

Redefining Residence:

An Alternative Memory Care Environment for single, childless persons with Alzheimer's Disease

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Abstract

Single, childless older adults with Alzheimer's disease (AD) are among the most vulnerable and socially isolated demographic within this rising population. Individuals who do not have social support from partners or adult children experience barriers that hinder their ability to safely age in place while living with AD, resulting in social isolation and/or premature institutionalization. This practicum offers an interior design solution for the main level of The Lakes Memory Care Center, a long-term care facility for persons with Alzheimer's disease or related dementia. The facility is located on the site of the Dementia Friendly City Center (DFCC), a conceptual mixed-used development that provides a variety of housing options and amenities through the adaptive reuse of a vacant retail property. The goal of The Lakes Memory Care Center is to provide a supportive living environment that enhances the independence, sense of belonging, and well-being of residents experiencing relocation, while allowing them to remain active members of the surrounding community. The proposed design integrates evidence-based design strategies as well as theoretical literature related to retrogenesis, place attachment and wayfinding to create an environment that is tailored to the needs of this user group.

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Chapter 1:

Project Overview

Project Overview

1.1 Introduction

According to Alzheimer’s Disease International (2018), one person is diagnosed with Alzheimer’s disease (AD) every three seconds. The World Health Organization (2017) states that there are nearly 50 million people living with AD, and is expected to rise to 82 million by 2030. The rising prevalence of Alzheimer’s disease can be attributed to a number of factors, including: the global aging population, sex, genetics, chronic illness and other life-style factors (Alzheimer Society of Canada, 2018a). Demographic trends suggest that single, childless older adults with Alzheimer’s disease are among the most vulnerable demographics within this population, where by 2030, 30% of people over the age of seventy in developed countries will be without children (de Medeiros et. al., 2013). Without adequate support from a spouse or adult child, the ability to safely age in place while living with AD is hindered.

An innovative new approach to dementia care environments has been proposed by Dr. Emily Roberts of Oklahoma State University (OSU), called the Dementia Friendly City Center (DFCC) concept. Inspired by the Hogeweyk Dementia Village, Dr. Roberts and OSU students have been developing the vacant Plaza Mayor Shopping Mall, located in Oklahoma City, OK, as the

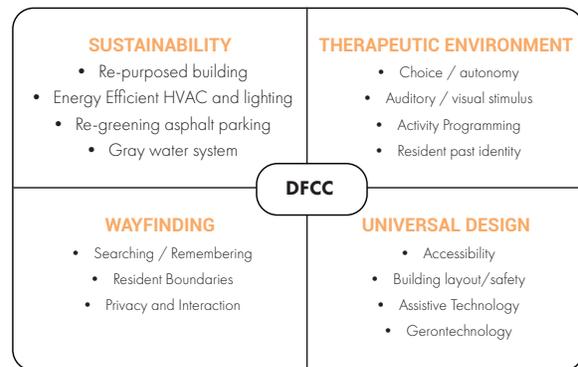


Figure 1. *The Dementia Friendly City Center Concept (DFCC) by Roberts and Pereira (2018)*

conceptual site of the DFCC (Roberts, 2019). The DFCC’s mission is to create “an environment designed to promote a comfortable and productive model for everyday life for those living with dementia and their families” with a focus on sustainability, therapeutic environments, wayfinding, and universal design, as shown in Figure 1 (Roberts & Pereira, 2018, Slide 33). Through adaptive reuse and new construction, the intent of the DFCC is to convert an underused site into a secured, mixed-use development that includes medical, retail, fitness, educational, and leisure facilities, as well as independent, assisted living and memory care housing for persons with dementia and surrounding community members (Roberts, 2019). As single, childless older adults would benefit greatly from this type of environment, the conceptual site of the

DFCC was selected for this practicum. By understanding a person with AD's needs through evidence-based research and theoretical literature, this practicum provides an interior design solution for The Lakes, a memory care facility located on the conceptual site of the DFCC. By building off of the existing work of Dr. Roberts and students of Oklahoma State University, the goal of this practicum is to create a living environment for single, childless persons with AD that enhances the user's well-being, sense of belonging and supports their independence while remaining part of the DFCC community.

The research and theoretical literature presented in this document are derived from a multitude of disciplines to inform the interior design and programming of this practicum. Over the last thirty years, much evidence-based research has been conducted regarding supportive design techniques for persons with Alzheimer's disease and related dementias. Two comprehensive literature reviews conducted by Habib Chaudhury, Heather A. Cooke, Heather Cowie, and Leila Razaghi (2017) and Gesine Marquardt, Kathrin Bueter, and Tom Motzek's (2014) are analyzed to decipher what design strategies are relevant to this practicum and are well supported by evidence-based research. The theory of retrogenesis by Dr. Barry Reisberg and the person-centered care model by Thomas Kitwood are referenced in this document to gain an understanding of how Alzheimer's disease impacts the individual, and how it informs their specific care needs. The theory of place attachment by Graham D. Rowles, Leila Scannell,

Robert Gifford and Maria Lewicka is analyzed to inform how person-place bonds can be facilitated within a new environment when they are broken as a result of relocation. It is through the theory of place attachment that the reader will learn how an individual's well-being and sense of belonging can be supplemented by the interior environment. Lastly, the theory of wayfinding by Kevin Lynch, and Landmark Salience for Human Navigation by David Caduff and Sabine Timpf, Rebecca Davis, Jennifer M. Ohman, and Catherine Weisbeck is used to inform this practicum to create an environment that supports the independence of an individual living with AD in the DFCC community.

1.2 Rationale

Currently, the most common type of facility that persons with Alzheimer's disease receive care are in high density, secured, long-term care units that segregate the individual by limiting their interactions to the confines of the unit. However, researchers have discovered that persons with AD living in traditional, large scale facilities experience accelerated cognitive decline, and individuals who do not have the support of a partner or adult child are more likely to experience premature institutionalization (Riley, Burgener, & Buckwalter, 2014; Hajek et al., 2015; Calkins, 2018). Though the design of long-term care environments using supportive design strategies have been correlated with improved quality of life outcomes, these facilities continue to segregate persons living with AD from the rest of the community, acting as a "form of restraint" (Calkins, 2018, p.117).

An increasingly popular method of avoiding premature institutionalization for persons with AD is to age in place, a framework that encourages “living at home, in the community, with some level of independence” through the integration of accessible home modifications, such as ramps and grab bars as well as assistive technologies to support the independence of the individual (Iecovich, 2014, p.22; Riley, Burgener, & Buckwalter, 2014). However, aging in place is problematic for single, childless individuals with AD as the framework requires care to be facilitated by family members and supplemented by formal services (Iecovich, 2014). If the individual does not have immediate family members, such as a spouse or adult child to rely on, aging in place is unsuccessful and even detrimental to the safety and well-being of the individual (Burgener, & Buckwalter, 2014). Therefore, this practicum offers a solution to this housing problem by providing single, childless persons with AD with a living environment that allows them to access the care that they need while supporting their independence through the provision of the conceptual services and amenities that make up the DFCC.

1.3 Design Objectives

The design objectives associated with this practicum are to research how interior design can be used to create a supportive environment for single, childless individuals living with Alzheimer’s disease relocating into a memory care facility. Furthermore, this practicum explores how the interior environment can enhance the user’s well-being, sense of belonging and support their

independence based on evidence-based and theoretical literature. Ultimately, the goal of the following practicum project is to offer alternative solutions for memory care environments in response to the dynamic needs of this changing demographic.

1.4 Questions of Inquiry

In order to design an environment for persons with AD, it is imperative that the designer understands how the disease impacts the individual and how it influences their experience of the built environment following relocation. The three questions of inquiry listed below are used to inform the interior design and programming of this practicum.

1) What are the specific needs of single, childless persons with Alzheimer’s disease?

In order to design an environment for persons with AD, it is important to understand how the disease affects the individual to ensure that the new environment supports their needs throughout each stage. In *Chapter 2: What is Alzheimer’s disease?* I will discuss the needs of a person with AD through the theory of retrogenesis. The person-centered care model is also highlighted to not only provide an overview regarding current dementia care practices, but also how the environment interacts with this care model to support persons with AD living in memory care.

2) *What design strategies and programmatic qualities facilitate a supportive environment that enhances the independence, well-being and sense of belonging of single, childless persons with AD entering memory care?*

Due to the large body of evidence-based research dedicated to supportive environments for persons with dementia, I examine two comprehensive literature reviews in *Chapter 3: Evidence-Based Design Strategies for Persons with Alzheimer's Disease* to discuss their relevance to this practicum as well as highlight any limitations regarding this body of research.

As relocation has adverse effects on the psychological well-being of persons with AD, ridding the individual of their independence, belonging and therefore well-being, I will analyze place attachment theory in the context of AD in *Chapter 4: Theoretical Framework* to determine what environmental features may facilitate new person-place bonds when they are broken due to relocation.

The hippocampus is one of the first regions of the brain to become damaged from Alzheimer's disease, resulting in cognitive deficits related to orientation, spatial memory, and wayfinding (O'Connor, 2019, p.8). As the ability to navigate space is paramount to independent functioning and social interaction, (Davis & Ohman, 2016) I will analyze the theory of wayfinding in *Chapter 4: Theoretical Framework* to discuss how the environment can support and individual's ability to navigate the space to support their independence.

3) Based on the above inquiries, what interior design strategies can help support the four areas of Roberts' (2018) Dementia Friendly City Center concept related to sustainability, therapeutic environments, wayfinding and universal design, as shown in Figure 1?

Chapter 2:

What is Alzheimer's Disease?

What is Alzheimer's Disease?

2.1 Introduction

Alzheimer's disease, the most common form of dementia, is a neurodegenerative disorder caused by the accumulation of the beta-amyloid proteins, called plaques and the disintegration of tau proteins, referred to as tangles, that prevent both nerve signals and nutrients from being transferred within the brain, causing the tissue to shrink in size and expire (Alzheimer Society, 2018).

As the disease progresses, the deterioration of various regions of the brain causes a wide range of symptoms, including: the decline of cognitive processes, such as short and long-term memory. This results in confusion, forgetting how to perform everyday tasks, misplacing objects, and forgetting directions to familiar places (Brawley, 2006; Alzheimer Society of Canada, 2018b). A person with AD will begin having trouble with verbal communication, often forgetting what they are saying mid-sentence (Alzheimer's Society, 2018). In the advanced stages of dementia, persons with AD may forget who their friends and family are, which can heighten their confusion. Another symptom of AD is the loss of intellectual functions, such as problem solving, planning, and decision making. Persons with AD will also begin experiencing visual problems, such as the inability to understand visual information and spatial relationships as well as problems with coordination, orientation and mobility (Alzheimer's Society, 2018; Alzheimer's Society,

2019a). The symptoms of Alzheimer's disease may also cause the person to socially isolate themselves in fear of making a "mistake" as a result of their condition (Riley, Burgener, & Buckwalter, 2014). Lastly, cell death caused by Alzheimer's disease manifests itself in behavioural problems such as aggression and agitation (Alzheimer Society of Canada, 2018c). Arguably, the disease completely erodes the individual's sense of self and their understanding of the people and world around them. This loss of personhood and autonomy significantly affects the person's mood, emotions and personality, which can lead to anxiety and depression (Brawley, 2006; Alzheimer's Society of Canada, 2018c).

2.2 Who is affected by Alzheimer's Disease?

Research suggests that there are more women living in long-term care facilities than men (de Medeiros et al., 2013), and that women are more susceptible to developing Alzheimer's disease, where one out of every five women are affected, compared to one in eleven men (Alzheimers.net, 2018). Genetics, chronic illness and other lifestyle factors increases a person's chance of developing the disease, including: cardiovascular disease, high cholesterol, high blood pressure, diabetes, obesity, smoking tobacco, and traumatic head injuries (Alzheimer Society of Canada, 2018a). Given these trajectories, Alzheimer's disease is a rising public health

epidemic that will affect not only the individual, but also their informal caregivers, such as their spouse or adult children, leading to an increased need for specialized care environments. However, there is one particularly vulnerable group within this growing population: single and childless older adults.

As mentioned in *Chapter 1: Project Overview*, single and childless elderly individuals are by far the most vulnerable population facing this public health epidemic. It is estimated that by 2030, 30% of people over the age of seventy in developed countries will be without children (de Medeiros et. al., 2013). Research has shown that single and childless elderly individuals were found to be less social and have fewer visitors per month than individuals with children (de Medeiros et. al., 2013). Moreover, researchers have also discovered that persons with AD living in traditional, large scale facilities experience accelerated cognitive decline, and individuals who do not have the support of a partner or adult child are more likely to experience premature institutionalization (Riley, Burgener, & Buckwalter, 2014; Hajek et al., 2015; Calkins, 2018). Given the needs of this changing demographic, the primary users of this practicum will be single, childless persons with a diagnosis of mild to moderate Alzheimer's disease or related dementia.

2.3 Pathology of Alzheimer's Disease

When designing a care facility for persons with Alzheimer's disease and related dementias, it is important that the designer understands the pathology

of the disease to ensure that the built environment can compensate for the individual's losses while supporting their remaining abilities. From a medical perspective, the pathology of Alzheimer's disease is understood through the theory of retrogenesis. Developed by Dr. Barry Reisberg, the theory of retrogenesis suggests that the "brain of a person with Alzheimer's disease deteriorates in the reverse order that it developed from birth" (Carson, Vanderhorst, & Koenig, 2015, p.2). Dr. Reisberg developed this theory to be used as an assessment tool to identify which stage of Alzheimer's disease a person may be in, referred to as the Functional Assessment Staging Test, or the FAST test, shown in Table 1 (Carson, Vanderhorst, & Koenig, 2015). The intention of the FAST test is to not only help medical professionals but also caregivers better understand the effects of the disease on the individual throughout each stage of their prognosis.

2.4 Alzheimer's Disease, Retrogenesis, and the Brain

Alzheimer's disease begins by altering the structure of the brain as early as twenty years prior to the development of the first symptom, causing various regions of the brain to deteriorate over seven stages (Brawley, 2006; Carson, Vanderhorst, & Koenig, 2015). During the first, or preclinical stage, damage to the hippocampus begins, however, no impairment can be detected and the individual is able to function as an average adult (Sclan, & Reisberg, 1992; Reisberg et al., 2002; Carson, Vanderhorst, & Koenig, 2015). The hippocampus is the portion of the brain that is responsible for learning, spatial orientation and navigation, storing episodic, or autobiographical memories, as well as the regulation

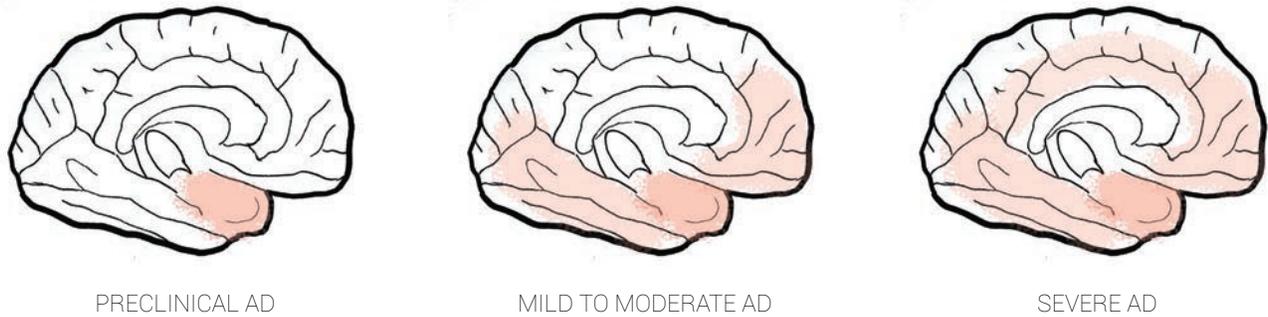


Figure 2. *Progression of Alzheimer's Disease.*

of emotions (Dhikav & Anand, 2012). As the disease advances, the temporal lobes, located on either side of the brain become damaged. These regions are responsible for the storage of declarative, or long-term memory, semantic, or factual memories, as well as a portion of the episodic memory (Alzheimer's Society, 2018). The temporal lobe also deals with the ability to recognize faces and objects. When the temporal lobes become damaged from Alzheimer's disease, the individual loses their ability to perceive and interpret spatial information, also known as visual agnosia (Quental, Brucki, & Bueno, 2013). By the second stage, lapses in memory begin, however, they are often mistaken as signs of "getting older," rather than an indication of cognitive decline. By the third stage, mild memory loss can be detected by friends, family and co-workers, however, the person with AD may be in denial or embarrassed by their memory missteps. The individual may no longer remember scheduled appointments, have trouble navigating new places, or begin exhibiting poor work performance (Sclan, & Reisberg, 1992; Carson, Vanderhorst, & Koenig, 2015). As illustrated in Table 1,

Dr. Reisberg contrasted these three stages with Piaget's final stage of cognitive development, referred to as the formal operational stage. The formal operational stage begins at the age of twelve and continues to be developed into adulthood. This stage of development allows the individual to think logically and solve problems through reasoning, rather than trial-and-error (Sullivan, 2009). According to the theory of retrogenesis, the skills acquired during the formal operational stage of development are the first skills to be lost as a result of the degenerative effects of dementia (Carson, Vanderhorst, & Koenig, 2015). During the fourth and fifth stages of FAST, the individual experiences dramatic cognitive decline, functioning at a level of what medical professionals describe as an eight to twelve and five to seven-year-old, respectively (Sclan, & Reisberg, 1992; Reisberg et al., 2002; Carson, Vanderhorst, & Koenig, 2015). During this time, the individual loses all skills that were acquired during their concrete and preoperational stages.

Table 1.

*Piaget's
Cognitive
Development
Levels and
Reisberg's
Theory of
Retrogenesis
(or FAST test
applied to
Alzheimer's
disease.*

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As disease advances, the parietal lobe becomes damaged. The parietal lobe is located above the temporal lobe in the upper-rear portion of the brain and is responsible for processing sensory information with respect to scale, proportion and location in space (Alzheimer's Society of Canada, 2018c). Damage to this region of the brain results in apraxia, or the loss of motor skills in persons with Alzheimer's disease, such as dressing or feeding oneself (Marquardt, 2011, Alzheimer Society of Canada, 2018c). The parietal lobe is not only responsible for processing sensory information, it also is responsible for the comprehension of reading, writing and processing numbers (Alzheimer's Society of Canada, 2018). As the disease progresses, cognitive functioning continues to decline, severely damaging all three parts of the frontal lobe, the region that serves as the "control panel" of the brain. The upper portion of the frontal lobe is responsible for organization, planning and skill acquisition. The middle portion is responsible for motivation, causing an individual to become apathetic and lethargic when damaged by Alzheimer's disease (Alzheimer's Society of Canada, 2018; Alzheimer's Society of Canada, 2018b). The frontal lobe is also responsible for our social behaviour, which allows the individual to refrain from acting out inappropriately or impulsively, resulting in personality and behavioral changes when damaged by the disease. The rear portion of the frontal lobe contains the motor cortex and is responsible for controlling voluntary movements or actions (Alzheimer's Society, 2018). Lastly, the occipital lobe, located at the back of the brain is responsible for processing visual information, including depth perception,

colour differentiation and motion, resulting in visual deficits when damaged by the disease (Quental, Brucki, & Bueno, 2013; Alzheimer's Society, 2018).

During the sixth stage of the FAST scale, the individual experiences moderate to severe dementia and functions at the level equivalent to a two to four-year-old, and the short-term memory only lasts a few minutes (Carson, Vanderhorst, & Koenig, 2015). The seventh and final stage of Alzheimer's disease is referred to as stage seven, or the severe stage of the FAST scale. Persons with severe dementia typically function between the ages of a newborn to a two-year-old and can no longer talk, walk or sit up on their own; returning to their sensory motor stage of development (Carson, Vanderhorst, & Koenig, 2015). When all of the discussed areas of the brain can no longer transmit signals due to the deteriorating effects of Alzheimer's disease, the brain can no longer keep the major organs running, resulting in the death of the individual.

2.5 Controversies Regarding the Theory of Retrogenesis

As the theory of retrogenesis, also referred to as the "second childhood," (Reisberg et al., 2002) compares a person with AD's declining functional and cognitive state with that of a child, it can be argued that this theory contributes to the infantilization and of persons with dementia by equating their personhood with that of a toddler. Moreover, the theory of retrogenesis describes a person's functional status through the disease itself,

focusing on what abilities are lost, rather than what remains. From a bioethics perspective, it is argued that the theory of retrogenesis contributes to the stigmatization of persons with dementia, perpetuating deep-rooted misunderstandings of the condition that undermines the individual's personhood (Jongsma & Schweda, 2018, p.414). This stigmatization is one of the driving forces behind why persons with Alzheimer's disease and related dementias are segregated from society when they enter institutionalized care. Much evidence-based research has been conducted to develop both supportive and therapeutic environments to maintain the personhood, dignity and well-being of the individual with AD. However, many of these environments continue to segregate individuals with AD from the rest of the community. Though every intention is made to enhance the quality of life of individuals within many of these settings, the fact that they have limited access to the surrounding community continues to reduce the individual with AD. Though the theory of retrogenesis offers an in-depth understanding of the neurodegenerative process of Alzheimer's disease, it is important to understand that there is much more to a person than their declining abilities. Therefore, the interior environment must also create a space that supports the individual despite their declining cognitive, sensory and physical abilities.

2.6 Personhood and Person-centered Care

Because the traditional model of care for persons with AD and related dementias focuses on what the individual

loses, academics have been redeveloping a new theory in dementia care that focuses on the personhood and well-being of the individual. The concept of personhood, in its simplest definition, can be described as the characteristics that make up a person and is directly related to the concept of dignity and human rights (Mitchell, & Agnelli, 2015; Michael, 2014). If someone is considered a person, then they are deserving of dignity, moral status and human rights. However, not all disciplines agree on exactly what constitutes a person and continues to be a controversial topic in areas such as bioethics, human rights law, and religion today. In response, social psychologist Thomas Kitwood developed the person-centered care model to develop a theory of dementia care that supports the dignity, personhood and moral status of the individual receiving care. He says that personhood is: "a standing or status that is bestowed upon one human being, by others, in context of relationship and social being. It implies recognition, respect and trust" (Kitwood, 1997, p.8). In other words, Kitwood believes that personhood is either supported or undermined by another, typically by the formal care giver onto the care receiver in the context of AD.

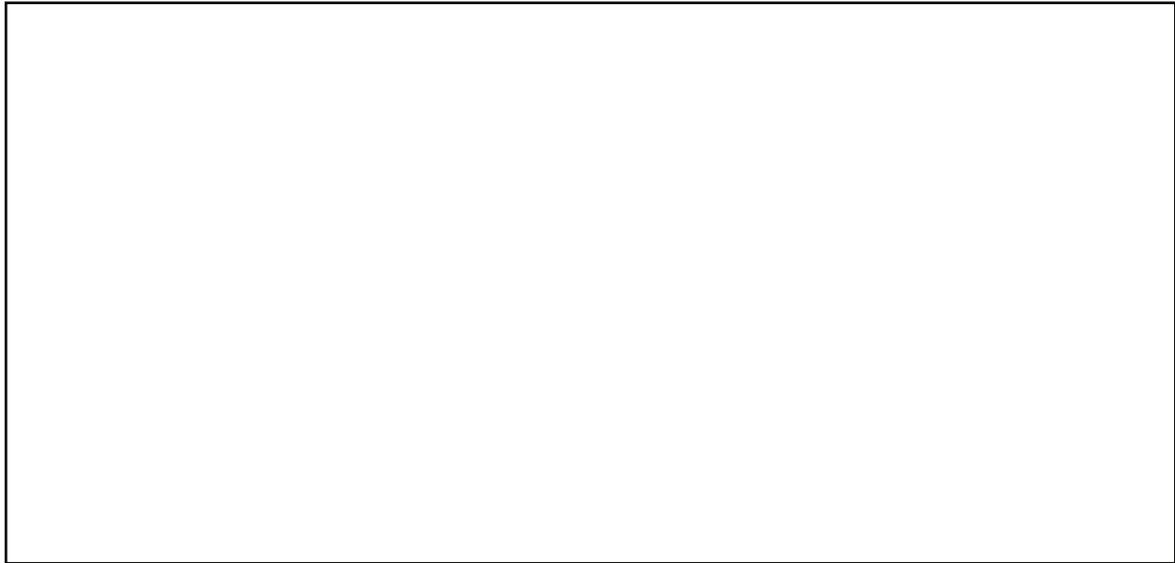


Figure 3. *Person-Centered Care model.*
Thomas Kitwood. *Dementia Reconsidered*
(1997).

Figure 4. *PC PEARLS: 7 Elements of Person-Centered Care.*
Alzheimer Society of Canada.

The concept of person-centered care (PCC), previously known as person-centered therapy, Rogerian theory or client-centered therapy, was first introduced by Psychotherapist Carl Rogers in his work entitled *Client-Centered Therapy: Its Current Practice, Implications and Theory*. Roger's ideas focused on understanding the needs of the patient using an empathetic care approach through the formation of interpersonal relationships between the therapist and patient (Fazio et al., 2018). Roger's ideas were further developed by Thomas Kitwood who believed that dementia affects each person very differently and is the product of the relationship between the individual's health status, social psychology and the environment (Fazio et al., 2018). Rejecting the notion that one treatment fits all, PCC differs from the traditional medical model by providing high quality, interpersonal care that affords the patient with dignity, compassion and respect by supporting the individual's well-being and personhood while living in long-term care (Fazio et al., 2018).

To support an individual's personhood, Kitwood organized the PCC model with love at the center, as shown in Figure 3, with comfort, attachment, inclusion, occupation and identity stemming from the core. Personhood is supported by comforting the individual, as the deteriorating effects of dementia may be difficult to comprehend and cope with (Kitwood, 1997; Fazio et al., 2018). Persons with AD must feel attached, as

institutionalization can cause the person to feel alienated from the surroundings they once knew. The PCC model emphasizes that personhood is maintained by including the individual in their care and must be occupied by engaging in activities that bring a sense of meaning and gratification to their lives (Kitwood, 1997; Fazio et al., 2018). The last component of the PCC model is helping the individual maintain their identity and self-continuity. By supporting an individual's personhood through love, comfort, attachment, inclusion, occupation, and identity, Kitwood believes that the individual's quality of life is enhanced in the long-term care setting, and is continued to be used as a caregiving tool in many long-term care homes today.

What is interesting about Kitwood's ideas is that he not only recognizes how social interactions between the caregiver and receiver can either support or undermine an individual's personhood and therefore well-being, he also believed that the physical environment can support or undermine the person with dementia (Fazio et al., 2018). However, as shown in Figure 3, the physical environment was not included as a main component of Kitwood's PCC model. Evidence-based design for persons with dementia was in its infancy at the time that Kitwood was developing his theory in dementia care, which may explain why it was not included in his framework. However, variations of Kitwood's person-centered care model have emerged. For example, the Alzheimer Society of Canada's PC P.E.A.R.L.S®, as shown in Figure 4, has been redeveloped to include the physical environment as a key element of their model in an effort to enhance the quality of life of persons with

dementia living in long-term care (Alzheimer Society of Canada, 2019). Specific evidence-based design strategies that support the personhood and therefore well-being of persons with dementia will be discussed in *Chapter 3: Evidence Based Design for Persons with Alzheimer's Disease*.

2.7 Questions of Inquiry Revisited

The first research question associated with this practicum is: 1) *What are the specific needs of single, childless persons with Alzheimer's disease?*

As mentioned in *Chapter 1: Project Overview*, aging in place is becoming an increasingly popular method of delaying institutionalization for persons with dementia, however, single and childless individuals with AD lack adequate support to continue living safely in the community. Relocation into a memory care facility can result in a decreased sense of belonging, decreased independence and therefore decreased well-being. This user group requires an environment that they can receive care in, affords them of social interaction while allowing them to remain active members of the surrounding community.

Based on the Theory of Retrogenesis by Dr. Reisberg, the needs of persons with AD vary greatly depending on their prognosis. The theory highlighted that persons with MCI to moderate dementia experience deficits related to their memory, vision, wayfinding abilities, and task performance. Persons with AD require an environment that supports the memory and helps the individual navigate

the space around them or perform a specific task (Sclan, & Reisberg, 1992; Reisberg et al., 2002; Carson, Vanderhorst, & Koenig, 2015). Persons with MCI to moderate dementia can still engage in activities of daily living (ie. personal hygiene, toileting, dressing, feeding, walking) but may need help at various degrees (Carson, Vanderhorst, & Koenig, 2015). Likewise, persons with mild to moderate AD can still engage in instrumental activities of daily living (ie. companionship, shopping, preparing meals, managing household, medications, finances). Again, some help may be required for certain tasks as AD affects every person differently (Carson, Vanderhorst, & Koenig, 2015). Regier and Gitlin (2017) conducted the study "Characteristics of Activities for Persons With Dementia at the Mild, Moderate, and Severe Stages" to determine what activities were appropriate for each associated stage. The most common activity persons with mild to moderate AD engaged in were complex arts and crafts activities. Other activities persons with mild to moderate AD are encouraged to engage in are home-making activities such as cooking and folding laundry. Bingo, simple word games, music and reminiscence are also encouraged (Alzheimer's Association, 2019). Ultimately, persons with AD are encouraged to engage in many activities they once did prior to relocation. Therefore, it is imperative that the interior programming of the environment allows for such activities to take place with fellow residents or caregivers.

Based on these findings, it is evident that individuals with mild cognitive impairment to moderate dementia require support related to their sense of belonging,

independence, memory, vision, wayfinding abilities and task performance. The person-centered care model by Thomas Kitwood discussed earlier in this chapter emphasizes that not only the care provided but also the physical environment must support the dignity, personhood and moral status of the individual. Because The Lakes Memory Care focuses on providing individuals with a space that enhances well-being, sense of belonging, and independence, the personhood of the individual is maintained through these means. However, specific design considerations for persons with mild to moderate AD were not answered in this chapter. I will examine evidence-based design strategies for persons with Alzheimer's disease in *Chapter 3* to determine how the interior environment can support this user group.

Chapter 3:

Evidence-Based Design Strategies for Persons with Alzheimer's Disease

Evidence-Based Design Strategies for Persons with Alzheimer's Disease

3.1 Introduction

The following chapter will outline evidence-based design strategies for persons with Alzheimer's disease and related dementias to create a supportive environment that enhances their well-being. The work of Dr. Powell Lawton will be examined to provide the reader with a background on the origins of this type of research. Secondly, due to the abundance of evidence-based research that has been collected following Powell Lawton's work, two recent literature reviews will be examined to determine the relevance of Powell Lawton's research to today's findings. I will also highlight what strategies are relevant to this practicum and identify limitations to this work.

Prior to 1970, the most common types of facilities to house persons with Alzheimer's disease and related dementias were mental institutions or homes for the aged (Calkins, n.d.). In response to the lack of specialized care environments to meet the needs of persons with dementia, environmental psychologist Dr. Powell Lawton (1923-2001) developed the Weiss Pavilion at the Philadelphia Geriatric Center in 1974 (Lawton, Fulcomer, & Kleban, 1984; Calkins, 2003). Powell Lawton was an environmental psychologist who specialized in the area of aging, health and quality of life, and is credited for developing the first set of design principles to enhance

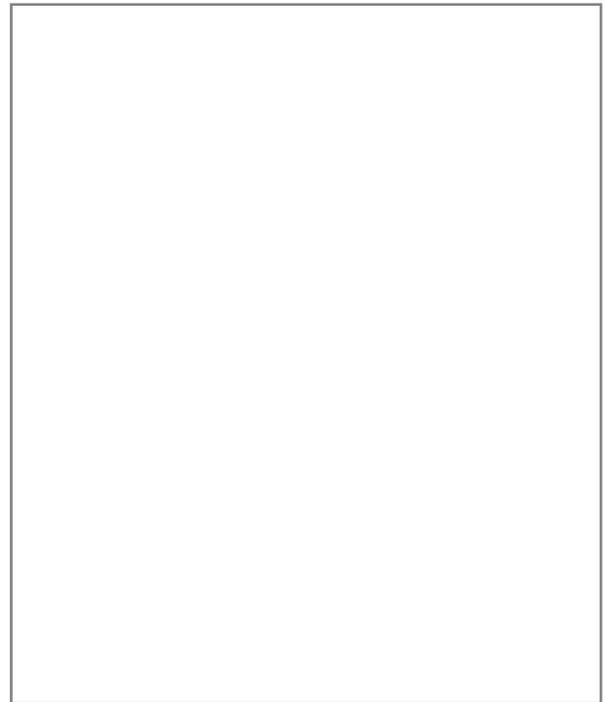


Figure 5. *Floor Plan of the Weiss Pavilion at the Philadelphia Geriatric Center by Dr. Powell Lawton*

the well-being of persons with dementia living in care facilities (Calkins, 2003). These principles include setting size, orientation, negotiability, personalization, social interaction, integration, and safety. As depicted in Figure 5., the Weiss Pavilion was organized with the resident's room located around the perimeter of the building, rather than through a double loaded corridor in traditional facilities. The common areas and relevant spatial information were directed toward the center. Powell

Lawton first introduced these principles into the design of the Weiss Pavilion, and a post-occupancy evaluation (POE) was conducted the following year to determine the success of its design (Lawton, Fulcomer, & Kleban, 1984; Calkins, 2003). Though the POE that was conducted by Powell Lawton and his colleagues, introducing potentially biased results, their findings were nonetheless promising. Following the success of the POE, the Weiss Pavilion has served as an example of how newly built facilities can adopt these design principles to enhance the quality of life of residents living with Alzheimer's disease and related dementias (Calkins, 2003).

