

ABSTRACT

Title of Thesis:

AGE IN PLACE: DESIGN FOR DIGNITY

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The senior population in the United States is rapidly growing. As a result, there is a growing need for more affordable housing options for seniors. Assisted living centers can be a wonderful community for seniors to live in when they can no longer maintain their homes or if they need additional care. These apartments provide excellent opportunities for socialization, exercise, and travel. However, a variety of factors including cost, availability of specific care facility, and a desire for independence can cause a senior to not receive the help that they need in a timely manner. For seniors with additional care needs, such as a form of dementia, the need for flexible care is paramount. Current care options often lead to seniors with dementia having to move to facilities that are not designed for residents with dementia and hire additional care aids. The lifetime cost of dementia is a huge burden to the patient and their family. Affordable senior housing is needed for seniors who cannot afford memory care and choose to live in assisted living facilities in order to improve a senior's quality of life. The thesis will explore how we can use findings of environmental psychology to improve the design of assisted living facilities for seniors dealing with rapid memory loss from dementia.

AGE IN PLACE: DESIGNING FOR DIGNITY

by

Abigail Perkins

Thesis submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
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Professor Emeritus Ralph Bennett, Chair
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Preface

The problems associated with senior housing was first brought to my attention 6 years ago when my grandfather, John, needed to move into an independent living facility due to his dementia worsening. For the past 6 years, I watched both of my grandparents struggle to adapt to their independent and assisted living conditions. Institutionalized architecture made life more confusing for both of them, especially for my grandfather, John Perkins, who suffered from vascular dementia. This thesis sought to better understand why assisted living facilities are designed the way they are, how the built environment effects people with dementia, and how these findings could create a better space that improves the quality of life of people with dementia in assisted living.

Dedication

To my late grandfather, John Perkins, whose struggle with dementia first made me aware of the inadequate care options for people with dementia. I love you and miss you every day.

Acknowledgements

I extend my deepest gratitude to my thesis chair, Ralph Bennett, whose guidance, expertise, and unwavering support have been invaluable throughout this research and design journey. Ralph, your insightful feedback, encouragement, and personal experience shared have significantly contributed to the completion of this dissertation. Your mentorship has not only enhanced my academic growth but has also inspired me to continue this work as my career continues.

I cannot thank my friends and family enough for their support as I worked on this thesis. I'd like to thank my parents for their unwavering support and openness throughout the process of completing this dissertation. Their encouragement, understanding, and willingness to share their struggles have been invaluable to me. To my friends, specifically Cassie, Rohan, Sumi, Jie, Nick, John, Ben, and Andrew, thank you for your encouragement, opinions, and allowing me to constantly rearrange plans to work on this. To my classmates thank you for honesty and opinions in our charrettes and for constantly fixing my grammar. Special thanks to Adrian for answering my phone calls at all hours to discuss thesis and Kiara for bringing be meals for two weeks straight and helping my drawings come to life when I was extremely stressed towards the end. I could not have finished without all of your support.

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List of Abbreviations

Instrumental activities of daily living (IADLs)

Basic activities of daily living (BADLs)

Mild cognitive impairment (MCI)

Chapter 1: Introduction

The number of seniors being diagnosed with dementia is rapidly increasing. As of 2018, an estimated 5.7 million Americans are living with Alzheimer's disease or other forms of dementia and another 13.8 million have mild cognitive impairment (MCI), a precursor to dementia.¹ The number of seniors with memory care needs will only increase as the population ages. Furthermore, the aging population is causing the number of people diagnosed with dementia to increase even more. By 2050, nearly one in four people in the world will be over the age of 60.² In America, providing care for the growing number of seniors with dementia is one of the largest public health crises of this generation. Seniors with dementia can find themselves not receiving the care they need in a timely manner. The three main reasons seniors with dementia do not seek out help after diagnoses are the desire for independence, family obligation, and the cost of memory care. Memory care facilities are often institutionalized, discouraging people with early and middle stages of dementia from choosing to live there in order to maintain their independence. Furthermore, the cost of memory care in the United States can be double the cost of an assisted living facility. As a result of cost factors and their desire for independence, many seniors with dementia choose to live in a standard assisted living facility rather than a specialized memory care facility. This can cause seniors to have to constantly move

¹ Walter D. Dawson, "Impact on Care of an Increasing Population Living With Alzheimer's Disease and Dementia: The 21st Century Challenge." *Seniors Housing & Care Journal* 26, no. 1 (January 2018): 96–102.

² Agnieszka Z. Burzynska, and Laura H. Malinin. "Enriched Environments for Healthy Aging: Qualities of Seniors Housing Designs Promoting Brain and Cognitive Health." *Seniors Housing & Care Journal* 25, no. 1 (January 2017): 15–37.

which creates increased confusion on the cognitive impaired and prevents residents from receiving the care they need. However, seniors with dementia have additional needs that are not typically provided for in assisted living facilities. The current care options provided for people with dementia needs significant improvement.

The current assisted living facilities need to be adaptable for people with dementia. Currently, smaller facilities are typically better for people with dementia because the staff there can cater the treatment to become more personalized for the seniors living there. However, many seniors would rather live in larger facilities to have access to more amenities and a larger community. Assisted living facilities should be able to treat people with dementia regardless of size. Facilities can be catered to address environmental issues inside of assisted facilities through methods of wayfinding, fostering a connection to nature, creating an ambient environment through light therapy, and creating multiple scales of community. They can be improved for people with dementia by fostering cognitive stimulation amongst residents in order to help prevent decline of resident's cognitive abilities. In addressing the challenges seniors with dementia face in assisted living facilities, a better community can be established that has the opportunity to help increase resident's cognitive abilities and create a higher quality of life.

This thesis analyzes quantitative and qualitative data in order to understand the scope of the problem of dementia care in the United States. Research from reputable organizations such as the Alzheimer's Association was studied in order to break down how people with dementia live and their daily struggles. Based on

recommended therapies and passive treatments for dementia, key areas of focus for improvement are outlined as a method for improvement in assisted living design.

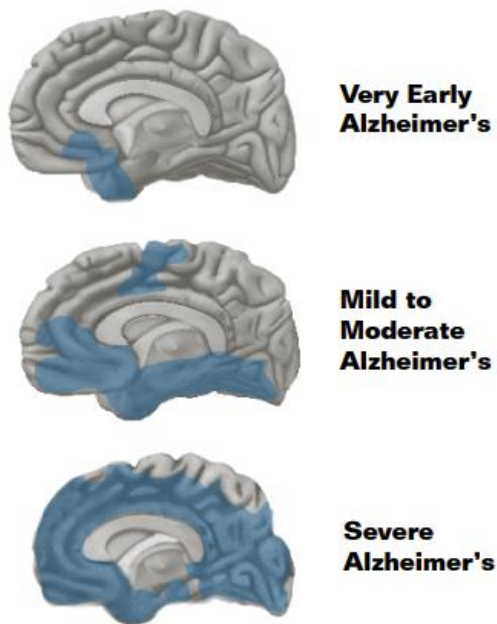
Chapter 2: Problems of Dementia in Contemporary America

The increase in people being diagnosed with dementia is considered one of the greatest public health crises in America. The percentage of seniors being diagnosed with dementia is increasing at a rate greater than the population is aging. Dementia is a complicated disease that's progression greatly varies based on the individual. The progression of the disease can take place over a decade and the care needs of the patient changes based on the type of dementia they have and the stage of dementia that the person is in. There are a series of types of dementia a patient can be diagnosed with and unfortunately most studies on dementia focus only on Alzheimer's Dementia. A dementia diagnosis doesn't just affect the patient. Dementia affects the individual, family, and the community. In order to design for dementia, one must understand what dementia is and how it affects people.

What is Dementia?

Dementia is an overall term that describes the condition of a loss of memory, language, problem solving, and other thinking abilities to inhibit one's daily life. Dementia symptoms trigger a decline in cognitive ability. Dementia is a progressive condition, which means the symptoms will gradually get worse. Over time these symptoms will become severe enough to impair daily life and prevent the independent functioning of a person. While people who have dementia often have some of the same symptoms, the progression of dementia varies from person to person. As a result, the degree that Dementia affects each person varies. Dementia is not diagnosed by a single test and is not found through routine screening, making diagnoses difficult and mostly dependent on self-reporting behaviors in early stages.

With a diagnosis of dementia, comes unpredictable shifts in behavior, memory, and language³. People with dementia also experience psychological symptoms or neuropsychiatric symptoms such as sleepless nights, aggravation, denial, and depression. Problems with memory, attention and concentration, processing speed, visuospatial abilities, and language are referred to as cognitive symptoms of dementia⁴. When these symptoms impact the abilities of the brain, it is called cognitive impairment. A diagnosis of dementia comes to define nearly every aspect of



As Alzheimer's disease progresses, neurofibrillary tangles spread throughout the brain (shown in blue). Plaques also spread throughout the brain, starting in the neocortex. By the final stage, damage is widespread, and brain tissue has shrunk significantly.

Figure 1: Stages of Alzheimer's Dementia (Source Alzheimer's Disease Education & Referral Center)

a person's life. With a diagnosis, nearly all day-to-day routines will change and affect other illnesses, surgical decisions, prognoses, and follow up plans.

The most common types of dementia are Alzheimer's disease, vascular dementia, mixed dementia, Lewy body disease, and frontotemporal dementia.

None of the most common forms of dementia currently have treatments to cure or consistently slow the disease

from person to person. The most

common form of dementia is

Alzheimer's disease. The primary

³ National Institute for Health and Care Excellence (Great Britain). 2018. Dementia : Assessment, Management and Support for People Living with Dementia and Their Carers. Nice Guideline, 97. London: National Institute for Health and Care Excellence.

⁴ James M. Noble, *Navigating Life with Dementia*. New York, NY: Oxford University Press, 2022, 23.

Clinical Symptoms	Core Characteristic	Supportive Characteristic
Dementia (problems with attention, executive function such as problem solving and reasoning, visual perception)	X	
Movement problems/parkinsonism (slowness of movement, muscle rigidity, tremor at rest)	X	
Cognitive fluctuations (unpredictable changes in concentration, attention; staring into space)	X	
Visual hallucinations	X	
REM sleep behavior disorder	X	
Extreme sensitivity to antipsychotic medications		X
Falls, fainting		X
Severe problems with involuntary functions (maintaining blood pressure; incontinence; constipation; loss of smell)		X
Changes in personality and mood (depression, apathy, anxiety)		X
Test Results Supporting Diagnosis	Core Characteristic	Supportive Characteristic
PET or SPECT brain scan showing reduced dopamine transporter (DaT) uptake in basal ganglia (brain region)		X
Abnormal ¹²³ Iodine-MIBG myocardial scintigraphy showing reduced communication of cardiac nerves		X
Sleep study confirming REM sleep behavior disorder without loss of muscle tone		X

Figure 2: Symptoms of Lewy Body Dementia (Source: National Institute on Aging, and National Institute of Neurological Disorders and Stroke)

feature of this disease is memory loss for recent events, world finding difficulty, visuospatial problems, low interest in activities, irritability and anger, denial, and sundowning⁵. The progression of Alzheimer's is slow over years. Lewy Body Dementia's primary features are memory loss and visuospatial disorientation as well as physical changes including tremors, slowness, stiffness, imbalance, visual hallucinations and misperceptions, and dream enactment.

Lewy Body Dementia is a slow progression over years with severity ranging based on the day⁶. Frontotemporal dementia's primary features include changes in personality, language, and memory. These changes may be accompanied by parkinsonism or motor neuron disease. This disease is a slow progression over years. Vascular dementia has all of the symptoms of the other dementias as well as weakness or language problems after one has a stroke. The progression of vascular dementia is stepwise with sudden or obvious changes after large strokes⁷. Other causes of

⁵ Alzheimer's Disease Education & Referral Center (National Institute on Aging). *Alzheimer's Disease*. Fact Sheet. Bethesda, Md.: U.S. Dept. of Health and Human Services, National Institutes of Health, Alzheimer's Disease Education & Referral Center, 2011.

⁶ National Institute on Aging, and National Institute of Neurological Disorders and Stroke (U.S.). *Lewy Body Dementia: Information for Patients, Families, and Professionals* (version [June 2018 edition]). [June 2018 edition] ed. Publication, No. 18-Ag-7907. Bethesda, Md.: National Institutes of Health, National Institute on Aging, National Institute of Neurological Disorders and Stroke, 2018.

⁷ Jacobsen, Sarah R, ed. *Vascular Dementia : Risk Factors, Diagnosis, and Treatment*. *Neuroscience Research Progress*. New York: Nova Science Publishers, 2011.

dementia include Huntington's disease, Creutzfeldt-Jakob disease, normal pressure hydrocephalus, brain tumors, epilepsy, and multiple sclerosis.

Age is an important factor in the development of dementia both in why some people develop it and how it is named. The terms early-onset and late-onset are used to describe the age someone is when they first start to experience the symptoms of dementia. Late-onset dementia is used when a person develops dementia over the age of 60, whereas early-onset is used to describe when a person begins developing dementia symptoms before 60⁸. The first signs of symptoms with dementia are often found when people need help with chores, hobbies, or routine activities. These activities are known as instrumental activities of daily living (IADLs). Another set of activities that are affected by dementia are known as basic activities of daily living (BADLs) and they include essential daily functions such as personal hygiene. The emotional impact of feeling confused and the frustration struggling with these factors impact a person's quality of life. The ability of people with dementia to complete these daily activities varies based on the stage of dementia a person is in.

