UPSCALING DEMENTIA ARCHITECTURE
THESIS

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Dwelling Graduation Studio
Designing for Health and Care:
Towards a healthy and inclusive living environment

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ABSTRACT

Despite the predicted increase in the number of dementia patients, the Dutch government has opted against building any extra nursing facilities in the future. Individuals, families, healthcare institutions, and society as a whole may suffer as a result of persons with dementia remaining in their homes or neighborhoods which are unsuitable for their needs.

Therefore the purpose of this research is to answer the following question: *How can architectural and built-environmental solutions be implemented into existing Dutch neighborhoods to allow people with dementia to live in their own homes for as long as possible?*

Making existing neighborhoods dementia-friendly will result in a safe and inclusive living environment, which is required to accommodate the rising number of dementia patients and avoid future issues. Architectural solutions and small-scale initiatives can help reduce the progression of dementia and enhance quality of life. Meaningful and supportive settings in neighborhoods or households improve health. Giving people environmental control and fostering strong communal bonds has a positive impact on their well-being. Implementing these procedures guarantees that the elderly with dementia can live in their own homes for as long as possible.

Key words Dementia, Architecture, Neighborhood, Care, Design for care

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PREFACE

Architecture is a fascinating field that constantly evolves as society and technology progresses. As an architecture student, I have always been fascinated by the complex design process that goes into making attractive and useful environments that improve the quality of life for people and communities.

This research thesis has been an opportunity for me to delve deeper into the world of dementia and explore new perspectives on the subject matter. Millions of individuals worldwide suffer from dementia, which is a complicated and crippling condition. As architects, it is crucial that we take this population's particular requirements into account when creating environments.

Through this research, I have gained a deeper understanding of the challenges faced by individuals with dementia and the ways in which architecture can help alleviate their symptoms and improve their quality of life. This thesis examines the most recent design ideas and research that may be used to the development of dementia-friendly environments.

I hope that my thesis can contribute to the larger discussion around aging in place with dementia and how it may improve the wellbeing of people and communities.

Finally, I would like to express my heartfelt gratitude to my tutors and family for their unwavering support and guidance throughout my architectural research thesis. Their encouragement and belief in me have been instrumental in helping me achieve this accomplishment.
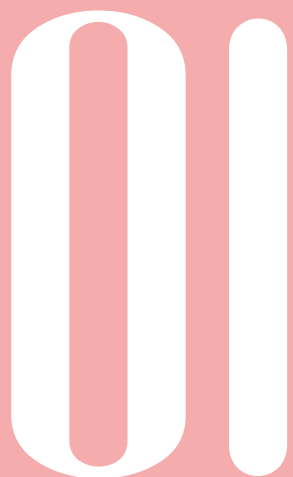
I hope you enjoy your reading.

Bugra Atciyurt
Delft, July 2023

"Memory loss may steal our loved one's past, but the love and connection we share in the present can help build a meaningful future"

Introduction

01

1.1 BACKGROUND

Dementia is an urgent and growing social problem. The disease has the highest burden of care and affects people with dementia as well as their loved ones and caregivers. In 2015, the Netherlands still had 117,000 over 90-year-olds, but by 2040 there will be 340,000 (Ministerie van Algemene Zaken, 2021). Dementia is particularly prevalent in this age group and 40 percent of all people in their nineties are expected to be affected. The RIVM (n.d.) reckons that within the next 20 years, the number of individuals with dementia will be doubled. This means that much more care is needed for the elderly, and as a result, we also need a lot more help providing care for them. To ensure that elderly care can continue to be well organized in the future, given the severe shortage of staff and rising demand for care, Alzheimer's Netherlands advocates building 11,000 dementia-friendly homes per year (Alzheimer Nederland, n.d.).

Dementia has a major impact on society and healthcare. In 2015, for example, healthcare costs for patients with dementia was more than 5 billion euros. Specialist care, nursing home care, mental health treatment, as well as home care and day care, are all included. Furthermore, because persons with dementia are living at home for longer periods of time, there is a growing dependence on those outside the health care system, such as neighbors and police in cases of 'wandering behavior.' (Volksgezondheid Toekomst Verkenning, n.d.)