Following the development of Powell Lawton's design principles, much evidence-based research has been conducted to determine their effectiveness, and many literature reviews on the topic have been published since. Published in 2017, Chaudhury, Cooke, Cowie, and Razaghi conducted a literature review entitled "The Influence of the Physical Environment on Residents with Dementia in Long-Term Care Settings: A Review of the Empirical Literature." The authors analyzed 103 studies published after 2000 related to design features for persons with dementia. Similarly, Marquardt, Bueter, and Motzek (2014) published "Impact of the Design of the Built Environment on People with Dementia: An Evidence-Based Review" that reviewed 169 studies published between 1980 and 2013. Both reviews determine what is known about environments for persons with dementia and offer recommendations for future research to help improve prospective environments. Similar to Powell Lawton's design principles, the authors grouped their review into findings based on the unit's size/density, sensory stimulation, building organization and orientation

cues, home-like character, and outdoor areas.

3.2 Unit Size / Density

According to the review conducted by Chaudhury, Cooke, Cowie and Razaghi (2017) the literature revealed that small unit sizes with 5-15 residents were shown to benefit residents with AD in many ways, including: enhancing well-being, behaviour, independent functioning as well as activity engagement. This finding is not surprising, as smaller unit sizes allow staff to provide care and facilitate activities to a smaller number of residents at a time, increasing one-on-one contact and enhancing their quality of care and levels of engagement. Likewise, if the setting size is small, it allows the resident to function more independently as there is less environmental stimulation to navigate. Other studies reviewed by the authors indicated that smaller unit densities were shown to increase social engagement and activities of daily living (ADL), therefore increasing the quality of life of the resident (p.326). These findings validate Powell Lawton's design principle related to the size of the care unit and social interaction, as he found that smaller unit sizes have a direct effect on resident well-being, stimulation and encourages residents to initiate participation in activities and interactions (Calkins, 2003). Moreover, Powell Lawton defines the principle of negotiability as the environment's ability to support a resident's functional independence (Calkins, 2003, p.73) and is clearly supported by Chaudhury, Cooke, Cowie and Razaghi's (2017) findings mentioned previously. Marquardt, Bueter, and Motzek (2014) made similar findings regarding the impact of small-scale environments for persons with dementia. The authors also support the finding that unit

sizes with 5 to 15 residents were shown to benefit persons with dementia, decreased behavioural disturbances, improved cognitive function, increased functional status and enhanced social engagement (p.134-135).

In the context of this practicum, The Lakes Memory Care is located on the conceptual site of Roberts' (2019) Dementia Friendly City Center, a former shopping mall property. Given the fact that small scale environments have demonstrated to be beneficial for persons with AD, specifically related to their well-being, functional status, socialization and levels of engagement, special consideration must be taken into the size and adjacency of spaces to ensure that these needs continue to be met, despite the facility being located in a large-scale environment. Moreover, when an individual relocates, making the transition from living alone to being surrounded by strangers is of course a significant change, therefore it is not surprising that smaller unit densities are preferred by residents to ensure privacy is maintained. The main takeaway from this evidence-based design strategy is to ensure that the size of spaces are appropriately reduced and close together to support the resident's independence and avoid confusion. Moreover, the interior programming will support large and small social densities to ensure both socialization and privacy needs are met in an effort to create a supportive environment for persons with AD.

3.3 Building Organization and Environmental Cues

Powell Lawton recognized the importance of supporting a resident's orientation and wayfinding abilities to help them navigate space through the use of an open plan and direct sight lines to certain locations, such as the bathroom or nursing station to create a supportive environment that fosters independence (Lawton, Fulcomer, & Kleban, 1984; Calkins, 2003). According to Chaudhury, Cooke, Cowie and Razaghi (2017) the results of their literature review indicated that buildings organized using straight circulation paths with direct views to environmental information and minimal changes in direction were supportive for persons with dementia and validate Powell Lawton's principle related to orientation. The authors also note that the use of environmental cues, such as photographs or personally meaningful objects outside of resident rooms helped them locate their own space (Chaudhury, Cooke, Cowie and Razaghi, 2017). Though the authors note that this study consisted of a small sample size, it still provides designers with valuable information regarding how personally meaningful objects may be supportive for persons with dementia.

The findings by Marquardt, Bueter, and Motzek's (2014) literature review with respect to building organization and environmental cues were nearly identical to that of Chaudhury, Cooke, Cowie and Razaghi (2017). However, Marquardt, Bueter, and Motzek's (2014) also note that the building's organization with respect to the nursing station helped promote socialization among staff

and residents when there were direct views to and from adjacent spaces. This finding is conflicting, however, as nursing stations that are also highly visible and contribute to the institutionalized atmosphere, further reducing the home-like aesthetic. Unsurprisingly, the authors also found that environmental cues such as signs, labels and colour coding helped residents carry out activities of daily living, and that cues that used text were better understood than cues that used icons or images alone (Marquardt, Bueter, & Motzek, 2014). Moreover, Marquardt, Bueter, and Motzek's (2014) also highlight a study conducted by Connell, McConnell and Francis (2002) who found that the resident's oral hygiene improved when pictures and colours were added to their bathrooms to help support the process of toothbrushing. This finding also supports Powell Lawton's principle of negotiability, as this study demonstrates that environmental cues are an important factor that influence the resident's ability to perform the activity of tooth brushing. In either circumstance, these findings demonstrate the importance of a building's size, organization and environmental cues at every level help remind the resident how to locate their room, an object, or perform a specific task. The relationship between these design features are imperative to help maintain the resident's functional independence and therefore quality of life while living in a new environment.

As persons with mild to moderate Alzheimer's disease begin experiencing disorientation and trouble performing activities of daily living, many of the findings pointed out by both authors are highly relevant to this practicum. By providing a space that is highly organized and

integrates environmental cues that may be redundant or obvious to some, are highly supportive to maintaining the independence and therefore well-being of the individual with AD. These design strategies are especially important within a large-scale environment to ensure that the individual can successfully navigate the space around them and are prompted by their environment in the event of a lapse in memory.

3.4 Home-like Character

A facility with a home-like character is one that integrates artwork and domestic furnishings into its design, provides the resident with a private room and access to open communal spaces with a living room and kitchenette. According to Chaudhury, Cooke, Cowie and Razaghi (2017), the evidence-based research that was reviewed indicated that facilities with a home-like, rather than institutional character increased the affective and cognitive functioning of its residents, as well as enhanced the socialization and engagement of the individual. The authors state that residents receiving care in facilities with a home-like character experienced less territorial invasion, exit-seeking and agitated behaviours as a result (Chaudhury, Cooke, Cowie & Razaghi, 2017). However, Chaudhury, Cooke, Cowie and Razaghi (2017) make an interesting point that strict policies and procedures may render the home-like character of an environment to be counterintuitive. For example, locked doors or restricted access to the kitchenette may frustrate the resident, causing them to become agitated (Chaudhury, Cooke, Cowie & Razaghi, 2017). In contrast, resident-accessible

kitchenettes with a microwave, coffee machine, and a fridge were shown to help foster functional independence (Chaudhury, Cooke, Cowie & Razaghi, 2017). Therefore, it is important to note that the home-like character is not entirely based on the facility looking like a home, but rather allowing the residents to engage in activities they once did prior to relocation. A limitation to the design of a home-like environment is ensuring that resident-accessible kitchens can be safely used by someone with cognitive impairments. Ovens and cook tops should have safety switches that automatically turn off after a predetermined time or if the temperature exceeds a specific limit. Open shelving allows residents to easily see items that are regularly used and smoke detectors should be installed directly in the kitchen (Dementia Enabling Environments, 2018).

Unlike Chaudhury, Cooke, Cowie and Razaghi (2017), Marquardt, Bueter, and Motzek (2014) found that the ability to both personalize and individualize the environment, such as a resident's private room, helped facilitate a home-like atmosphere and produced fewer negative behaviour changes, therefore increasing quality of life and support Powell Lawton's principle related to personalization. Moreover, the authors state that flexible seating arrangements in the dining area encouraged social interaction and increased food intake (Marquardt, Bueter, & Motzek, 2014). Therefore, it is imperative that the ability to provide spaces that can be personalized and individualized are conducive to creating a supportive home-like environment for persons with dementia.

3.5 Sensory Stimulation

Sensory stimulation from the environment, including lighting and acoustics, are two elements that can affect the quality of life of persons with dementia. According to researchers, noisy environments are associated with increased agitation and aggression, maladaptive behaviours, and decreased social interaction (Chaudhury, Cooke, Cowie & Razaghi, 2017). There is currently no consensus regarding recommended noise levels for care facilities, however, researchers have discovered that persons with dementia living in long-term care are exposed to noise levels of 60 decibels. In contrast, recommended noise levels for hospital environments are between 35-40 decibels (Chaudhury, Cooke, Cowie & Razaghi, 2017). Therefore, special attention will be made to the acoustic treatments within The Lakes Memory Care to ensure that noise levels are reduced and acoustic comfort is maintained.

According to Chaudhury, Cooke, Cowie and Razaghi (2017), persons with dementia are exposed to lower than recommended lighting levels, therefore creating an under stimulating environment. This finding is problematic, as adequate lighting is required for residents to safely navigate their environment and reduces the chances of falls. Both authors point out that exposure to higher lighting levels can help regulate sleep-wake cycles, enhances moods and alertness (Marquardt, Bueter, & Motzek, 2014; Chaudhury, Cooke, Cowie & Razaghi, 2017). However, most of these studies were conducted in the context of bright light therapy, a type of therapy

that exposes an individual to a bright light source placed on a table for a specific amount of time (Alzheimer's Society, 2019b). A second type of lighting system being introduced into office environments and long-term care facilities is circadian ambient lighting systems, a type of artificial lighting system that changes in colour temperature and intensity throughout the day to help regulate the sleep-wake cycles of the individuals exposed to it. Given the fact that persons with AD experience a disruption to their sleep-wake cycle as a result of the disease, it is hypothesized that circadian ambient lighting systems installed in long-term care facilities have the potential to help naturally regulate the circadian rhythm of person with AD and improve sleep efficiency (Figueiro, 2017). However, neither author discuss this type of lighting system in their reviews, therefore it can be concluded that circadian lighting systems for persons with AD is significantly under researched, and it is not yet supported as an evidence-based design strategy.

3.6 Outdoor Environments

An aspect of the environment that Powell Lawton does not discuss is the relationship between the ability to access outdoor areas and its effect on the well-being of persons with dementia. Unlike Marquardt, Bueter, and Motzek (2014), Chaudhury, Cooke, Cowie and Razaghi (2017) examined several studies that analyzed how access to the outdoors effects resident well-being. The literature revealed that residents who spent time outdoors in the garden or participating in outdoor activities such as walking experienced less agitation and aggression as

well as improved sleeping patterns (Chaudhury, Cooke, Cowie & Razaghi, 2017). Because of the fairly extensive body of research that validates the positive relationship between nature and well-being (Grinde & Patil, 2009), it is not surprising that it also benefits persons with dementia. Therefore, dementia-friendly outdoor areas must be considered in the design of The Lakes Memory Care, however, Chaudhury, Cooke, Cowie and Razaghi (2017) do not offer any guidelines regarding supportive design features for persons with AD.

In the context of this practicum, the main level of The Lakes Memory Care dedicated to persons with mild cognitive impairment to moderate AD will allow residents to freely access both the indoors and outdoors as well as the services and amenities offered on the conceptual site of the Dementia Friendly City Center. Outdoor design considerations should be implemented to ensure that the exterior environment is just as supportive as the interior. It is suggested that the landscape design should incorporate non-poisonous plants, exterior signage to supplement wayfinding, uneven surfaces should not be used to avoid falls or mobility issues and handrails should be provided with spaces to rest with access to shade along walking paths (Brawley, 2006; Wrublowsky, 2017).

3.7 Limitations

Based on the reviews conducted by Marquardt, Bueter, and Motzek (2014) and Chaudhury, Cooke, Cowie and Razaghi (2017), many of Powell Lawton's design principles were validated through the literature

that was reviewed by both authors. However, both authors identified gaps in the existing research as well. Marquardt, Bueter, and Motzek (2014) pointed out that many of the studies were conducted using small, homogeneous sample sizes and the type or stage of dementia the participant was in was not known. As a result, it remains unclear whether all of the evidence-based design strategies identified are appropriate for persons with mild, moderate and severe dementia or only specific groups. Moreover, the research that currently exists relies heavily on the perspective of staff and family members (Marquardt, Bueter, & Motzek, 2014), as persons with cognitive impairments, such as those with dementia are deemed unable to provide consent according to research ethics. Therefore, valuable feedback is lost when the perspective of persons with dementia is rarely considered. To gain a better understanding of the long-term implications of the built environment, Marquardt, Bueter, and Motzek (2014) recommend that longitudinal research must be conducted. However, this can be very difficult as individuals with dementia may pass away before the research is completed. As it was discussed previously that persons with AD have very different care needs throughout each stage of the disease, future studies must take the participant's stage of dementia into consideration to test which strategies are considered supportive and which might be overly restrictive to create an environment that is supportive of individuals with AD or related dementia.

3.8 Questions of Inquiry Revisited

The first research question that has not been fully answered is 1) *What are the specific needs of single, childless persons with Alzheimer's disease and how can the interior design and programming of their environments meet these needs?* Based on the findings from Chapter 2: *What is Alzheimer's Disease?* it was discovered that the needs of single, childless individuals with AD require support related to their memory, independence, socialization, and ability to navigate space to enhance their well-being and independence as a result of relocation.

Based on the literature reviews that were examined in this chapter, the evidence-based design strategies related to unit size/density, building organization/wayfinding cues, home-like environment, sensory stimulation and outdoor areas are all ways in which an individual's needs can be met related to their memory, independence, socialization, and ability to navigate space.

Through the provision of the building organization and wayfinding cues, the memory, independence and ability to navigate space can be supported using an open plan with direct sight lines, minimal changes in direction, and wayfinding cues such as signs, labels, and colour coding can help support the independence and therefore well-being of an individual with AD (Marquardt, Bueter, & Motzek, 2014; Chaudhury, Cooke, Cowie & Razaghi, 2017). Manageable room sizes with close adjacencies

were also revealed to be supportive based on the evidence-based literature.

Socialization needs can be supported through the unit size and density of the space, ensuring that there is a balance between public and private spaces to ensure that individuals engage with one and other while privacy can be maintained. (Marquardt, Bueter, & Motzek, 2014; Chaudhury, Cooke, Cowie & Razaghi, 2017).

Lastly, the literature revealed that adequate sensory stimulation through lighting, acoustics, and access to outdoor areas enhance the well-being of the individual based on research findings (Marquardt, Bueter, & Motzek, 2014; Chaudhury, Cooke, Cowie & Razaghi, 2017). The integration of acoustic treatments and adequate natural and artificial lighting are ways in which visual and acoustic comfort can be achieved. Outdoor environments that support persons with AD include landscape design with non-poisonous plants, exterior signage to supplement wayfinding, limited uneven surfaces, such as cobblestone, to avoid falls or mobility issues, and providing hand-rails with spaces to rest along walking paths (Brawley, 2006; Wrublowsky, 2017). Together, these strategies will be used to create a supportive environment for persons with AD that enhances the individual's independence, sense of belonging and support their overall well-being while living in the DFCC community.

Table 2. Summary of Evidence-Based Design Strategies

Evidence-Based Design Strategies	Application
<p>Unit Size / Density (Marquardt, Bueter, & Motzek, 2014; Chaudhury, Cooke, Cowie & Razaghi, 2017)</p>	<ul style="list-style-type: none"> • Reduced, manageable room sizes with close adjacencies to support independence and avoid confusion/disorientation • Mix of high and low density areas to meet socialization and privacy needs
<p>Building Organization / Wayfinding Cues (Marquardt, Bueter, & Motzek, 2014; Chaudhury, Cooke, Cowie & Razaghi, 2017)</p>	<ul style="list-style-type: none"> • Open plan with direct sightlines • Minimize changes in direction to avoid confusion • Redundancy of cues through signs, labels and colour coding to support/prompt the individual on how to locate their room, an object, or perform a specific task
<p>Home-like Environment (Marquardt, Bueter, & Motzek, 2014; Chaudhury, Cooke, Cowie & Razaghi, 2017; (Dementia Enabling Environments, 2018).)</p>	<ul style="list-style-type: none"> • Reduce the clinical atmosphere using artwork, domestic finishes and furnishings • Provide private rooms • Provide opportunities for personalization • Ovens and cook tops should have safety switches that automatically turn off after a predetermined time / if temperature exceeds a specific limit • Open shelving allows residents to easily see items that are regularly used • Smoke detectors should be installed directly in the kitchen to limit fire risk
<p>Sensory Stimulation (Marquardt, Bueter, & Motzek, 2014; Chaudhury, Cooke, Cowie & Razaghi, 2017)</p>	<ul style="list-style-type: none"> • Use acoustic treatments (ie. acoustic ceiling tile, acoustic panels, baffles, etc) to reduce overstimulating noise levels in public / communal areas • Provide adequate artificial and natural lighting and eliminate glare
<p>Outdoor Areas (Brawley, 2006; Wrublowsky, 2017)</p>	<ul style="list-style-type: none"> • Landscape design should incorporate non-poisonous plants • Exterior signage to supplement wayfinding • Limiting uneven surfaces to avoid falls or mobility issues • Provide handrails and spaces to rest with access to shade along walking paths.

Chapter 4:

Theoretical Framework

Theoretical Framework

4.1 Theory of Place Attachment: Introduction

Place attachment (PA) theory is a multidimensional concept that is widely defined as the emotional bond created between an individual and the physical environment, such as one's home or neighborhood (Scannell & Gifford, 2010). This theory has been studied extensively by many disciplines, resulting in a variety of definitions and perspectives that have been applied to environmental gerontology, relocation, displacement, disaster psychology and mobility (Scannell & Gifford, 2010). When transitioning into a care facility, persons with Alzheimer's disease experience a disruption of their attachment to a certain place – specifically their home or neighborhood – when they relocate. The severance of one's attachment through relocation can be detrimental if their new environment does not meet their needs, especially in the context Alzheimer's disease (Lewicka, 2014; Scannell & Gifford, 2016). Therefore, it is crucial to understand the individual's needs and mechanisms of attachment to ensure that designers create spaces that can help facilitate new person-place bonds when transitioning into a care facility.

4.1.2 Theory of Insideness: Place attachment in Older Adults

From an environmental gerontology perspective, Graham

D. Rowles developed the Theory of Insideness (1983) to conceptualize attachment and adaptation to place in old age. Rowles (1983) conducted in-depth interviews with older adults from Colton, a rural Appalachian community to understand these concepts. Three themes, or "dimensions of insideness" emerged from the study: physical, social, and autobiographical insideness. Physical insideness is based on attachments to place and are formed over an extended period of time, resulting in a sense of environmental control through familiarity and routine. Social insideness is related to attachment that is formed through the social bonds that integrate a person into the community and contributes to one's sense of belonging. Autobiographical insideness are person-place bonds that are formed through the memories related to particular objects or spaces that make up one's self-identity (Rowles, 1983). Based on these findings, Rowles (1983) argues that physical and social insideness are the only types of attachments that can be used to form new bonds to place following relocation.

There are some benefits and limitations to Rowles' (1983) work in the context of this practicum. Though the author's research offers a great first look into the theory of place attachment in old age, his study included a small sample of older adults from one geographic location to base his theory off of. The sample size Rowles (1983) used included what he describes as "young old" and "old-old," using these groups to illustrate how generational

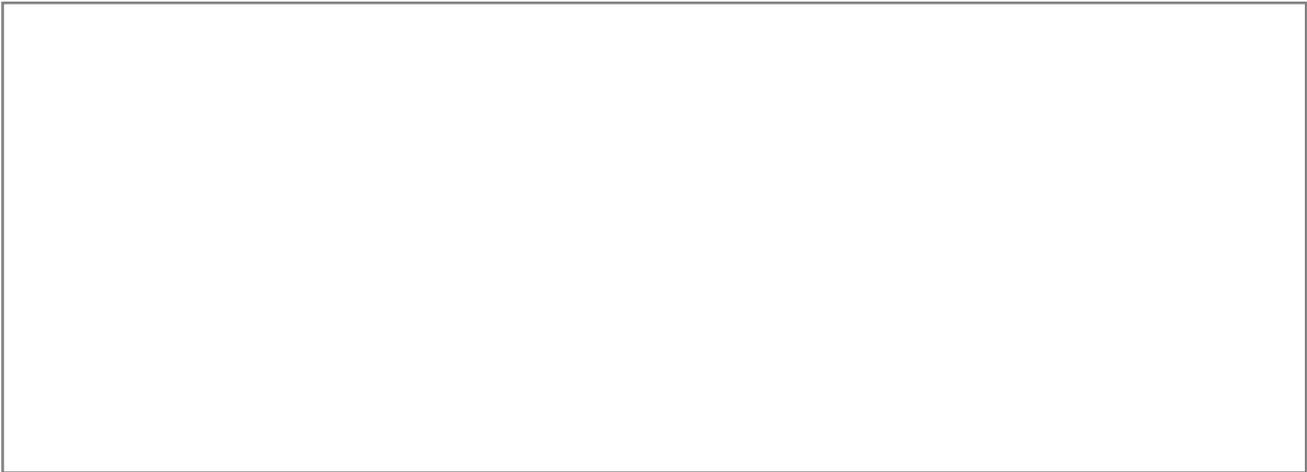


Figure 6. Rowles' (1983) *Theory of Insideness* (left) and Scannell and Gifford's (2010) tripartite model of place attachment (right)

differences may influence attachments to place. However, the user groups interviewed in this study were healthy older adults and not persons with AD, therefore attitudes and attachments to place may vary depending on health status. For example, the literature review "The experience of lived space in persons with dementia: a systematic meta-synthesis" by Førsvund, Grov, Helvik, Juvet, Skovdahl, and Eriksen (2018) examined 136 research articles that included interviews with persons with dementia to determine how space, such as their home or long-term care environment is experienced and perceived by this group. Persons with AD in long-term care viewed their new home as either the "beginning of the end" or as the "start of a new life that signaled an overall winding down" (Førsvund et al., 2018, p.12). Therefore, the ability to form new attachments to space is also highly dependent on the individual's view of themselves in relation to their diagnosis. However, if an individual is well supported by their environment that reflects the life they once lived prior to institutionalization,

there is an opportunity to form new attachments to space despite an individual's declining health.

4.2 Person-Process-Place

From an environmental psychology perspective, Scannell and Gifford (2010) developed the person-process-place (PPP) framework in their work *Defining Place Attachment: A Tripartite Organizing Framework*. Rather than focusing on older adults exclusively, Scannell and Gifford (2010) collected and categorized definitions of place attachment from a variety of disciplines to create a more uniform definition and therefore understanding of the theory. Based on existing literature, Scannell and Gifford (2010) categorize the theory into three dimensions: person, process and place.

4.2.1 The Person Dimension: Individual/Group Level

With respect to the person dimension of the PPP framework, Scannell and Gifford (2010) argue that attachment can be experienced at both the individual and group levels. At the individual level, places may become personally significant as a result of the positive experiences, memories, or milestones that are associated with a specific place (Scannell & Gifford, 2010). Most often, these places include one's home, town, or neighborhood where many memories are formed, and major milestones take place.

At the group level of Scannell and Gifford's (2010) PPP framework, attachment is "compromised of the symbolic meanings of a place that are shared among members" and play a significant role in one's self concept (Scannell & Gifford, 2010, p. 2). Much like Rowles' (1983) dimension of social insideness, group level attachments are formed through associations with a community, nation, culture or religious group and contribute to an individual's identity and sense of belonging (Scannell & Gifford, 2010). Despite the nearly thirty-year publication gap between both pieces of literature, it is evident that the overarching theme with respect to place attachment is the relationship between place, identity and belonging, all of which become threatened when attachments are broken due to institutionalization.

In the context of Alzheimer's disease, group level place attachment can be threatened due to the anxiety and

deep-rooted stigmas associated with the condition, causing individuals to socially isolate themselves from others if they are still living at home (Riley, Burgener, & Buckwalter, 2014). Moreover, relocation also threatens group level place attachment as the individual must move away from these groups they once belonged to. What the authors fail to point out is how important these group level place attachments are in promoting social relationships. If an individual's group level attachments are broken as a result of relocation, they are not only losing an attachment that informs a piece of who they are, but also the social groups and interactions that come with being a member, thus, severing their sense of belonging as well. Though the Scannell and Gifford (2010) categorize group and social dimensions of place attachments as separate entities, they should be viewed as a symbiotic relationship within this context.

4.2.2 The Process Dimension: Affect, Cognition and Behaviour

The process dimension of the PPP framework can be broken down into three categories: affect, cognition, and behaviour. Place attachment as affect describes the concept in terms of an emotional attachment to a specific place (Scannell & Gifford, 2010). Place attachment as cognition is composed of the memories, beliefs, meanings and knowledge that facilitate an attachment to a specific place (Scannell & Gifford, 2010). The third category of the process dimension is place attachment as behaviour, or attachment that is facilitated through one's actions or routines (Scannell & Gifford, 2010).

Arguably, one's emotions and memories play a significant role in the construction of place attachment as humans rely on these processes to create place meaning and place-identity (Scannell & Gifford, 2010). However, a limitation to Scannell and Gifford's (2010) work is that they do not provide specific insights into what parts of the memory are used for attachment and how they can facilitate new person-place bonds.

The relationships between emotion, attachment and memory are examined in the work of psychologist Maria Lewicka who argues that the procedural and episodic memory can help facilitate an individual's attachment to a new environment (Lewicka, 2014). The procedural memory, also referred to as habit memory, is a component of the long-term memory that is responsible for storing information about how to perform certain tasks, such as walking and talking (Lewicka, 2014). Habit memory is formed by time-space routines and are embedded in specific places, such as the home. When these time-space relationships are broken due to relocation, Lewicka argues that it can lead to feelings of estrangement and alienation (Lewicka, 2014). Based on Lewicka's work, these relationships demonstrate that a home is more than providing the resident a room with a couch and a bed. A home is more than a desk or wardrobe and it is certainly more than a desk or wardrobe. The home is filled with activities and routines that make us who we are and help form our attachments to space.

Lewicka's research not only demonstrates the significance between place attachment and procedural memory, she

also discusses the relationship between PA theory and episodic memory, which are the memories associated with autobiographical events or experiences (Lewicka, 2014). Lewicka argues that place-related memories are integral to the development of personal identity and self-continuity within a new environment. Furthermore, the use of one's episodic memory allows the individual to strengthen their relationship to their new environment (Lewicka, 2014). Similarly, Scannell and Gifford (2010) recognize how behavioural expressions of attachment through the reconstruction of place can help facilitate person-place bonds. Though Scannell and Gifford use war refugees and victims of natural disasters as examples of displaced individuals, many persons with Alzheimer's disease go through the same feelings of place loss when transitioning into a new environment. When an individual moves from one place to another, many try to reconstruct a former place with meaningful objects such as photographs, furniture or other significant belongings, defined as the behavioural dimension of the PPP framework. This allows the individual to establish a sense of ownership, familiarity and territory in a space that is feels foreign to them. These behavioural expressions of attachment are reflective of the use of "memory-jogging" mechanisms and opportunities for personalization within the care environment, as suggested by researchers Margaret Calkins (1988), Elizabeth Brawley (2006), John Zeisel (2009) and Gesine Marquardt (2011). These authors emphasize that residents who engage with personally meaningful objects, such as mementos, photographs, or furniture from their previous home helps the individual not only understand the space around

them but also adds a sense of familiarity in an otherwise unfamiliar environment. Though evidence-based research has identified the use of personally meaningful objects to identify their own space, these objects also serve a dual purpose in making the space feel more at home to the individual.

From a material culture perspective, Melanie Lovatt from the University of Stirling, conducted an ethnographic study to examine the relationship between an older adult's possessions and meaning of home while living in long-term care. Lovatt (2018) concludes that meaningful objects are not necessarily the objects that passively sit on a shelf, but rather the objects individuals interact with on a daily basis. These objects are "conceptualized as providing older people with an important sense of control and continuity at a time when they may be experiencing less control over their lives and environments...The everyday nature of home was also demonstrated through residents' routine practices such as cleaning and hosting, which were mediated through their material surroundings. In 'doing' and 'performing' home in this way, residents demonstrated their control of, and belonging in, the materiality of their rooms. (Lovatt, 2018, p.367). This finding reiterates the importance of engaging persons with dementia transitioning into long-term care with objects and routines, such as making a cup of tea from their old kettle, while living in a memory care facility. As traditional care environments are highly restrictive and do not allow residents to access many everyday objects, such as a kettle, these "safety proofing" environments can significantly impede an individual's ability to feel at

home in the long-term care facility. The private rooms in this practicum will be equipped with a small kitchenette and storage spaces to provide residents with a space to not only display, but engage with familiar objects from their previous home while maintaining a level of independence.

4.2.3 Place Dimension Social and Physical Place

Scannell and Gifford (2010) argue that the most important dimension of place attachment is the place itself. The place dimension can be broken down into two categories: social and physical place (Scannell & Gifford, 2010). Similar to Rowles' (1983) findings regarding social insideness and its ability to form attachments, humans are attached to places that foster social ties and group identity, which is likely why humans are so highly attached to their homes. This perspective holds the belief that the more a space allows the occupant to create social bonds with others, the more comfortable, and therefore attached the person may become (Scannell & Gifford, 2010). However, in the context of Alzheimer's disease, this finding is mixed. Research has shown that care environments were viewed as either an opportunity for social engagement, while others wished for privacy (Førsund et al., 2018). Therefore, it is important to balance the integration of social spaces with places of privacy to ensure that all needs are met and attachments can be facilitated within the new environment.

The second component of the place dimension of the PPP framework is the physical place, either natural or built. Scannell and Gifford's (2010) view the built physical place in three dimensions: home, neighborhood and city. However, the authors do not provide any insight into what qualities of each level help support an individual's attachment to place. In the context of this practicum, *Chapter 3: Evidence-Based Design Strategies for Persons with Alzheimer's Disease* outlined several design features that constitute a supportive physical environment for persons with AD, including: unit's size/density, sensory stimulation, building organization and orientation cues, home-like character, and outdoor areas. These strategies will be implemented to help support not only the independence but also the well-being of the individual, providing a means of attachment through a supportive environment that meets the needs of the individual experiencing relocation.

Based on the body of literature that supports the relationship between exposure to nature and well-being (Grinde & Patil, 2009), it is not surprising that the natural environment makes up a component of an individual's attachment to place. According to Scannell and Gifford (2010), environmental identity, which is the "inclusion of nature into one's self concept helps individuals align their self-definitions with the natural world," therefore facilitating an individual's attachment to nature (p.5). A related and perhaps a more widely understood theory in the design discipline is the Biophilic Hypothesis. This theory, proposed by Biologist and author E. O. Wilson, suggests that humans possess an inherent will

to seek connections with nature due to evolutionary instinct (Kellert & Wilson, 1993; Berto et al., 2018). This hypothesis has been studied by Roger S. Ulrich, a prominent evidence-based healthcare design researcher, who discovered that hospital patients who had visual contact with natural environments through their window experienced reduced stress levels than patients exposed to urban environments (Ulrich et al., 1991). As the process of relocation can induce feelings of stress, anxiety, and/or depression, providing residents with exposure to nature has the potential to reduce the incidence of such feelings. However, anxiety and depression are both co-morbidities of Alzheimer's disease, therefore treatment for such conditions cannot be relied on the environment alone for certain individuals (Johns Hopkins Medicine, 2019).

4.3 Questions of Inquiry Revisited

The second research question related to this practicum is 2) *What design strategies and programmatic qualities facilitate a supportive environment that enhances the independence, well-being and sense of belonging of single, childless persons with AD entering memory care?* Based on the literature, well-being and belonging can be supported through the integration of place attachment theory. In the context of Alzheimer's disease, place attachment can be facilitated through place attachment as behaviour, or attachment that is facilitated through one's actions or routines. It is evident that individuals become attached to places that support familiarity and routine, therefore, offering spaces that support both

instrumental and meaningful activities of daily living can support the resident by helping them carry out these routines, while enhancing their independence and well-being. Attachments within the process dimension can also be supplemented through behavioural expressions of place, such as the reconstruction of place through personalization to create a familiar space in an otherwise unfamiliar environment.

Place attachment can also be facilitated by the physical space with respect to social and physical dimensions of place. As it was discovered that the social dimension of place can facilitate person-place bonds through social ties and group identity, the integration of social spaces, particularly in the Welcome Center will help support the belonging needs that are required to form attachments. Attachments with respect to the physical dimension of place attachment can be supplemented by the integration of evidence-based design strategies to ensure its built form supports the individual with AD. Access to nature through the courtyard will also facilitate attachments through the natural dimension of the physical place, offering mechanisms to support stress reduction and enhance well-being.

Throughout this chapter, it has become evident that person-place bonds have a significant impact on the individual entering institutionalized care. The relationship between Rowle's (1983) early work regarding place attachment and old age and Scannell and Gifford's (2010) more extensive person-process-place framework demonstrate that various interior design, evidence-based

design and programmatic characteristics can facilitate person-place bonds when they are broken due to relocation. It should be noted, however, that each person experiences Alzheimer's disease or related dementias very differently and each person may perceive their surroundings in a variety of ways. The goal of integrating place attachment theory into this practicum is to ensure that persons with AD living at The Lakes Memory Care have access to all of the features that have helped support their previous attachments to home in an effort to make the process of relocation and experience living with AD as fulfilling as possible.

4.4 Theory of Wayfinding: Introduction

The ability to find one's way, referred to as wayfinding, is an essential cognitive process that is paramount for survival. Early humans relied on these abilities to find their way back home when hunting and gathering food, therefore increasing their chance of survival for not only themselves, but also their next of kin (Miniaci & De Leonibus, 2018). Those who were unable to find their way back home were unlikely to survive. With the rise of modernization, humans no longer rely so heavily on their wayfinding abilities as a means of survival, however, they are essential skills that help with independent functioning and social interaction (Davis & Ohman, 2016). In the context of Alzheimer's disease, the hippocampus, also referred to as the human "GPS" is the first region of the brain to become damaged as a result of the disease, leading to problems with orientation, spatial memory, and wayfinding (O'Connor, 2019, p.8). Damage to the hippocampus robs the individual with AD of their independence, puts their safety at risk, and can lead to social isolation as the individual often fears they may become lost when trying to leave home to visit friends or family (Carson, Vanderhorst, & Koenig, 2015). As a result, the theory of wayfinding will be examined to create an environment that is safe, supportive of independent functioning and promotes social interaction among members The Lakes Memory Care and surrounding community.