Stages of Dementia

There are 7 stages of Dementia: no cognitive impairment, very mild cognitive decline, mild cognitive decline, moderate cognitive decline, moderately severe cognitive decline, severe cognitive decline, and very severe cognitive decline. These stages can be broken down into three categories that are used to describe the condition of the person: early stages (or mild dementia), middle stages (moderate

⁸ James M. Noble, *Navigating Life with Dementia*. New York, NY: Oxford University Press, 2022, 23.

dementia), and late stages (severe dementia). The duration of each stage is difficult to predict but there is a recognized progression within each stage and the changes a resident will endure.

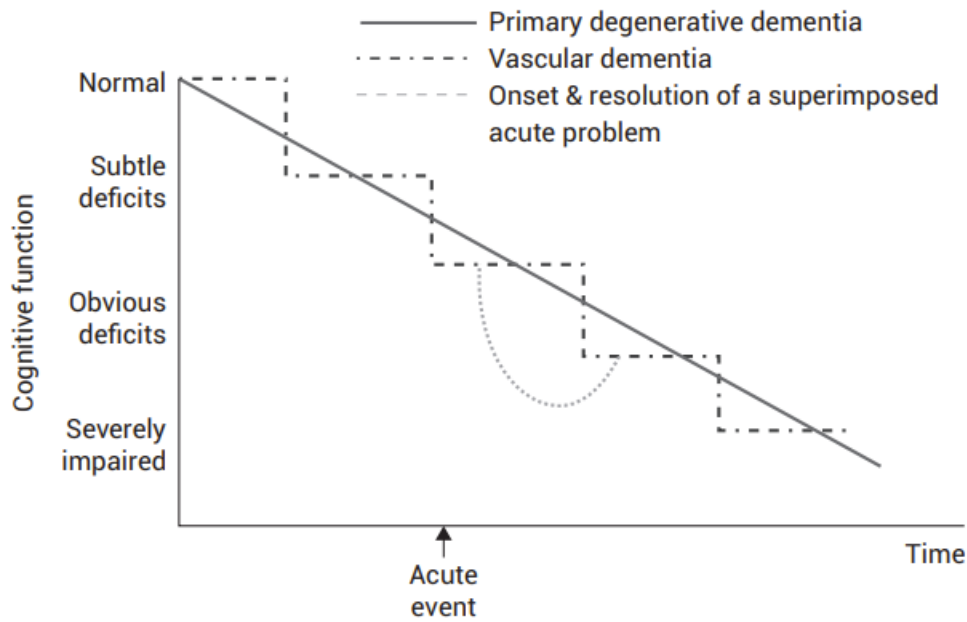


Figure 3: Stages of Dementia (Source James M. Noble)

Mild cognitive impairment (MCI) or predementia is a transitional stage defined by a period of time when the person may notice some forgetfulness or other small changes in thinking or behavior. People with MCI still function at a fairly normal level. They are able to go to work, take care of responsibilities at home and provide care to their family members with complex needs. MCI is a descriptive term that refers to a group of signs and symptoms and does not define a specific biological cause. MCI can be broken down into two main categories: amnesic and nonamnesic⁹. Amnesic MCI refers to people who have forgetfulness as a symptom of their MCI. An amnesic MCI is the first sign of what will be full blown dementia. Sometimes MCI improves,

⁹ James M. Noble, *Navigating Life with Dementia*. New York, NY: Oxford University Press, 2022, 23.

especially if a treatable or reversible cause of cognitive decline is diagnosed. When a person is diagnosed with MCI, it is crucial that they identify a care partner, who can transition to a caregiver, in order to plan ahead. Identifying when MCI begins is hard to determine since normal changes of thinking and memory occur with aging. Some symptoms of dementia are easily visible after a large health problem such as a stroke or heart attack. Early cognitive changes are often subtle and are explained away as just aging. Dementia can begin to affect work because of forgetfulness, inattention, poor concentration, difficulty in planning, or personality changes. Friends and family who visit frequently often cannot notice the subtle changes in someone with MCI, but someone who does not visit often is more likely to notice the subtle changes.

People with moderate or middle state dementia have a more notable change in their ability to perform most activities of daily living with a greater reliance to others. Symptoms of dementia become more obvious to casual observers and care givers spend more time supporting the person's basic needs such as hygiene or dressing. Obvious behavioral symptoms emerge such as psychosis and aggression. Physical decline, such as episodes of falling, is also apparent to casual observers. Severe or late-stage dementia patients need caregiver support in nearly every aspect of care. This includes but is not limited to feeding, communication, and movement. They have limited mobility and are constantly confused, eventually they speak very little. Most people with dementia in a severe stage develop complications from immobility and begin to experience problems from being bedbound. Patients are likely to develop decubitus ulcers, skin infections, and blood clots in the legs. Urinary tract infections

are also common. The inability to chew and swallow can lead to aspiration pneumonia from inhaling their food.

Dementia Statistics

Dementia is one of the greatest public health challenges of the 21st century. A majority of people, approximately 70 percent, diagnosed with Alzheimer's live in their own homes¹⁰. However, the intensive care needs and cognitive impairment on those with dementia mean that they need additional care in their homes or need to move. Approximately 97 percent of people with dementia have experienced at least one of the following symptoms: depression, irritability, agitation, or anxiety¹¹. These symptoms are being noted in most patients with dementia¹². The American population diagnosed with dementia is increasing rapidly. As of 2018, an estimated 5.7 million Americans were living with Alzheimer's disease or some form of dementia. Another 13.8 million individuals are believed to have MCI¹³. These numbers are only expected to get higher as the American population ages. By 2050, the Alzheimer's association estimates nearly 14 million Americans will be living with some form of dementia unless an effective treatment or prevention method can be developed. The likelihood of developing dementia increases with age. About 10 percent of adults 65 or over

¹⁰ Walter D. Dawson, "Impact on Care of an Increasing Population Living With Alzheimer's Disease and Dementia: The 21st Century Challenge." *Seniors Housing & Care Journal* 26, no. 1 (January 2018): 96–102.

¹¹ *ibid*

¹² *ibid*

¹³ *ibid*

have some form of dementia¹⁴. Once people reach 85, their likelihood of developing dementia is one in three . The sheer size of the population effected by dementia and the rate that it is growing is one of the reasons dementias is one of the greatest public health challenges facing Americans.

The average life expectancy for someone recently diagnosed with Alzheimer’s disease from time of diagnoses to death is 5 years¹⁵. However, some have a much shorter life expectancy, as little as 2 years, and some have a much longer lifespan, as long as 20 years. The wide range in longevity is based on community-based studies with intense screening studies. However, less is known about the life expectancy of those who are diagnosed with other forms of dementia. People with frontotemporal dementia might liv longer than those with Alzheimer’s disease, however this longevity might be shortened if the amyotrophic lateral sclerosis develops. The life expectancy of those with Lewy Body Dementia is not as well studied as that of Alzheimer’s but it is thought to be similar. In most dementias, microscopic brain changes begin 15 years before the first cognitive symptom is shown. Dementia does not cause death shortly after diagnoses. Dementia is a long disease where the person diagnosed slowly loses their cognitive abilities.

¹⁴ Walter D. Dawson, “Impact on Care of an Increasing Population Living With Alzheimer’s Disease and Dementia: The 21st Century Challenge.” *Seniors Housing & Care Journal* 26, no. 1 (January 2018): 96–102.

¹⁵ James M. Noble. *Navigating Life with Dementia*. New York, NY: Oxford University Press, 2022, 23.

Impact of Dementia on the individual, family, and community

People diagnosed with dementia experience unpredictable shifts in behavior, memory, and language. People with dementia also experience psychological symptoms or neuropsychiatric symptoms of dementia such as sleepless nights, aggravation, denial, and depression. Problems with memory, attention and concentration, processing speed, visuospatial abilities, and language are referred to as cognitive symptoms of dementia¹⁶. The inability to complete IADL and BADL results in individuals need for others to complete these activities for them. The effect that the inability to complete the IADL and BADL has on the individual has a direct impact on a person's mental health. This is one of the reasons that people with dementia are more likely to suffer from depression, specifically those diagnosed with vascular and Parkinsons dementia¹⁷. People with dementia need access to resources to help treat their depression such as therapy spaces. The impact of the inability to complete BADL adds to a person's likelihood of developing depression. Bathrooms need to be accessible and have room for a caretaker to help the patient complete their hygiene needs of BADL. People with dementia can feel a loss of a sense of dignity when they are being cared for while a caregiver is helping them with BADL, which can worsen depression. The inability to complete IADL means that most memory care units do not have kitchens in the rooms and instead have a communal dining area¹⁸. Many

¹⁶ James M. Noble. *Navigating Life with Dementia*. New York, NY: Oxford University Press, 2022, 23.

¹⁷ "Depression and Dementia." Alzheimer's Society, December 7, 2021.

¹⁸ James M. Noble. *Navigating Life with Dementia*. New York, NY: Oxford University Press, 2022, 55.

people find cooking therapeutic. The loss of a dining space can cause a resident to feel disconnected from their meals.

When a family member is diagnosed with dementia, the first thing they are asked is to identify a care partner who will help them adjust as their symptoms progress. The care partner typically will turn into a caregiver as their family member worsens¹⁹. For family caregivers of dementia patients with severe dementia, they must bathe, feed, and assist in other BADLs. Dementia patients also can experience confusion and delirium which can take form in anger on the family member or caregiver. In memory care facilities, the rooms are often small and often only have space for one chair where residents' families can visit. The lack of spaces for the resident's family hinders their ability to form connections. While many memory care facilities and assisted living facilities have communal spaces where families can meet with the resident, these spaces are not normally utilized. Family members sometimes will need to help pay the burden of the resident's care. As of 2018, in America the average lifetime costs of dementia by family members was \$143,735²⁰. The extreme financial cost on families can prevent them from spending time with their loved ones in their final days. It can also create a sense of resentment towards the family member who needs the help.

Most Dementia care facilities are in suburban areas away from people.

However, people want to stay where they are used to. If they lived in the city before they were diagnosed, they will most likely want to stay in the city. If they lived in the

¹⁹ James M. Noble. *Navigating Life with Dementia*. New York, NY: Oxford University Press, 202

²⁰ Walter D. Dawson, "Impact on Care of an Increasing Population Living With Alzheimer's Disease and Dementia: The 21st Century Challenge." *Seniors Housing & Care Journal* 26, no. 1 (January 2018): 96–102.

suburbs, they would want to stay in the suburbs they grew old in. However, the isolation of assisted living facilities in certain areas has caused people to have to move away from their home and community to enter these facilities. Assisted living facilities need to be in all areas with an elderly population so that people have the option of living in an assisted living facility without being removed from the community they are comfortable in.

Chapter 3: Dementia in Assisted Living Facilities

The level of care a person with dementia receives vastly depends on where they are living and the additional care they pay for. Not all assisted living facilities are the same. The opportunities available to seniors with dementia depend on the type of assisted living facility that they choose to reside in. Each typology of assisted living facilities has its own unique benefits and disadvantages.

Typologies of Assisted Living Facilities

When a senior decides they are unable to live on their own, they may choose to move to an assisted living facility. For some, a typical day in an assisted living facility is not that different to one at their previous home. They have meals, watch tv, sleep, read, take care of their personal needs, practice their hobbies, and visit with family and friends. However, for some assisted living could not be more different than their previous home. Some seniors reported that the shift from single family home to apartment style life was a great adjustment.²¹ For others, the daily schedule and structure is a significant modification of their preferred day to day life. Some residents are thrilled by the increased availability of activities at their assisted living while others, who prefer privacy and solitary pursuits, find the constant presence of people to be an annoyance. Assisted living facilities are meant to be noninstitutional by design, however institutional elements are evident in building characteristics, professional dominance, rigid schedule, and emphasis on the group rather than the

²¹ Eckert, J. Kevin. 2009. *Inside Assisted Living : The Search for Home*. Baltimore: Johns Hopkins University Press, 149-212.

individual. Requirements on Maryland's assisted living regulations mandate three meals daily in a "common dining area" with meal plans that are "nutritionally adequate".²² Group living presents a challenge as residents have to adapt to share spaces and daily activities organized by the facility. The ownership of the facility also affects the care of the residents. 56% of assisted living facilities are chain affiliated²³. Chain facilities have more rigid guidelines in rules than non-chain facilities. However, chain facilities have more opportunities for residents.

Large complexes can mean two hundred or more beds. More than 70 percent of assisted living seniors live in large communities²⁴. However, the average number of people in an assisted living facility is thirty-three people. Larger complexes can be older whereas small residences are normally only open for less than 10 years. In larger communities' people are typically older. Bigger facilities typically have multiple levels of care. Multiple levels of care typically means that as dementia progresses, there is a place to advance within the facility that is fully prepared to deal with these issues. However, typically in these facilities, the memory care wing is completely separate from the main facility. People with dementia can live there in independent living until their minds deteriorate to the point, they need specific memory care with trained professionals. Large complexes are found to have more

²² Eckert, J. Kevin. 2009. *Inside Assisted Living : The Search for Home*. Baltimore: Johns Hopkins University Press.

²³ "Assisted Living Facts & Figures." American Health Care Association National Center for Assisted Living. Accessed December 19, 2023. <https://www.ahcanca.org/Assisted-Living/Facts-and-Figures/Pages/default.aspx>.

²⁴ DementiaCareCentral.com. "Understanding the Differences between Large and Small Assisted Living / Memory Care Residences." Pros & Cons of Large and Small Assisted Living Residences, July 7, 2020.

residents that have falls which lead to hospitalization. Large facilities are more likely to have better amenities such as a pool, gym, spa, hairdresser, or movie theater.