People suffering from dementia desire to live their regular lives for as long as possible but often end up in social isolation without help because of their disease. Unfortunately, that help does not seem to come naturally: only 25% of the Dutch think they can recognize the signs of dementia. 42% find it difficult to approach someone with dementia on the street who may need help. In a dementia-friendly society, people with dementia feel safe because they are seen and there are people who make the effort to understand them (Zorg&Sociaalweb, 2018).

1.2 PROBLEM STATEMENT

The Dutch government has decided against developing any additional nursing homes in the future, despite the anticipated rise in the number of individuals with dementia. As a consequence, individuals with dementia stay in their homes as long as feasible, which can have negative consequences for individuals, families, healthcare systems, and society as a whole.

Dementia is a crippling illness that impairs cognitive function and memory, making it challenging for sufferers to freely navigate their environment and carry out everyday tasks. Homes and neighborhoods that are not built to accommodate the special requirements of people with dementia can present serious difficulties, resulting in safety issues, social isolation, and a lower quality of life. Addressing this issue requires the creation of innovative architectural concepts and methods that make it possible for those with dementia to live securely and peacefully in their homes and communities.

The transition from home to a nursing home is too steep. The nursing home is the last resort when it becomes nearly impossible to live at home. In the future, we will face problems when there is a lack of space in nursing homes. Additionally, individuals delay admittance as long as possible due to the stigma of the nursing home. Because intermediate housing options are lacking, people with dementia stay living at home for too long. As a result, informal carers are further burdened in an improper household.

An elderly person's habits, rituals, and social connections will be significantly disturbed if they are removed from their home, where they may have lived during their whole lifetime. This may result in transfer trauma, sometimes referred to as relocation stress syndrome (Seniors, 2021). Dementia patients frequently depend on comfortable, familiar surroundings for mental stability, therefore for these people, a change in setting is more likely to be unpleasant. Seniors who have this disease are more likely to experience health issues, including major illnesses

and injuries. Those who display the symptoms of relocation stress syndrome are at a higher risk of mortality (Robertson, 1993).

Through the years, many solutions for dementia care were found. The dementia village is a recent solution and example of a utopian and theoretical society that raises questions about unique and acceptable approaches to dementia care. Living in a carefully constructed village has the unfortunate consequence of occasionally making reality seem a little less real (Haeusermann, 2018). Since the introduction of the Dementia Village model, not much progress is made. This may be due to the possibility that dementia care providers lack the financial resources and staff size to create diverse activities and advanced medical services for residents. The planning and construction costs related to new construction for a healthcare center of the scale and scope of the Dementia Village are another issue that worries providers (Roberts, 2020). A different approach is needed to accommodate the growing group of dementia patients and prevent future problems.

Current dementia-friendly design solutions are either too small scaled or expensive. The existing Dutch facilities and solutions are insufficient to handle the predicted growth in the number of persons with dementia. Dutch neigborhoods require significant improvements to make them more accessible and supportive for people with dementia. Due to limited space and high construction costs, it is not viable to demolish the existing and construct new structures everywhere, particularly in heavily populated places. As a result, it is critical to examine the current built environment for opportunities for transformation and modification.

Goals

The goal of this study is to understand the needs of people with dementia and how architecture can aid them in their daily lives. Finding solutions to implement architectural principles on a larger scale can make it possible for people with dementia to live as long as possible in their own homes. Learning from existing dementia-friendly solutions and upscaling them into a neighborhood scale could offer new insight to accommodate this growing group.

A strategy will be made to make neighborhoods dementia-friendly so people with dementia can stay physically, mentally, and socially active. The solution will accommodate future-proof lifestyles that allow individuals to stay in their homes rather than having to relocate to nursing homes. People being more self-reliant and slowing down dementia and are priorities in the design. Those who have dementia continue to live their life as fully as possible and remain part of our society instead of moving into closed communities.

Relevance

Studies about dementia-friendly architectural principles have been done before. However, studies focusing on dementia-friendly neighborhoods or implementing dementia-friendly design principles in existing neighborhood context are rare. This study can help to fill gaps in existing knowledge and generate new ideas and hypotheses. The idea of a dementia-friendly neighborhoods is relatively new and the current solutions are not perfect, which offers an opportunity to find new solutions or improve them with this research. As the dementia problem in the Netherlands grows, the relevance and value of this study will increase.