As proteins accumulate and cause damage to the

brain tissue of a person with AD, their memory is not only affected, but also ability to orient themselves and navigate the space around them (Carson, Vanderhorst, & Koenig, 2015; Davis & Weisbeck, 2016). These neurological deficits not only impede an individual's wayfinding abilities, it also restricts their capacity to form a cognitive map required to navigate their environment. The inability to form a cognitive map, defined as the mental representation of an individual's environment, causes the person with AD to become confused, agitated, anxious, or even aggressive with the loss of this function, resulting in a loss of independence, social isolation and decreased quality of life (Marquardt and Schmiege, 2009; Davis & Ohman, 2017). Likewise, a person with Alzheimer's disease also loses the ability to interpret spatial information in the most familiar places, resulting in institutionalization to protect the person from getting lost or hurt (Marquardt and Schmiege, 2009). Visual changes, such as decreased contrast sensitivity, decreased field of vision, loss of peripheral vision, changes in depth perception, decreased pupillary response, changes in visual processing speed, as well as changes caused by eye diseases such as cataracts and glaucoma can also effect a person with AD's ability to interpret and safely navigate their surroundings (Alzheimer's Society, 2019a; Davis & Weisbeck, 2016). Therefore, both the cognitive and perceptual changes experienced by a person with AD must be addressed when designing a care environment with respect to wayfinding.

The theory of wayfinding was first introduced by urban planner and theorist Kevin Lynch in his work entitled *Image of the City* (1960). Lynch states that in order for an individual to successfully navigate their environment, the user depends on the creation of an environmental image, or cognitive map composed of sensory cues, past experiences or knowledge, as well as the recognition of patterns within the environment to interpret spatial information and navigate their surroundings (Lynch, 1960). When describing the characteristics of a good environmental image, Lynch (1960) states that it must be:

"sufficient, true in a pragmatic sense, allowing the individual to operate within their environment to the extent desired. The map, whether exact or not, must be good enough to get one home. It must be sufficiently clear and well-integrated to be economical of mental effort: the map must be readable. It should be safe, with a surplus of clues so that alternative actions are possible and the risk of failure is not too high...It is that shape, colour, or arrangement which facilitates the making of vividly identified, powerfully structured, highly useful mental images of the environment." (p. 9).

Though Lynch describes these features through the context of urban planning, his ideas are just as relevant to the creation of a legible interior environment that promotes orientation and wayfinding for its occupants. To create a good environmental image, Lynch developed what is known as the "Elements of Legibility" that break down the environment into five components that support the observer's ability to find their way: districts, paths, nodes,

edges and landmarks (Lynch, 1960).

According to Lynch (1960), districts, defined as the largest element of the environment, are regions that have a distinctive character, are easily identifiable and are the most dominant feature in the construction of an environmental image (Lynch, 1960). Paths are areas of the environment that an individual travels through, such as a street or corridor (Lynch, 1960). Nodes are components of the environment that are located at the intersections of two or more paths, such as a set of stairs or a reception desk. Likewise, nodes also act as places where people naturally converge, such as a lobby or common area (Lynch, 1960). Edges are environmental features that act as boundaries, such as walls or fences. Edges serve as spatial organizing devices that help categorize or distinguish one environment or district from another (Lynch, 1960). Lastly, landmarks are components of the environment that are highly visible and are used for location and orientation purposes. Lynch (1960) describes landmarks as simple, built elements that allow the observer to "single one element out from a host of possibilities" (p. 48). Through the integration of districts, paths, nodes, edges and landmarks, these elements work together to create a legible environmental image that supports the occupant's ability to orient themselves and navigate the space around them.

What is interesting about Lynch's ideas is that he not only recognizes the importance of environmental legibility and one's capacity to navigate space, he connects these ideas through the sense of comfort and security that a

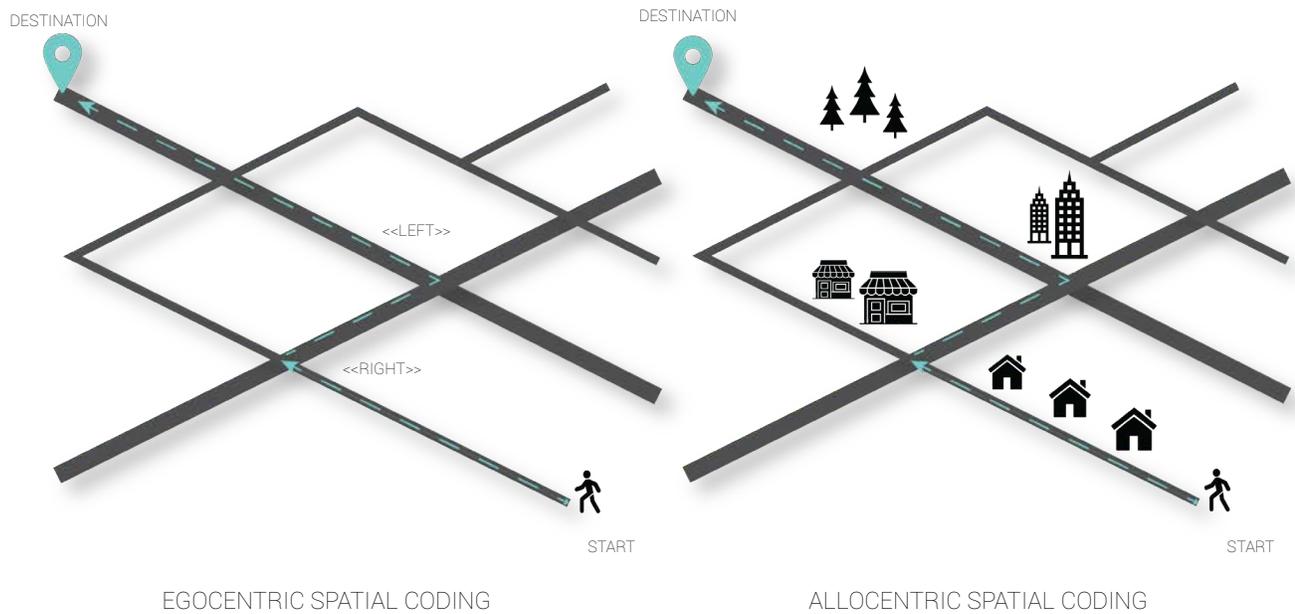


Figure 7. *Egocentric and Allocentric Wayfinding. Adapted from Miniaci and De Leonibus (2018).*

good environmental image may bring to the observer. He acknowledges that when an individual experiences spatial disorientation, they may endure anxiety and fear as a result, demonstrating how closely linked our ability to navigate space is with our sense well-being (Lynch, 1960). Similarly, a highly legible environment also supports the resident's independence, allowing the resident to feel empowered when the environment supports their cognitive and perceptual deficits (Zeisel, 2009). Therefore, the relationship between the ability to navigate space and well-being should be considered at the forefront of the design of The Lakes Memory Care.

Building upon Lynch's ideas, neuroscientists have categorized the ability to encode environmental information during the wayfinding process using

two types of systems: egocentric (subject-to-object) and allocentric (object-to-object) coding systems (Imagery Lab, n.d.). As shown in Figure 7, egocentric spatial coding is a cognitive process that interprets environmental information using the body as a point of reference, whereas allocentric spatial coding interprets environmental information in relation to surrounding features, such as landmarks, independently of the user's body in space (Imagery Lab, n.d.; Miniaci & De Leonibus, 2018, p.2; Colombo et al., 2017). It should be noted, however, that successful navigation requires the user to be able to combine and switch from egocentric to allocentric spatial coding processes; and that this ability decreases with age (Colombo et al., 2017). Moreover, researchers have hypothesized that persons with AD are unable to use egocentric coding systems to

navigate their environment, relying more heavily on the allocentric spatial coding process in which the observer relies on environmental cues, such as landmarks, to successfully navigate space (Zen et al., 2013). Therefore, the relationship between allocentric spatial processing, Lynch's Elements of Legibility, and evidence-based design strategies that support the wayfinding abilities of persons with AD will be further discussed in this chapter.

4.4.1 Lynch's Elements of Legibility

4.4.2 Districts

Districts, defined by Lynch (1960) are the largest element of the environment and are regions that have a distinctive character. To help facilitate an individual's orientation within the care environment, it is encouraged that each room should have a distinctive character to reduce confusion (Calkins, 1988; Zeisel, 2009). For example, the use of colour and furniture can help organize each space and create separate "zones", or districts, allowing the person with AD to be able to understand which space they are in and how to behave within it. Likewise, distinctive architectural features, such as the ceiling plane can help differentiate one space from another to enhance spatial orientation and facilitate independent wayfinding.

4.4.3 Paths

Lynch (1960) defines paths as areas of the environment that an individual travels through, such as a street or corridor and are the primary wayfinding mechanism used

in the built environment. Architectural researcher Gesine Marquardt (2011) reviewed several studies that analyzed supportive orientation and wayfinding strategies for persons with dementia with respect to walking paths. The author concludes that the design of paths must: have direct visual access to relevant spatial information to enhance orientation and simple decision and reference points to reduce confusion (Marquardt, 2011). Furthermore, signage and personal items displayed on the resident's door or in a memory box were also found to be supportive wayfinding devices with respect to walking paths (Zeisel, 2009; Marquardt, 2011).

Marquardt (2011) found that building features that hindered the resident's ability to orient themselves include long, double-loaded corridors, repetitive, monotonous elements such a large number of doors and exits as well as changes in direction of circulation paths increased the resident's likelihood to become disoriented and confused (Marquardt, 2011). As a result, the design of The Lakes should limit changes in direction of circulation paths, reduce the length of corridors along these paths, and limit the number of exits in an effort to create an environment that supports the resident's wayfinding abilities.

4.4.4 Nodes

As mentioned previously, nodes are components of the environment that are located at the intersections of two or more paths, such as a set of stairs or a reception desk. Likewise, nodes also act as places where people naturally converge (Lynch, 1960). In the long-term

care environment, nodes can help encourage social interaction among members of the facility. Therefore, placing major circulation routes along nodes, such as the dining room, allows by-passers to stop and interact with others who may be in the space.

4.4.5 Edges

As wandering, confusion, and disorientation are symptoms of Alzheimer's disease, the environment must support the resident to ensure their well-being is not compromised (Brawley, 2006). Furthermore, wandering into dangerous areas, such as storage closets where hazardous chemicals are stored or into an unprotected outdoor environment can put the safety and well-being of the resident at risk (Calkins, 1988). Exit control strategies are required to ensure that the resident can move independently without compromising their safety or well-being.

A major challenge that is faced when designing exit control into the built environment is making sure the resident does not feel overly restricted by their surroundings (Calkins, 1988). Exit control is typically implemented into the built environment through camouflaging, such as painting the door and door frame the same colour as the wall so they blend together as one (Zeisel et al., 2003; Zeisel, 2009). However, the primary user group of this practicum are persons with mild cognitive impairment to moderate AD living in a memory care household and not a secured facility, therefore exit control strategies are not relevant to this

user group. However, camouflaging has the potential to reduce environmental noise and simplify the resident's surroundings, allowing them to navigate the space around them more easily and with less confusion.

4.4.6 Landmarks

Finally, landmarks are components of the environment that are simple, highly visible built elements used for and orientation, location and identification purposes (Lynch, 1960). A landmark within the interior environment can be anything that visually locates a particular space, such as millwork, sculpture, or artwork. However, landmarks do not always have to be physical elements. An design strategy is the use of sensory landmarks to enhance orientation and understanding for persons with AD (Brawley, 2006; Zeisel, 2009). For example, the smell of food cooking in the kitchen allows the individual to understand the function of the space they are in, and encourages them to engage in the associated behaviour related to that function, which in this case, is eating (Brawley, 2006; Zeisel, 2009). Similarly, the sensation of hunger is also stimulated when the resident can directly smell food. (Chaudhury, Hung, & Badger, 2013). By providing the occupant with an enhanced understanding of space through the olfactory senses, the individual may experience less confusion as a result (Zeisel, 2009).

As mentioned previously, researchers have hypothesized that persons with AD rely heavily on allocentric, rather than the egocentric spatial coding to interpret environmental information and navigate space (Zen et

al., 2013). When an observer uses their allocentric spatial coding, environmental information is interpreted in relation to surrounding cues, such as landmarks, to successfully navigate their environment (Imagery Lab, n.d.; Miniaci & De Leonibus, 2018; Colombo et al., 2017). Due to the cognitive and perceptual deficits that results from AD, landmarks must be salient, or prominent, to ensure that they help the person with AD navigate their surroundings.

4.5 Landmark Salience for Human Navigation

According to Caduff and Timpf (2008), successful navigation requires landmarks to be highly salient, or prominent, and are made up of three components: perceptual, cognitive, and contextual salience. Perceptual salience helps the environmental cue or landmark stand out from its surroundings using its colour, form, size and location (Davis, Ohman, & Weisbeck, 2017; Caduff & Timpf, 2008). Cognitive salience refers to environmental cues that evoke the memory of the observer through recognizable, relevant or meaningful cues (Davis, Ohman, & Weisbeck, 2017; Caduff & Timpf, 2008). Lastly, contextual cues are landmarks that represent a particular setting or function related to a specific environment that helps the observer understand the context of said environment (Davis, Ohman, & Weisbeck, 2017; Caduff & Timpf, 2008). The intention of Caduff and Timpf's (2008) components of landmark salience were designed to be used for the general population and did not focus on individuals with cognitive impairments, such as persons with Alzheimer's disease. Researchers

Davis, Ohman, and Weisbeck (2017) expanded on Caduff and Timpf's (2008) ideas to develop and test a set of recommendations to enhance landmark salience for persons with Alzheimer's disease, including: colour, familiarity and location.

4.5.1 Colour

The use of colour can be a beneficial tool to enhance the perceptual salience of a landmark, making it more noticeable and indefinable to the observer. Moreover, perceptual salience can help enhance recognition, selection and memory of environmental cues in persons with mild dementia (Davis, Ohman, & Weisbeck, 2017, p.1041). As mentioned previously, persons with AD experience many visual changes that affect the person's perception, including decreased contrast sensitivity and reduced visual processing speed (Alzheimer's Society, 2019; Davis & Weisbeck, 2016). Increasing the perceptual salience of a landmark through the use of contrasting colours can help the person not only successfully perceive the landmark due to their reduced contrast sensitivity, but it can also help the observer with decreased visual processing speed to locate the landmark among surrounding environmental information. Though there is some evidence that supports the use of colour to enhance wayfinding for persons with dementia, such as the study conducted by Gibson, MacLean, Borrie, and Geiger (2004) that examined the use of colour to identify resident rooms, Davis, Ohman, & Weisbeck (2017) state that the use of colour in wayfinding for persons with dementia is understudied and

requires further research.

4.5.2 Familiarity

According to Davis, Ohman, and Weisbeck (2017), familiar, recognizable, or meaningful environmental cues have the potential to increase the cognitive salience of a landmark. This idea is supported in long-term care design for persons with dementia through the use of memory boxes to help residents locate their rooms. Familiar landmarks, such as memory boxes, have not only been shown to increase the resident's ability to identify their rooms, it also provides them with a sense of ownership by allowing them to personalize their space through these means. However, Davis, Ohman, and Weisbeck (2017) also note that the current body of research only tests the resident's ability to find their way to one location, such as their room, and that there are currently very few studies that test a person with AD's ability to find their way through large-scale environments.

4.5.3 Location

As persons with AD experience many visual changes, such as the loss of peripheral vision, the location of environmental cues used for wayfinding is extremely important to ensure that they can be seen by the observer with AD. It should be noted, however, that there is some evidence to support that mobile persons with AD and related dementias look at the ground when walking, and those using a wheelchair look just above the handrails when navigating space (Davis, Ohman, & Weisbeck,

2017). Therefore, environmental cues that are placed too high and out of the field of vision of a person with AD can easily be missed. As a result, the location of landmarks must be considered for both mobile individuals who look forward, look toward the ground, and residents who look just above the handrail when using a wheelchair.

Based on these recommendations, Davis, Ohman, and Weisbeck (2017) tested the effectiveness of familiar and colourful landmarks when navigating a virtual environment. Participants with AD and healthy older adults were asked to find their way through a virtual reality (VR) simulation under two conditions: one with no extra cues and a condition using colorful, memorable salient cues (Davis, Ohman, & Weisbeck, 2017). The results of the study indicated that both participants with AD and healthy older adults were able to navigate the VR environment more quickly and efficiently in the salient cue condition than the condition with no extra cues. Colour, familiarity and location of landmarks are effective cues to create salient landmarks to support a person with AD's allocentric spatial coding. Moreover, the study conducted by Davis, Ohman, and Weisbeck (2017) offers the first bit of evidence that salient landmarks can help persons with AD navigate large-scale environments.

4.6 Environmental Barriers

Evidence-based researchers have highlighted several barriers that impede safe wayfinding. Drastic changes in flooring material or colour can appear as a level change to an individual with AD (Calkins, 1988; Brawley,

2006), causing them to become confused and try to step over the perceived change in level, therefore increasing the risk of falling. Likewise, highly reflective surfaces can be overstimulating for persons with AD, as the glare produced from these surfaces interferes with the resident's vision, leading them to become agitated, frustrated or confused. Busy material patterns, such as upholstery, flooring and wall coverings have also been found to be confusing and should be used minimally or avoided (Calkins, 1988; Brawley, 2006). Lastly, effective colour contrast must be used between the walls, flooring, millwork and furniture so the environment can be highly legible to the aging eye (Brawley, 2006).

Lighting can also act as a wayfinding barrier for persons with AD if the lighting design is not integrated into the space effectively. Uneven lighting levels create pockets of shadow, causing the resident to become confused, disoriented and even frightened (Brawley, 2006). If the corridors or other areas of the facility are inadequately lit, the resident may become scared and refrain from interacting with these areas. Special attention must be paid to the lighting design of the long-term care environment to ensure it does not cause any glare, shadow or poorly lit areas that confuse or frighten the resident.

Throughout this chapter, it is evident that the theory of wayfinding by Kevin Lynch is extremely relevant in the context of long-term care for person's with Alzheimer's disease and overlaps with many evidence-based design strategies that were reviewed by Marquardt (2011). As

persons with AD can no longer form a cognitive map to safely navigate the space around them, the care facility will integrate Lynch's Elements of Legibility to create an environment that compensates for this loss. The long-term care facility will also integrate the design strategies outlined by Marquardt (2011) and Davis, Ohman, and Weisbeck (2017) to ensure these elements support the resident with AD. By integrating the theory of wayfinding into the long-term care community, the built environment will support the resident's personhood by providing them with an environment that reduces confusion and allows them to navigate the space independently, helping the resident feel safe, secure and empowered within their environment.

4.7 Questions of Inquiry Revisited

The last research question to answer is 3) *What interior design strategies can help support the four areas of Roberts and Pereira's (2018) Dementia Friendly City Center concept (DFCC)?*

The first area of Roberts and Pereira's (2018) DFCC concept is sustainability. Though sustainability was not an area of emphasis within the theoretical framework of this practicum, it does not mean that these design features are not important. From an interior design perspective, a sustainable interior environment will be achieved in the following ways:

- Indoor Water Use – the design of The Lakes will use water efficient fixtures to ensure potable water

consumption is reduced.

- Energy – Energy consumption will be reduced through the specification of energy efficient lighting systems, equipment and appliances with non CFC-containing HVAC&R equipment.
- Materials – the construction of The Lakes will include materials, finishes and furniture that are low VOC with high recycled contents. FSC-certified products will be used where applicable.

The second area of Roberts and Pereira's (2018) DFCC concept is therapeutic environments.

Various chapters of this practicum have pointed out how both a therapeutic and supportive environment can be achieved. Using the evidence-based design strategies highlighted in, Chapter 3, various design features that will enhance the independence, sense of belonging and therefore overall well-being will be integrated into the design of The Lakes Memory Care.

- Place attachment theory was examined as a means of exploring why individuals are attached to certain places, and how attachment can be facilitated in a new environment as a result of relocation. The literature revealed that individuals are attached to places that support identity and belonging. Specifically, the supporting familiarity and routine, as well as the reconstruction of place through personalization can help facilitate person-place

bonds in an unfamiliar environment.

- Place attachment theory also highlighted how therapeutic environments can be achieved, such as the natural component of the physical place dimension of Scannell and Gifford's (2010) person-process-place framework. As having both direct contact and views to nature can reduce stress and enhance well-being (Ulrich et al., 1991), a therapeutic environments can also be achieved through these means.

The third area of Roberts and Pereira's (2018) DFCC concept is wayfinding.

The theory wayfinding and landmark salience for human navigation are two ways in which wayfinding for person with AD will be achieved in this practicum. Using the Elements of Legibility by Kevin Lynch (1960), it was discovered that paths, districts, nodes, edges and landmarks are all components of the environment that help inform an individual's cognitive map. Moreover, Lynch's work highlighted the relationship between the ability to navigate space is to our sense of safety, security and overall well-being. Lynch's (1960) ideas were contrasted with Marquardt's (2011) design recommendations for successful wayfinding for persons with dementia. This includes:

- Districts - colour and furniture can help organize each space and create separate "zones", or districts, allowing the person with AD to be able to

understand and differentiate space.

- Paths – Paths must have direct visual access to relevant spatial information to enhance orientation and simple decision and reference points to reduce confusion, memory aids can help supplement wayfinding.
- Nodes – nodes, such as major activity areas or social spaces around major circulation points have the potential to enhance socialization within the space.
- Edges – Camouflaging techniques can help reduce visual noise within a space and highlight only relevant spatial information.
- Landmarks – It was discovered that landmarks are components of the environment that persons with AD depend on most to navigate space, using allocentric spatial coding processes to identify landmarks to navigate their surroundings. Therefore, Landmark Salience for Human Navigation was used to supplement Lynch (1960) and Marquardt's (2011) ideas related to wayfinding in the context of AD.

According to Davis, Ohman, and Weisbeck (2017), the salience of a landmark can be enhanced by colour, familiarity and location.

- Contrasting colours can help enhance the salience of a landmark as persons with AD begin

experiencing many visual changes that effect their perception of objects and the space around them.

- Similar to the strategies pointed out by Marquardt (2011), familiarity of a landmark had a significant impact on the individual's ability to navigate space.
- An interesting point that was not considered by Lynch (1960) or Marquardt (2011) is the location of the landmark. Davis, Ohman, and Weisbeck (2017), noted mobile persons with AD looked to the ground when walking, and those using a wheelchair look just above the handrails when navigating space. Therefore, environmental cues that are placed too high and out of the field of vision of a person with AD can easily be missed.

Together, the strategies derived from the work of Lynch (1960), Marquardt's (2011) and Davis, Ohman, and Weisbeck (2017) will be used to create a space that supports persons with AD, promotes independent wayfinding to reduce the confusion and disorientation that often occurs as a result of AD.

The last area of Roberts and Pereira's (2018) DFCC concept is universal design. Universal / barrier-free design strategies as well as Americans with Disabilities Act (ADA) compliant fixtures will be integrated into this practicum to ensure that it complies with building code standards, and that the space is accessible to all users and visitors.

Chapter 5:

Precedent Analysis

Precedent Analysis

5.1 Introduction

The following chapter outlines several design precedents that were analyzed to help inform the interior design and programming of this practicum. Each precedent was selected based on several factors, including: care philosophies, programmatic characteristics and design qualities. Two built precedents selected for review include: Hogeweyk Dementia Village located in Weesp, Netherlands, and the Dr. George W. Davis Senior Residence and Senior Center, located in San Francisco, California, United States. As there are currently no built precedents to examine how the designers integrate wayfinding cues in a large-scale facility, one research study by Rebecca Davis, Jennifer M. Ohman, and Catherine Weisbeck of Grand Valley State University will also be used as a precedent to analyze how the wayfinding performance for persons with mild AD can be supported using virtual reality to test their wayfinding performance.

5.1.2 Project Overview

Project: Hogeweyk Dementia Village

Location: Weesp, Netherlands

Building footprint: 81, 850 sq ft

Designer: Molenaar & Bol & VanDillen Architects
(Architect)

Niek Roozen (Landscape Architect)

Year: 2009

Completed in 2009 by Molenaar & Bol & VanDillen Architects, the Hogeweyk, known as the world's first dementia village, is an 81,850 square foot self-contained facility located in Weesp, Netherlands that provides long-term care to 169 persons with severe dementia (Hogeweyk, n.d.a; Anderzhon Hughes, Judd, Kiyota, & Wijnties, 2012; I. Van Slooten, personal communication, March 23, 2020). Unlike traditional care facilities, the design of the Hogeweyk organizes each household around the perimeter of the building and the outdoor spaces are located toward the center. This innovative design feature allows the residents to be safely contained within the village, allowing them to roam both indoors and outdoors independently (Anderzhon et al, 2012). As long-term care environments for persons with dementia typically prohibit the resident from going outdoors on their own, the interior-exterior spatial organization of the Hogeweyk creates a safe environment that significantly enhances the resident's independence while living in long-term care.

The main entrance of the Hogeweyk is located at the eastern-most point of the plan, with many amenities found in a typical village are located nearby. These amenities include a grocery store, theatre, hair salon, and a restaurant, all of which are intended to engage residents with familiar activities and promote independence in a safe and secure environment (Hogeweyk, n.d.b; Anderzhon et al., 2012). These amenities provide residents with a vastly different care experience than that of traditional care facilities, where emphasis is placed on

Figure 8. *The Hogeweyk (also known as the world's first dementia village) Weesp, The Netherlands.*

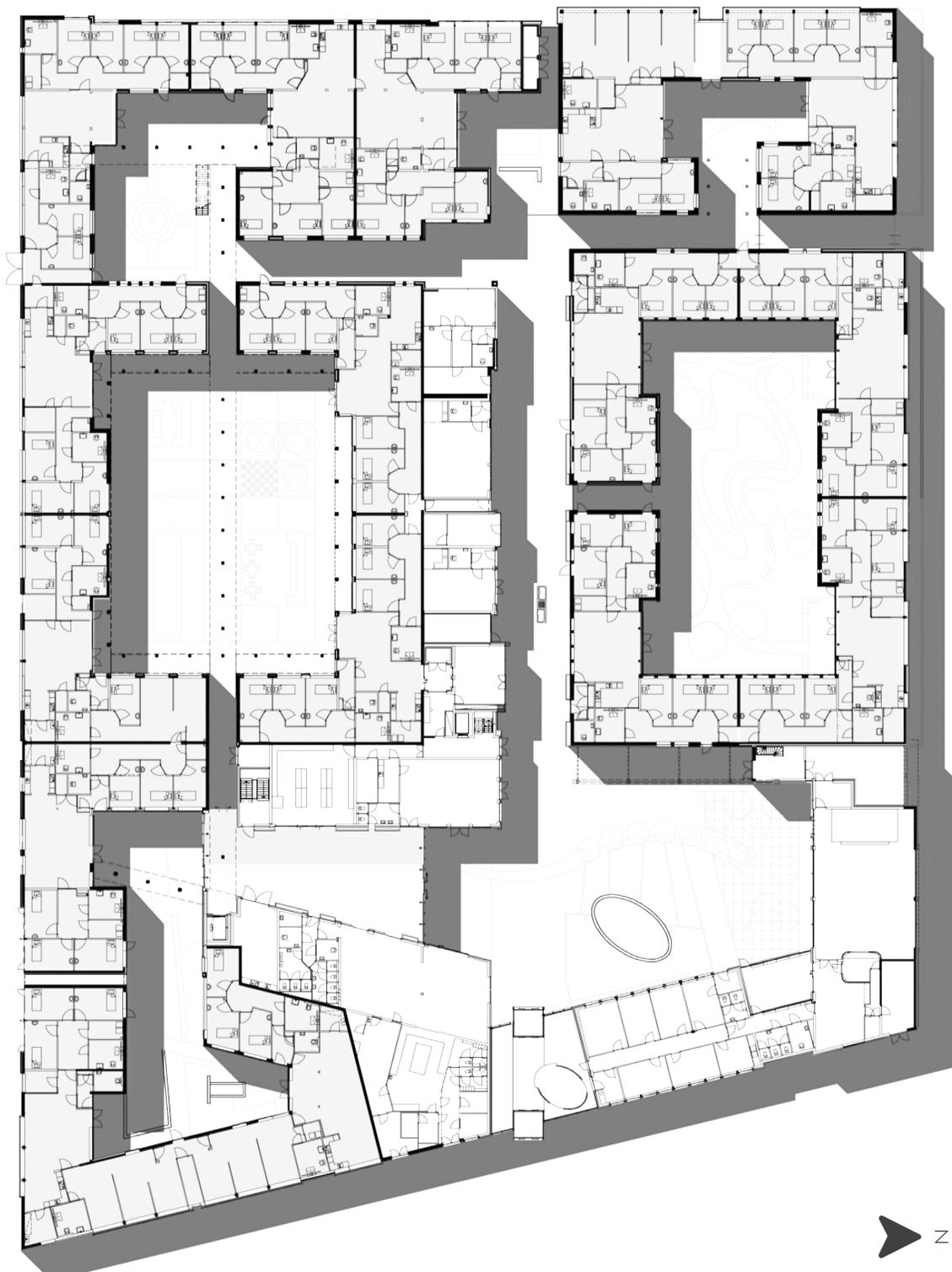




Figure 9. "Urban Lifestyle" Household at The Hogeweyk (also known as the world's first dementia village) Weesp, The Netherlands.

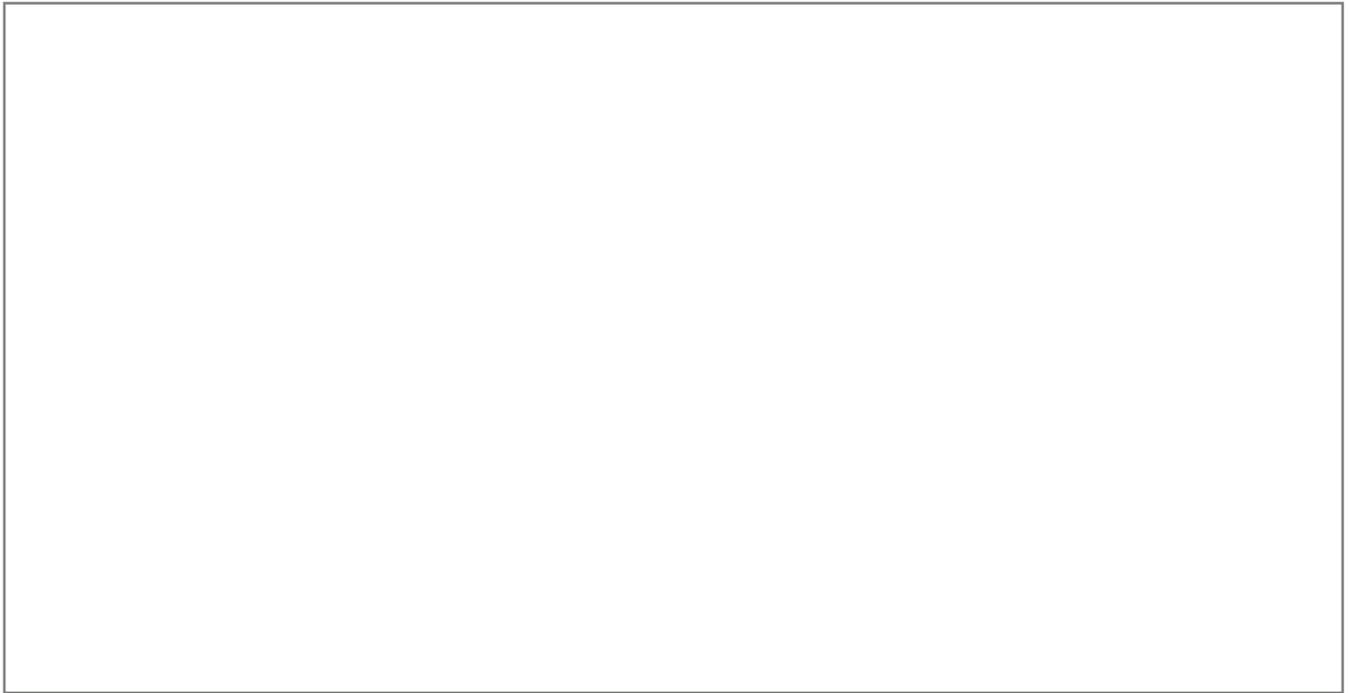


Figure 10. "Cultural Lifestyle" Household at The Hogeweyk (also known as the world's first dementia village) Weesp, The Netherlands.



Figure 11. *The Hogeweyk (also known as the world's first dementia village) Weesp, The Netherlands.*

living a normal, everyday life where freedom and choice is encouraged (Be, 2016). From the main entrance, a boulevard spans to the rear of the facility and appears to be double the width of any other corridor within the plan, providing the resident with direct views from one side to the other. The boulevard also connects the residents to a park pond and main square located on site, as well as the household blocks that surround the public spaces throughout the plan (Anderzhon et al., 2012).

The housing facilities at the Hogeweyk are separated into 27 households containing six to seven residents per household, with two shared bathrooms, a living room, a kitchen and a private room for each resident (Hogeweyk, n.d.b; Anderzhon et al., 2012; van Amerongen, 2018). Within each household, the private rooms are connected

through a corridor to a central common space to promote social interaction within the household, and each household block is organized around a courtyard that connects to the main boulevard (Anderzhon et al., 2012).