Small facilities typically have anywhere between four and twenty-five people. In these smaller settings, staff are able to be able to be more accommodating to individual likes and dislikes. The kitchen can be located in the center of the house where the sight, smells, and sounds of the preparation of food is nearby the residents²⁵. Opening the kitchen to a family space where residents might be able to eat their meals in a family style can help create a sense of community as well as provide a space for residents and caretakers to sit in in between meal hours. Small facilities are able to better accommodate a resident's preferences in order to serve a smaller community. Small facilities, however, are more likely to go out of business within 10 years, providing less security than a larger assisted living facility²⁶. For people looking for a more financially stable place to live for the rest of their life, a smaller facility might not be ideal.

Challenges of Dementia Patients in Assisted Living Facilities

Dementia is a costly disease. The individual lifetime cost of dementia is estimated at \$95,441²⁷. The lifetime value of unpaid, informal care provided by family members is estimated at \$143,735²⁸. As of 2018, the average cost of a private

²⁵ Eckert, J. Kevin. 2009. *Inside Assisted Living : The Search for Home*. Baltimore: Johns Hopkins University Press.

²⁶ DementiaCareCentral.com. "Understanding the Differences between Large and Small Assisted Living / Memory Care Residences." Pros & Cons of Large and Small Assisted Living Residences, July 7, 2020.

²⁷ Walter D. Dawson, "Impact on Care of an Increasing Population Living With Alzheimer's Disease and Dementia: The 21st Century Challenge." *Seniors Housing & Care Journal* 26, no. 1 (January 2018): 96–102.

²⁸ *ibid*

room in a nursing facility in 2017 was \$97,455 compared to the yearly cost of a room in an assisted living facility estimated at \$45,000²⁹. This is more than double the cost of an assisted living facility. Dementia can also be a long disease where people live for more than 10 years after their diagnoses. The total lifetime cost of dementia is estimated at \$341,840³⁰. This is sobering when you compare the cost of dementia care to the amount of Americans with retirement savings. Roughly 45% of all working age households in the United States have no retirement savings³¹. The median retirement account balance is \$2,500 in America. For those who are nearest to retirement, it is a staggering \$14,500³². The typical American family simply does not have the resources to cover the costs associated with dementia. In 2018, the United States spent 277 billion dollars on dementia and is estimated to spend as much as 1.1 trillion annually as early as 2040³³. These numbers are unsustainable and will pressure the main sources of payment funding dementia care: Medicaid, Medicare, and private insurance.

²⁹ Taylor Shuman. “Memory Care Costs: Average Costs of Dementia & Alzheimer’s Care.” SeniorLiving.org, November 21, 2023. <https://www.seniorliving.org/memory-care/costs/>.

³⁰ Walter D. Dawson “Impact on Care of an Increasing Population Living with Alzheimer’s Disease and Dementia: The 21st Century Challenge.” *Seniors Housing & Care Journal* 26, no. 1 (January 2018): 96–102.

³¹ *ibid*

³² *ibid*

³³ *ibid*

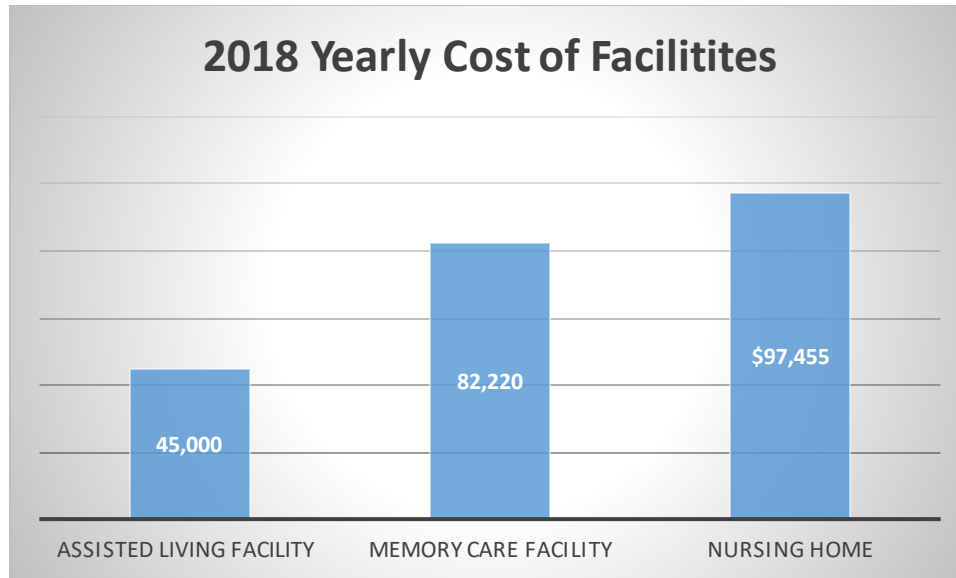


Figure 4: Comparative Costs based on Facility Type (Source: Author)

Most seniors are not eager to move into an assisted living facility. When they finally make the decision to move, the limited availability of suitable facilities prevents them from moving to a better facility. Typically, it is easier to find a room in a larger facility than a small one.

Preservation of autonomy and privacy are stated in the goals of assisted living. However, both these goals are challenged with the competing objective of around the clock resident safety and security. Confused patients have been known to accidentally wander into other residents' rooms. Due to concerns for safety and security, additional regulations are put into place and are enforced. Residents also are constantly hospitalized due to illness, and injuries that need rehabilitation. Ratios in memory care centers are fairly unregulated. Most states do not require specific ratios, with regulation only stating that there needs to be adequate staff on hand to fulfill every resident's needs. A higher number of staff for each resident leads to more personalized care. Large, assisted living facilities have more challenges staffing and

managing than smaller residences since administration is more of a corporate environment. However, staff at larger facilities are likely to receive higher salaries than smaller facilities. Better qualified professionals are more likely to go to the large, assisted facilities.

Memory Care vs Assisted Living Facilities

Memory care differs from assisted living facilities. Assisted living facilities are long-term care facilities that allow seniors to be independent, providing help with daily tasks. Assisted living residents often require personal care support but they are able to communicate their care needs. Memory care facilities are secured facilities that caters to the needs of people with some form of dementia. Safety is one of the key concerns of memory care facilities. They are designed to be more inviting with a lack of clutter, softer colors, and clear signage. In memory care, the staff to patient ratio is much lower because dementia residents need more care. Staff at memory care units need additional training as well. Due to these reasons, dementia care is significantly more expensive than assisted living. There are also significantly less options for memory care than assisted living. Only 18 percent of assisted living facilities have a dementia care unit, wing, or floor. Only 11 percent of facilities will serve adults with dementia.³⁴ Currently, fewer than 5 percent of assisted living facility beds are dementia care units. This percentage is unacceptable especially when considering that the percentage of adults 65 and over with dementia is more than three times the percentage of beds available. These issues with memory care are the main two

³⁴ "Facts & Figures." Facts and Figures. Accessed November 21, 2023.

reasons that the seniors with dementia typically choose to live in assisted living rather than memory care. Assisted Living facilities are not designed specifically for people with dementia.

Types of Assisted Living Facilities

TYPES	DESCRIPTION
Residential Care Homes	Homelike Environment for Seniors Needing Assistance With Daily Living Activities, Housing a Small Number of Residents, and Offering Personalized Care in a More Intimate Setting
Assisted Living Communities	Offers Services and Amenities to Seniors Requiring Assistance With Daily Living Activities While Maintaining Independence Offers Private or Semi-private Apartments, Communal Dining Areas, and Various Recreational Activities
Continuing Care Retirement Communities (CCRCs)	Offers a Continuum of Care for Seniors, Allowing Transition From Independent Living to Assisted Living and Eventually to Skilled Nursing Care as Needs Change A Long-Term Care Solution for Seniors and Their Families
Specialized Memory Care Facilities	Designed Specifically for Seniors With Alzheimer’s Disease or Other Forms of Dementia, Provides a Secure and Supportive Environment With Specialized Programming and Staff Trained in Dementia Care




Figure 5: Types of Asssted Living Facilities (Source Finance Strategies)

Chapter 4: Experiential Issues in Assisted Living Facilities

In assisted living facilities, there are environmental conditions that can create a negative impact on people with dementia. With the cost of memory care units being almost twice what assisted living facilities, most seniors with dementia choose to live in assisted living facilities instead. However, regular assisted living facilities are not designed for people with dementia. There is a need for wayfinding methods, connection to nature, access to natural light, and community.

Wayfinding

Wayfinding is the use of signage, color, and other design principles to help an occupant navigate spaces. Wayfinding is particularly useful in multifaced spaces such as healthcare complexes, airports, and education campuses. The goal of wayfinding is to provide spatial orientation as quickly and as clearly as possible³⁵. An effective wayfinding strategy adds information to a user's journey. Effective wayfinding also removes excessive information. There are five principles to wayfinding that create a better navigating system: journey, legibility, accessibility, design, and consistency. These strategies can be implemented through color, mapmaking, dimensional forms, material selection, and new media³⁶. Wayfinding for human navigation in a space is created through Lynch's Elements of Legibility: districts, paths, nodes, edges, and

³⁵ Chris van Uffelen. *Designing Orientation : Signage, Concepts & Wayfinding Systems*. 1st ed. Salenstein, Switzerland: Braun Publishing, 2021.

³⁶ David Gibson. *The Wayfinding Handbook : Information Design for Public Places*. Design Briefs. New York: Princeton Architectural Press, 2009.

landmarks³⁷. Creating these spaces can help people with dementia find their way home and allow them independence while promoting safety.

The use of wayfinding with people with dementia is found to help with short term memory. Bright, bold, and vivid colors have been found to improve the cognitive abilities of wayfinding. Specifically, the



Figure 6: Wayfinding used in memory Care Facility (Source McKnight Senior Living)

colors red, orange, and yellow have been found to be stimulating colors for the population of people with dementia. One method of wayfinding that has been found to be beneficial for health care facilities is progressive disclosure. Progressive disclosure is to provide just enough information to get a visitor to their next point, minimizing decision making and information overload. This form of wayfinding has been found to prevent distress. These tools can be beneficial for seniors with dementia because they have the urge to wander. The Alzheimer's association found that 60 percent of people with dementia will feel the urge to wander once they are diagnosed, which can lead to them going missing. While many are found and returned safely, 30 percent of dementia patients who wander die from exposure, injuries, or fatalities³⁸. Wayfinding can help a senior find their way home before they are in

³⁷ Kelsey Grabowski. *Redefining Residence: An Alternative Memory Care Environment for single, childless persons with Alzheimer's Disease*, 2020.

³⁸ Theora Care. "Research Shows Dementia Wandering Is More Lethal than We Thought." Theora Care, November 21, 2022. <https://theoracare.com/research-shows-dementia-wandering-is-more-lethal-than-we-thought/>.

danger. Providing a path where they can wander safely is crucial to assisted living facilities, specifically when residents have dementia.

Lack of Connection to Nature

Another way assisted living facilities need improvement is providing seniors a connection to nature. In an assisted living facility, the mobility capabilities of seniors vary. While many facilities provide one place where residents can connect to nature, they do not account for people with mobility needs. If a caretaker does not take a resident down to the courtyard, they might not see the outdoors for weeks at a time. Designing every public space and bedroom to have a connection to nature can help people passively connect. A connection to the environment positively impacts the brain. Experiencing nature has been found to enhance working memory, relieve fear and stress, reduce heart rate and blood pressure, as well as calm emotions³⁹. Walking in nature for 90 minutes reduced rumination and associated brain activity. This was not found in urban walking. This is crucial for people living with dementia in an urban setting since dementia has people with dementia are often fearful, depressed, and can experience severe mood swings. Seniors are often found to have low levels of vitamin D⁴⁰. Spending time outside can lead to an increase in vitamin D levels which are linked to pain in muscles and bones, inflammation, and a risk of type 1 diabetes. Seniors over the age of 65 are found to experience a change in the way that they connect to nature. A study in New Zealand by experts in medicine, physiotherapy,

³⁹ Kirsten Weir. "Nurtured by Nature." *Monitor on Psychology*, April 1, 2020. <https://www.apa.org/monitor/2020/04/nurtured-nature>.

⁴⁰ Ann Bossen. "The Importance of Getting Back to Nature for People with Dementia." *Journal of Gerontological Nursing* 36, no. 2 (2010): 17–22. <https://doi.org/10.3928/00989134-20100111-01>.

and geography found that nearly all of the seniors they studied experienced a change in their ways of connecting to nature, typically attributed to their health and mobility changes⁴¹. Accessible nature opportunities need to be available to seniors in assisted living facilities no matter their mobility and age circumstances. For people with severe dementia, who can no longer walk, accessibility to nature within their room is crucial to helping their mental and physical health in their last days. Access to public green spaces as well as private balconies and gardens have been found to positively affect residents' satisfaction. While residents enjoy being outdoors with 90 percent of residents stating that access to nature was important to them, the reality is factors such as poor design, and lack of staff assistance has been cited as a barrier to them spending time outdoors⁴². Assisted living facilities need to have some form of green space for all residents, especially for those who cannot move to the building green space.

⁴¹ Claire Freeman, Debra L. Waters, Yvette Buttery, and Yolanda van Heezik. "The Impacts of Ageing on Connection to Nature: The Varied Responses of Older Adults." *Health & Place* 56 (2019): 24–33. <https://doi.org/10.1016/j.healthplace.2019.01.010>.

⁴² Claire Freeman, Debra L. Waters, Yvette Buttery, and Yolanda van Heezik. "The Impacts of Ageing on Connection to Nature: The Varied Responses of Older Adults." *Health & Place* 56 (2019): 24–33. <https://doi.org/10.1016/j.healthplace.2019.01.010>.

Lack of Natural Light

An ambient environment refers to the air, lighting, temperature, and noise. An incorporation of natural light in space can help lead to a more ambient environment. Bright light exposure has been found to activate regions of the brain that promote alertness and improve



Figure 7: Hallway in an Assisted Living Facility Depicting the Lack of Natural Light (Source: El Comercio)

cognitive performance. It has also been found to help memory formation as well as regulate mood and overall brain health⁴³. Bright light therapy in the morning with reduced light exposed in the evenings has been found to improve sleep conditions and mood while reducing agitation in patients with dementia⁴⁴. This knowledge can be implemented in buildings where the less mobile patients can have their rooms facing the east, where they will be able to experience this naturally in their rooms. Placing communal spaces that residents will often frequent in the morning such as dining spaces will allow them to also have this experience. The use of bright white lights and

⁴³ Mohamed Boubekri, Ivy N. Cheung, Kathryn J. Reid, Chia-Hui Wang, and Phyllis C. Zee. "Impact of Windows and Daylight Exposure on Overall Health and Sleep Quality of Office Workers: A Case-Control Pilot Study." *Journal of Clinical Sleep Medicine* 10, no. 06 (2014): 603–11. <https://doi.org/10.5664/jcsm.3780>.

⁴⁴Tieyi Shi, and Baozhong Chen. "Association between Ambient Illumination and Cognitive Impairment: A Population-Based Study of Older." *Behavioural Neurology* 2023 (2023): 1–8. <https://doi.org/10.1155/2023/4131377>.

blue lights in light fixtures in spaces instead of yellow lights has been found to create this therapy in spaces in the morning.

There have been many studies over the years that prove the positive correlating relationship between daylighting, psychological well-being, and worker productivity. There are also studies that address the impact of daylight on sleep, quality of life, and overall health. These are all elements of life that people with dementia need help in. Incorporating light-dark patterns can act as an environmental cue that influences the human 24-hour biological, mental and behavior activities. In an environment where people do not need to get up for work every day, exposure to light therapy can help create a pattern, keeping residents minds active and improving their quality of life⁴⁵. The timing of light exposure can influence the rhythm and can act as a regulator of circadian physiology behavior. All rooms in an assisted living facility must have access to natural daylight in order to create a sense of pattern for residents. This kind of natural use of pattern psychologically encourages residents to follow a schedule without forcing the facility to become institutionalized. This will allow residents to keep their independence longer.

Lack of Community

The creation of a community in an assisted living center is typically centered on a few communal spaces and community activities that residents can participate in. These places include dining area, cafes, theaters, gyms, and game rooms. Communal

⁴⁵ Mohamed Boubekri, Ivy N. Cheung, Kathryn J. Reid, Chia-Hui Wang, and Phyllis C. Zee. "Impact of Windows and Daylight Exposure on Overall Health and Sleep Quality of Office Workers: A Case-Control Pilot Study." *Journal of Clinical Sleep Medicine* 10, no. 06 (2014): 603–11. <https://doi.org/10.5664/jcsm.3780>.

activities generally vary based on the care givers in each facility. However, patients with dementia can have a harder time creating a community. Physical and mental conditions can bar residents from community events, preventing social interactions. Studies have found that residents with dementia typically respond better to small communities⁴⁶. These small communities of around 8 people are able to create a small community with a care giver designated to a small number of people, who are able to understand the individual and take care of their individual needs. The idea of community is not just limited to the house that a resident lives in. Creating a space with multiple levels of community will better enable residents to thrive. These communities will be created in the pod level, the site level, and the local community. Engaging the residents with the local community around the site will allow them to fulfill some additional purpose in their life as well as create new and meaningful connections. This community can be created through partnership with local institutions such as schools and churches. It can also be created through access to public spaces such as parks, restaurants, and community buildings.

Social interactions have been found to have positive impacts on mood and morals. Additionally, isolation has been found to have negative impacts on cognition and memory. This was found to be especially evident during the COVID-19 pandemic where residents in assisted living often found themselves confined to their rooms for long periods of time alone, with little community engagement⁴⁷. Residents diagnosed with dementia and their care takers reported a quicker drop in cognitive

⁴⁶ Farhana Ferdous, and Emily Roberts, eds. 2023. (Re)Designing the Continuum of Care for Older Adults : The Future of Long-Term Care Settings. Cham: Springer. doi:10.1007/978-3-031-20970-3.

⁴⁷ Farhana Ferdous, and Emily Roberts, eds. 2023. (Re)Designing the Continuum of Care for Older Adults : The Future of Long-Term Care Settings. Cham: Springer. doi:10.1007/978-3-031-20970-3.

abilities and mood in seniors with dementia. Increase in socialization can help a resident become more focused in the here-and-now, helping their brains become sharp and give a sense of empowerment. The brain is a muscle. The brain needs to stay active in order to stay fit. Communication, socialization, and a sense of community become more important with the diagnosis of dementia.

Chapter 5: Cognitive Stimulation for Dementia Patients in Assisted Living Facilities

Cognitive stimulation refers to the set of techniques, strategies, and materials to improve performance and effectiveness of a person with dementia's cognitive capabilities and executive functions. These stimulation activities can help improve memory, attention, language, reasoning, and planning. People with dementia have been found to improve cognitive function with cognitive stimulation.

Daily Activities

The ability of people with dementia to complete their daily activities is one of the best ways doctors can monitor a dementia patient's health. Daily activities can be separated into two categories: instrumental activities of daily living(IADL) and basic activities of daily living(BADL)⁴⁸. The ability of a dementia resident to complete these activities helps to define what stage of dementia a resident is in as well as what help and care that they need. The difference between IADL and BADL is that IADL is not necessary for functional living but can improve the quality of life

⁴⁸ Kathleen Abrahamson, Dana Burr Bradley, Kristopher H. Morgan, and Bradley R. Fulton. 2012. "Does Functional Independence Influence Satisfaction Among Assisted Living Residents?" *Seniors Housing & Care Journal* 20 (1): 85–97.

of a person with dementia. If a person with dementia is able to complete IADLs, they are capable of living independently. These activities include but are not limited to cooking, cleaning, transportation, laundry, and managing finances. Occupational therapists monitor people with dementia in the rehab setting to determine how much assistance a resident will need⁴⁹. IADL are often confused with BADL. However, BADL are functions that are necessary for basic human living. These activities include feeding, dressing, bathing, and walking. If a patient is unable to complete BADLs, they will need additional healthcare assistance. Monitoring a resident's ability to complete IADLs is important to making sure that dementia is detected early at MCI. This monitoring needs to be available for all assisted living residents in order to ensure that early diagnoses of dementia can take place. Monitoring will also allow residents to see when they move from one stage of dementia to another. Information and planning ahead when diagnosed are keys to a longer and happier life.

Engaging Mind Activities

Studies have found that people with dementia partaking in cognitively stimulating activities can help improve memory, attention, language, reasoning, and planning. Some methods of cognitively stimulating activities according to the Alzheimer's Association include listening to a resident's favorite music, looking at family albums, afternoon tea, watching a sporting event on television, playing with play dough, games such as checkers or dominoes, naming the presidents, baking, or

⁴⁹ Manisha Sengupta, Farida K. Ejaz, and Lauren D. Harris-Kojetin. 2016. "Personal Care Aides in Assisted Living and Similar Residential Care Communities: An Overview from the 2010 National Survey of Residential Care Facilities (NSRCF)." *Seniors Housing & Care Journal* 24 (1): 72–87.

reading⁵⁰. These activities, while more difficult to complete with dementia diagnoses, can greatly improve a resident's mental capacity. The activities can be completed in a communal space or within the pod unit of residents. Cognitive Stimulation therapy, or CST, is a type of evidence-based treatment originating in the UK for dementia patients in order to actively stimulate and engage people by providing an optimal learning environment and a social environment⁵¹. This treatment involves 14 or more sessions of themed activities, twice a week, following a theme of activities chosen to cater to the group's interests. The study found that CST not only prevented further memory loss but actually helped improve and maintain memory. CST can be administered by trained health care professionals such as social workers, occupational therapists, speech-language pathologists, and registered nurses. The results focused on memory and orientation but also language and visuospatial abilities and found that CST was equally effective as several dementia drugs. Engaging mind activities were found to improve participants communication and social interaction as well as decrease their experiences of distress.

Physical Exercise

Physical exercise has also been found to benefit people with dementia. Physical exercise such as walking, gardening, dancing, and sports has been found to help people with dementia specifically in the MCI and mild stages of dementia. Physical activities help increase a person's heart rate as well as causing someone to

⁵⁰ "Brain Training and Dementia." Alzheimer's Society, September 29, 2023.

⁵¹ "Therapy and Approaches for Memory Loss Support." Alzheimer's Society. Accessed November 21, 2023.

breathe more deeply⁵². Physical activities can also help improve a patient's self-esteem and mood, which helps to encourage a more social environment. These methods of exercise also help to create a sense of community and improve the mental health of the residents. There are different activities that one can do based on the stage of dementia that a patient is in. For people in the early phases of dementia gardening, bowling, dance, seated exercise, swimming, tai chi, and walking have been found to be beneficial. These activities are completed in a communal space where social connectedness thrives. For patients with later stages of dementia, balance in a standing position, lying flat on the bed for 30 min a day, standing up regularly, and sitting unsupported for a few minutes a day have been found to help patients⁵³. This can take place in their private rooms or in a dedicated physical therapy room. Variations of CST focusing on exercised-based activities have also been found to help improve the brain capacity of patients⁵⁴. In exercised-based CST, the groups have shared a ball toss, chair exercises, or stretched to help memory and mobility. Their sessions focus on getting the body moving to help stimulate recall and brain stimulation.

⁵² Annette Leibing, and Silke Schicktanz, eds. *Preventing Dementia? : Critical Perspectives on a New Paradigm of Preparing for Old Age. Life Course, Culture and Aging : Global Transformations, Volume 7.* New York: Berghahn Books, 2021.

⁵³ Tania Plahay, and Martin Green. *Yoga for Dementia : A Guide for People with Dementia, Their Families and Caregivers.* London: Jessica Kingsley, 2018.

⁵⁴ "Therapy and Approaches for Memory Loss Support." Alzheimer's Society. Accessed November 21, 2023.

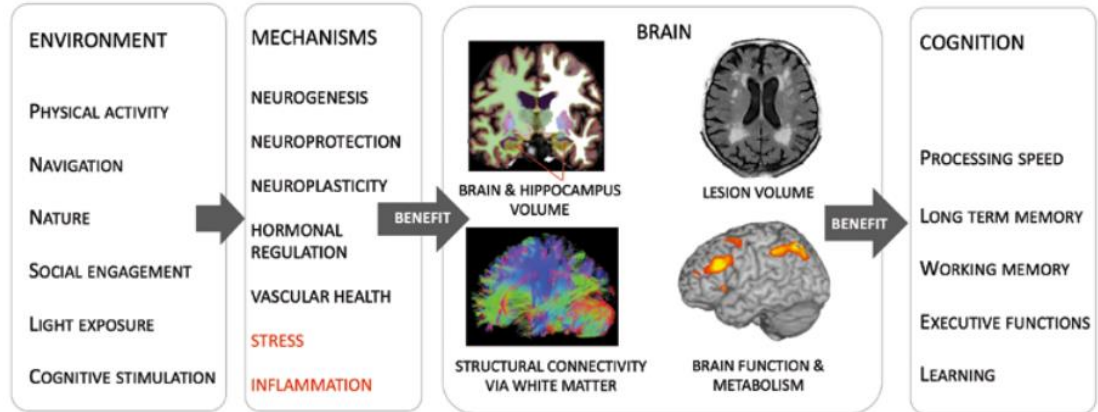


Figure 8: Environments for Cognitive Improvement (Source: Agnieszka Z. Burzynska, PhD; Laura H. Malinin, PhD, AIA, EDAC)

Evidence shows that physical activity can help all assisted living residents by preventing falls, reducing symptoms of depression, and maintaining cognitive abilities. Older adults who engage in regular physical activities are also more likely to remain in assisted living for a longer period of time and less likely to have to transition to a higher level of care such as a nursing home. However, despite the empirical evidence of the benefits of physical exercise, most older adults do not meet the recommended guidelines of 30 minutes of moderate physical activity per day. Most seniors in assisted living spend a majority of their time engaged in sedentary behaviors with extremely low levels of moderate to vigorous exercise. Intrapersonal factors, interpersonal factors, environment, and policy related issues within assisted living facilities can lead to residents not choosing so to partake in physical activity. Some interpersonal factors that affect whether a resident engages in physical activity include resident-to-resident social interactions as well as perceived social support from staff and family members. Psychological well-being of residents and social engagement of residents is also a factor that influences physical activity. Studies found that if an assisted living is able to provide activities that are enjoyable but also

built in some physical activity, such as physical bingo, may further increase the amount of time engaged in physical activity. Location and accessibility to local surroundings can affect how much each resident will exercise. If a facility encourages people to leave the facility to walk to a local park full of amenities, they are more likely to leave the facility and get exercise.

Proven Treatments for People with Dementia

In addition to the passive treatments stated above, there are medical treatments that are available to people with dementia in order to help slow the decline of one's cognitive function. Medications, however, are typically a temporary treatment that patients tend to forget to take. Cholinesterase inhibitors are medication that boost levels of a chemical messenger involved with memory and judgement⁵⁵. These memory improving drugs cause symptoms of nausea, vomiting, and diarrhea. Understanding the struggles that the residents will undergo with their treatments will help design a better space for them. Another successful drug that residents can take for memory is Lecanemab⁵⁶, a liquid IV infusion that needs to be administered every week. As many residents cannot drive, a place for this treatment to be administered in the facility will be crucial to help establish a better home for people with dementia.