When the Hogeweyk first opened, each household was designed based on seven different lifestyles that the resident may relate to, including: the Artisan, Christian, Cultural, Gooische, or formal lifestyle, as well as the Homey, Indonesian and Urban lifestyle (Hogeweyk, n.d.c; Anderzhon et al., 2012). To meet the needs of an evolving society, the Hogeweyk now separates its households into four different lifestyles. This will likely change in the future to keep up with changing social structures of future generations (I. Van Slooten, personal communication, March 23, 2020). The interior design

and furniture selection of each household is designed to not only represent each lifestyle, as shown in Figures 9 and 10, but the unique identity of each space also helps the resident differentiate their own household from another. Moreover, the interior design of each household creates a home-like, rather than institutional environment so the resident can feel comfortable and relate to their surroundings (Anderzhon et al., 2012). To create an environment that feels more like a home than an institution, it is evident that artwork, home-like finishes, such as wood and wallpaper as well as domestic furnishings are used to reduce the clinical atmosphere within the space.

5.1.3 Controversies Regarding Hogeweyk Dementia Village

Though the innovative architecture of the Hogeweyk Dementia Village has inspired the design of many other newly constructed dementia care facilities, the autonomous, dementia village concept has also received its share of criticism. One could argue that the design of the Hogeweyk unfairly deceives the residents into believing they live in a real town, rather than an institution. However, this does not mean that residents are deceived when they ask where they are. In an interview with ABC News, the Hogeweyk's information officer says that "We wouldn't lie about [living in long term care], of course. If asked, a staff member would say they're living somewhere where they get the care and support they need" (Moisse, 2012). Asking frequent questions and getting confused about where they are is a common symptom of dementia, and just because an individual lives in an aesthetically pleasing, well-designed facility,

does not mean the individual will forget about their former home. The main goal of the Hogeweyk Dementia Village is to provide a care environment that supports the continuance of everyday life with a focus on health and well-being (Be, 2016), not convincing the residents into believing they are somewhere that they are not during their stay.

5.1.4 Application to Practicum

The design of the Hogeweyk Dementia Village has many important qualities that can be applied to this practicum. The first application is the integration of care philosophies into the design of the built environment. As mentioned previously, the Hogeweyk Care Concept emphasizes maintaining the individual's identity despite the physical and cognitive deficits caused by dementia and the continuance of everyday life that promotes a balance between living, health and well-being (Be, 2016). Similarly, the person-centered care model discussed in *Chapter 2* emphasizes that persons with dementia are deserving of dignity, compassion and respect while recognizing a person's own strengths and abilities despite their neurological deficits, these two value systems have many similarities. It is important that the environment and care practices compliment the other, as it was pointed out previously that highly restrictive care practices can be counterintuitive to the design of the facility (Chaudhury, Cooke, Cowie & Razaghi, 2017). Therefore, the designer must be well versed in the client's values and care practices to ensure that the environment allows the staff to facilitate high quality care without compromising the well-being of the individual.

As discussed in *Chapter 3*, evidence-based research suggests that long-term care environments with reduced unit sizes and social densities, adequate sensory stimulation, simple building organization with a home-like character and access to protected outdoor areas are all features that support the well-being of persons with dementia (Chaudhury, Cooke, Cowie & Razaghi, 2017). It is evident that these features are also present in the design of the Hogeweyk. It was mentioned previously that residents are organized into household blocks containing six to seven residents and home-like finishes and furnishings related to each lifestyle are also used to reduce the clinical atmosphere within each household (Hogeweyk, n.d.b; Anderzhon et al., 2012). The Hogeweyk's building organization supports the resident's ability to access the outdoors independently, which is also supported by evidence-based research. As mentioned in *Chapter 4*, having outdoor access can also support an individual's attachment to place, reduce stress and promote circadian rhythm regulation, all of which are important to the well-being of persons with dementia. Based on the above analysis, the Hogeweyk serves as an excellent example of how to design supportive care environments for persons with dementia that can help foster independence, well-being and personhood, allowing the resident to lead a high-quality, fulfilling life while living in a long-term care environment.

5.2 Project Overview

Project: Dr. George W. Davis Senior Residence and Senior Center

Location: San Francisco, California, United States

Area: 14,000 sq ft

Designer: David Baker Architects (Architect), Gelfand Partners Architects (Interior Design)

Year: 2016

Certified LEED Platinum

Completed in 2016 by David Baker and Gelfand Partners Architects, the Dr. George W. Davis Senior Residence and Senior Center, located in San Francisco, California, is a 14,000 square foot senior housing and community center that provides affordable housing and access to on-site support services for older adults (ArchDaily, 2018). The main floor of the east wing is composed of a common room, an event kitchen, a fitness center, hair salon, as well as social and case management services (ArchDaily, 2018). The community center is located on the main floor of the west wing and is made up of classrooms that provide the residents with lessons on cooking, exercise, wellness, as well as arts and crafts. The community center also hosts game nights, pool tournaments, birthday parties and other special events (ArchDaily, 2018). An exterior courtyard is located in the center of the plan, providing residents with access to an outdoor green space with shaded seating.

The ground floor is organized using a main circulation path that runs directly from the northern-most to southern-most point of the plan in both the west and east wings. Extensive glazing is used along the corridor of each

wing to provide the residents with views to the exterior courtyard while supplying the space with an abundance of natural light. Interior glazing systems are also used to not only transmit natural light throughout the building, but to also provide residents with views into the activities that are going on in each space, creating a warm, welcoming environment for not only residents but surrounding community members as well.

Private living units are located on the upper levels of the building, with approximately eighteen living residents per wing organized along a double loaded corridor. Each private room is provided with a kitchenette, living space, a bedroom and bathroom. It is unclear whether the private residences were designed for single individuals or partners. The central tower located between the east and west wing provide viewing platforms to the courtyard and street below.

To reflect the cultural identity of the primary user group, the designers used African-inspired design elements throughout the space (ArchDaily, 2018). The curvilinear central tower located at the center of the east and west wing as well as the earth-tone materials and finishes were inspired by traditional village architecture, and the accent colours used on the exterior of the building were inspired by African textiles (ArchDaily, 2018). Together, these design features were used to create a space that not only provides residents with affordable housing and support services, it also provides them with a space that reflects their cultural identity. Though the author does not go into detail about what sustainable elements were used in the project, the project received LEED for Homes Platinum certification (ArchDaily, 2018).



Figure 12. Exterior of Dr. George W. Davis Senior Residence and Senior Center. Courtesy David Baker Architects/Bruce Damonte

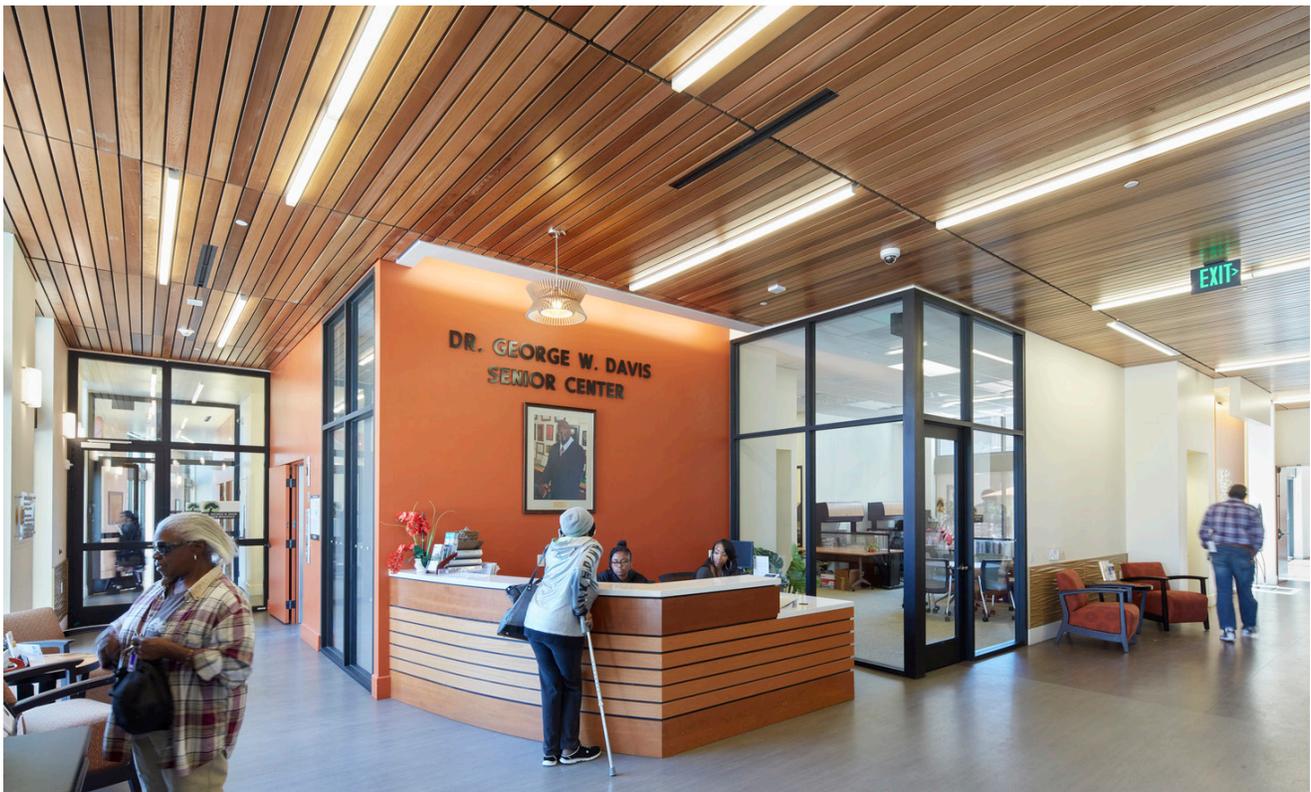


Figure 13. Reception - Dr. George W. Davis Senior Residence and Senior Center. Courtesy David Baker Architects/Bruce Damonte.



Figure 14. Ground Floor Plan Dr. George W. Davis Senior Residence and Senior Center
Courtesy David Baker Architects/Bruce Damonte.



Figure 15. Classroom - Dr. George W. Davis Senior Residence and Senior Center.
Courtesy David Baker Architects/Bruce Damonte.



Figure 16. Common Room - Dr. George W. Davis Senior Residence and Senior Center
Courtesy David Baker Architects/Bruce Damonte.

5.2.1 Limitations

A limitation to the design of the Dr. George W. Davis Senior Residence and Senior Center is that it was designed for older adults, and not for persons with Alzheimer's disease or related dementia. As persons with AD are making up more and more of the older adult population, it is unfortunate that the only evidence-based design strategy that was used is access to outdoors. Therefore, many of the evidence-based design strategies that were mentioned in *Chapter 3*, such as social density, building organization and wayfinding strategies were not integrated into this facility. Though the Dr. George W. Davis Senior Residence and Senior Center did not consider evidence-based design strategies for persons with Alzheimer's disease in its design, it still offers excellent learning opportunities regarding its programmatic characteristics in the context of this practicum.

5.2.2 Application to Practicum

The programming of Dr. George W. Davis Senior Residence and Senior Center is the main learning opportunity that can be applied to this practicum. As it was discovered that single, childless individuals with AD have high socialization needs, therefore community based programming used in this precedent can easily be applied to persons with AD, as long as the environment also supports their cognitive deficits. Providing residents with access to a common room, communal kitchen, a fitness center, as well as social and case management services provides the individual with valuable programs

and services that fosters socialization and allows them to remain as active members of their community. The largest take away from this precedent is to not view older adults as passive members of the community with little value, but rather dynamic individuals with a variety of needs. As a result, the community-based programming from this precedent will be used in the programme of The Lakes Memory Care to supplement the exiting services and amenities located on the conceptual site of the DFCC in an effort to provide spaces that support resident well-being, sense of belonging and independence while remaining part of the DFCC community.

5.3 Project Overview

Project: Salient Cues and Wayfinding in Alzheimer’s Disease Within a Virtual Senior Residence
Location: Grand Valley State University, Grand Rapids, MI, USA
Author(s): Rebecca Davis, Jennifer M. Ohman, Catherine Weisbeck
Year: 2017

Currently, there are very few built examples available that demonstrate how wayfinding cues can be integrated into a large-scale environment to support persons with mild to moderate Alzheimer’s disease. Rebecca Davis, Jennifer M. Ohman, and Catherine Weisbeck of Grand Valley State University conducted a study to test the wayfinding performance of persons with Alzheimer’s disease (AD) or mild cognitive impairment (MCI) using a virtual reality (VR) simulation of a long-term care residence (Davis, Ohman, & Weisbeck, 2017). The study was conducted

over a three day period, using thirty persons with AD/MCI and forty older adults without AD/MCI as the control group (Davis, Ohman, and Weisbeck, 2017). Both groups’ wayfinding performance were tested under two conditions. The first, or standard condition used no extra wayfinding cues within the virtual environment and contained bare walls, muted carpeting, and the doors were spaced equally apart (Davis, Ohman, and Weisbeck, 2017, p.1048). The goal location under the standard condition was a dining room with a table and chairs. The second, or salient condition contained the same bare walls and muted carpeting as the first condition; however, it was enhanced using ten different salient cues placed at key decision points. These cues included a red car, a rainbow, an orange fish, red balloons, a red cardinal, a yellow sun, a purple butterfly, a picture of children, and an American flag (Davis, Ohman, and Weisbeck, 2017). The goal location in the salient cue condition was an open set of doors that lead to a large tree. The VR simulation was displayed on a



Figure 17. Floor Plan of virtual senior residence used for testing the wayfinding performance of persons with AD in the standard condition (left) and salient condition (right).

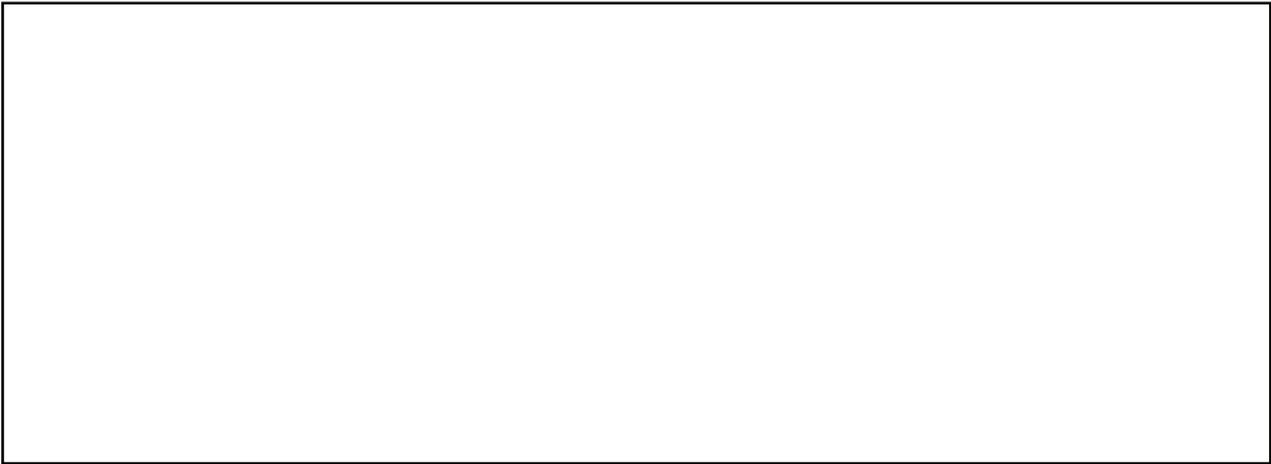


Figure 18. 3D perspective of virtual senior residence used for testing the wayfinding performance of persons with AD in the standard condition (left) and salient condition (right).

twelve foot wide rectangular screen and participants used a joystick to navigate each environment (Davis, Ohman, and Weisbeck, 2017). Both conditions spanned a total of 285 feet in length with six hallways to serve as “distractors.” There was only one correct path the participants could take to reach the goal location in either condition (Davis, Ohman, and Weisbeck, 2017, p.1048).

As the researchers hypothesized, participants with and without AD/MCI found their way more quickly and efficiently when navigating the virtual environment under the salient condition, suggesting that familiar and colourful cues help support the wayfinding performance of a person with mild AD (Davis, Ohman, and Weisbeck, 2017). The researchers also found that wayfinding performance for both groups in the salient condition improved on the second day of testing, suggesting that salient cues can also aid with spatial learning and memory recall (Davis, Ohman, and Weisbeck, 2017).

5.3.1 Limitations

Arguably, one of the most significant limitations that the authors note is how noise, lighting and other environmental stimulation can impact the wayfinding performance of a person with AD living in a long-term care residence (Davis, Ohman, and Weisbeck, 2017). Another limitation is that the 3D model used to simulate the virtual long-term care residence did not allow participants to go through doors or elevators, and only one correct path could be taken to find the goal location. It is unknown whether or not the 3D environment also contained other locations that exist in long-term care, such as a common room or bathroom to test how the participant navigates a variety of environments to find their goal location. Lastly, the authors did not discuss how the location of cues, other than being placed at key decision points, influenced wayfinding performance. As Davis, Ohman, and Weisbeck (2017) noted there is some

evidence to support that mobile persons with AD tend to look at the ground when walking, and those using a wheelchair look just above the handrails when navigating space, they offer no insight into how this finding was integrated into the location of the salient cues in the study.

Lastly, Davis, Ohman, and Weisbeck's (2017) findings also conflict with some research that was discussed previously. In *Chapter 3: Evidence-Based Design Strategies for Persons with Alzheimer's Disease*, the literature review conducted by Marquardt, Bueter, and Motzek (2014) revealed that environmental cues such as signs, labels and colour coding helped residents carry out activities of daily living, and cues that used text were better understood than cues that used icons or images alone. In Davis, Ohman, and Weisbeck's (2017) study, text was not used to supplement the wayfinding cues, yet persons with mild AD and MCI were still able to find their way more efficiently with the support of colourful, familiar environmental cues. Because the sample size consisted of thirty persons with mild AD in Davis, Ohman, and Weisbeck's (2017) study, it can be concluded that these individuals do not rely on the integration of text to remember and navigate the space around them. It can be hypothesized that the findings from Marquardt, Bueter, and Motzek's (2014) literature could have included persons with severe dementia, who may rely more on text than images to find their way. As language is one of the first skills humans develop, it is one of the last skills persons with AD lose according to the theory of retrogenesis. Therefore, persons with mild AD may not rely so heavily on text as do persons with severe AD. As Alzheimer's disease affects each person very differently, some may rely more on visual images over text to navigate their

environment, or vice versa. Given these conflicting findings, both images and text will be used in the design of The Lakes to ensure all persons with AD can safely navigate the space around them.

5.3.2 Application to Practicum

Despite the limitations outlined above, Davis, Ohman, and Weisbeck's (2017) research is one of very few examples that reveal a positive correlation between a person with mild AD's wayfinding performance using colourful, familiar cues in large-scale environments. As the DFCC integrates a variety of services and amenities to its occupants with dementia, it is important that these wayfinding features are introduced to provide occupants with wayfinding support in a large-scale environment. As highly salient cues were demonstrated to enhance the wayfinding performance of persons with AD, these features will be integrated into the design of The Lakes, however, other factors that were not tested in the study must be considered. To ensure the cue remains highly salient, visual stimulation around the cue must be reduced to ensure it stands out as much as possible. Moreover, due to the fact that the DFCC and The Lakes are both large scale environments, acoustic and visual comfort must also be maintained to ensure the wayfinding of persons with AD is not hindered. Lastly, due to the conflicting findings regarding the use of text to support environmental cues, text will also be used to supplement the wayfinding cues in the design of The Lakes Memory Care to ensure all persons with AD can navigate the space around them.

Chapter 6:

Design Programme

Design Programme

6.1 Introduction

The following chapter outlines the design programme that will inform the development of the interior design and programming of The Lakes Memory Care, located on the conceptual site of Roberts' (2018) Dementia Friendly City Center (DFCC). This chapter includes a profile of the client as well as a statement on how the facilities are expected to operate, an overview of user groups expected to use the space, as well as functional and spatial requirements that will help inform the design of the facility.

6.2 Client Profile

The Lakes is a hypothetical memory care provider and client for this practicum. The care model used by the client is the person-centered care (PCC) model. As mentioned in *Chapter 2*, PCC is a dementia care philosophy that values providing high quality care that affords the care-receiver with dignity, compassion and respect. PCC recognizes the individual and their strengths, rather than focusing only on the illness. Unlike traditional memory care facilities that typically group all persons with dementia into one secured environment, The Lakes Memory Care wishes to offer a supportive living environment for persons with mild to moderate dementia on the main level of the building. When an individual reaches the moderate to severe stage, they are relocated

to the secured wings on the upper level. The design of this practicum will focus on the lower living units for persons with mild to moderate dementia.

6.3 Facility Operations

6.3.1 The Lakes Memory Care

The supportive living environment located on the main level is available for single / childless persons with mild to moderate AD who wish to have access to care services but want to remain part of a community. The memory care provider is organized into business office management that includes administration personnel and book keepers, environmental services that include house keeping, laundry services, and maintenance. Recreation services will be provided by visiting instructors and volunteers. Rehabilitation services will be provided by occupational and physiotherapists and social work services will be provided by the social workers located in the Welcome Center. Lastly, dietary and nursing services provided by nurses and healthcare aides at The Lakes Memory Care.

Unlike traditional memory care environments, the units on the main level will not be locked and will allow persons with mild to moderate dementia to freely come and go, as well as access the services and amenities located on



Figure 19. Site plan of the Dementia Friendly City Center (DFCC) depicting the surrounding amenities proposed by Roberts and Students of Oklahoma State University (2018).

the conceptual site of the DFCC, as shown in Figure 19.

Similar to home care services, the staff who work on the households will provide various levels of care (ie. cleaning, dressing, medications), depending on the individual's needs. The Welcome Center is located on the main level of the north wing and will provide a variety of support services for not only the residents living on the units, but also to persons with AD from outside the facility. The activity room will host activities and events for persons with dementia living at The Lakes or in the surrounding community. The social work offices will provide residents living at The Lakes with access to a power of attorney as single, childless individuals with AD may not have family members to make legal decisions for them.

6.3.2 Dementia Friendly City Center

Because this practicum is using the site of Roberts and Pereira's (2018) Dementia Friendly City Center concept, there is already a fitness facility, retail, bank, medical clinic, library and community gardens located on site, shown in Figure 19.

6.4 Human Factor Analysis

The following human factor analysis will provide an overview of the primary, secondary and tertiary users that are expected to use the The Lakes Memory Care. Each user will be provided with a description, as well as an assessment of their needs and activities they are expected to engage in. This information will be used to help inform the interior design and programming of the space to ensure that all needs and activities are well supported.

Table 3. Primary Users - Persons with Alzheimer's Disease

User	Age/ Gender	Description	Needs	Activities
Person with Mild to Moderate Alzheimer's Disease QTY: 8 per household 24 total	50+ All gender identities	<ul style="list-style-type: none"> Requires assistance for some activities of daily living, such as dressing. May require assistance for some personal care, such as bathing Responds to music; likes to engage in repetitive behaviors or simple activities such as clipping coupons, folding laundry, sorting coins (Carson, Vanderhorst, & Koenig, 2015). Responds to nostalgic activities such as listening, singing or dancing to music from their youth Experiences lapses in memory Aggression, agitation, anxiety and apathy occurs more regularly depending on the person's coping abilities (Carson, Vanderhorst, & Koenig, 2015). 	<ul style="list-style-type: none"> Universal/barrier free design Supportive design Adequate indoor environmental quality (acoustic, visual, temperature, etc). Circadian rhythm regulation Privacy Belonging Control /ownership Secure Safe At ease Familiar / At home Trust Empowerment 	<ul style="list-style-type: none"> Activities of daily living (ie. personal hygiene, toileting, dressing, feeding, walking) on own or with aid Instrumental activities of daily living (ie. companionship, shopping, preparing meals, managing household, medications, finances) on own or with aid Sleeping Socializing Lounging/relaxing Receiving treatments/therapies Physical/Recreational Activity

Table 4. Primary Users - Persons with Alzheimer's Disease

Though persons with Severe AD will not be living the main floor of The Lakes Memory Care, there will be individuals with severe AD accessing the Welcome Center and surrounding amenities located on site. Therefore it is important to consider the needs of these individuals as well to ensure that the space is equally supportive.

User	Age/ Gender	Description	Needs	Activities
Person with Severe Alzheimer's Disease (Late Stage) QTY: varies	50+ All gender identities	<ul style="list-style-type: none"> Needs help with all activities of daily living Requires 24/7 care Challenging behaviors become more apparent depending on the person's coping abilities (Carson, Vanderhorst, & Koenig, 2015). Enjoys simple, repetitive behaviors and nostalgic music (Carson, Vanderhorst, & Koenig, 2015). 	<ul style="list-style-type: none"> Universal/barrier free design Supportive design Adequate indoor environmental quality (acoustic, visual, temperature, etc). Circadian rhythm regulation Belonging Control Secure Safe At ease Familiar Trust Empowerment 	<ul style="list-style-type: none"> Instrumental activities of daily living (ie. companionship, shopping, preparing meals) with aid Socializing Leisure Activity Physical/Recreational Activity

Table 5. Primary Users - Medical / Caregiving Staff

User	Age/ Gender	Description	Needs	Activities
Geriatrician QTY: 1	30+ All gender identities	<ul style="list-style-type: none"> Specialize in care for older individuals Diagnose and treat age related conditions Help maintain patient mental and physical well-being Part-time staff member 	<ul style="list-style-type: none"> Productive, efficient environment Adequate sensory stimulation for accurate treatment / medicine distribution 	<ul style="list-style-type: none"> Facilitate treatments, measuring and recording vitals, administer medications, engaging with residents, clerical work
Geriatric Nurse QTY: 2 per unit	25+ All gender identities	<ul style="list-style-type: none"> Specialize in care for older individuals Provide daily care for residents Help maintain patient mental and physical well-being Full-time staff member 	<ul style="list-style-type: none"> Productive, efficient Adequate sensory stimulation for accurate treatment / medicine distribution Adequate space to assist residents 	<ul style="list-style-type: none"> Measuring and recording vitals, administer medications, helping residents with basic activities of daily living, engaging with residents, clerical work, organizing events and activities, collaborate with other staff to plan activities

Table 6. Primary Users - Medical / Caregiving Staff Continued

User	Age/ Gender	Description	Needs	Activities
Health Care Aide QTY: 2 per unit	25+ All gender identities	<ul style="list-style-type: none"> • Help nursing staff care for residents • Provide daily care for residents • Help maintain patient mental and physical well-being • Full-time staff member 	<ul style="list-style-type: none"> • Productive environment that provides adequate space to assist or spend time with residents • Adequate sensory stimulation 	<ul style="list-style-type: none"> • Help nursing staff provide care for residents, helping residents with basic activities of daily living, engaging with residents, organizing events and activities, collaborate with other staff to plan activities / events
Social Worker QTY: 3	25+ All gender identities	<ul style="list-style-type: none"> • Specialize in the social well-being of individuals and their families • Participate in resident care planning • Full-time staff member 	<ul style="list-style-type: none"> • Comfortable environment to discuss care plans with residents / geriatrician • Adequate sensory stimulation • Organized work environment 	<ul style="list-style-type: none"> • Advocate and help maintain resident's mental, physical, and social well-being, responsible for admissions and marketing processes, provide counseling to residents, participate in resident care planning, collaborate with other staff to plan activities / events, arrange meetings with the physician, eating

Table 7. Secondary Users - Support Staff, Administrative Staff, Maintenance Staff

User	Age/ Gender	Description	Needs	Activities
Administrative Staff QTY: 2	18+ All gender identities	<ul style="list-style-type: none"> • Conducts administrative duties within the facility such as patient records, organizing events, etc. • Full-time staff member 	<ul style="list-style-type: none"> • Organized environment for productive clerical work • Comfortable • Adequate sensory stimulation 	<ul style="list-style-type: none"> • Clerical work, organizational work
Cafe Staff QTY: 4	18+ All gender identities	<ul style="list-style-type: none"> • Prepare and cook meals to be served in the cafe • Full-time staff member 	<ul style="list-style-type: none"> • Safe work environment with adequate sight lines to avoid falls around hot / sharp equipment • Organized • Adequate sensory stimulation 	<ul style="list-style-type: none"> • Cooking, cleaning, ordering products (ie. food)
Maintenance QTY: 1 per unit	18+ All gender identities	<ul style="list-style-type: none"> • Maintains the building so that is clean and safe for the users • Full-time staff member 	<ul style="list-style-type: none"> • Efficient, safe work environment • Adequate sensory stimulation to ensure dirt / spills can be seen 	<ul style="list-style-type: none"> • Cleaning, ordering products (ie. cleaning supplies), doing laundry

Table 7. Secondary Users Continued

Hired Companions / Volunteers QTY: varies	18+ All gender identities	<ul style="list-style-type: none"> Helps nursing and healthcare aids with the care of the social needs of the residents Part-time staff members 	<ul style="list-style-type: none"> Adequate sensory stimulation 	<ul style="list-style-type: none"> Socializing with residents, engaging in activities with residents
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Table 8. Tertiary Users - Support Staff, Community Members

User	Age/ Gender	Description	Needs	Activities
Occupational Therapist	25+ All gender identities	<ul style="list-style-type: none"> Specialize in the treatment of residents through the therapeutic use of basic and meaningful activities of daily living Participate in resident care planning Part time staff member 	<ul style="list-style-type: none"> Productive environment to carry out activities / treatments Sufficient space to assist residents using a wheelchair Adequate sensory stimulation 	<ul style="list-style-type: none"> Advocate and help maintain resident's functional and psychological well-being, access and record activities and progress, participate in resident care planning (ie. recommend specific aids, such as a wheelchair), collaborate with other staff to plan activities / events, eating, lounging, socializing
Dietitian	25+ All gender identities	<ul style="list-style-type: none"> Specialize in meeting the nutritional needs of residents through specialized meal planning Full time staff member 	<ul style="list-style-type: none"> Safe work environment with adequate sight lines to avoid falls around hot / sharp equipment Organized Adequate sensory stimulation 	<ul style="list-style-type: none"> Assess newly admitted residents for nutritional risks, document individual needs, prepare meal plans for residents, facilitate meal plan among kitchen staff, managing food production operations
Visitors and community members	18+ All gender identities	<ul style="list-style-type: none"> Each community member will be on site for a brief period of time and have very different needs 	<ul style="list-style-type: none"> Universal/Barrier-free Design Safe Social interaction 	<ul style="list-style-type: none"> Varies
Delivery services, emergency medical services (EMS), visiting instructors	18+ All gender identities	<ul style="list-style-type: none"> Each user will be on the site for a brief period of time 	<ul style="list-style-type: none"> Efficient Access to main points of entry Access to loading zones 	<ul style="list-style-type: none"> Delivery services: drop off parcels EMS: pick up persons who need emergency medical assistance, bring expired individuals to funeral home Visiting instructors: facilitate leisure/ recreation activities to residents

6.5 Functional and Spatial Requirements

Table 9. *The Lakes - Welcome Center*

Space/Activity	Description	Area	FF&E	Atmosphere	Material considerations
Reception QTY: 1	<ul style="list-style-type: none"> To provide users with a space of orientation for both residents and visitors. 	200 sq ft	<ul style="list-style-type: none"> Furniture: Horizontal work surface, storage for files, personal items, task seating, lounge seating, coffee tables Equipment: desk top computer, surveillance system, telephone 	<ul style="list-style-type: none"> Warm, welcoming, home-like 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, anti-slip, subtle patterns, effective colour contrast, sound absorbing where applicable, sustainable (ie. high recycled content), low VOCs
Waiting Area	<ul style="list-style-type: none"> To provide residents and visitors with a space to sit while waiting for the social workers 	650 sq ft	<ul style="list-style-type: none"> Furniture: Couch, tables, side tables, chairs, lounge seating Fixtures: lamp(s) Equipment: TV screen 	<ul style="list-style-type: none"> Warm, welcoming, home-like 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, anti-slip, subtle patterns, effective colour contrast, sound absorbing where applicable, sustainable (ie. high recycled content), low VOCs
Social Services Private Offices QTY: 3	<ul style="list-style-type: none"> To provide a comfortable environment to discuss care plans with residents / caregivers, and to conduct admissions and marketing work for the facility 	150 sq ft each	<ul style="list-style-type: none"> Furniture: Horizontal work surface, storage for resident files and personal items, task chair, guest chair, recycling Fixtures: - Equipment: Desktop computer, key card entry 	<ul style="list-style-type: none"> Functional, productive, focused 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, sound absorbing, subtle patterns, effective colour contrast, sound absorbing, sustainable (ie. high recycled content), low VOCs

Space/Activity	Description	Area	FF&E	Atmosphere	Material considerations
Resource Room QTY: 1	<ul style="list-style-type: none"> To provide the administrative staff an area to make copies of resident files, print or scan files as well as a place to store office supplies 	100 sq ft	<ul style="list-style-type: none"> Furniture: Horizontal work surface, storage Equipment: Desktop computer, copy machine, printer/scanner, office supply storage, recycling/e-waste, confidential waste, key card entry 	<ul style="list-style-type: none"> Warm, welcoming, functional, efficient 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, sound absorbing, sustainable (ie. high recycled content), low VOCs
Meeting Room QTY: 1	<ul style="list-style-type: none"> To provide staff with a space to hold group meetings, as well as meet with stakeholders from outside of the facility Offers small support group sessions for residents 	200 sq ft	<ul style="list-style-type: none"> Furniture: Conference table, conference chairs, credenza Fixtures: Sink Equipment: projector, smart board, coffee machine, under cabinet fridge, key card entry 	<ul style="list-style-type: none"> Warm, welcoming, engaging, private 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, sound absorbing, subtle patterns, effective colour contrast, sound absorbing, sustainable (ie. high recycled content), low VOCs
Activity Room QTY: 2	<ul style="list-style-type: none"> To provide a space to hold events and activities for persons with dementia living at The Lakes or outside the facility 	+/- 1,500 sq ft	<ul style="list-style-type: none"> Furniture: Tables, chairs, shelving, storage Fixtures: sink Equipment: projector, projector screen 	<ul style="list-style-type: none"> Warm, welcoming 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, acoustic control, subtle patterns, effective colour contrast, sustainable (ie. high recycled content), low VOCs
Universal Toilet Room QTY: 2 water closets for males, 3 for females, as per the NBCC.	<ul style="list-style-type: none"> Instead of traditional male/female water closets, five separate universal toilet rooms will be provided 	75 sq ft each	<ul style="list-style-type: none"> Fixtures: Sink, toilet Equipment: Hand dryer Accessories: toilet paper holder, soap dispenser, grab bars, garbage bin 	<ul style="list-style-type: none"> Functional, private, secure 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, sound absorbing, subtle patterns, effective colour contrast