⁵⁵ "Dementia." Mayo Clinic, August 30, 2023. [https://www.mayoclinic.org/diseases-conditions/dementia/diagnosis-treatment/drc-20352019#:~:text=The%20following%20are%20used%20to,and%20galantamine%20\(Razadyne%20ER\).](https://www.mayoclinic.org/diseases-conditions/dementia/diagnosis-treatment/drc-20352019#:~:text=The%20following%20are%20used%20to,and%20galantamine%20(Razadyne%20ER).)

⁵⁶ "Dementia." Mayo Clinic, August 30, 2023. [https://www.mayoclinic.org/diseases-conditions/dementia/diagnosis-treatment/drc-20352019#:~:text=The%20following%20are%20used%20to,and%20galantamine%20\(Razadyne%20ER\).](https://www.mayoclinic.org/diseases-conditions/dementia/diagnosis-treatment/drc-20352019#:~:text=The%20following%20are%20used%20to,and%20galantamine%20(Razadyne%20ER).)

Chapter 6: Program

Abstract

The main program areas needed to reinvent the perception of assisted living facilities in terms of people with dementia are connection to nature, consistent living, caretakers, social connection, and cognitive stimulation. Connection to nature refers to the use of green spaces as a wandering path to help increase a person with dementia's psyche. Facilitating the connection to nature and an ambient environment for people with dementia is crucial. An ambient environment can be created through natural daylight and warm colors surrounding them. Consistent living refers to the need of people with dementia to have a routine that they can follow. They need to have a stable room and a regular schedule. Social connection refers to the how we can improve the lack of community within a dementia care center. Cognitive stimulation through activities such as exercise, art, or mind exercises can help stimulate the brain of someone with dementia and help prevent the rapid decline of memory. Memory care in Scandinavia and Japan is better than memory care in America. These memory care precedents can help inform how the design of an American assisted living facility can improve on their ideas.

Precedents

Hogeweyk Dementia Village

Location: Netherlands

Year: 2009

Architect: Buro Kade Architects

Discription: An innovative and disruptive vision on living, care, and wellbeing for people living with severe dementia. Hogeweyk attempts to deinstitutionalize traditional nursing homes to create a neighborhood that is part of the broader own Weesp. People live together based on similar lifestyles. They have a pub, restaurant, theater, and supermarket.

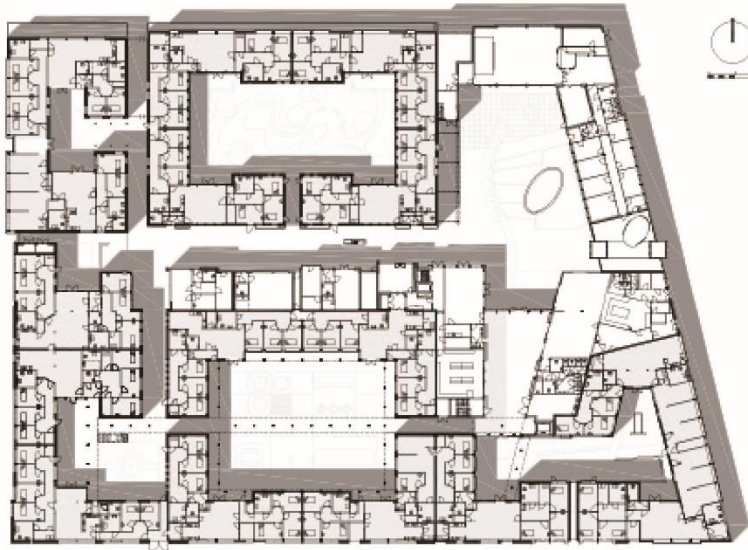
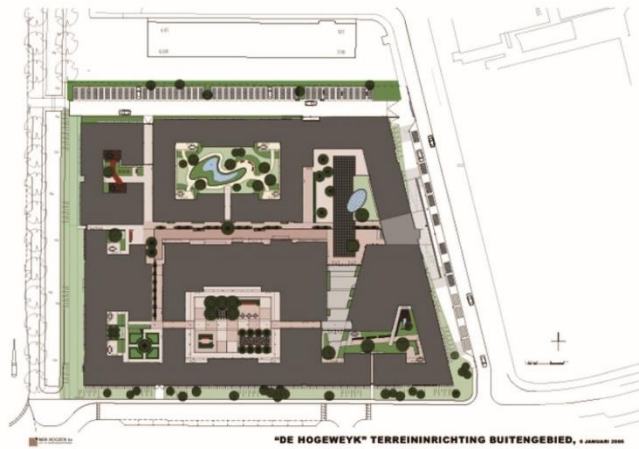


Figure 9: Case Study of Hogeweyk Dementia Village (Source Buro Kade Architects)

Carpe Diem Dementia Village

Location: Baerum, Norway

Year: 2017-2020

Architect: HENT, Bjorbekk & Lindheim, Norconsult, Cadi, Contiga

Description: A housing and treatment center for people suffering from dementia. The project has 136 communal housing units and 22 high care dementia units. It was designed to cultivate the domestic atmosphere of a small village with domestic residences and community center broken up into smaller units, separated by gardens and squares.

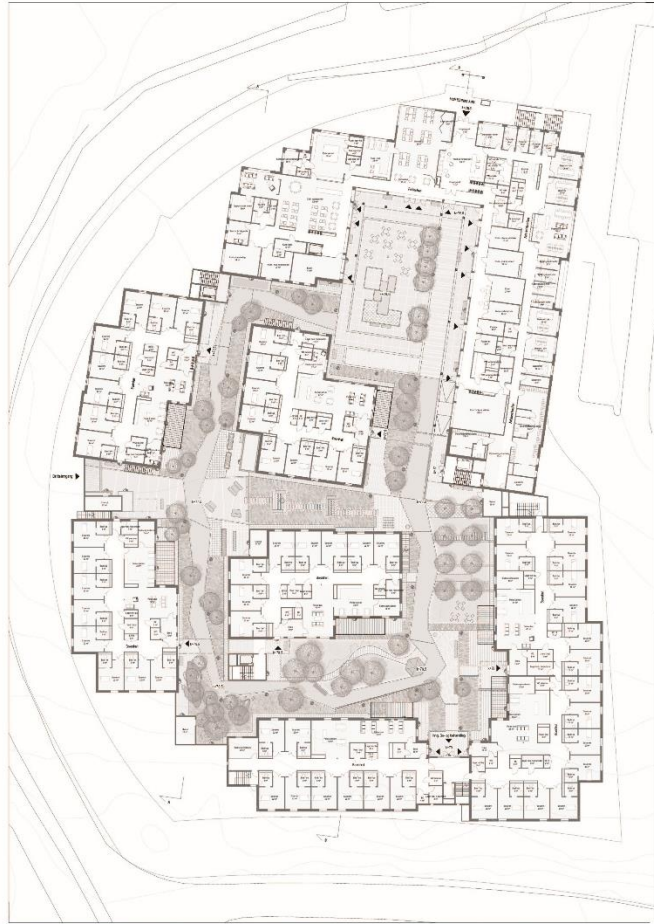


Figure 10: Case Study of Carpe Diem Dementia Village (Source: Nordic Office of Architecture)

BOSWIJK Vught

Location: Vught, Netherlands

Year: 2011

Architect: EGM architecten

Discription: This village in the Netherlands focused on a clear division between the public and private area. The dementia facility's is one story with 12 'houses' reaching out from the central street that enclose all of the public spaces such as a café and hairdresser.

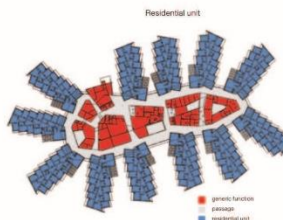


Figure 11: Case Study of BOSWIJK Vught Dementia Village (Source EDM architecten)

NewDirection Care at Bellmere

Location: Australia

Year: 2019

Architect:

Description: The facility contains 17 uniquely designed homes that house up to 120 residents. Their principal ideas was to allow residents to be more involved in their individual daily routine and decision making and to help with cooking and other household chores. Freedom of movement and access to the outdoor spaces and the wider community provide opportunities for our residents to socially interact. Facility includes a corner store, café, cinema, hair salon, barber shop, music room, and wellness center.



Figure 12: Case Study of NewDirection Care at Bellmeret (Source NewDirection Care)

El Terreno Communal Garden

Location: Mexico City Mexico

Year: 2021

Architect: Vertebral

Discription: A community garden and education center made out of recycled materials. It is an environmental facility that's products are distributed locally and for personal consumption by users and community volunteers.



Figure 13: Case Study Of El Terreno Community Garden (Source: ArchDaily)

Case Study

Carpe Diem Dementia Village is a housing and treatment center for people suffering from dementia. The project has 136 communal housing units and 22 high care dementia units. It was designed to cultivate the domestic atmosphere of a small village with domestic residences and community center broken up into smaller units, separated by gardens and squares.

	Description	Quantity	Size	Total	
	Private				
Housing (17 housing units)	Bedroom	136	240	32,640	
	Bathroom	136	55	7,480	
	High Care Bedroom	22	240	5,280	
	High Care Bathroom	22	55	1,210	
	Private Total			46,610	
	Public				
	living	17	600	10,200	
	Kitchen	17	160	2,720	
	dining	17	325	5,525	
	outdoor area	17	215	3,655	
	service	17	215	3,655	
	Bathroom	17	33	561	
	High Care living	2	100	200	
	High Care Kitchen and	2	645	1,290	
	High Care outdoor area	2	550	1,100	
	High Care service	2	500	1,000	
	High Care Bathroom	2	65	130	
	Public Total			30,036	
	Site Total			119,000	

	Description	Quantity	Size	Total	
	Admin				
Public	Office	8	125	1,000	
	Bathroom	1	200	200	
	Meeting room	5	240	1,200	
	Kitchen	1	650	650	
	Service	1	500	3,050	
	Admin Total			6,100	
	Public				
	Vestibule	1	130	130	
	Lobby	1	750	750	
	Kitchen	1	550	550	
	dining	1	1,300	1,300	
	service	1	12,500	12,500	
	Wellness Center	1	3,000	3,000	
Café	1	1,300	1,300		
Parking	1	1,400	1,400		
Public Total			20,930		
Site Total			28,300		

	Description	Quantity	Size	Total
	Building Footprint			
Site	Buildings	6	39,700	166,000
	Courtyard	1	44,469	44,469
	total			210,469

Figure 14: Program Breakdown of Carpe Diem Dementia Village (Source Author)

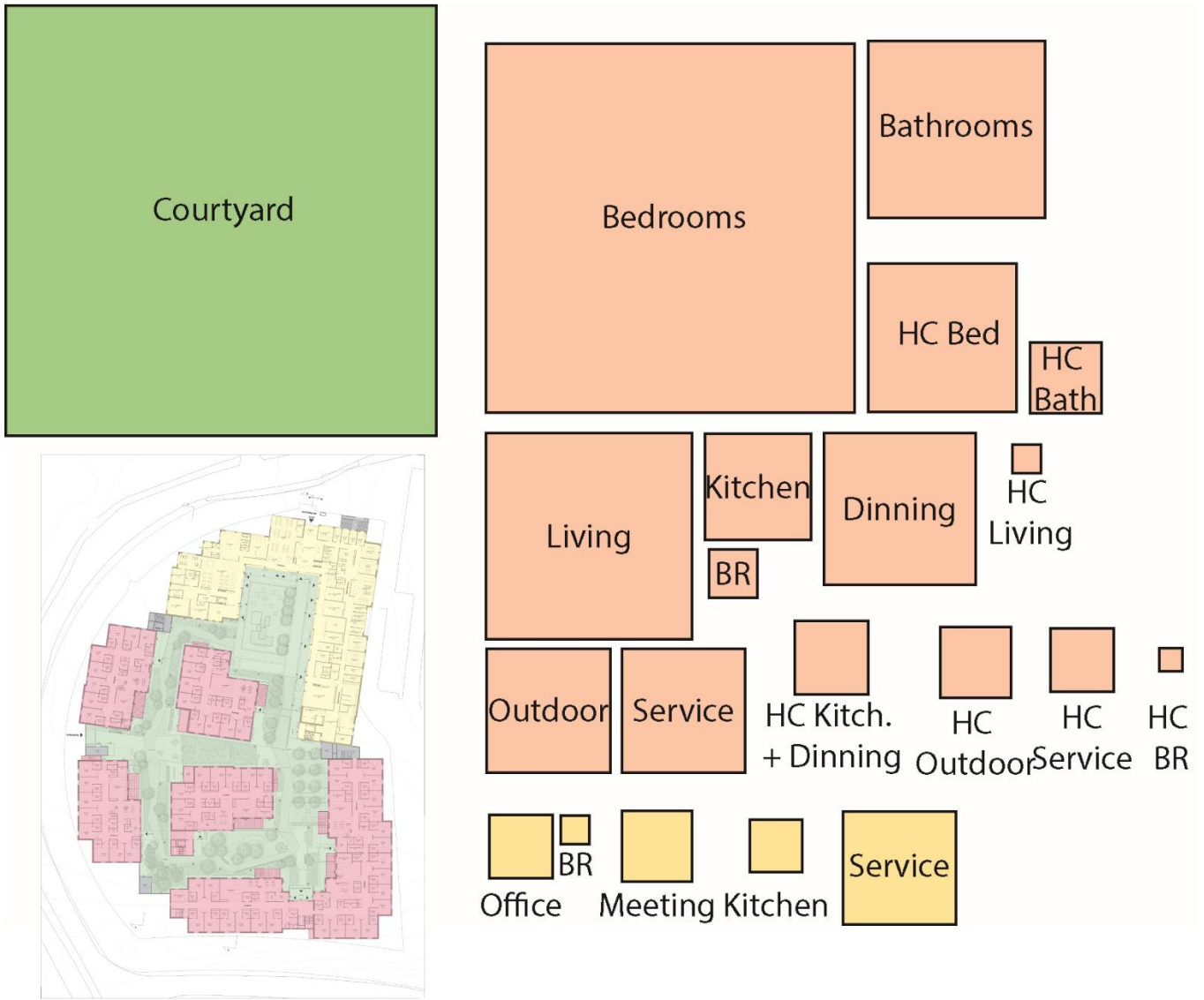


Figure 16: Carpe Diem Program (Source Author)

Total Building Program	103,676
Total Building Area	166,000
Efficiency	62.5%
Circuation Area	62,324

Figure 15: Carpe Diem Efficiency Diagram (Source Author)

Proposed Program

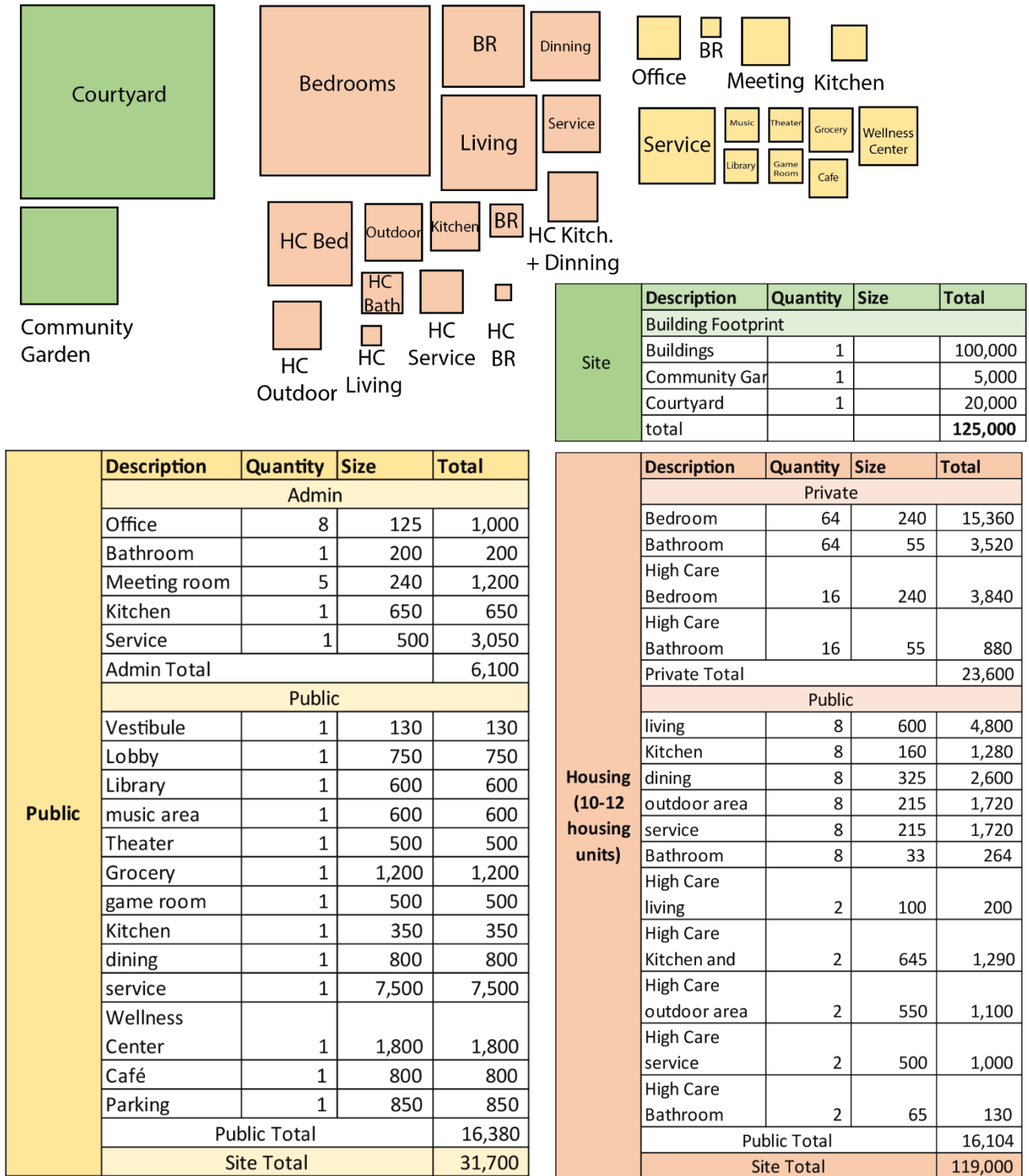


Figure 17: Conceptual Proposed Program (Source Author)

Conclusion

This thesis will be an experimental look into assisted living design. The facility will serve 10 to 12 communities of 8 seniors each with an assigned caretaker in each space. Communal spaces will be located in every community as well as in the larger site community. This assisted living facility will improve on what currently exists in American assisted living facilities by designing knowing that residents living there will have dementia. The facility will be an improvement of current facilities by the inclusion of multiple scales of community, ambient light therapy, wayfinding, connection to nature, consistent living environment, and incorporation of cognitively stimulating activities.

Chapter 7: Site Selection

Abstract

The rate of seniors being diagnosed with dementia is rapidly growing on a global scale. The problem of dementia is considered by American public health experts to be the one of the biggest health concerns in the United States. This problem is especially problematic in Maryland with two of the top five counties in the United States leading in percentage of residents with dementia. Baltimore City is the second highest percentage of dementia residents per county in the United States. Prince Georges County is the fourth highest percentage of dementia residents per county in the United States. There is also additional opportunities in Maryland for dementia

care with John's Hopkins Bayview Medical Center being one of the leading centers for dementia research in Baltimore City. Affordability of care is a key component to this experimental design. The cost of living for dementia care in the US is astronomically high and is one of the main reasons people do not receive the care that they need, especially for memory care. In the Maryland, the cost of dementia care is \$6,125 a month compared to the national average of \$5,625⁵⁷. The outrageous cost of living for dementia in Maryland makes the state a better location for a testing ground of a possible cheaper alternative to dementia care.

In finding a site for this innovative building typology, it was important to create a community for the seniors with dementia at a series of different scales. It was also important to create a connection to nature between the residents and their environment. As a result, some of the key factors in selecting a site were related to public parks and community around. Since most seniors are unable to drive, access to public transit is important for seniors to be able to get around the community. Other key factors related to community and nature were access to public parks, walkability rating, access to places of worship, access to light and air in the east as well as a couple of community buildings in the area. Safety is also a key factor since many residents with dementia experience falls or have multiple strokes. Proximity to a hospital was a key factor when determining a site within the two counties with the highest percentage of dementia. The more accessible these community buildings are,

⁵⁷ "Memory Care in Maryland." MemoryCare.com, May 25, 2023. <https://www.memorycare.com/memory-care-in-maryland/>.

the less they will be needed in the program of the assisted living facility and the better the community will be created.

Site Options

Bayview, Baltimore

Bayview Site is located on the grounds of Joseph E. Lee Park in Baltimore, Maryland. The site is adjacent to Johns Hopkins, a hospital leading the American dementia research. Within a 5 mile walk radius there are a series of amenities: The National Institute of Aging, Joseph E. Lee Park, Claremont School, Our Lady of Fatima, Our Lady of Fatima 2, Savesmart Supermarket, Retail shops on Eastern Avenue and LA Fitness. The local community is zoned mostly for rowhomes and town homes with a 54% ownership and 46% rented housing statistics.

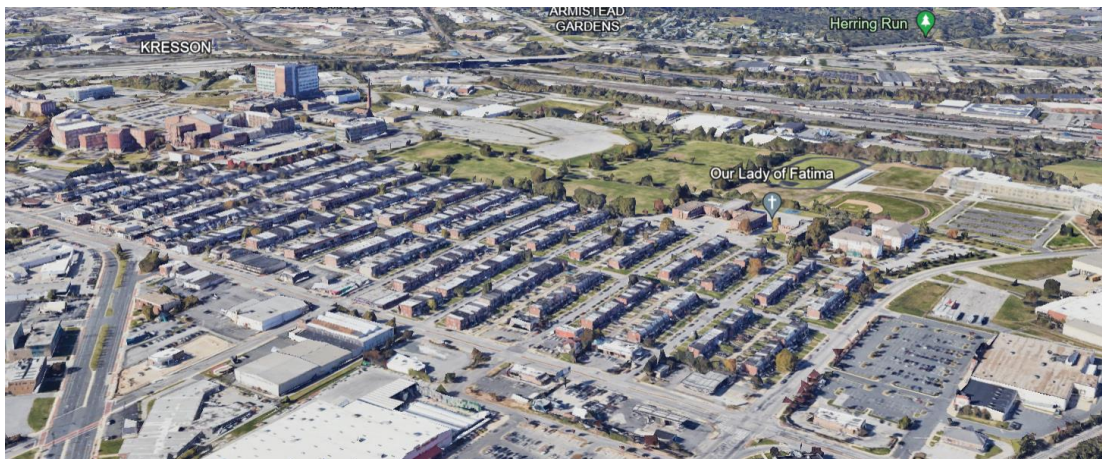


Figure 18: Aerial View of Bayview (Source: Google Earth)



Figure 20: Plan View of Bayview (Source: Google Earth)

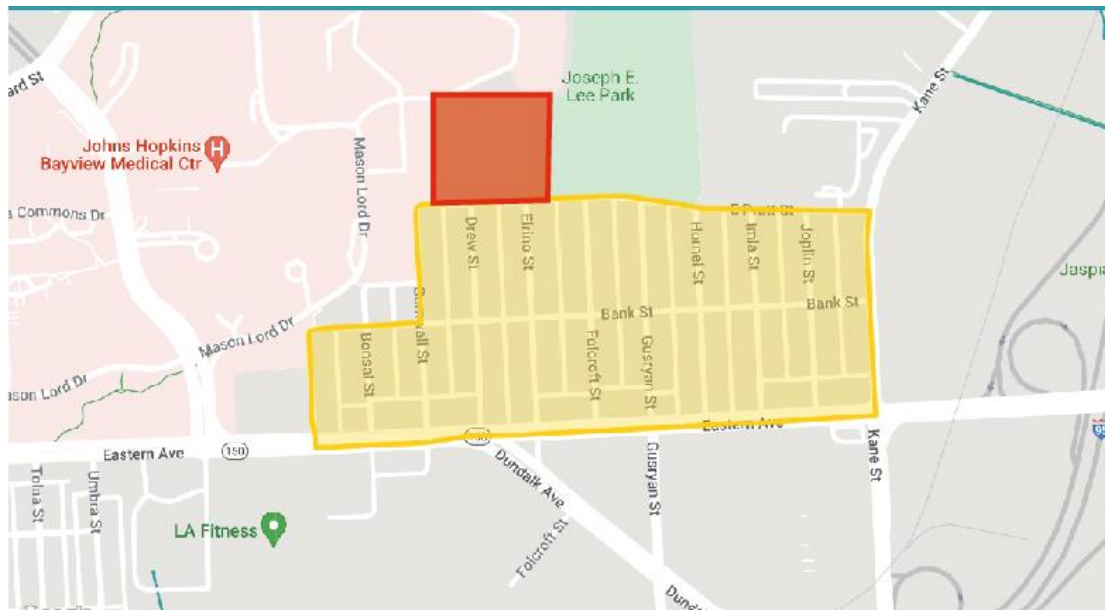


Figure 19: Zoning Plan of Bayview with Intended Site Highlighted in Red (Source: LiveBaltimore)

Fairwood, Bowie

Fairwood Community is located in Bowie Maryland. The intended site is adjacent to Fairwood Community Park. Fairwood park has access to the WB&A biking trails, frequent concerts, art exhibits, and other community events. The Site is also adjacent to a medical office park that contains a variety of medical services such as women's health, dental, orthodontic, Xray, pediatrician, and optician. There is a Shopping center adjacent to the site that contains a pharmacy, various restaurants and coffee shops, a grocery store, nail salon, and a gym. Also within the 5-minute radius is two bus stops, a historic house and grounds, an urgent care center, and another park.