Space/Activity	Description	Area	FF&E	Atmosphere	Material considerations
Cafe - Kitchen QTY: 1	<ul style="list-style-type: none"> To prepare meals for residents or facility events 	750 sq ft	<ul style="list-style-type: none"> Furniture: Horizontal prep surface, dry food storage, cold and frozen food storage Fixtures: Sink Equipment: refrigerator, freezer, dishwasher, garbage/recycling, oven/cook top, microwave, POS system 	<ul style="list-style-type: none"> Functional, efficient 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-slip, sustainable (ie. high recycled content), low VOCs
Cafe - Seating Area QTY: 1	<ul style="list-style-type: none"> To provide a space for residents and visitors to eat their meals 	2,000 sq ft	<ul style="list-style-type: none"> Furniture: Dining table and chairs 	<ul style="list-style-type: none"> Warm, welcoming 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, acoustic control, subtle patterns, effective colour contrast, sustainable (ie. high recycled content), low VOCs
Courtyard QTY: 1	<ul style="list-style-type: none"> To provide a protected outdoor area for residents and visitors to enjoy 	-	<ul style="list-style-type: none"> Furniture: Outdoor tables and chairs, planters 	<ul style="list-style-type: none"> Relaxing, Safe, Secure 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare
WELCOME CENTER TOTAL SQ FT + 15% CIRCULATION = 6200 + 930 = APPROX 7,130 SQ FT					

Table 10. *The Lakes - Typical Household*

Space/Activity	Description	Area	FF&E	Atmosphere	Material considerations
Lounge QTY: 1 per household	<ul style="list-style-type: none"> To provide a space for residents to socialize. 	600 sq ft	<ul style="list-style-type: none"> Furniture: Lounge seating, coffee tables, end tables, fire place, shelving for books, entertainment unit Equipment: Television, radio/ stereo system 	<ul style="list-style-type: none"> Warm, welcoming, calming, cozy, at home 	<ul style="list-style-type: none"> Warm tones, soft, cleanable, anti-microbial, durable, anti-glare, anti-slip, subtle patterns, effective colour contrast, sustainable (ie. high recycled content), low VOCs
Charting Station QTY: 1 per household	<ul style="list-style-type: none"> To provide users with a space of orientation for both residents. Residents can use this space to receive help from nurses/care givers. Nurses and care givers use this space for clerical work when they are not tending to the resident. 	150 sq ft	<ul style="list-style-type: none"> Furniture: Horizontal work surface, storage for resident files, personal items, task seating, lounge seating, coffee tables Equipment: desk top computer, surveillance system, telephone, medical supplies 	<ul style="list-style-type: none"> Warm, welcoming comfortable, approachable, views to nature 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, anti-slip, subtle patterns, effective colour contrast, sound absorbing where applicable, sustainable (ie. high recycled content), low VOCs
Kitchen QTY: 1 per household	<ul style="list-style-type: none"> To prepare meals in a group setting for residents and caregivers 	600 sq ft	<ul style="list-style-type: none"> Furniture: horizontal prep surface, dry food storage, serving cart Fixtures: Sink Equipment: stove, microwave, dishwasher, coffee machine, refrigerator, freezer 	<ul style="list-style-type: none"> Welcoming, safe, functional 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, anti-slip, subtle patterns, effective colour contrast, sound absorbing where applicable, sustainable (ie. high recycled content), low VOCs

Space/Activity	Description	Area	FF&E	Atmosphere	Material considerations
Dining Room QTY: 1 per household	<ul style="list-style-type: none"> To provide a space for residents to sit and dine with visitors, caregivers or fellow residents 	700 sq ft	<ul style="list-style-type: none"> Furniture: Dining table and chairs 	<ul style="list-style-type: none"> Welcoming, safe, functional 	<ul style="list-style-type: none"> Warm, contrasting tones Cleanable, anti-microbial, durable, anti-slip, sustainable (ie. high recycled content), low VOCs
Private Suites QTY: 8 per household	<ul style="list-style-type: none"> To provide residents with a private space to sleep, dress, bathe, etc. Each suite and its private bathroom must be fully accessible. Private suites include a bedroom, bathroom, kitchenette/dining room and living space Must be fully accessible 	625 sq ft per suite Total: 5,000 sq ft	<ul style="list-style-type: none"> Furniture: Geriatric bed, wardrobe, storage, shelving, table, soft seating, dining table and chairs Fixtures: Sink, toilet, accessible bath/shower Equipment: call button, lighting controls, microwave, coffee machine, kettle, stove with safety switches, key card entry 	<ul style="list-style-type: none"> Warm, relaxing, private, cozy, at home 	<ul style="list-style-type: none"> Warm, contrasting tones Cleanable, anti-microbial, durable, anti-glare, anti-slip, subtle patterns, effective colour contrast, sound absorbing, sustainable (ie. high recycled content), low VOCs
Clean Storage QTY: 1 per household	<ul style="list-style-type: none"> To provide staff with an area to store clean linens and equipment 	250 sq ft	<ul style="list-style-type: none"> Furniture: Shelving, Horizontal work surface, storage, clean linen cart Fixtures: Utility sink, soap dispenser, napkin dispenser 	<ul style="list-style-type: none"> Functional, utilitarian, sanitary 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, , sustainable (ie. high recycled content), low VOCs
Dirty Storage QTY: 1 per household	<ul style="list-style-type: none"> To provide staff with an area to dispose of soiled products 	250 sq ft	<ul style="list-style-type: none"> Furniture: Shelving, Horizontal work surface, storage, soiled linen cart Fixtures: Utility sink, soap dispenser, napkin dispenser Equipment: medical disposal 	<ul style="list-style-type: none"> Functional, utilitarian, sanitary 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, , sustainable (ie. high recycled content), low VOCs

Space/Activity	Description	Area	FF&E	Atmosphere	Material considerations
Laundry QTY: 1 per household	<ul style="list-style-type: none"> To provide a space for residents to clean their laundry 	200 sq ft	<ul style="list-style-type: none"> Furniture: Horizontal work surface Fixtures: Utility Sink Equipment: Washing machines, Dryers, Shelving for cleaning supplies, Storage 	<ul style="list-style-type: none"> Clean, organized 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, , sustainable (ie. high recycled content), low VOCs
Bathing Room QTY: 1 per household	<ul style="list-style-type: none"> To provide a space for caregivers to help residents bathe 	150 sq ft	<ul style="list-style-type: none"> Fixtures: accessible bathtub/shower, sink, toilet Accessories: toilet paper holder, grab bars, linen storage 	<ul style="list-style-type: none"> Calming, clean, private 	<ul style="list-style-type: none"> Warm tones Cleanable, anti-microbial, durable, anti-glare, , sustainable (ie. high recycled content), low VOCs
Staff Room QTY: 1 per household	<ul style="list-style-type: none"> To provide a space for staff to relax, lounge, or hold meetings 	250 sq ft	<ul style="list-style-type: none"> Furniture: table, task chairs, horizontal work surface Fixtures: sink Equipment: refrigerator, microwave, lockers 	<ul style="list-style-type: none"> Calming, private 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, , sustainable (ie. high recycled content), low VOCs
Storage QTY: 1 per household	<ul style="list-style-type: none"> To provide a space for storage 	75 sq ft		<ul style="list-style-type: none"> Organized, functional 	
Universal Toilet Room QTY: 1 per household	<ul style="list-style-type: none"> Instead of traditional male/female water closets, five separate universal toilet rooms will be provided 	75 sq ft each	<ul style="list-style-type: none"> Fixtures: Sink, toilet Equipment: Hand dryer Accessories: toilet paper holder, soap dispenser, grab bars, garbage bin 	<ul style="list-style-type: none"> Functional, private, secure 	<ul style="list-style-type: none"> Cleanable, anti-microbial, durable, anti-glare, sound absorbing, subtle patterns, effective colour contrast
HOUSEHOLD TOTAL SQ FT + 15% CIRCULATION = 11,000 + 1650 = APPROX 12,650 SQ FT					

GRAND TOTAL

WELCOME CENTER = 7,130 SQ FT
HOUSEHOLDS = 12,650 x 3 HOUSEHOLDS = 37,950 SQ FT

45,080 SQ FT REQUIRED

Chapter 7:

Site and Building Analysis

Site and Building Analysis

7.1 Introduction

As mentioned in *Chapter 1: Project Overview*, the conceptual site for this practicum project builds off of the work of Dr. Emily Robert's Dementia Friendly City Center (DFCC) concept. Located on the site of the Plaza Mayor, a vacant shopping mall located in Oklahoma City, OK, USA, Dr. Emily Roberts of Oklahoma State University has proposed to redevelop the former retail site into a dementia friendly city center.

The DFCC concept was developed over a three day design charrette involving researchers, under graduate and graduate students as well as community members from a nearby town (Roberts, 2019). The purpose of the charrette was to discover what organizational factors are required to create a feasible DFCC from an existing retail property, what services and amenities should be included in the DFCC, what private and/or public partnerships can be created and how might the redevelopment of a vacant retail property impact destitute communities, as well as how can sustainable design strategies be implemented into the DFCC concept (Roberts, 2019). The outcome of the charrette revealed that there is a need to integrate therapeutic environments, sustainability, wayfinding and universal design strategies to create a city center that is dementia friendly (Roberts & Pereira, 2018; Roberts, 2019).



Figure 20. Oklahoma, USA

Based on the charrette outcomes, medical, retail, fitness, educational, leisure facilities, as well as independent, assisted living and memory care units were proposed on the conceptual site of the DFCC that can be accessed by those with dementia as well as surrounding community members (Roberts, 2019). Specifically, this practicum project focuses on the interior design of The Lakes Memory Care, located on the southern most point of the site plan, shown in Figure 222.

The Lakes Memory Care

Project Type

- New construction
- Healthcare

Area

- +/- 45,000 sq ft
(Main level - The Lakes Memory Care)

Address

7000 Crossroads Blvd
Oklahoma City, OK, USA

7.2 Existing Conditions

The Plaza Mayor, formally known as the Crossroads Mall is a vacant, two storey shopping center located in South Oklahoma City, Oklahoma, at the “crossroads” of interstates 35 and 240. Oklahoma City is the capital of the state, with a population of 643, 650 (U.S. Census Bureau, 2017).

The Plaza Mayor opened its doors as the Crossroads mall in 1974, and ceased operation in 2017 after a failed re-branding attempt as the Plaza Mayor (Money, 2017). As of 2019, the mall and its surrounding anchor stores are vacant except for the east anchor store, which has been renovated into the Santa Fe Charter High School.

7.3 Site Inventory

The zoning of the site is currently composed of industrial and retail properties with residential directly adjacent. Properties adjacent to the site in the north include Burger King, JA King, Magnuson Hotel Oklahoma City South. Properties located to the east of the the site include Dealers Finance Company, as well as Wingate Wyndham Oklahoma City South, Residence Marriott Oklahoma City South, Texas Roadhouse, and AMC Classic Crossroads Mall Movie Theatre in the south. OCCC Professional Development and the Will Rogers World Airport is located to the west of the site.

The majority of the site is composed of concrete due to the surface parking lot and mall structure that exist on site. The only vegetation located on site are boulevards to divide vehicular access points.

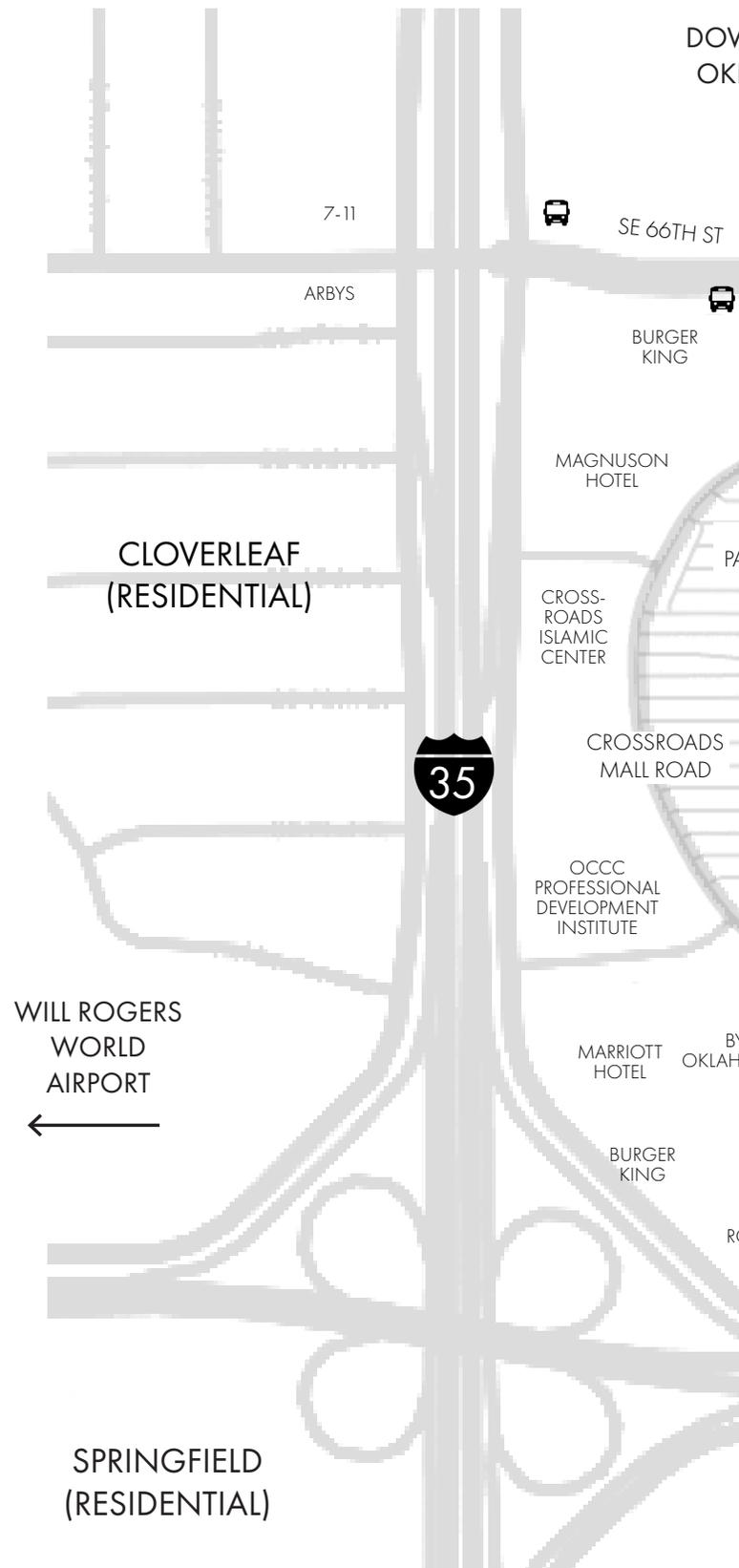


Figure 21. Existing Site Plan - NTS

WINTOWN
OKLAHOMA
CITY



SE 66TH ST

VALLEY BROOK
(RESIDENTIAL)

CROSSROADS
MALL ROAD

TRACKS

SURFACE
PARKING LOT

SURFACE
PARKING LOT

ARRAY
PRODUCTS

DOW AERO
LOGISTICS

DURHAM
SUPPLY



**EXISTING
SITE**

SANTA FE
CHARTER
SCHOOL

BEVCO

PHARMACORR

DIRECTIONAL
FLUID DISPOSALS

SURFACE
PARKING LOT

SURFACE
PARKING LOT

DEALERS
FINANCE
COMPANY

CROSSROADS
BOULEVARD

WINGATE
BY WYNDHAM
OKLAHOMA CITY SOUTH
HOTEL

CROSSROADS
MALL ROAD

TRACKS

AMC CLASSIC
MOVIE THEATRE

TEXAS
ROADHOUSE



SOUTH OKLAHOMA CITY





Figure 22. The Dementia Friendly City Center site plan as proposed by Roberts and Students. This practicum will develop the interior of The Lakes Memory Care, a conceptual facility for persons with Alzheimer's disease.

7.4 Climate

Oklahoma's climate varies from humid subtropical in the eastern portion of the state and to semi-arid in the west (Oklahoma Climatological Survey, 2018). Humidity, cloudiness and precipitation experienced in the south and eastern regions is caused by warm air moving up from the Gulf of Mexico (Oklahoma Climatological Survey, 2018). Oklahoma's summers are typically long and hot. Winters are shorter and milder than northern states (Oklahoma Climatological Survey, 2018). The mean annual temperature ranges from 14°C (58F) in the north, 16°C (62F) in the south, and 13°C (56F) in the west (Oklahoma Climatological Survey, 2018).

7.5 Vegetation

To offset the environmental impacts associated with the excessive use of concrete in retail properties, the proposed site plan of the DFCC by Roberts and OSU students (2019) includes the re-greening of the surface parking lot, the addition of a retention pond that surrounds The Lakes Memory Care, and the addition of foliage around the site.

7.6 Wind Patterns

From spring to fall, prevailing winds are primarily from south to south east. The state experiences roughly equal north and south winds during the winter months (Oklahoma Climatological Survey, 2018)

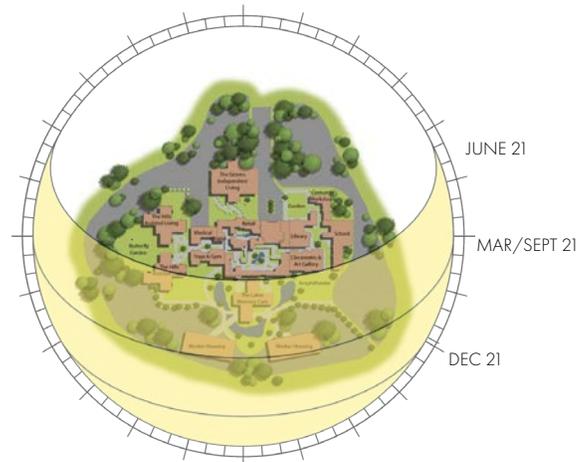


Figure 23. Sun Path Diagram. The site receives the most natural light in the south.

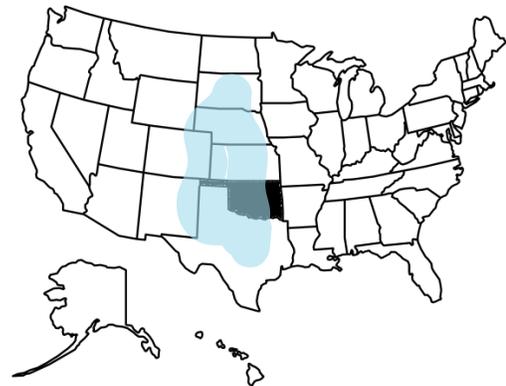


Figure 24. "Tornado Alley." It should be noted that over half of the state is within this path of extreme weather.

7.7 Extreme Weather

Oklahoma City located in the US's "Tornado Alley" due to the frequency it experiences these extreme weather events, primarily from March to June (Oklahoma Climatological Survey, 2018). Over the last seventy years, the state has experienced an average of 53 tornadoes per year (Oklahoma Climatological Survey, 2018).

Due to the extreme weather events that take place in the state of Oklahoma, resilient design strategies must be introduced to ensure the occupants of the building are protected. Some resilient design strategies related to tornadoes include: safe rooms that provide a fortified place of refuge for building occupants in the event of extreme weather, protected back-up generators structural reinforcement to the building's roof and foundation, as well as Federal Emergency Management Agency (FEMA) approved doors and windows to protect the building's openings and its occupants against high pressure winds and flying debris (U.S. Climate Resilience Toolkit, 2019).

7.8 Vehicular Access

The site is located at the intersection of interstates I-35 and I-240. Because it is on the site of a former shopping mall in the suburbs of Oklahoma City, it was previously designed to accommodate high levels of vehicular traffic. The site can be accessed by public transportation through the 014 Se Bryant or Sunnyslane bus service lines on SE 66th street, located north-west of the site. According to the city's bus schedule, the 014 Se Bryant services the site every forty-five minutes. To encourage occupants to use public transportation, more service lines should be introduced to encourage occupants to visit the site from other areas of the city, or the bus must come more

frequently to make the site more convenient to visit.

7.9 Circulation

On the proposed DFCC site, exterior walking paths lead up to eight points of entry located on the north, south, east and west segments of the building.

Vertical circulation, such as elevators and fire stairs have not yet been determined.

7.10 Site Opportunities

The site provides a sustainable alternative to meet the housing needs for persons with Alzheimer's disease through the adaptive reuse and new construction (Roberts, 2019). Likewise, the site provides an opportunity to implement sustainable design strategies to counteract the environmental impacts produced by suburban shopping malls (ie. Heat Island Effect from excessive use of concrete for surface parking) (Roberts, 2019).

The site of the DFCC has the potential to serve the needs of the surrounding community, and break down social barriers between younger and older members of the community (Roberts, 2019). By providing living environments away from the downtown core, urban design strategies can be implemented to allow persons with AD to roam the site independently and not be restricted to the indoors (Roberts, 2019).

7.11 Site Constraints

The site is located in one of the most tornado prone cities in the United States. Therefore resilient design strategies discussed previously must be introduced to protect both

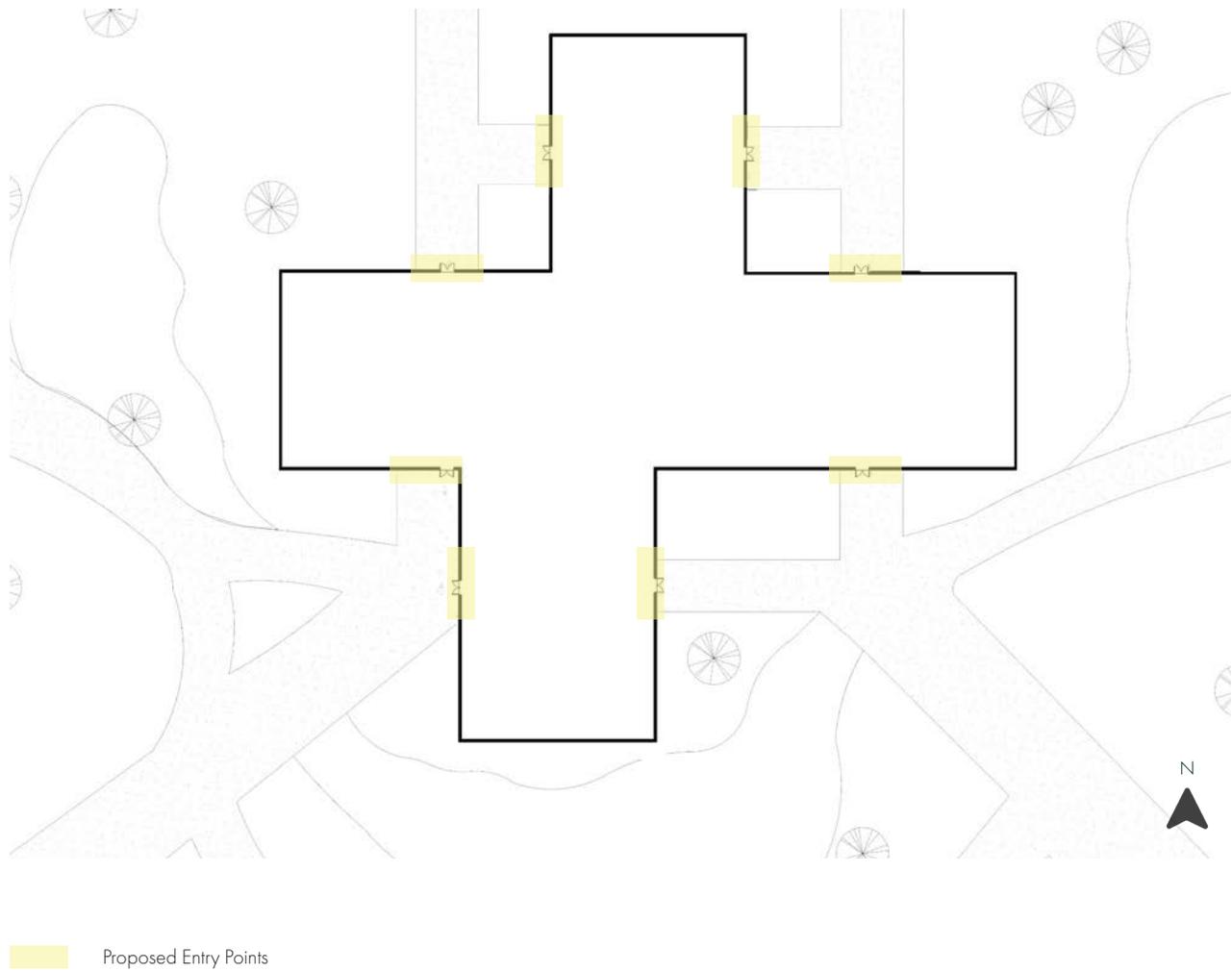


Figure 25. *Proposed entry points by Dr. Roberts and students of Oklahoma State University*

the building’s occupants and surrounding community.

The site is located in a suburban, Industrial area that cannot be accessed easily by public transit or foot.

The site is located 8.1 miles from the city’s major airport, therefore it can be assumed it experiences some level of noise pollution from both the interstates and airplanes landing/taking off.

7.12 Building Features

As The Lakes Memory Care is a hypothetical facility on a conceptual site, the building footprint is currently the only defining feature of the facility that has been developed. The main level is approximately 45,000 square feet. Vehicular access and exterior walking paths have been proposed by students of Oklahoma State, as indicated in Figure 255. The exterior facade has not yet been developed for The Lakes Memory Care.

Chapter 8:

Design Proposal

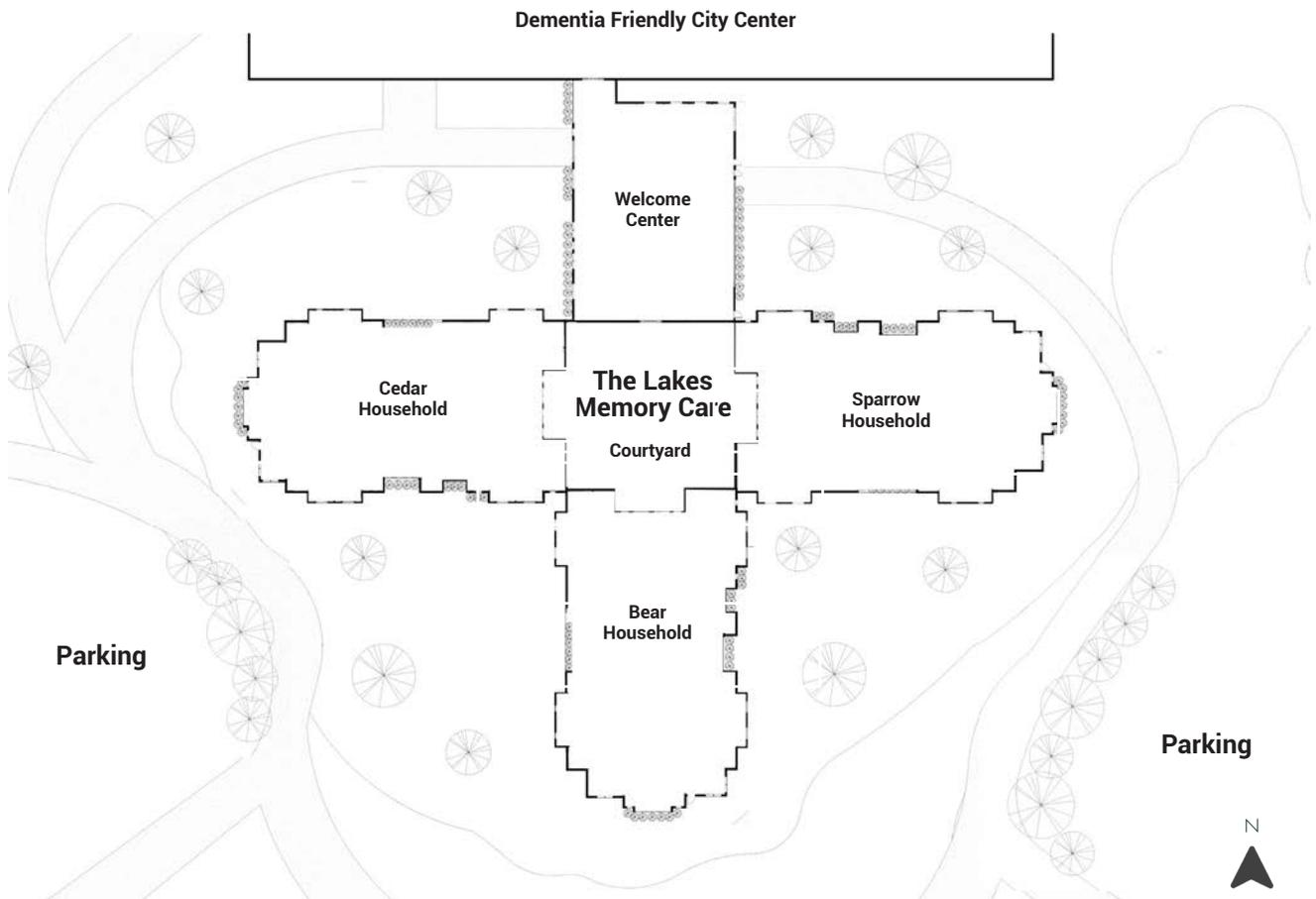


Figure 26. Site Plan - NTS

8.1 Introduction

As mentioned in *Chapter 1: Project Overview*, the design objectives associated with this practicum are to research how interior design can be used to create a supportive environment for single, childless individuals living with Alzheimer’s disease relocating into a memory care facility, and to explore how the interior environment can enhance the user’s well-being, sense of belonging and support their independence based on evidence-based and theoretical literature. In the following chapter, I will outline how the design of the proposed facility integrates

the theoretical and evidence-based literature to support the design objectives of this practicum.

8.2 Concept Statement

The Lakes Memory Care provides twenty-four persons with Alzheimer's disease with an environment that allows residents to continue living their day to day lives in a safe environment that supports their independence, sense of belonging and well-being while remaining part of

the surrounding Dementia Friendly City Center (DFCC) community (Roberts, 2019). Using a palette of warm tones, soft furnishings, natural materials and residential detailing, the design of The Lakes Memory Care emulates a comforting, home-like environment intended to enhance the well-being of the individual and reduce the clinical atmosphere so often associated with healthcare settings. Interior planting, direct views to the surrounding lake and access to the outdoors are incorporated into the design of the facility to minimize the stress and anxiety associated with relocation and provide calming views to nature. By drawing upon evidence-based and theoretical literature, the facility is organized to support the independence and social engagement of the individual, allowing them to engage in activities and create meaningful relationships while living in long-term care.

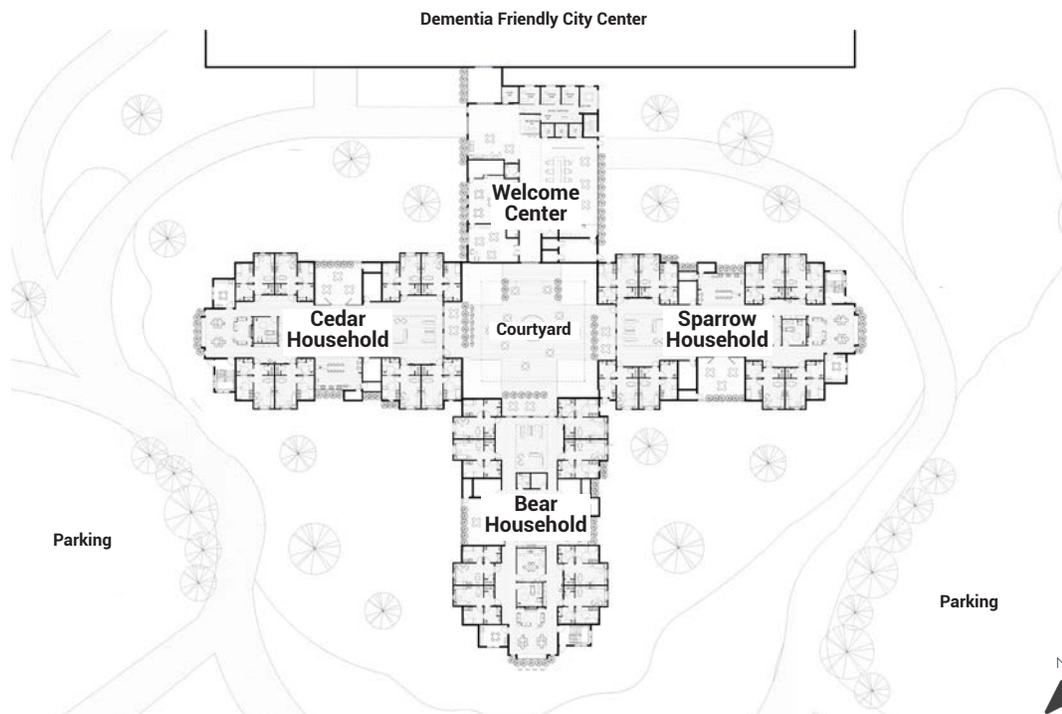
8.3 Building form and organization

To implement the evidence-based and theoretical literature discussed in previous chapters, modifications to the building's footprint and entry points are proposed. The bottom portion of the latitudinal form was moved to align with the upper latitudinal form, resulting in two equal rectilinear forms that intersected one another at their respective midpoints. This revision was proposed for three reasons. Firstly, it was important that each household was programmed to accommodate the same number of residents, therefore dividing the building into equal parts was important to achieve this. Secondly, evidence-based research suggests that buildings organized with straight circulation paths, direct sightlines and minimal changes in direction helped support the wayfinding performance and therefore independence of a person with AD (Mquardt, 2011). As a result, a symmetrical building footprint with a central node was vital to achieve this. Lastly, the revision of the building's footprint provided each private room organized along the perimeter with access to natural light, and all private rooms have a direct

view to the foliage or retention pond that surrounds the site. This revision to the building's footprint helped support the natural place dimension of place attachment theory by Scannell and Gifford (2010), who emphasize that humans are highly attached to natural places. Moreover, research suggests that direct views to nature have a significant impact on the well-being of the observer and can help reduce stress (Ulrich et al., 1991). As the process of relocation can induce feelings of stress, anxiety, and/or depression, the literature suggests that providing residents with exposure to nature has the potential to reduce the incidence of such feelings, enhancing the well-being and therefore quality of life of the residents relocating to the facility.