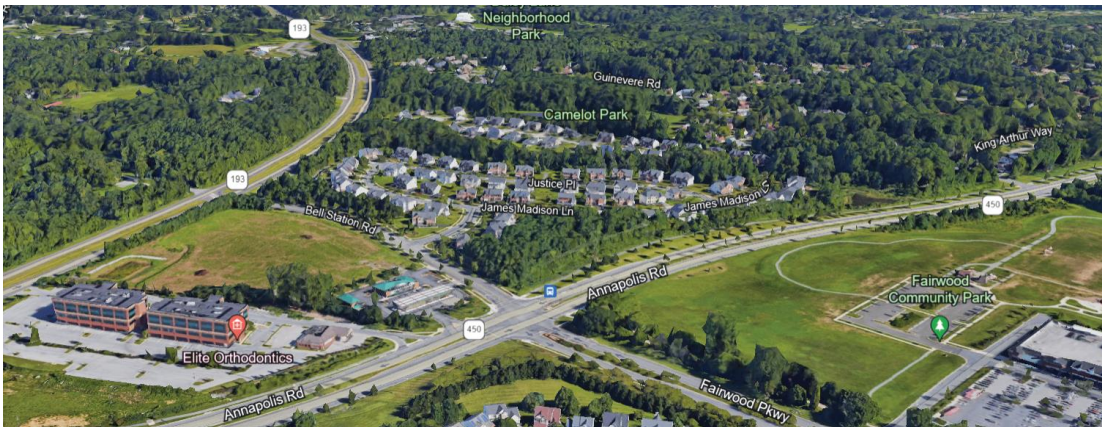


Figure 21: Aerial view of Fairwood (Source: Google Earth)

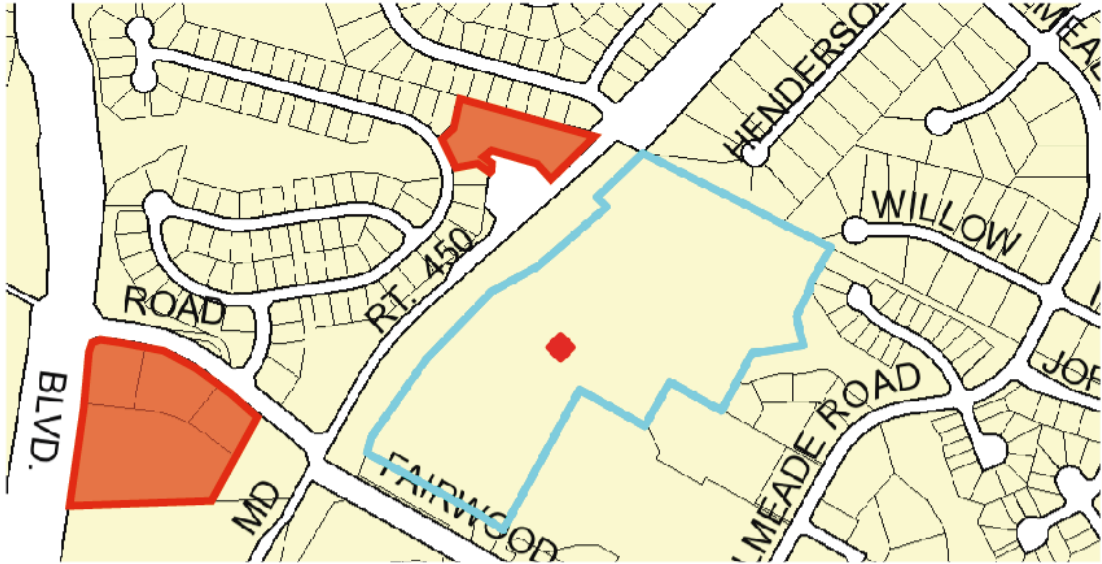


Figure 22: Zoning Map of Fairwood with the proposed sites in red (Source: PG Atlas)



Figure 23: Site Images (Source: Google Earth)

Montpelier, Laurel

Montpelier is located in Laurel Maryland. The proposed site is adjacent to to the Montpelier Arts Center. The arts center is part of the Montpelier historic house and museum and is an active space for the local communities. Within a 1-mile radius, there is Deerfield Run Elementary School, Chrystal Plaza Shopping Center, Brock Bridge Road Trail, and the US Post office. The shopping mall contains a food lion, restaurants, and retail spaces.

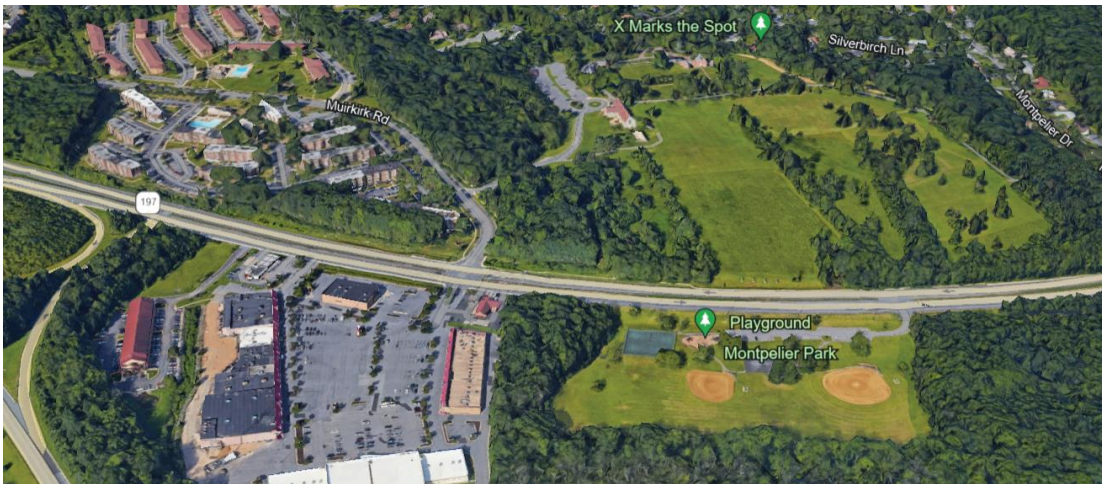


Figure 24: Aerial of Montpelier Community (Source Google Earth)

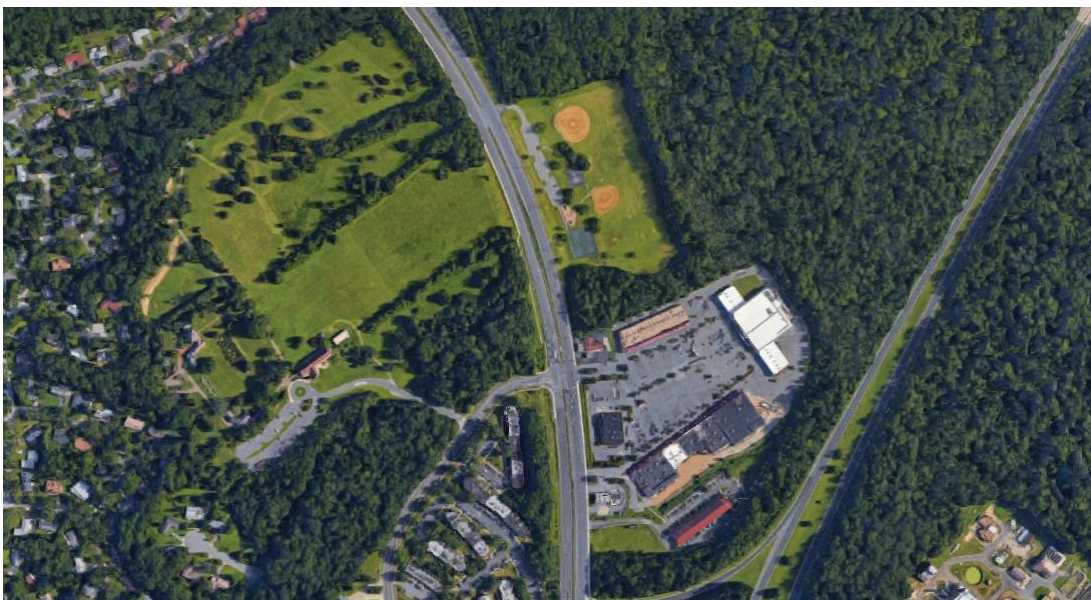


Figure 25: Plan View of MontPelier Community (Source: Google Earth)

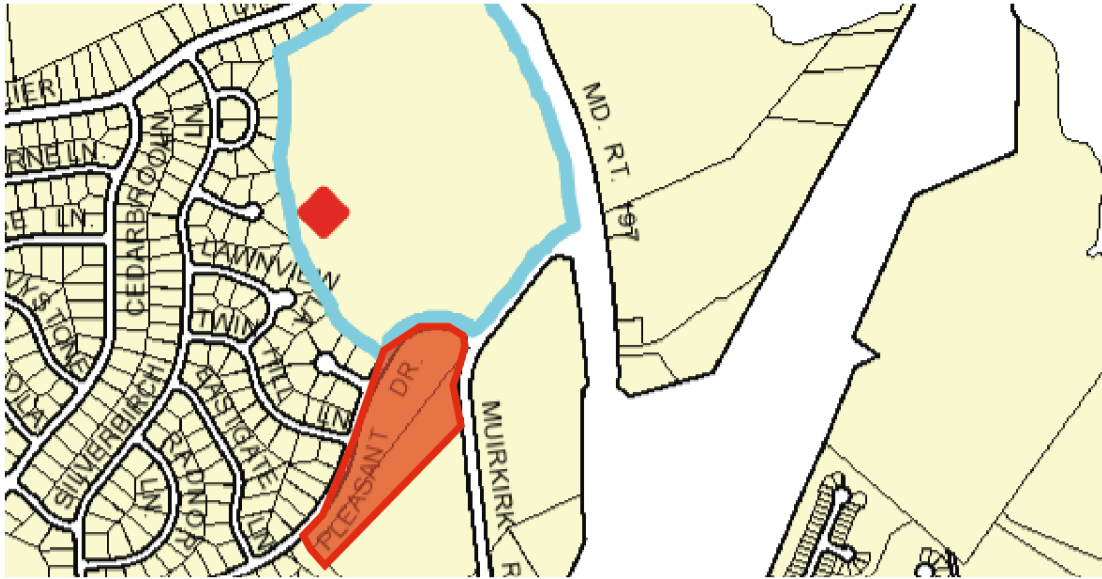


Figure 26: Zoning Map of Montpelier (Source: PG Atlas)

Site Matrix

*** = Weighted 3(x)




			
Criteria	Site 1: Bayview	Site 2: Fairwood	Site 3: Montpelier
Number of county residents with dementia***	100,380	147,829	147,829
number of memory care facilities over county senior population***	0.0519%	0.0210%	0.0210%
Number of assisted living facilities in the county***	492	299	299
Number of memory care facilities in the county	43	26	26
Percentage of county population 65+	13.71%	13.51%	13.51%
Proximity to a public park	0 miles	0 Miles	Montpelier Park .5 miles away
Proximity to hospitals or other medical centers	Adjacent to Johns Hopkins	Adjacent to Excelsior Urgent Care & Primary Care. Adjacent to Fairwood Office Park (medical center group)	Johns Hopkins Community Physicians 3 miles
Cost of Living in the area	A+	F	F
Walkability Rating	84	36	34
Accessibility to multiple forms of public transit	Bus 59 & 63	Bus B24	Bus 302 & 301
Access to place of worship	Adjacent to Our Lady of Fatima and Our Lady of Fatima II	Abundant Life Christian Ministries 1.1 mile away	Faith Baptist Church 1.5 miles
Number of community spaces in a 5 min walking radius	~40	~20	~15
Access to light and air in east	420 feet	450 feet	650 feet
City Senior Population	18.0%	14.5%	13.7%

Figure 27: Site Matrix Criteria (Source Author)

*** = Weighted 3(x)




			
Criteria	Site 1: Bayview	Site 2: Fairwood	Site 3: Montpelier
Percentage of county residents with dementia***	8	10	10
number of memory care facilities over county senior population***	8	10	10
Number of assisted living facilities in the county***	7	6	6
Number of memory care facilities in the county	7	6	6
Percentage of county population 65+	8	10	10
Proximity to a public park	7	10	5
Proximity to hospitals or other medical centers	10	9	4
Cost of Living in the area	6	5	5
Walkability Rating	8	6	6
Accessibility to multiple forms of public transit	7	6	7
Access to place of worship	6	5	4
Number of community spaces in a 5 min walking radius	8	6	5
Access to light and air in east	5	7	9
City Senior Population	8	7	5
Total	145	155	144
Percent	74.50%	77.50%	72.00%

Figure 28: Site Criteria Matrix Scaled (Source Author)

Chapter 8: Convergence

Introduction:

One of the main concerns in designing for people with dementia is safety. The severely impaired dementia residents who need a higher level of care will need a space to live where it is safe for them to indulge their desire to wander. Creating a safe place to wander has been instrumental in the decision process of blocking this site. The living spaces are broken up based on the pod ideas of community with 8 residents in each. Each pod of 8 residents are represented as one of the residential boxes. To help the site blend in seamlessly within its context, no building is taller than 4 stories. The site can block itself off from the surrounding context to create a community with a central public space or embrace to local community by creating a front entrance through the use of public spaces.

Site Blocking Option 1:

In the first site blocking option, the communal public spaces in yellow border the corner of the site facing Fairwood community park. This blocking strategy separates the large public spaces into 3 stories including the chapel, wellness center, library and private office spaces for caretakers. The corner entrance is on axis with the park to help connect and encourage the community to utilize the park. The residential pods are all 2 stories with 2 pods in each building. The buildings are set on site to create a series of outdoor wandering spaces that are varying in size. Each wandering space

would have a central landmark to help residents wayfind their way back to their homes. To protect the people with severe dementia, the severe dementia units are located on the third floor of two different buildings. This way, staff would only have to use the highest level of security on the top floors and the rest of the site can be secured with soft edges.



Figure 29: Conceptual Site Blocking Scheme 1 (Source Author)

Site Blocking Option 2:

In the second site blocking option, the communal public spaces in yellow also border the corner of the site facing Fairwood community park. This blocking strategy also separates the large public spaces into 3 stories including the chapel, wellness center, library and private office spaces for caretakers. The corner entrance is on axis with the park to help connect and encourage the community to utilize the park. The residential pods are all 2 to 3 stories with each pod being a different level. The buildings are set on site to create a series of three outdoor spaces with wandering paths that connect each space that varies in size. Each wandering space would have a central landmark to help residents wayfind their way back to their homes. To protect

the people with severe dementia, the severe dementia units are located in the center of the site away from the main roads. They are in two buildings that separate the main outdoor space. This way, residents with more security needs are further away from the dangers of the roads.



Figure 30: Conceptual Site Blocking Scheme 2 (Source Author)

Site Blocking Option 3:

In the third site blocking option, the communal public spaces in yellow border the area located in the center of the site with the residential spaces surrounding the public space. This blocking strategy separates the large public spaces into 3 stories including the chapel, wellness center, library and private office spaces for caretakers in an O shaped building. The residential pods are all 2 to 3 stories with each floor representing a different pod respectively. The buildings are set on site to create a large wandering path around the building that will pass a series of outdoor spaces. Each wandering space would have a central landmark to help residents wayfind their way back to their homes. To protect the people with severe dementia, the severe dementia units are located on the fourth floor of the main public buildings. This way,

staff would only have to use the highest level of security on the top floors and the rest of the site could be secured with soft edges. This plan also gives the residents with severe dementia their own outdoor space that can be secured. It also is easier for them to interact with the rest of the community in public spaces since they will not have to travel far.



Figure 31: Conceptual Site Blocking Scheme 3 (Source Author)

Conclusion

Safety of residents and connection to nature are two of the most important considerations when blocking the site. Creating a space where the severely impaired dementia residents, who need a higher level of care, will be able to engage in the community is paramount. All residents need a safe path to indulge their desire to wander. Breaking up the living spaces into the pods adds to the idea of community at a variety of scales. Each pod of 8 can be housed based on personal interest to improve community. Large public gathering places are also provided to create a larger scale of community where all residents can interact. To help the site blend in seamlessly within its context, local building heights should be consulted. The site can block itself

off from the surrounding context to create a community with a central public space or embrace the local community by creating a front entrance through the use of public spaces.

Chapter 9: Conclusion

Proposed Plan

Parti

The design of the site was heavily influenced by the desire to incorporate the residents of the assisted living facility with the surrounding community. All housing within a 20-minute walk is made up of single-family housing and townhouses. There is significant noise to the east of the site at the open park and shopping center whereas the west of the site is much quieter with a heavily wooded park and single-family residents. The ideal entrance to the site is to the north of the site with potential secondary entrances to the south. The site is

comprised of independent living in carriage houses with an enclosed assisted living area. There are parking lots adjacent to the carriage houses and a large parking lot next to the assisted living entrance. The assisted living facility has a large courtyard with separate rooms inside to act as a wayfinding device.

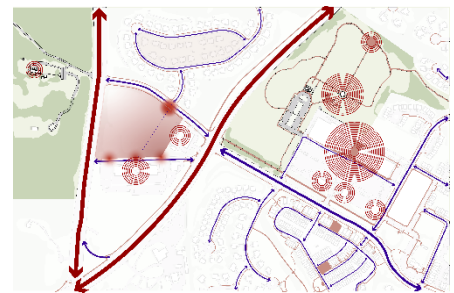


Figure 33: Site Analysis Diagram (Source Author)

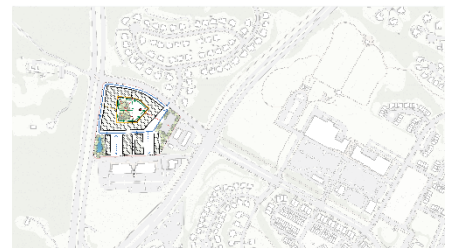


Figure 32: Parti Diagram (Source Author)

Proposed Intervention

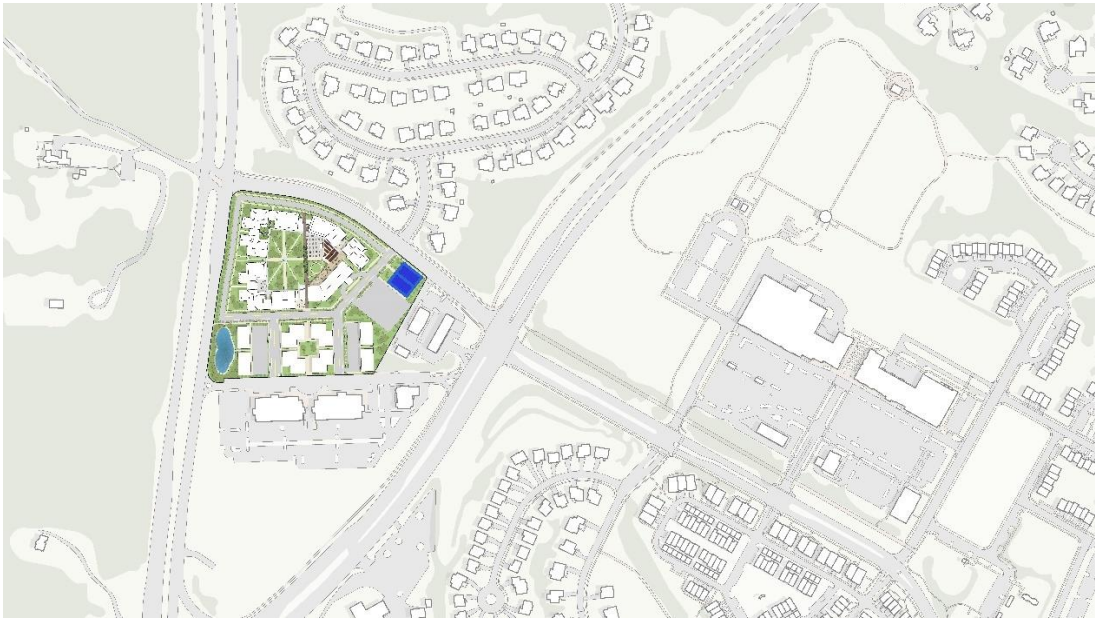


Figure 34: Proposed Site Intervention (Source Author)

The site is made up of 8 independent living buildings in the south of the site and 11 buildings in the assisted living facility. The site also boasts a tennis and pickleball court for seniors to stay active and expand the park network into the site. The low point of the site has been extended to create a storm water management pond that is disguised as a turtle pond for residents to walk around. In the central courtyard, there is a wooded room, full of tall trees and rolling hills, a community garden with planters, some in boxes for accessibility and some in the ground for more complex plants. There is also a flexible communal courtyard, and smaller courtyards that reflect each local community's characteristics.

Communities

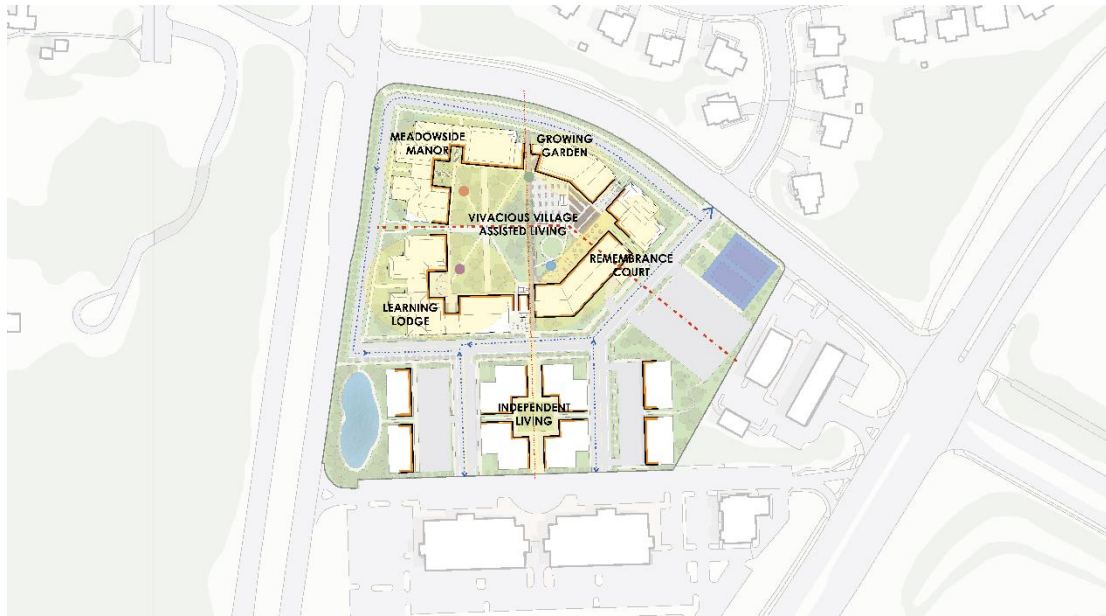


Figure 35: Places Diagram (Source Author)

Remembrance Court



Figure 36: Remembrance Court Exterior Rendering (Source Author)

Remembrance court is the entrance building to the assisted living facility. The ground floor contains the lobby, mail room, café, laundry, grocery store, pub, a theater, as

well as mechanical spaces. The second and third floor contains special memory care units in the main building and assisted living in the second. The courtyard for this community is composed of a beer garden.



Figure 37: Beer Garden Perspective (Source Author)

Figure 38: Nail Salon Perspective (Source Author)

Learning Lodge



Figure 39: Learning Lodge Exterior Rendering (Source Author)

Learning Lodge is along the main street on the site. It contains a wellness center, composed of a gym and a salon. There is also a health center, game room, library, and classroom space. The courtyard for this space is an outdoor classroom with an

aluminum tree made out of books sculpture in the center. The first floor is the amenity spaces with two floors of assisted living above it.

Meadowside Manor



Figure 40: Meadowside Manor Exterior Perspective (Source Author)

Meadowside manor is on the quiet side of the site. The courtyard is composed of impermeable surfaces with a grassy stone pathway lined by a meadow on both sides. All 3 floors are all housing with assisted living facilities. All north facing units on this facility have bay windows to allow light from multiple directions.

Growing Garden



Figure 41: Growing Garden Exterior Rendering (Source Author)

The Growing Garden is also on the quiet side of the site. All three floors of the site are assisted living units. There is 1 community per floor with larger community spaces than the other units. These additional community spaces are available for rent for the rest of the residents if there is a special event they want to hold. The courtyard of this building is a community garden where the community will get together for gardening club.

Improvements

Community

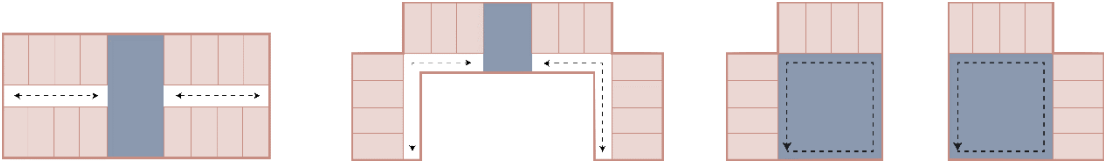


Figure 42: Removal of Double Loaded Corridor (Source Author)

The design of the communities was based off dementia research that shows 8 residents in a community report better cognitive function. Each building is designed to house a series of 8 residents. The institutionalized double loaded corridor causes confusion for residents and creates problems when residents accidentally walk into the wrong room. As a result, the double loaded corridor is removed, and the corridor space is ingrained in the living space to create a unique entrance at each door opening.



Figure 43: Community A (Source Author)



Figure 44: Community B (Source Author)

Cognitive Stimulation

There are methods of cognitive stimulation to improve the cognitive function of the residents employed at a variety of scales. At the site scale, there are amenity spaces to improve the cognitive function of the residents. At the building level, The public spaces are opened up to make the place feel like a house and less like an institution. The kitchen is opened to the residents due to the fact that cooking, with supervision, and smelling the food cooking has been found to have a positive correlation in

cognitive function.



Figure 45: Community A Axon (Source Author)

Wayfinding

Throughout the site, wayfinding strategies have been put into place to help allow residents to subconsciously find their way home. Each building has a designated accent color that was found to have a positive impact on cognitive function. Each building also has a distinct brick color. The courtyards have a set sculpture to act as a wayfinding device.

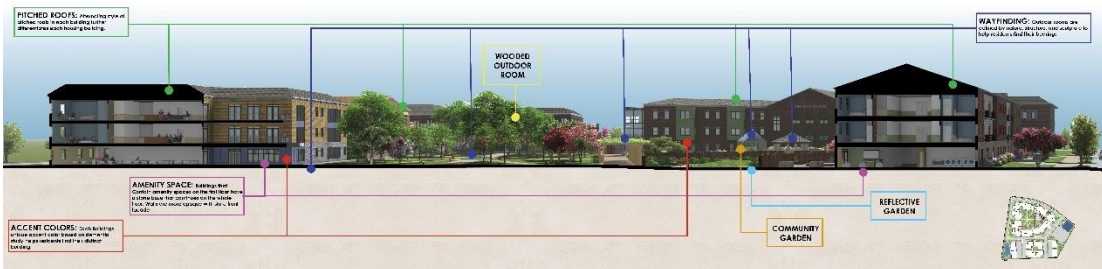


Figure 46: Wayfinding Diagram (Source Author)

Daylighting

Each Community type is designated to have kitchen and living spaces in the east so that the residents can experience morning light in the east which has positive effects on cognitive function throughout the day. All bedrooms have at least 2 directions of light. This is made possible by the

unique building shape that makes it so that half the units in community A have corner units.

The interior units have bay windows to allow light from multiple directions.



Figure 47: Remembrance Court Assisted Living Daylighting Section (Source Author)



Figure 48: Site Daylighting Strategies (Source Author)



Figure 49: Community A Daylighting (Source Author)

Conclusion

The inclusion of strategies that improve community, cognitive stimulation, wayfinding, and daylighting at the scale of the unit, community, building, and site creates a better space for seniors dealing with rapid memory loss from dementia to both help improve their cognitive function as well as extend the time they can live in an assisted living facility.

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