The proposed design of The Lakes Memory Care is divided into four segments, or wings, as shown in Figure 27. The north wing contains the Welcome Center which includes the facility's reception, social services, a café and two activity rooms. It was important to locate the Welcome Center in the north wing due to its proximity to the Dementia Friendly City Center (DFCC). The east wing contains the Sparrow household. The south wing contains the Bear household and the west wing contains the Cedar household, with an open-air courtyard that joins the three households with the Welcome Center. Each household was named after a familiar plant or animal so residents could easily identify and differentiate their household from another. As evidence-based research suggests that households with 5-15 residents were shown to enhance the well-being, behaviour, independent functioning and activity engagement of residents (Chaudhury, Cooke, Cowie & Razaghi, 2017), the building's area and programmatic requirements determined that eight private rooms could be accommodated per household to support this evidence-based design strategy to enhance the well-being of residents living at the proposed facility.

Figure 27.
Site plan with
partitioning - NTS



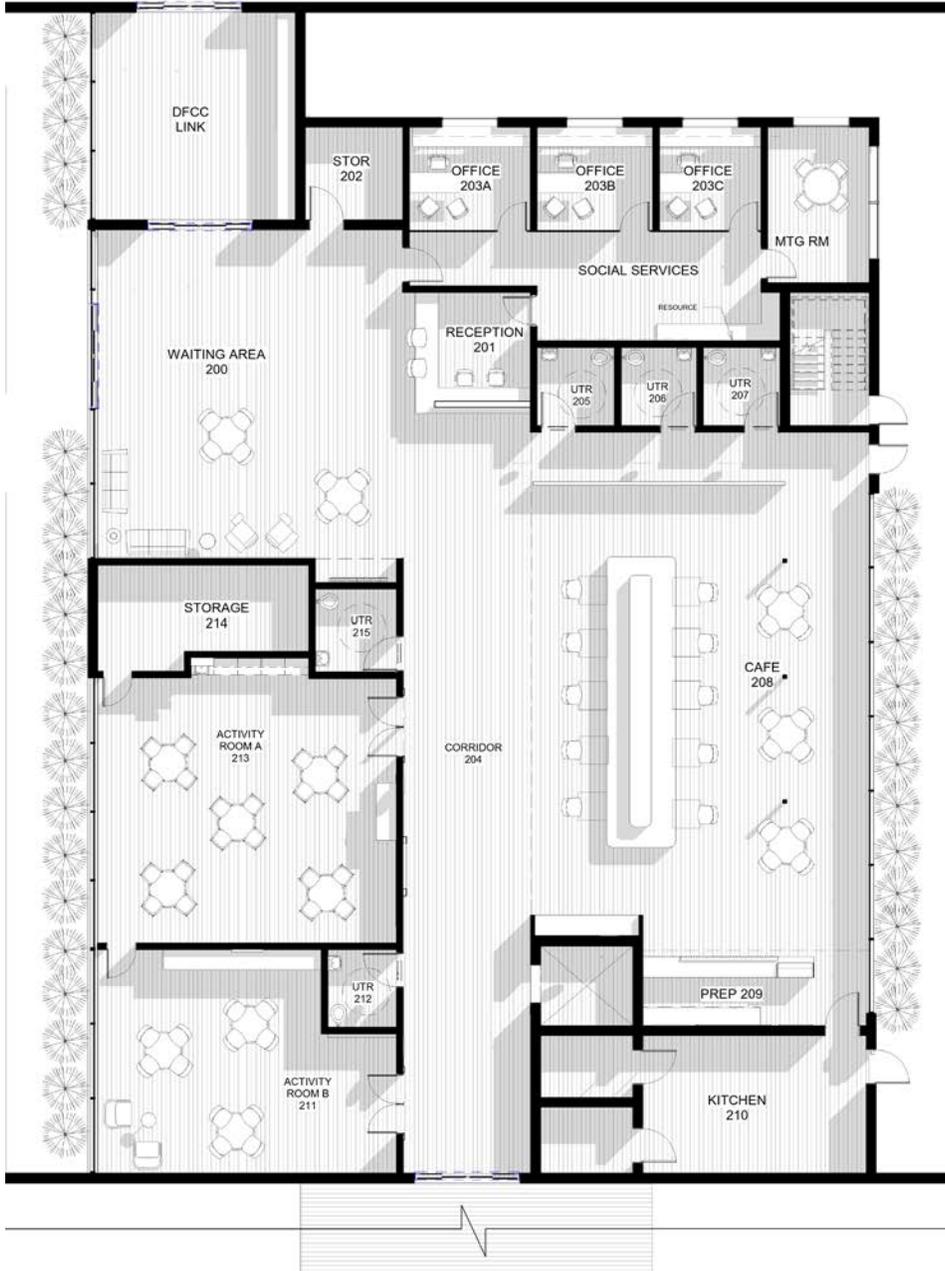
8.4 Welcome Center

As an individual walks into the Welcome Center from the DFCC, they enter the waiting area, with the receptionist and social services located directly adjacent. The reception desk is located with direct views to the corridor that leads to the courtyard, serving as a visual aide to support the wayfinding performance of a person with AD. The direct sightline between the reception desk and courtyard was crucial to support an individual's ability to find their way from their household to the Welcome Center, to the DFCC. As home-like, rather than institutional environments are supportive of the well-being of persons with AD (Marquardt, Bueter, & Motzek 2014; Chaudhury, Cooke, Cowie & Razaghi, 2017) the waiting room shown in Figure 29 was designed using soft furnishings and wall protection that mimics the look of shiplap to create a more residential, "lake house" atmosphere. The Lakes Memory Care logo is pin mounted onto the painted blue feature wall and lit by the ceiling mounted track lighting system to add dimension

to the space, while serving as a visual aide to orient not only visitors but also residents of the facility. A LED screen with pamphlets that contain information about The Lakes Memory Care as well as the DFCC are located underneath to provide visitors with information about the facility while they are in the waiting room.

As single, childless persons with AD may not have friends or family members to serve as their legal decision makers when their AD prognosis renders their decisional capacity to fall below state law, the employees located in the social services office adjacent to the waiting room help with legal decision making, whether financial or medical, and help maintain the resident's mental, physical, and social well-being while living at The Lakes Memory Care. The social workers are also responsible for admissions and marketing processes of the facility, provide counseling and resident care planning services as well as collaborate with other staff members to plan activities and events for the facility.

Dementia Friendly City Center



Courtyard / Households

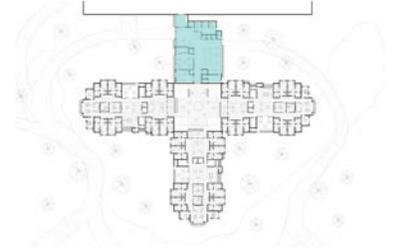


Figure 28. Welcome Center - NTS



Figure 29. *Waiting Area*



Figure 30. *Reception*

8.4.1 Cafe

Moving through the Welcome Center from the waiting area, a spacious corridor was proposed to divide the café from the enclosed activity rooms located opposite. A café was proposed in the Welcome Center to provide a space for residents living at the facility as well as visitors and employees to eat and socialize. However, noise may become an issue in an open space that can accommodate large groups of people. As evidence-based research suggests that noisy environments are associated with increased agitation, aggression, maladaptive behaviours, and decreased social interaction for persons with AD, adequate sensory stimulation is an important design factor for persons with dementia (Chaudhury, Cooke, Cowie & Razaghi, 2017). The acoustic baffles located above the banquette seating in the café was proposed to enhance the acoustic comfort of the space, while the horizontal windows located on the east facade provide views to the exterior as well as a source of natural light. In terms of wayfinding, the wooden acoustic baffles also serve to create a “district” that is visually distinctive from the waiting room to enhance the orientation of the resident. The banquette seating was designed with a planter bench that also serves as the back rest to provide the space with interior greenery, with rounded edges to prevent injury. The back lit wayfinding cues that locate the activity rooms on the interior wall of the corridor contrast the soft white walls, supporting the individual’s wayfinding performance using a familiar symbol with supporting text directly below.



Figure 31. View of Cafe / Corridor



Figure 32. Wayfinding Symbols

To create salient wayfinding cues, back lit, curvilinear signage was introduced to contrast the rectilinearity of the space to enhance their salience. The green bathroom wayfinding cues contrast all other wayfinding symbols within the space to enhance the prominence of them as well.





Figure 33. Corridor Elevation - View to Cafe



Figure 34. Corridor Elevation

8.4.2 Activity Room

According to Scannell and Gifford (2010) the social dimension of place attachment theory can facilitate person-place bonds through social ties and group identity, helping establish a sense of belonging in an environment that may be unfamiliar to the individual. To support an individual's sense of belonging through social interaction and activity engagement, two activity rooms are proposed in the Welcome Center. Activity room A is designed to accommodate large groups of 20 to 25 residents and/or visitors, and Activity room B can accommodate 8-12 people. Activity Room A contains a large storage room, allowing the space to be used for a variety of functions, including arts and crafts, speaking engagements, or film activities. Activity Room B is dedicated to residents who respond better to quieter, small group activities. As persons with AD experience problems with depth perception and colour differentiation, the bright, salmon coloured feature wall and green upholstery were proposed to contrast the soft wood floor and surrounding walls to enhance the legibility of the environment and add warmth to the space.

8.4.3 Courtyard

From the corridor, the individual enters the courtyard of The Lakes Memory Care, with a large water fountain located at the center of the space to serve as a wayfinding landmark. As the research conducted by to Davis, Ohman, and Weisbeck (2017) suggests that the wayfinding performance of persons with AD is increased through the integration of highly salient landmarks, the water fountain was proposed to serve as a wayfinding cue to support the resident's ability to find their way to and from the DFCC. The courtyard contains bistro tables with chairs and an umbrella to provide a space for residents to socialize while having access to a protected, outdoor environment. As evidence-based research suggests that residents who spent time outdoors experience less agitation and aggression as well as improved sleeping patterns (Chaudhury, Cooke, Cowie & Razaghi, 2017), and access to outdoor environments has a positive effect on an individual's well-being (Grinde & Patil, 2009), it was imperative to provide such a space for the residents at The Lakes Memory Care to meet the design objectives of this practicum.



Figure 35. Activity Room A





Figure 36. Activity Room A - Film Activity



Figure 37. Activity Room A - Art Activity



Sparrow Household



Bear Household



Cedar Household



Figure 38. *Courtyard*



8.5 Households

8.5.1 Household Organization

By implementing evidence-based design strategies from *Chapter 3*, the households are organized using Dr. Powell Lawton's building organization strategy with private rooms located along the perimeter, and group/service spaces located toward the center, forming a continuous corridor from the front to the back of the facility. As evidence-based design suggests that buildings organized with straight circulation paths, direct sightlines and minimal changes in direction are supportive of persons with AD, this organization is beneficial to this user group to reduce confusion (Marquardt, 2011).

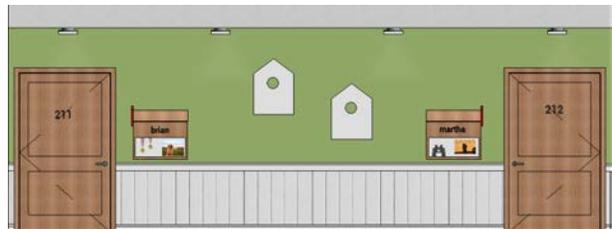
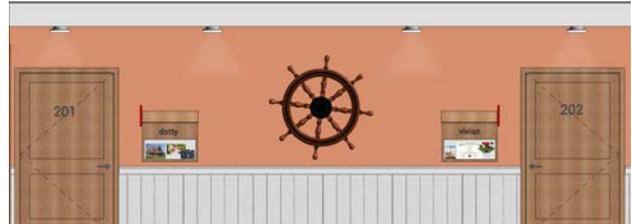


Figure 39. Typical Household - NTS

8.5.2 Private Rooms

To help residents locate their individual rooms, a mailbox is placed outside each room where residents can continue to receive their mail, with a small enclosure located underneath the mailbox to display personally meaningful objects so residents can recognize their own room. Landmarks are placed outside of resident rooms as a secondary means of locating their suite. According to Davis, Ohman, and Weisbeck (2017), the salience of a landmark can be enhanced by colour, familiarity and location. Therefore the walls outside of the resident rooms were painted a bright colour with a familiar object, such as a ship's wheel, grandfather clock, bird houses or image of the Oklahoma State's redbud tree to enhance the salience of each private room.

The interior of the private suites in The Lakes Memory Care were designed using the theory of place attachment. As researchers have hypothesized that place attachment serves four functions related to positive psychological well-being, including: belonging, self-esteem, meaning, and control (Scannell and Gifford, 2016), this theory was important to implement to meet the design objectives of this practicum. The work of Rowles (1983) and Scannell and Gifford (2010) recognize how behavioural expressions of attachment through the display of meaningful objects such as photographs, furniture or other significant belongings can help facilitate person-place bonds when they are broken due to relocation. Moreover, evidence-based design suggests that the ability to both personalize and individualize the environment, such as a resident's private room, helped facilitate a home-like atmosphere and produced fewer negative behaviour changes, therefore enhancing the well-being and therefore belonging of the individual



(Marquardt, Bueter, and Motzek, 2014). The millwork display designed along the perimeter wall of the individual suites provides a space for residents to display personally significant belongings to support an individual's attachment and sense of belonging within an unfamiliar environment.

Another form of place attachment theory that was implemented into the private suites at The Lakes is the living area and kitchenette. Researchers argue that place attachments are formed through time-space routines that are embedded in the home, and it is this "performance of home," that contributes to our attachment to space (Lewicka, 2014; Lovatt, 2018). Typically, private rooms in memory care facilities provide residents with a bed and private bathroom, offering very little spaces that support their independent functioning or former routines that they engaged in prior to relocation. By providing residents with a living area and kitchenette, the residents with mild to moderate dementia have more space to engage in activities they did prior to relocation in the privacy of their own rooms, such as making a cup of tea or doing a crossword puzzle in front of the TV. These activities are often overlooked, however, they place a crucial component in supporting the personhood of an individual, allowing them to remain as independent as possible during this stage of their disease.

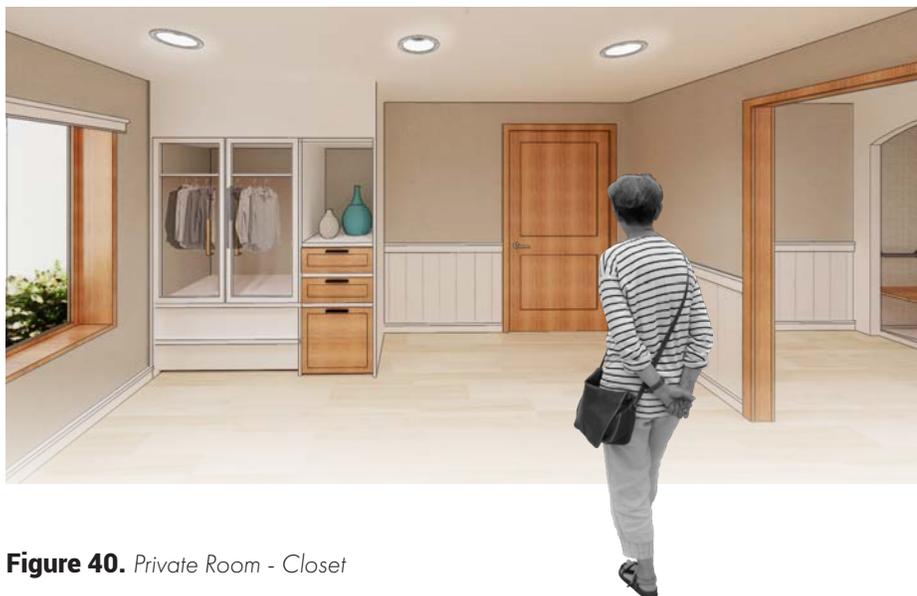


Figure 40. *Private Room - Closet*

It was important that the private room has a direct connection to the bathroom to ensure it can be found if a resident gets up in the middle of the night. One way glass film on the private room window protects the occupant from being seen by by-passers outside the building, but still provides the resident with a view to the outdoors from their bedroom window.



Figure 41.
Private Room



Figure 42. Private Room Elevation

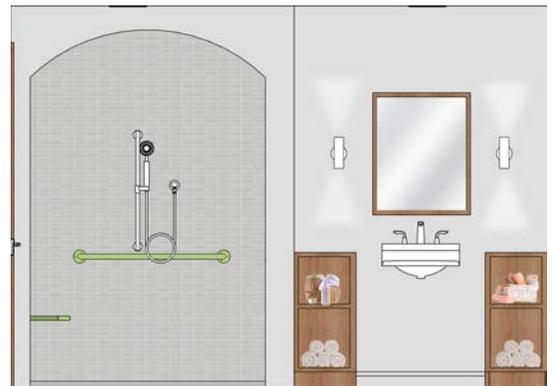


Figure 43. Private Bathroom Elevation

8.5.3 Kitchen

The kitchen is another area in the household that residents can engage in familiar, routine activity, where meals can be prepared with fellow residents and caregiving staff. The kitchen and adjacent dining room also serve as a major social node of the building, providing a space for residents to interact with each other, staff members as well as visitors. The millwork in the kitchen is proposed using matte, transparent resin panels rather than glass to reduce the incidence of glare in the space. The panels are transparent so residents can see the contents within the cabinets to help support the memory during the process of cooking.

The nursing station is located in the kitchen with a small desk and locked cabinets to decrease the institutional atmosphere that traditional nursing stations create.

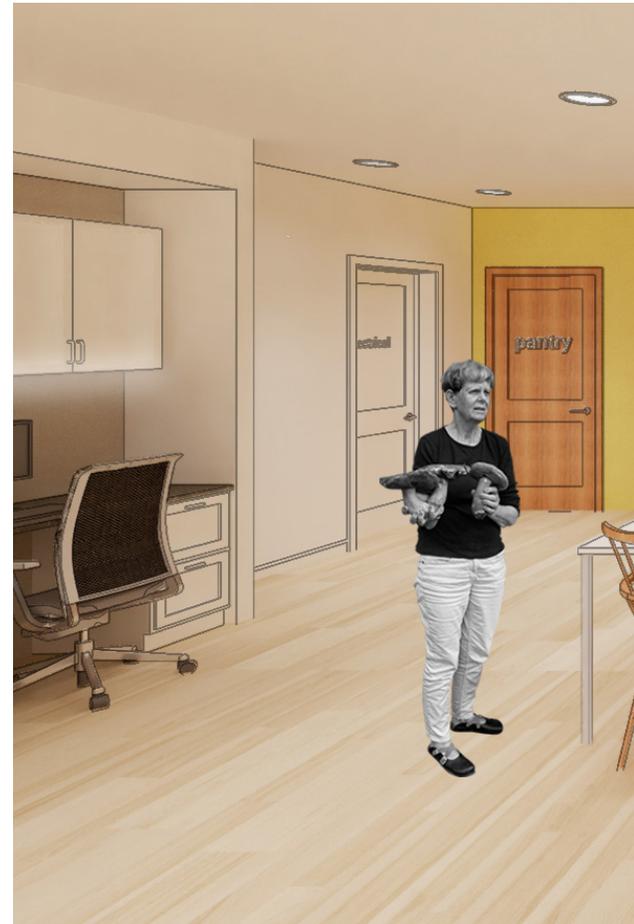


Figure 44. Kitchen





Figure 45. Kitchen Elevation



Figure 46. Nursing Station Elevation



8.5.4 Dining Room

Similar the café, wooden acoustic panels are introduced into the dining room to enhance the acoustic comfort of the space. A piano is located in the dining room to allow residents or visitors to engage with the instrument, providing them with a source of auditory stimulation. Located adjacent to the dining room is an outdoor patio that provides residents with access to the outdoors and enhances the quantity of natural light entering the space.

There are many areas with soft and hard seating throughout the household to provide residents, caregivers, visitors, instructors as well as volunteers a place to sit and engage with residents in their household.

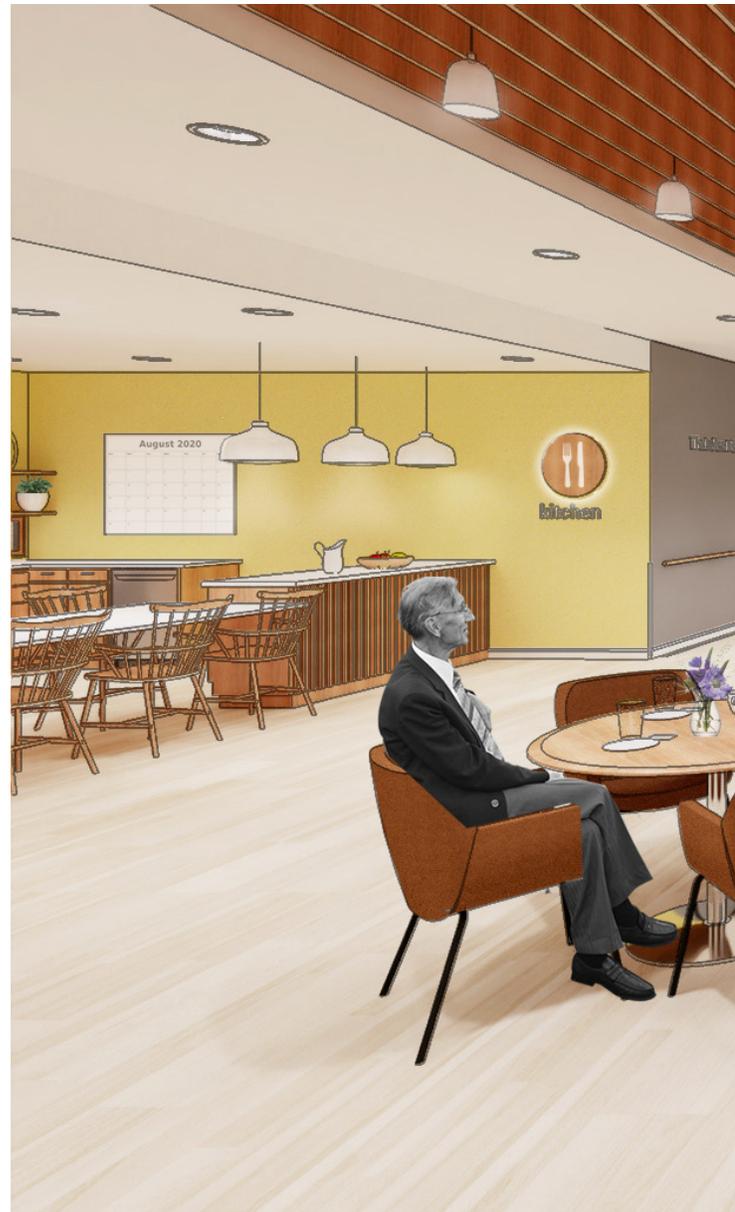


Figure 47. Dining Room



Figure 48. Corridor 1 Elevation





Figure 49. Laundry Room

8.5.5 Laundry Room

As place attachment is supported through the engagement of routine activity, the laundry room provides a space where residents can engage in another activity they did prior to relocation. The laundry room also has a TV and storage for books and board games to provide residents with entertainment while they wait for their laundry.

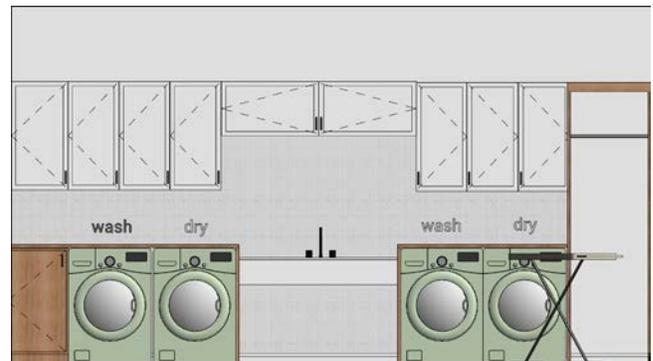


Figure 50. Laundry Room Elevation



Figure 51. Corridor 2 Elevation

8.5.6 Sunroom

Located at the rear of the facility is the sunroom, with large horizontal windows that have direct view to the retention pond located on site, providing the occupants with views to nature and an abundance of natural light. There is also a television, fireplace, storage for books, movies, and games as well a mix of soft and hard seating. The sunroom provides the residents with a space to lounge and socialize as well as engage in a variety of activities with fellow residents as well as visitors and caregiving staff. Visiting staff members, such as occupational therapists will also use this space to hold therapeutic activities with residents as well.



Figure 52. Sunroom



Figure 53. Sunroom Elevation

Though this project focused on deriving design solutions from theoretical and evidence-based literature, much of this practicum was also inspired by my time as a research assistant at a special care unit for persons with Alzheimer's disease (AD). Having spent time in a setting that allowed me to observe how persons with AD and related dementias interact with the space around them was an incredibly rewarding experience that brought an empathetic design approach to this practicum. Between my time as a research assistant and conducting a literature review of my own, I was able to identify how social structures are beginning to change in long-term care environments and propose solutions for this demographic. I used these ideas to build off of the work of Dr. Emily Roberts and students of Oklahoma State University to propose the solution that is presented in this document.

Because dementia affects each person very differently in a non-linear fashion, separating persons with AD based on prognosis is a complex feat, however, it is extremely important to consider in prospective environments as traditional family structures continue to decline, putting an inevitable strain on the healthcare system that relies heavily on family members (Burgener, & Buckwalter, 2014). This means that individuals who are highly functional but do not have the support of a spouse or adult child to safely age in place will be entering memory care environments with individuals who require more advanced levels of care, causing a disparity between not only quality of care but also environmental needs.

As the theory of retrogenesis revealed that persons with AD experience drastically different functional and cognitive capabilities throughout each stage, the proposed design for The Lakes Memory Care Center separates persons with AD based on their prognosis. Located on the main level, persons with mild cognitive

impairment to moderate dementia were the focus of this practicum and are permitted to come and go as they wish, with persons with moderate to severe, to severe dementia proposed on the more secure, conceptual upper level who may need more advanced levels of care.

In *Chapter 2: What is Alzheimer's Disease*, I discussed the needs of single, childless individuals with Alzheimer's disease (AD). Based on the literature, it is evident that the process of institutionalization may result in a loss of independence, decreased sense of belonging and an overall decrease in well-being (p. 21). The theory of retrogenesis highlighted that persons with mild cognitive impairment (MCI) to moderate dementia experience deficits related to their memory, vision, wayfinding and task performance. The person-centered care model (p.25-27) emphasized the need to view persons with dementia not as frail, dependent individuals, but those who must be empowered by their environment and the people around them to support their personhood while living in long-term care. Understanding a client with AD's physical and psychological needs through evidence-based research also provides a valuable resource to make informed design and programmatic decisions.

The Lakes Memory Care Center is an environment that supports the four areas of Roberts and Pereira's (2018) Dementia Friendly City Center (DFCC) concept, which include sustainability, therapeutic environments, wayfinding and universal design. To achieve a sustainable design in the Lakes Memory Care environment, Watersense certified fixtures, energy efficient equipment, lighting systems, window coverings and low-emitting materials that were either FloorScore or GreenGuard certified with high recycled contents were specified.

Therapeutic, or supportive environments were achieved using place attachment theory, specifically related to the social and behavioral expressions of place and the natural place dimension of Scannell and Gifford's (2010) person-process-place framework (p. 41).

The wayfinding component of this practicum referenced the theoretical work of Kevin Lynch (1960) and evidence-based research of Gesine Marquardt (2011). To gain more of an understanding of how to design for wayfinding for persons with AD in large-scale environments, the work of Davis, Ohman, & Weisbeck (2017) was referenced. The work of Davis, Ohman, & Weisbeck (2017) validated that the wayfinding performance of persons with mild AD can be supported through the integration of salient landmarks in a virtual environment, although more research is required using a built environment to test the large-scale wayfinding performance for persons with mild AD.

Universal/barrier-free design strategies are integrated into all areas of the households, courtyard and Welcome Center of The Lakes Memory Care to ensure that the space can meet the dynamic needs of this user group. When considering universal/barrier-free design, we often think that following building code standards is enough to create an accessible, equitable environment. The principles of universal design emphasize equitable and flexibility in use, perceptible, simple and intuitive use, tolerance for error, low physical effort, as well as size and space for approach and use (The Centre for Excellence in Universal Design, 2020). Examples of equitable and intuitive use in the design of The Lakes include familiar wayfinding cues, highly visible shelving to support the memory, as well as contrasting materials to create a perceptible environment for persons with cognitive impairments. Tolerance for error is supported in the design of The Lakes Memory Care through the building's organization to filter residents from their

household, through the courtyard and into the Welcome Center as they make their way to the Dementia Friendly City Center (DFCC). This prevents the resident from getting lost elsewhere on site when they leave the facility to get to the DFCC. Low physical effort is integrated into the facility using lever handles rather than knobs on doors and bathroom faucets to ensure that they can be used by persons with hindered wrist movement due to arthritis. Size and approach for use was integrated into the facility by providing barrier-free paths of travel, appropriate transfer space and turning radii in water closets as required by the building code. Universal design strategies require the designer to think far beyond what the building code expects, but to empathize with the user and integrate design strategies at all levels to support the everyday life of the persons they are designing for.

Though it is evident that much is known about the environmental qualities that facilitate a supportive environment for persons with dementia, we still do not know what strategies work for which stage, potentially resulting in environments that might be too restrictive or too lax for certain individuals (Marquardt, Bueter, & Motzek, 2014). Therefore it is imperative that designers, academics, caregivers and policy makers continue to push the boundaries of what long-term care may look like in an effort to create environments that enhance the quality of life of persons living with dementia throughout every stage of their prognosis.

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Appendix A:

Building Regulation Analysis

The building regulation analysis detailed below is referenced from the 2015 National Building Code of Canada (NBCC). This analysis ensures that the design presented in this document abides by the regulations outlined by the NBCC.

Part 3: Fire Protection, Occupant Safety, and Accessibility

Section 3.1 General

3.1.2.1 Major Occupancy Classification

Group B Division 3 – Care Occupancies

3.1.17.1 Occupant Load

As per Table 3.1.17.1, the area per person for care, treatment and sleeping room areas is 10 sq m per person. As each household at The Lakes is 14,350 sq ft (1,333 sq m), the occupant load for each household is 133 persons.

3.2.4 Fire Alarm and Detection Systems

3.2.4.1 Determination of Requirement for a Fire Alarm System

As The Lakes Memory Care will have an automatic sprinkler system installed, a fire alarm system conforming to 3.2.4.1 must also be installed.

3.2.4.3 Types of Fire Alarm Systems

As The Lakes Memory Care is a Group B occupancy, it requires a 2 stage fire alarm system.

3.2.4.10 Fire Detectors

Fire detectors are not required as the building is sprinklered throughout.

3.2.4.11 Smoke Detectors

Smoke detectors are not required in sleeping rooms and the corridors that serve the sleeping rooms within a suite of care occupancy where smoke alarms are installed in accordance with Article 3.2.4.20 smoke alarms.

3.2.4.16 Manual Stations

As the memory care facility is sprinklered throughout with a fire alarm system installed conforming to Article 3.2.4.1, a manual pull station is required in every floor area near every principle entrance and every exit.

3.2.4.20 Smoke Alarms

Smoke alarms must conform to 3.2.4.20 where they are required to be installed in each sleeping room, in a location between sleeping rooms and the remainder of the suite on or near the ceiling with permanent connections to an electrical circuit, no disconnect switch between smoke alarm and provided with back up battery as an alternative power source for a period of no less than seven days, followed by four minutes of alarm as per Article 3.2.4.20.

3.2.7.3 Emergency Lighting

Emergency lighting conforming to 3.2.7.3 must be installed and provide an average illumination level of 10 lx at floor or tread level located in exits, principle routes providing access to exit, corridors, floor areas where people may congregate.

3.2.7.3 Emergency Power for Lighting

Emergency back up power for lighting is required for a period of 1 hour for a Group B Occupancy from batteries or a generator. Oklahoma is a tornado-prone state, therefore back up generators located on the exterior of the building must be protected against damage caused by extreme weather events. Though this section of the NBCC does not have requirements related to tornado-preparedness, it must be considered in the facility to maintain power to the building in the event of extreme weather.

3.2.7.8 Emergency Power for Fire Alarm Systems

Emergency power for fire alarm systems at The Lakes Memory Care must be supplied from a generator and/or batteries, and provides no less than 24 hours of supervisory power with no less than 1 hour of emergency power under full load immediately following that period with immediate, automatic transfer, as per Article 3.2.7.8.

Section 3.3 Safety within Floor Areas

3.3.1 All Floor Areas

3.3.1.1 Separation of Suites

The fire resistance rating for fire separations are to be no less than 1 hour.

*See Article 3.3.3 for specific requirements related to care, treatment and detention occupancies.

3.3.1.3 Means of Egress

Access to exit within floor areas must conform to subsections 3.3.2 to 3.3.5 and will conform to 3.3.1.3(8), providing each suite in a floor area that contains more than one suite shall have a doorway into a public corridor

3.3.1.4 Public Corridor Separations

The fire separation between a public corridor and the remainder of the storey shall have a fire resistance rating no less than 45 minutes.

3.3.1.5 Egress Doorways

As per 3.3.1.5(1), a minimum of two egress doorways in a floor area that is sprinklered throughout is required. As The Lakes Memory Care facility is sprinklered throughout, a minimum of two egress doorways are required. According to 3.3.1.5(2), the two egress doors must be placed at a distance from one another equal or greater to than one third of the maximum overall diagonal dimension of the area to be served.

3.3.1.8 Headroom Clearance

The minimum headroom clearance in every access to exit in the memory care facility must conform to 3.4.3.4 for exits.

3.3.1.9 Corridors

The minimum width of public corridors in the facility must be 1100 mm (43 in) wide. The minimum unobstructed width of a public corridor serving patient's sleeping rooms shall be 1100 mm (43 in). The public corridors in the memory care facility are 2440 mm (96"), which exceed this minimum requirement. The facility will not have any horizontal obstructions or dead-end corridors.

3.3.1.13 Door and Door Hardware

All doors in the memory care facility are 48" (1220 mm), well beyond the minimum requirement of 800 mm (31.5"). Access to exit doors do not require special devices to operate and all door hardware is installed 1200 mm AFF.

3.3.1.17 Capacity of Access to Exits

As per Sentence 2.3.1.17(4), in an access to exit from a floor area used by residents in a Group B, Division 3 occupancy, the required width of corridors, doorways, and ramps shall be no less than 18.4 mm (0.72") per person and the capacity of stairs in an access to exit conforms to sentences 3.2.3.2 (1) to (3).

3.3.1.19 Transparent Doors and Panels

As per Sentence 3.3.1.19(1) and (2), a glass or transparent door must be designed and constructed so that the door can easily be seen and use visually contrasting hardware, bars, or other permanent fixtures attached to it. Fully glazed trans-

parent doors, such as the doors that lead to the patio in the facility, sidelights and panels must be enhanced by through the inclusion of mullions, markings or other elements that are visually contrasting, are at least 50 mm high, extend the full width of the door, sidelight or panel and are located 1300 mm to 1500 mm above the floor.

All glass doors and sidelights in the facility are constructed of laminated or tempered safety class conforming to CAN/CGBC-12.1-M or wired glass conforming to CAN/CGSB-12.11-M, as per Sentence 3.3.1.19(3). The lowest edge of vision glass in doors or transparent sidelights should be no higher than 900 mm above floor level, as per Sentence 3.3.1.19(6).

3.3.3 Care, Treatment and Detention Occupancies

3.3.3.3 Corridors

The Lakes Memory Care facility was designed with no dead-end corridors.

As per Sentence 3.3.3.3(3), corridors should not be less than 2400 mm (94.5") wide in buildings of treatment occupancies where corridors may be used to move patients or residents in beds. The corridors in the facility are 96" wide.

As per Sentence 3.3.3.3(4), the paired doors in a corridor that may be used to move patients or residents in beds must swing in opposite directions, the right hand door swinging in the direction of travel and should be no less than 1100 mm (43") wide. All doors except for doors leading to storage or pantry in the facility are 48" wide.

3.3.3.4 Doorway Width

As per Sentence 3.3.3.4(2), the minimum clear width of doorways through which it is necessary to move patients in bed shall be 1050 mm (41.3").

3.3.3.5 Compartments and Fire Separation

As per Sentence 3.3.3.5(14), walls between individual suites of a care occupancy and the remainder of the floor area in buildings of care occupancy shall be constructed as fire separations with a fire-resistance rating not less than that specified for residential occupancies in Sentences 3.3.4.2(1) and (2). These sentences require a fire separation having a fire-resistance rating not less than 1 hour.

Section 3.4 Exits

3.4.1 General

3.4.1.2 Separation of Exits

There are two separate exits in each wing of the memory care facility.

3.4.2 Number and Location of Exits from Floor Areas

As per 3.4.2.1(1) each floor area is served by two exits. Even though the facility is not more than two storeys in height and is sprinklered throughout, it is not eligible to be served by one exit as the occupant load is greater than 60.

3.4.2.3 Distance Between Exits

As per Sentence 3.4.2.3(1), the least distance between two exits from a floor area shall be half the maximum diagonal dimension of the floor area but not less than 9 m (29') for all other floor areas.

3.4.2.5 Location of Exits

As more than one exit is required for the memory care facility, the exits must be located so the travel distance to one exit is not more than 45 m. The facility is sprinklered throughout.

3.4.3 Width and Height of Exits

3.4.3.2 Exit Width

As per Sentence 3.4.3.2(2), the minimum aggregate width of exits serving floors areas intended for care, treatment or detention occupancies shall be determined by multiplying the occupant load of the area by 18.4 mm per person. As the occupant load of each household is 133 persons, the minimum aggregate width of exits serving floor areas is 2447 mm (96.3") per household.

The minimum width of exits conforms to tables 3.4.3.2-A and 3.4.3.2-B.

3.4.3.4 Headroom Clearance

Every exit shall have a clear height above the clear width of the exit not less than 2050 (81") mm. The headroom clearance for doorways shall be not less than 2030 mm (80"), and no door closer or other device shall be installed as to reduce the headroom clearance of a doorway to less than 1980 mm (78").

3.4.4.2 Fire Separation of Exits

4.4.1 Fire Resistance Rating of Exit Separations

The fire resistance rating required by Subsection 3.2.2 is no less than 1 hour and need not be more than 2 hours.

3.4.5 Exit Signs

3.4.5.1 Exit Signs

Every applicable exit door has an exit sign placed over or adjacent to it. Every exit sign is visible on approach to the exit, conforms to ISO 3864-1 "Graphical Symbols and Safety Markings" and conforms to ISO 7010: Graphic symbols – Safety colours and safety signs – Registered safety signs", as per Sentence 3.4.5.1(2). Internal illumination requirements conform to 3.4.5.1(3) and circuitry conforms to 3.4.5.1(5).

Section 3.7 Health Requirements

3.7.1 Height of Rooms

3.7.1.1 Room and Space Height

As per sentence 3.7.1.1(1), the design of the memory care facility ensures that the height of every room and space below it is sufficient and prevents the ceiling or ceiling fixtures from hindering the movement other activities below

3.7.2 Plumbing Facilities

3.7.2.2 Water Closets

Water closets in the memory care facility conform to Sentences 3.7.2.2(1-6) where applicable. In each household, each individual suite has a private bathroom with one water closet. One universal water closet is located adjacent to the dining room.

As there is a cafe in the welcome center and is an assembly occupancy, 2 water closets for males and 3 for females are required. Instead of placing all of the water closets in separate male and female restrooms, five universal toilet rooms were placed around the welcome center so they are visually accessible around the remainder of the building and are in close proximity to other spaces in the facility.

3.7.2.3 Lavatories

At least one lavatory is provided for every two water closets or urinal and operate automatically.

Section 3.8 Accessibility

3.8.2.2 Entrances

All entrances in the facility are barrier-free at ground level, therefore a ramp is not required.

3.8.2.3 Areas Requiring a Barrier-Free Path of Travel

As many occupants using the memory care facility will use a wheelchair, all areas in the memory care facility are supported by a barrier free path of travel.

3.8.2.8 Plumbing Facilities

As occupants may use a wheelchair or require assistance when toileting, all water closets in the facility will be barrier-free.

3.8.3 Design

3.8.3.2 Barrier-Free Path of Travel

All unobstructed barrier free paths of travel in the facility are 1220 mm (48") or greater and therefore exceed the minimum requirement of 920 mm (36 in). Interior and exterior walking services that support a barrier-free path of travel have no openings more than 13 mm in diameter, have any elongated openings perpendicular to the direction of travel, are stable, firm and slip resistant, and do not contain slopes.

3.8.3.6 Doorways and Doors

All doorways have a clear width of 1220 mm (48"), which exceeds the minimum 800 mm (31") requirement. Door-operating devices comply with Clause 3.8.3.8(1)(b) and are operable at a height of 900 mm (35.5") and 1100 mm (43") above the floor. Power door operators in the facility comply with Sentence 3.8.3.6(6). Thresholds are not more than 13 mm higher than the finish floor surface and are beveled to ensure wheelchairs can easily pass over the threshold.

3.8.3.12 Universal Washrooms

All universal washrooms are served by a barrier-free path of travel that is 48" or greater.

The door complies with Article 3.8.3.6 and has a latch operating mechanism 900 mm – 1000 mm above the finished floor that complies with Clause 3.8.3.8(1)(b).

All universal washrooms have one lavatory that is Americans with Disabilities Act (ADA) compliant and conforms with Article 3.8.3.15. See Article 3.8.3.15.

All universal washrooms have one water closet conforming to Article 3.8.3.13 and Clause 3.8.3.11(1)(d), are ADA compliant with a clear floor space at least 900 mm wide that is parallel and adjacent to the open side of the water closet. The seat of the water closet must be 430 to 460 mm above the ground. The flushing controls must be located 500 to 900 mm above the floor, is located no more than 350 mm from the transfer side and complies with Clause 3.8.3.8(1)(b). The water closet is equipped with a seat lid and its tank is secured attached.

All universal washrooms have grab bars conforming to clauses 3.8.3.11.(1)(e) and (f). Clause 3.8.3.11.(1)(e) requires an L-shaped grab bar that is mounted to the wall closest to the water closet, has horizontal and vertical components 750 to 850 mm above the floor with a vertical component in front of the water closet 150 mm above the floor and complies with Article 3.7.2.8. Clause 3.8.3.11.(1)(f) requires either one grab bar at least 600 mm long and centered over the water closet or two grab bars at least 300 mm long located either side of the flush valve.

All universal washrooms have a coat hook conforming to Clause 3.8.3.11(1)(g) mounted 1200 mm above the floor and does not project more than 50 mm from the wall.

All universal washrooms have a toilet paper dispenser conforming to Clause 3.8.3.11(1)(h), mounted on the wall closest to the water closet and is 600 to 800 mm above the ground measured from the bottom of the dispenser and the closest edge of the dispenser is 300 mm from the water closet.

The universal washrooms in the facility that do not have a counter provided have a shelf located not more than 1200 mm above the floor

All universal washrooms are designed to allow a wheelchair to turn in an open space not less than 1500 mm (60") in diameter.

3.8.3.15 Lavatories and Mirrors

All lavatories specified in the memory care facility conform with Article 3.8.3.15 and are ADA compliant. The faucets comply with Sentence 3.7.2.3(4).

The lavatories specified in the project are mounted no less than 460 mm between the centre-line of the lavatory and adjacent wall.

The rim height of the lavatory is not more than 865 mm above the floor and the clearance beneath the lavatory that conforms with Clause 3.8.3.15(1)(d).

The soap dispenser and hand dryer also comply with Article 3.8.3.13.

All soap dispensers are mounted not more than 1100 mm above the floor and not more than 500 mm from the lavatory.

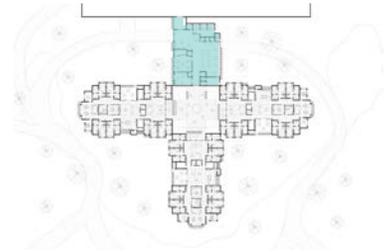
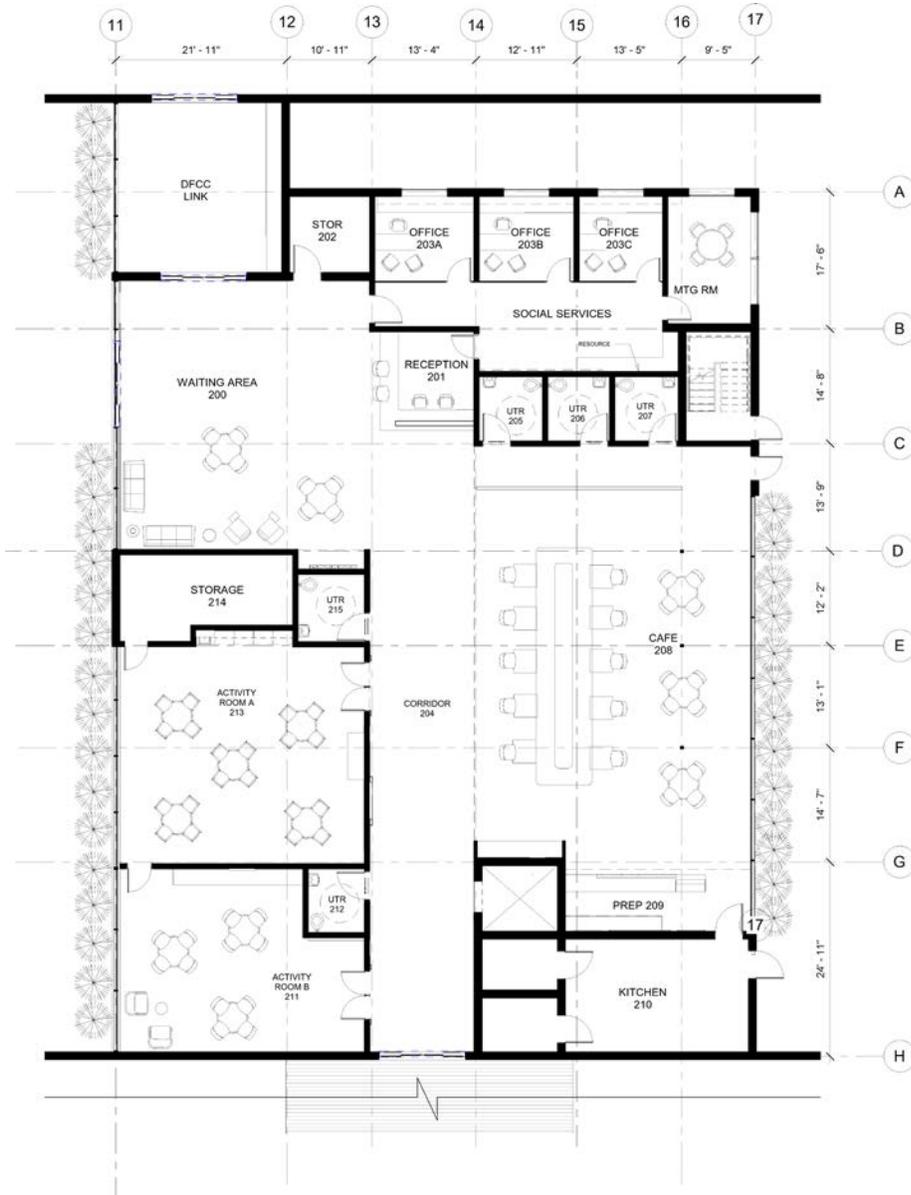
The hand dryer is mounted not more than 1200 mm above the floor. .

3.8.3.16 Showers

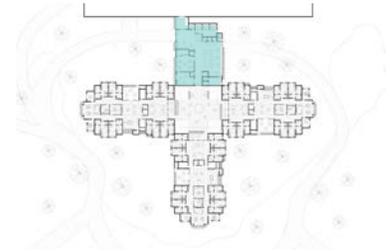
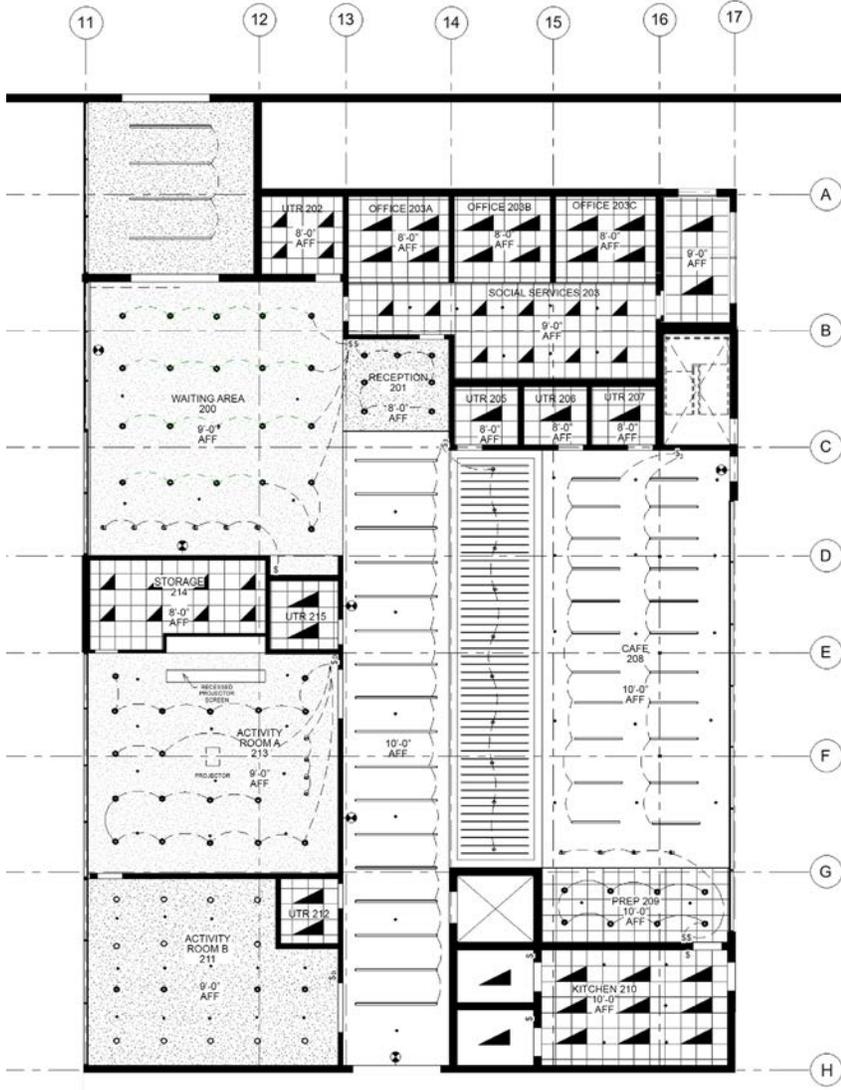
All showers in the individual suites comply with Article 3.8.3.16. All showers are not less than 1500 mm wide and 900 mm deep, with a clear floor space that is not less than 900 mm deep and is constructed with a slip resistant floor surface with grab bars that conform to Sentence 3.7.2.8(1). Each shower has a fixed seat with a smooth, slip resistant surface and has controls located opposite the shower with a flexible, handheld shower head. The soap holders can be reached for standing individuals and those seated on the fixed seat.

Appendix B:

Technical Drawings



1 WELCOME CENTER
NTS



- 8" RECESSED LED DOWNLIGHT
- 24" SURFACE MOUNTED LED
- 12" SURFACE MOUNTED LED
- CEILING FAN
- ▣ 12"x12" RECESSED LED TROFFER
- ▣ 12"x24" RECESSED LED TROFFER
- 6" LED PENDANT
- ⊕ 18" LED PENDANT
- ⊕ LED PENDANT
- SPRINGER
- RECESSED LINEAR LED
- SURFACE MOUNTED LED TRACKLIGHT
- ⚡ EMERGENCY EXIT
- ⚡ EMERGENCY LIGHTING
- ACOUSTIC BAFFLE
- ▨ GYPSUM WALL BOARD
- ▣ ACOUSTIC CEILING TILE



2 WELCOME CENTER - LIGHTING PLAN
NTS



4 TYPICAL HOUSEHOLD - LIGHTING PLAN
NTS

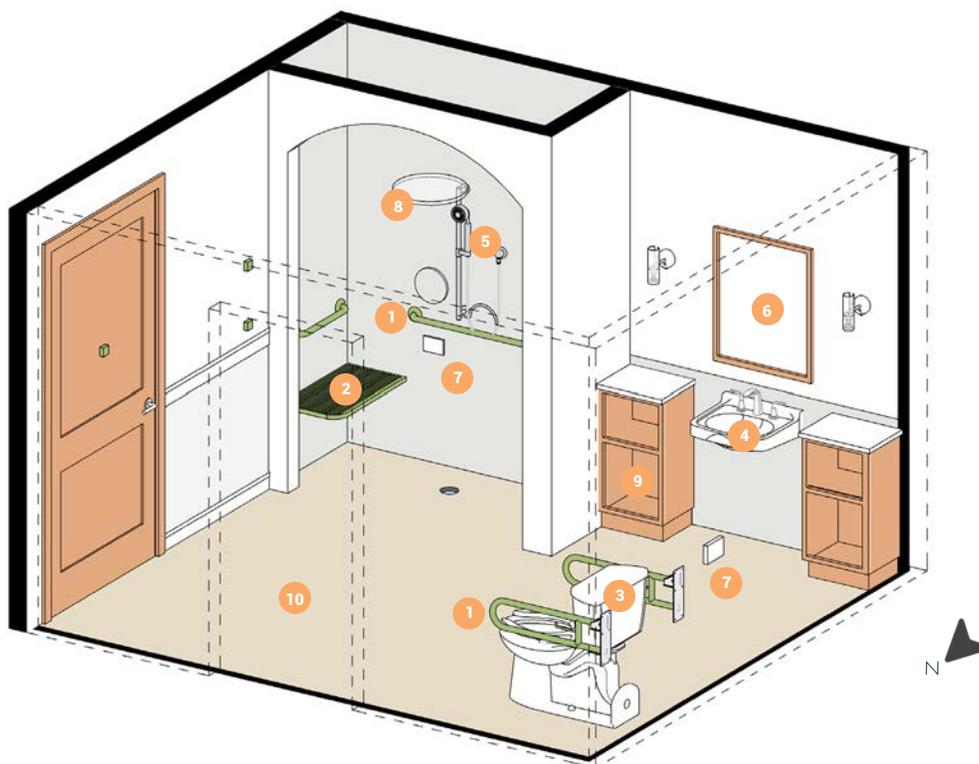


- 8" RECESSED LED DOWNLIGHT
- 24" SURFACE MOUNTED LED
- 12" SURFACE MOUNTED LED
- CEILING FAN
- ▣ 12"x12" RECESSED LED TROFFER
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- 6" LED PENDANT
- ⊕ 18" LED PENDANT
- ⊕ LED PENDANT
- SPRINKLER
- RECESSED LINEAR LED
- SURFACE MOUNTED LED TRACKLIGHT
- ⚡ EMERGENCY EXIT
- ⚡ EMERGENCY LIGHTING
- ACOUSTIC Baffle
- ▨ GYPSUM WALL BOARD
- ▨ ACOUSTIC CEILING TILE

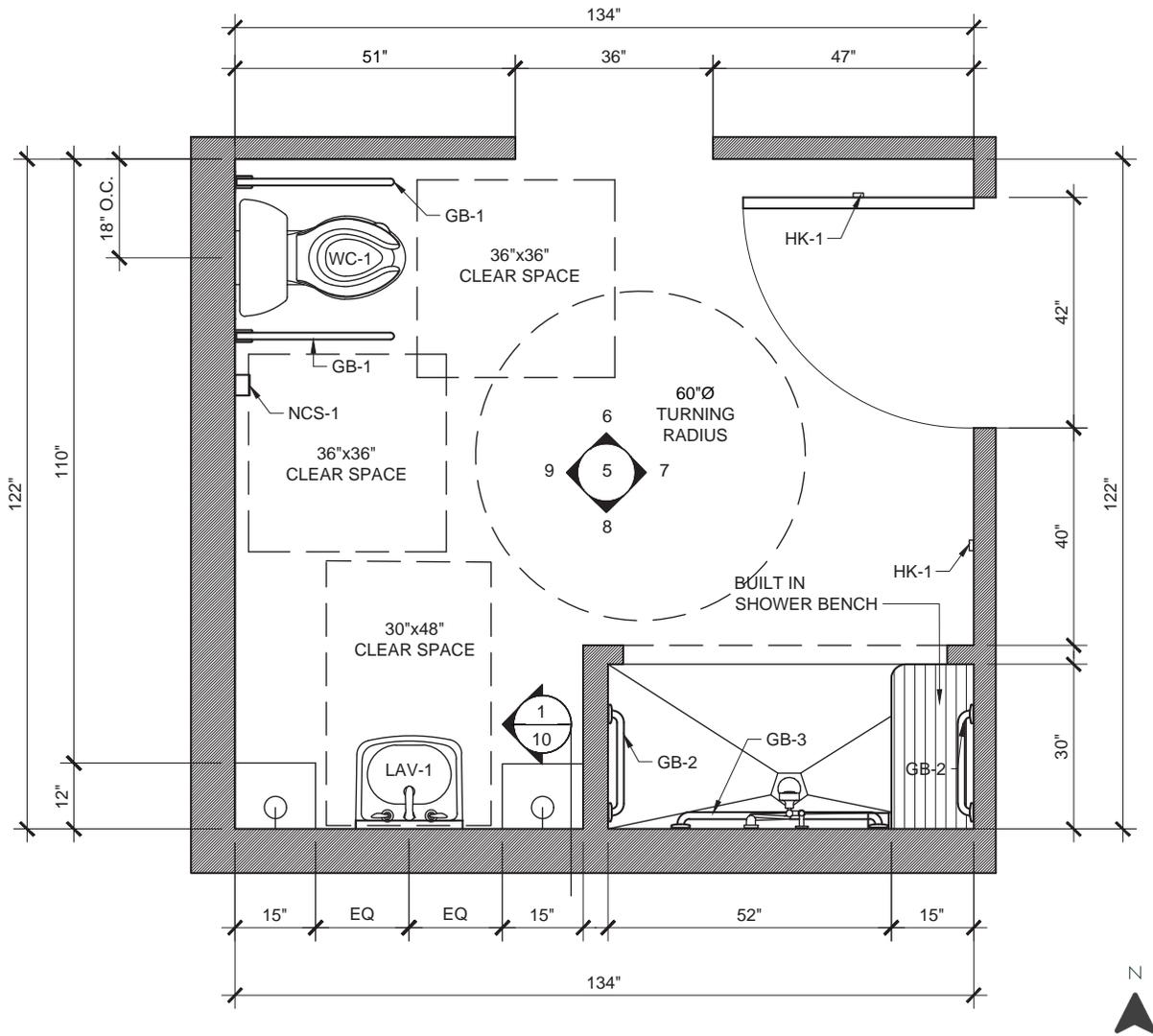
Appendix C:

Detail Drawings

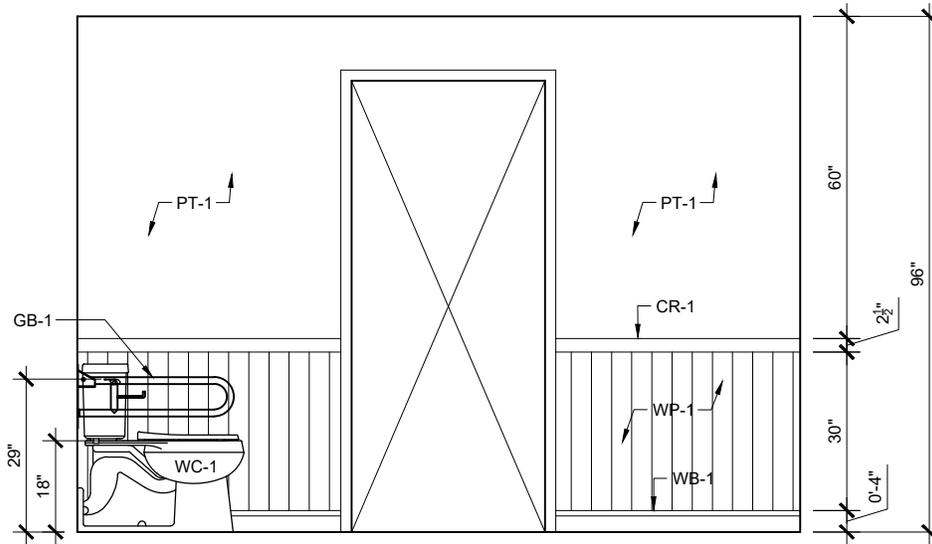
Dementia Friendly Bathroom - Typical Resident WC



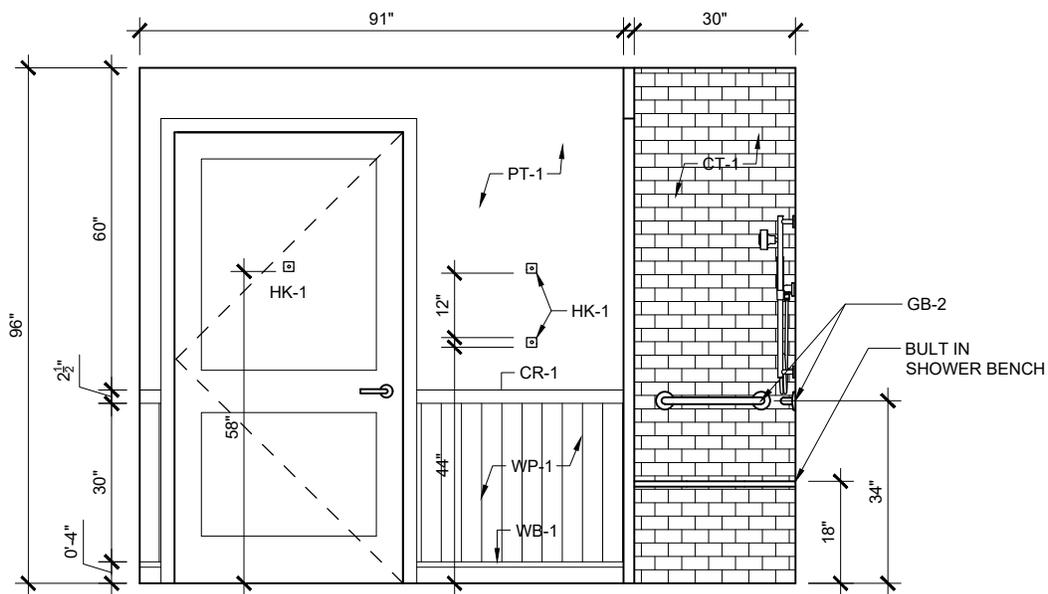
- | | | | |
|---|---|----|--|
| 1 | Contrasting Grab Bars | 6 | Reversible Mirror |
| 2 | Contrasting, fixed shower seat | 7 | Nurse Calling Station |
| 3 | ADA Compliant Water Closet | 8 | Heat Lamp |
| 4 | ADA Compliant Lavatory + Faucet | 9 | Open Shelving |
| 5 | Handheld shower with thermostatic valve | 10 | Light, anti-slip, anti-glare materials |



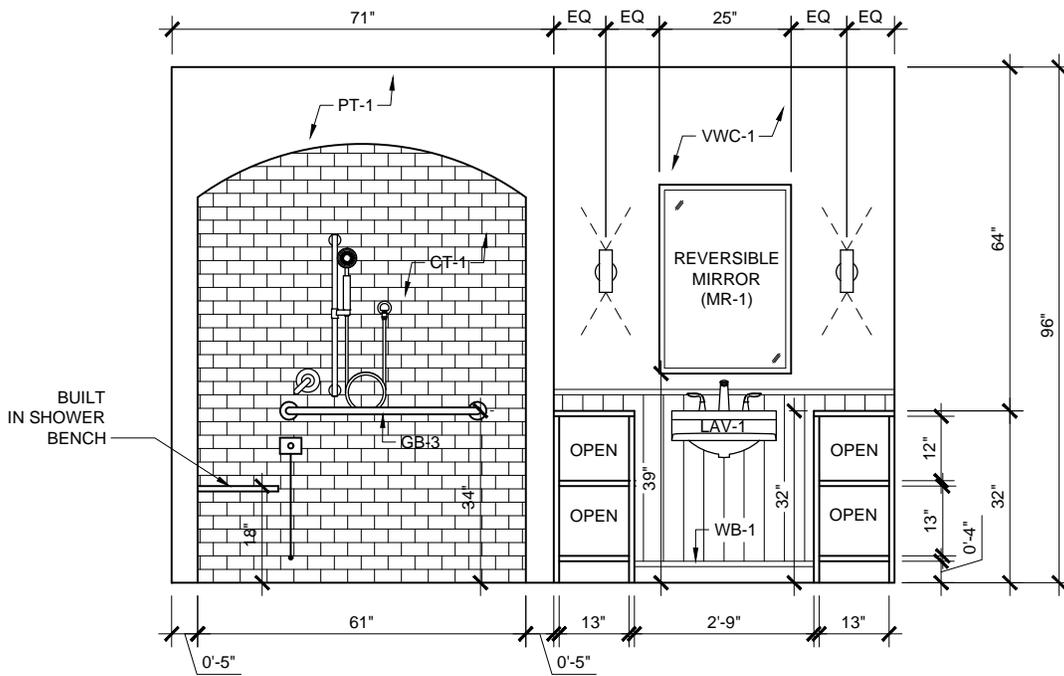
5 TYPICAL RESIDENT WC - 217
NTS



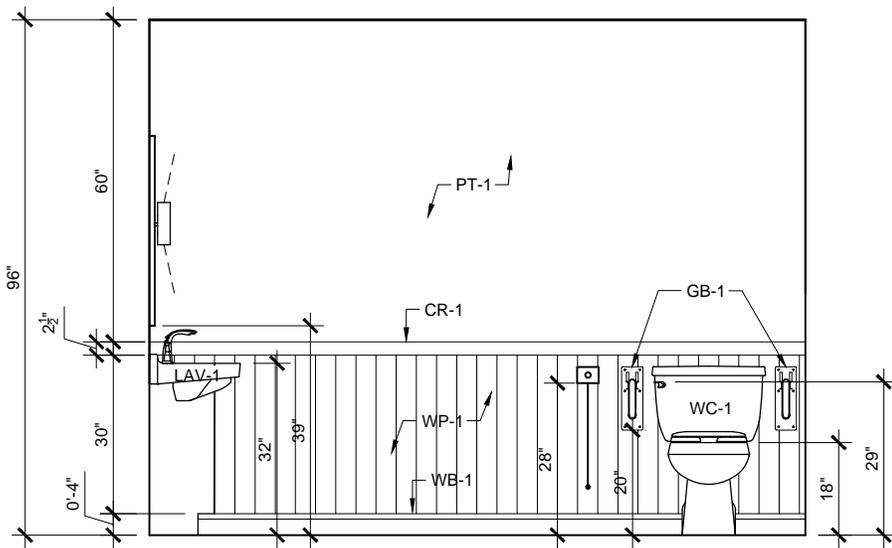
6 217 NORTH ELEVATION - TYPICAL RESIDENT W/C
NTS



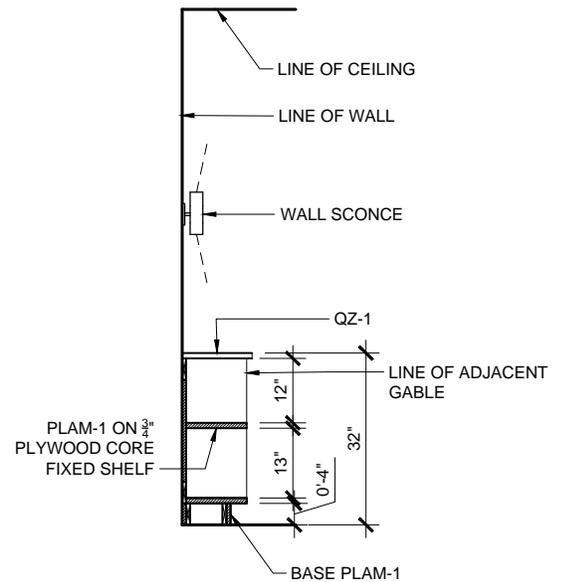
7 217 EAST ELEVATION - TYPICAL RESIDENT W/C
NTS



8 217 SOUTH ELEVATION - TYPICAL RESIDENT W/C
NTS



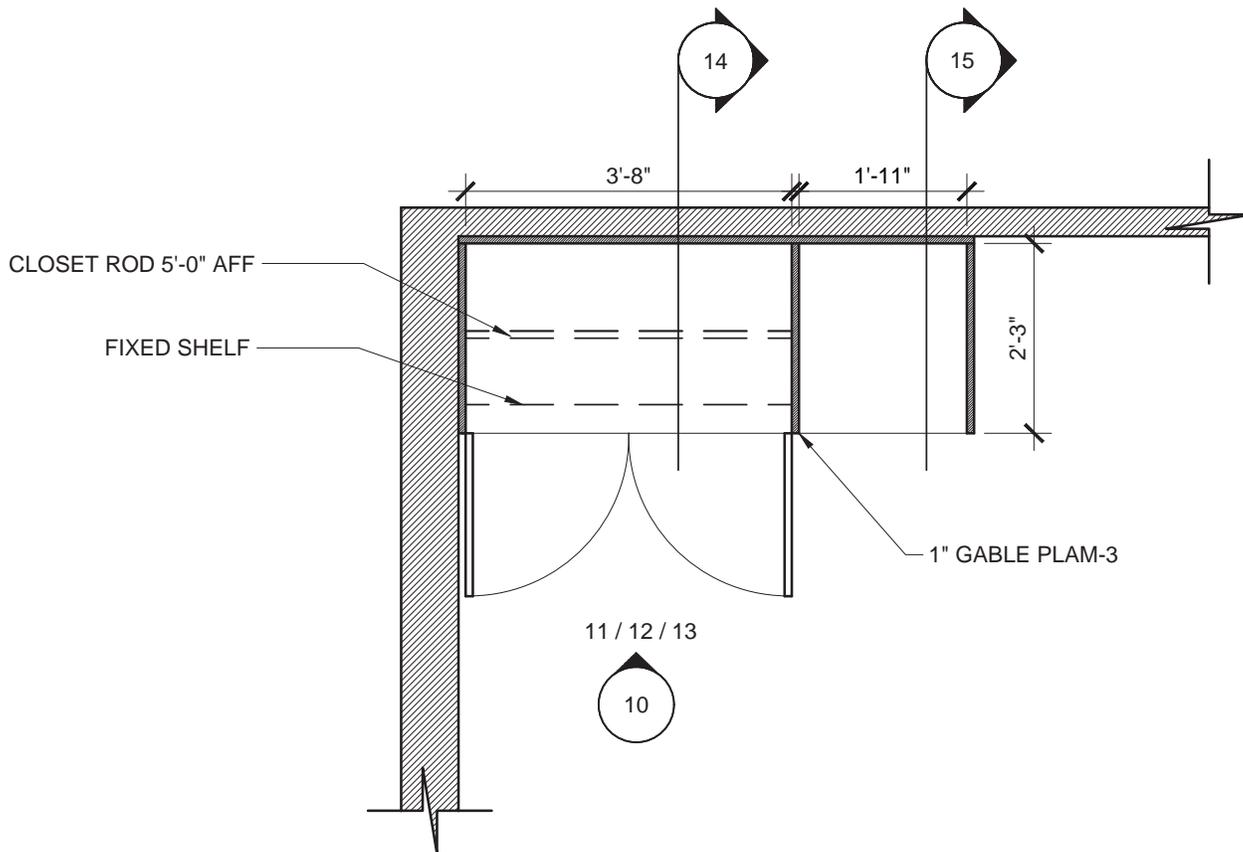
9 217 WEST ELEVATION - TYPICAL RESIDENT W/C
NTS



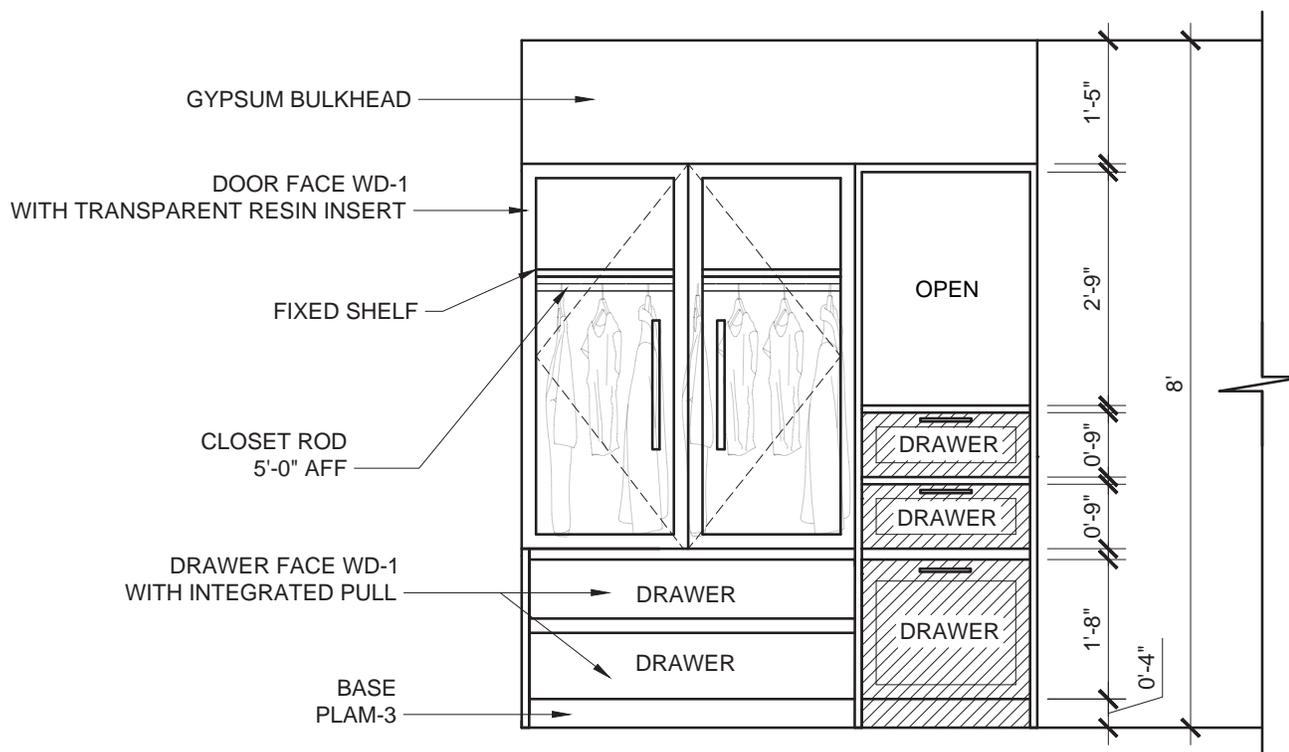
10 SECTION
NTS

FIXTURES / ACCESSORIES SCHEDULE						
Code	Type	Manufacturer	Product Code	Colour/Style	Notes	Sustainability
WC-1	Water Closet*	Kohler	Barrington K-3578-0	White Comfort Height	Toilet seat and lid to match PT-3	WaterSense 1.0 gpf
LAV-1	Lavatory*	Zurn	Wall Hung Lavatory Z5358	White Wall Hung	8" faucet centers	-
FAU-1	Faucet*	Kohler	Refinia K-5317-4-CP	Polished Chrome	8" center installation	WaterSense 1.2 gal/min flow rate
HK-1	Hook	Kohler	Maxton Hook K-R21850-CP	Polished Chrome	See elevations for mounting heights	-
GB-1	Grab Bar	Mediclinics	Vertical Swing Grab Bar BG0800CS	Stainless steel powder coated to match PT-3	See elevations for mounting heights	-
GB-2	Grab Bar	Ponte Giulio	G02JAS04	24" Straight Anti-Microbial Vinyl Grab Bar, G1 (Green)	See elevations for mounting heights	-
GB-3	Grab Bar	Ponte Giulio	G02JAS08	42" Straight Anti-Microbial Vinyl Grab Bar, G1 (Green)	See elevations for mounting heights	-
MR-1	Mirror	alzproducts. co.uk	Reversible Mirror 1005479	Custom order. Frame to match PLAM-1	Mirror/image insert to be 1'- 11" W x 2'-9" H	-
NCS-1	Nurse Calling Station	Castle and Cooper	Wireless Waterproof Emergency Call System 315-070-360	N/A	See Elevations for mounting heights	-

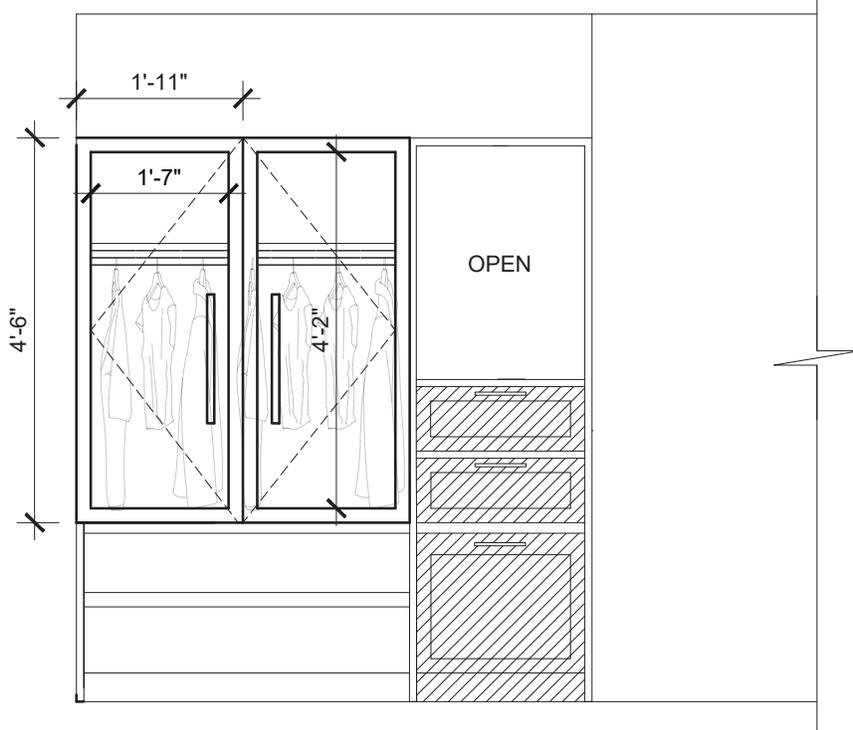
* = ADA compliant



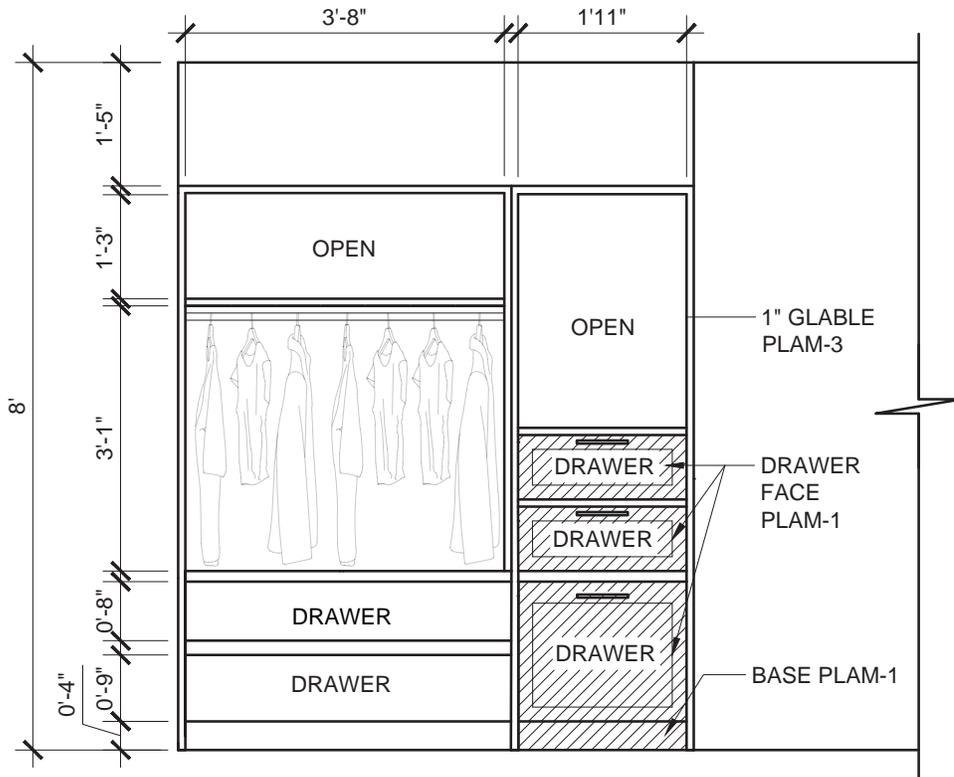
10 TYPICAL RESIDENT CLOSET
NTS



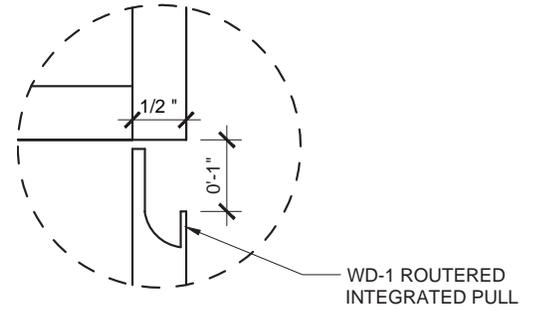
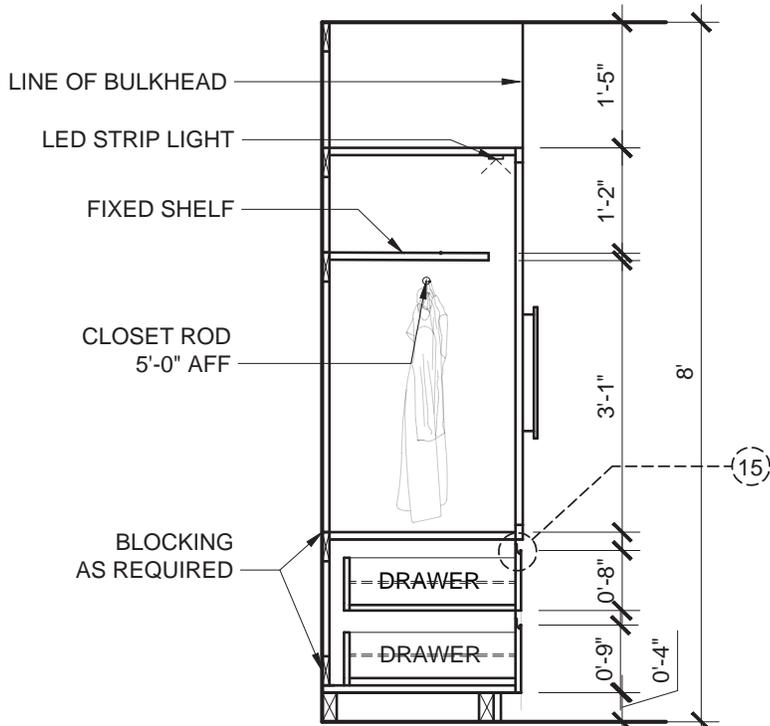
11 TYPICAL RESIDENT CLOSET ELEVATION
NTS



12 CLOSET DOOR ELEVATION
NTS

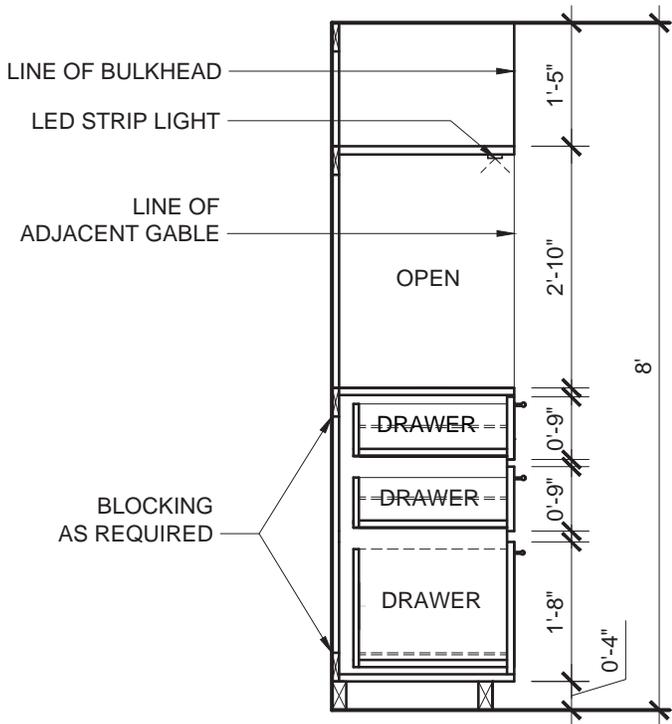


13 CLOSET STORAGE ELEVATION
NTS



15 INTEGRATED PULL DETAIL
NTS

14 CLOSET SECTION A
NTS



16 CLOSET SECTION B
NTS

Appendix D:

Materials and Finishes

Appendix D: Materials and Finishes

Code	Description	Manufacturer	Collection	Product Code	Colour/Style	Sustainability
PT-1	Field Paint	Benjamin Moore	Scuff-X Interior Paint	OC-17	White Dove	Low-E Material
PT-2	Ceiling Paint	Benjamin Moore	Scuff-X Interior Paint	OC-57	White Heron	Low- E Material
PT-3	Accent Paint	Benjamin Moore	Scuff-X Interior Paint	2028-30	Tequila Lime	Low- E Material
PT-4	Accent Paint	Benjamin Moore	Scuff-X Interior Paint	2051-50	Tranquil Blue	Low- E Material
PT-5	Accent Paint	Benjamin Moore	Scuff-X Interior Paint	2023-40	Sunburst	Low- E Material
PT-6	Accent Paint	Benjamin Moore	Scuff-X Interior Paint	2012-30	Tangerine Dream	Low- E Material
PT-7	Accent Paint	Benjamin Moore	Scuff-X Interior Paint	2015-30	Calypso Orange	Low- E Material
P-8	Accent Paint	Benjamin Moore	Ben Chalkboard Paint	K308	Chalkboard Paint	Low- E Material
WVC-1	Wall covering	KnollTextiles	Akita	#WC16212	Washi Paper	Green Guard
WP-1	Wall Protection	Inpro	Palladium® rigid sheet wall protection	Palladium® Beadboard Panels	Designer White 0101 in G2 Bioblend	Green Guard, EPD
WCG-1	Wall Corner Guard	Inpro	Corner Guard	150 Surface Mount Corner Guard	Designer White 0101	EPD, HPD
WT-1	Window treatment	Inpro	Solar Shades	Solarity® Solar Shades	White/Grey	Green Guard
PLAM-1	Plastic Laminate	Formica	Formica® Laminate - Commercial	6401	Natural Walnut	Green Guard
PLAM-2	Plastic Laminate	Wilsonart	Laminate	7977	White Barn Softgrain Finish	Green Guard
PLAM-3	Plastic Laminate	Formica	Formica® Laminate - Commercial	949	White	Green Guard
SS-1	Solid Surface	Formica	Formica Traditions	601	Bleached Concrete	Green Guard

EPH = Environmental Product Declaration

HPD = Health Product Declaration

Code	Description	Manufacturer	Collection	Product Code	Colour/Style	Sustainability
VF-1	Vinyl Flooring	Armstrong	Rejuvenations Timberline with Diamond 10 technology coating	37523	Maple Lane Agave	EPD, HPD Floorscore
WB-1	Wall Base	Armstrong	Cove Roll Wall Base	R4823	Milk	Floorscore
HR-1	Handrail	Inpro	Handrail	2000 Handrail	American Teak	EPD, HPD
ACT-1	Acoustic Ceiling Tile	Armstrong	Lyra Plant Based (PB)	8732PB	White	71% Recycled Content
AB-1	Acoustic Baffle	Armstrong	Woodworks Grille	-	Carbonized Bamboo	-
U-1	Upholstery	DesignTex	Linnen	3921-102	Mortar	LEED M.I.
U-2	Upholstery	DesignTex	Linnen	3921-501	Wasabi	LEED M.I.
U-3	Upholstery	DesignTex	Linnen	3921-104	Wildwood	LEED M.I.
U-4	Upholstery	DesignTex	Linnen	3921-502	Olive	LEED M.I.
U-5	Upholstery	Burch	Gabardine	1010441	London Fog	-
U-6	Upholstery	Burch	Gabardine	1010447	Coral	-
U-7	Upholstery	Burch	Gabardine	1010445	Granny Smith	-
U-8	Upholstery	Burch	Argyle	1010403	Silverado	-

EPH = Environmental Product Declaration

HPD = Health Product Declaration

LEED M.I. = LEED Disclosure & Optimization L Material Ingredients

Room Finish Schedule - Welcome Center

Room ###	Room Name	Floor	Walls				Ceiling
			North	East	South	West	
200	Waiting Area	VF-1	VWC-1, WP-1	-	PT-4	VWC-1, WP-1	PT-2
201	Reception	VF-1	PT-4	PT-4	-	-	PT-2
202	Water Closet	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	ACT-1
203	Social Services	VF-1	GLAZ-1	WP-1	PT-1, WP-1	PT-1, WP-1	ACT-1
203A	Private Office	VF-1	PT-1, WP-1	WP-1	GLAZ-1	PT-1, WP-1	ACT-1
203B	Private Office	VF-1	PT-1, WP-1	PT-1, WP-1	GLAZ-1	PT-1, WP-1	ACT-1
203C	Private Office	VF-1	PT-1, WP-1	PT-1, WP-1	GLAZ-1	PT-1, WP-1	ACT-1
204	Corridor	VF-1	-	-	VWC-1, WP-1	VWC-1, WP-1	PT-2
205	Water Closet	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	ACT-1
206	Water Closet	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	ACT-1
207	Water Closet	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	ACT-1
208	Cafe	VF-1	VWC-1, WP-1	WP-1	PT-1, WP-1	-	ACT-1
209	Prep	VF-1	-	PT-1 WP-1	PT-1 WP-1	PT-1 WP-1	ACT-1
210	Kitchen	VF-1	PT-1	PT-1	PT-1	PT-1	ACT-1
211	Activity Room B	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-2
212	Water Closet	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	ACT-1
213	Activity Room A	VF-1	PT-6, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-2
214	Storage	VF-1	PT-1	PT-1	PT-1	PT-1	ACT-1
215	Water Closet	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	ACT-1

Room Finish Schedule - Typical Household

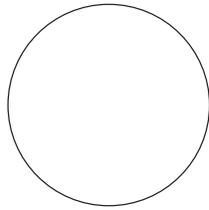
Room ###	Room Name	Floor	Walls				Ceiling
			North	East	South	West	
216	Lounge	VF-1	PT-6	PT-1	P-8	PT-1, WP-1	PT-2
217	Suite 217	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
217A	Bedroom	VF-1	WP-1	WP-1	WP-1	WP-1	PT-2
217B	Bathroom	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-2
218	Suite 218	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
218A	Bedroom	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
218B	Bathroom	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-2
219	Clean Utility	VF-1	PT-1	PT-1	PT-1	PT-1	ACT-1
220	Electrical	VF-1	PT-1	PT-1	PT-1	PT-1	ACT-1
221	Pantry	VF-1	PT-1	PT-1	PT-1	PT-1	ACT-1
222	Kitchen	VF-1	PT-5	PT-5	-	PT-1	PT-2
223	Suite 223	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
223A	Bedroom	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
223B	Bathroom	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-2
224	Suite 224	VF-1	WP-1	WP-1	WP-1	WP-1	PT-2
224A	Bedroom	VF-1	WP-1	WP-1	WP-1	WP-1	PT-2
224B	Bathroom	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-2
225	Sun Room	VF-1	WP-1	PT-1	WP-1	PT-1	PT-2
226	Suite 226	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
226A	Bedroom	VWC-1, VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2

Room Finish Schedule - Typical Household - Continued

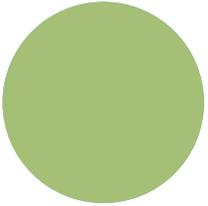
Room ###	Room Name	Floor	Walls				Ceiling
			North	East	South	West	
226B	Bathroom	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-2
227	Suite 227	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
227A	Bedroom	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
227B	Bathroom	VF-1	PT-1 WP-1	PT-1 WP-1	PT-1 WP-1	PT-1 WP-1	PT-2
228	Bathing Room	VF-1	PT-1, WP-1	PT-1	PT-1, WP-1	PT-1, WP-1	PT-2
229	Laundry Room	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-2
230	Dining Room	VF-1	-	PT-5	-	PT-1, WP-1	AB-1
231	Dirty Utility	VF-1	PT-1	PT-1	PT-1	PT-1	ACT-1
232	Water Closet	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	ACT-1
233	Storage	VF-1	PT-1	PT-1	PT-1	PT-1	ACT-1
234	Suite 234	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
234A	Bedroom	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
234B	Bathroom	VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-2
235	Suite 235	VF-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
235A	Bedroom	VF-1	VWC-1, P-1	VWC-1, WP-1	VWC-1, WP-1	VWC-1, WP-1	PT-2
235B	Bathroom	PT-1, VF-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-1, WP-1	PT-2



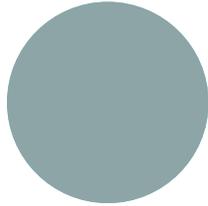
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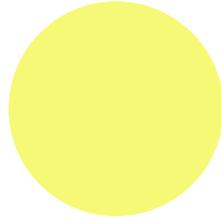
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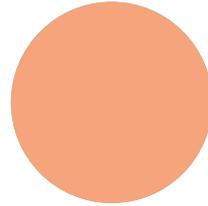
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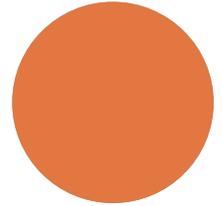
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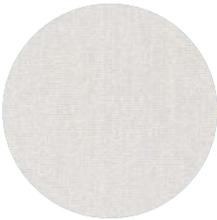
PT-5



PT-6



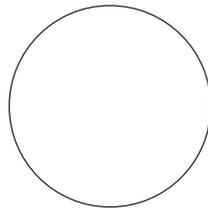
PT-7



VWC-1



WP-1



WB-1



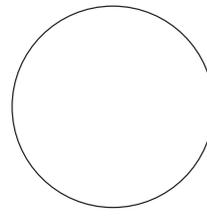
VF-1



PLAM-1



PLAM-2



PLAM-3



SS-1



U-1



U-2



U-3



U-4



U-5



U-6



U-7



U-8

Furniture Schedule - Welcome Center

Description	Product Name	Manufacturer	QTY	Finish
Task Chair	Amia	Steelcase	9	Upholstered Seat
Desk	West Elm Work Greenpoint Private Desk	Steelcase	3	Wood Veneer, Metal Base
Guest Chair	QiVi, sled base	Steelcase	6	Upholstered Seat, Metal Base
Guest Chair	Bindu	Coalesse	32	Upholstered Seat, Metal Base
Side Chair	Crosshatch Side chair	Herman Miller	32	Upholstered Seat, Walnut Frame
Sofa	Aspire Sofa	Wieland	2	Upholstered
Lounge Chair	Jenny Lounge Chair	Turnstone	4	Upholstered
Table	Montara650	Coalesse	23	Wood Veneer Top, Metal Base
Table	Nordic Care	Grace 501, Square	10	Wood Veneer
Outdoor Chair	.Enea	Aulkia Street Chair	36	Metal Frame

Furniture Schedule - Typical Household

Description	Product Name	Manufacturer	QTY	Finish
Table	Montara650	Coalesse	9	Wood Veneer Top, Metal Base
Table	Nordic Care	Grace 501, Square	6	Wood Veneer
Table	Coalesse	Denizen Table, Oval	1	Plastic Laminate Top, Metal Base
Dining Chair	Coalesse	Wishbone Chair	6	Wood
Task Chair	Amia	Steelcase	6	Upholstered Seat
Guest Chair	Bindu	Coalesse	32	Upholstered Seat, Metal Base
Dining Chair	Icons of Denmark	FDB - J52 Chair	8	Wood
Table	Nordic Care	Grace 501, Square	4	Wood Veneer
Side Chair	Crosshatch Side chair	Herman Miller	12	Upholstered Seat, Walnut Frame
Sofa	Astrid 3-seater	Ekdahls Möbler	3	Wood Frame, Upholstered Seat

Furniture Schedule - Typical Household Continued

Description	Product Name	Manufacturer	QTY	Finish
Side Table	Kona	Hightower	5	Plastic Laminate, Metal Base
Sofa	Together Bench	Coalesse	6	Upholstered
Lounge Chair	Rockwell Unscripted® High Back Lounge Chair	Knoll	2	Upholstered, Wood Base

Key Terms

Alzheimer's disease (AD)

Alzheimer's disease, the most common form of dementia, is a neurodegenerative disorder that causes brain tissue to shrink in size and expire, resulting in a wide range of symptoms over seven stages, including: memory loss, impaired problem solving and language, decreased wayfinding performance, visual and sensorial changes, as well as mood and behavioral changes. As the disease progresses, these cognitive deficits can hinder the individual's ability to perform everyday tasks and activities (Brawley, 2006; Alzheimer Society of Canada, 2018b; Alzheimer's Association, 2018).

Dementia

Dementia is a general term that describes various diseases and conditions that impair cognitive, intellectual, sensorial as well as affective functioning of the individual. Alzheimer's disease accounts for 60-80% of cases. Other dementias include Vascular dementia, Frontotemporal dementia, Lewy body dementia, to name a few (Alzheimer Society of Canada, 2017; Alzheimer's Association, 2020).

Dementia Friendly City Center (DFCC)

The Dementia Friendly City Center (DFCC) is a conceptual dementia care environment proposed by Dr. Emily Roberts of Oklahoma State University. Through adaptive reuse and new construction, the intent of the DFCC is to convert a vacant shopping mall into a secured, mixed-use development that includes medical, retail, fitness, educational, and leisure facilities, as well as independent, assisted living and memory care housing to support the daily functioning of persons with dementia and surrounding community members (Roberts, 2019).

Retrogenesis

The theory of retrogenesis suggests that the brain of a person with AD deteriorates in the reverse order that it developed from birth" and is used as an assessment tool to identify which stage of AD a person may be in based on their cognitive and functional status (Carson, Vanderhorst, & Koenig, 2015, p.2).

Person-centered Care (PCC) Model

Person-centered Care (PCC) is a caregiving model used in many dementia care environments. Unlike the traditional medical model, PCC does not focus on treating the disease by relying heavily on medications or restraints, but rather, using an empathetic, interpersonal care approach that affords the individual with dignity, compassion and respect while living in long-term care (Fazio et al., 2018).

Evidence-based Design

Evidence-based design is the process of making design decisions that have been empirically validated, creating high-quality spaces based on existing research (Center for Health Design, 2020).

Place Attachment (PA)

Place attachment (PA) theory is a multidimensional concept that is widely defined as the emotional bond created between an individual and the physical environment, such as one's home or neighborhood (Scannell & Gifford, 2010). In the context of AD, the process of institutionalization severs person-place bonds between an individual and their home, resulting in feelings of place loss and alienation.

Wayfinding

The ability to find one's way, referred to as wayfinding, is an essential cognitive process that is paramount for social interaction and independent functioning (Davis & Ohman, 2017). In order to successfully find one's way, an individual must be able to form a cognitive map to navigate their environment. This map is composed of sensory cues, past experiences or knowledge, as well as the recognition of patterns within the environment to interpret spatial information and navigate their surroundings (Lynch, 1960). In the context of AD, cognitive and sensorial deficits associated with the disease hinder an individual's wayfinding performance if their environment does not meet their needs.