1.3 RESEARCH QUESTION

Main research question:
How can architectural and built-environmental solutions be implemented into existing Dutch neighborhoods to allow people with dementia to live in their own homes for as long as possible?

Sub-questions:
1. What are the specific needs of people in various stages of dementia?

2. What architectural principles can assist and add value to people with dementia? (micro scale)

3. How can the found architectural principles be implemented for Dutch neighborhoods? (macro scale)

Design Hypothesis
Making existing neighborhoods dementia-friendly will result in a safe and inclusive living environment, which is needed to accommodate the growing group of dementia patients and prevent future problems. Architectural solutions and small-scale measures can provide a solution to slow down the progress of dementia and improve the quality of life. Meaningful and supporting spaces in neighborhoods or homes enhance the well-being. Giving individuals environmental control and enabling strong communal ties have a favorable correlation with well-being. Implementing these measures ensures the possibility for the elderly with dementia to be able to live as long as possible in their own homes. This also reduces costs and pressure on the Dutch healthcare system.

Research limitations
There are certain limitations on the scope and quality of this study because it must be completed within a specific time period and with a finite amount of resources.

The literature study for micro-scale architectural principles is made to create an overview and to understand the various themes and principles which must be taken into account for a dementia-friendly design. Although a big part of these themes are covered, there are still more to discover.

While there is plenty of information available on micro-scale design concepts, there are limited research and reference projects on dementia-friendly neighborhoods (macro-scale). Current studies merely state a few ideas and provide small examples. This resulted in a lack of projects to analyze as a case study or reference project.

The time constraint resulted in a lack of analysis of various Dutch neighborhoods from different time periods. Also only one reference project is analyzed to find architectural principles. More reference projects could have been useful to offer more insight and find more solutions.

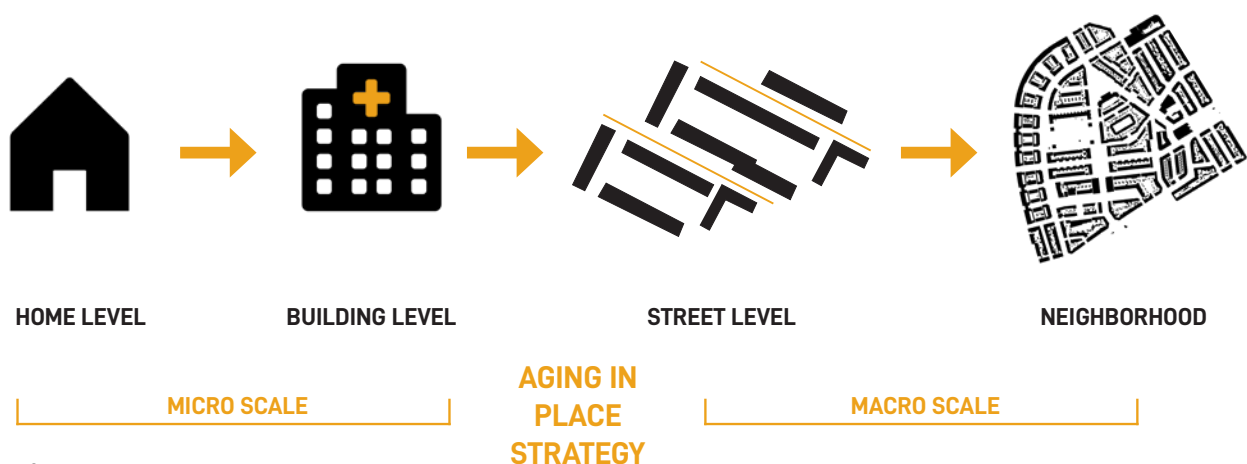| HOME LEVEL | BUILDING LEVEL | STREET LEVEL | NEIGHBORHOOD |

MICRO SCALE

AGING IN PLACE STRATEGY

MACRO SCALE

figure 1.3.1 - Combining micro- and macro scale as strategy.

1.4 RESEARCH METHODS

The research questions are major components of the study as each address a part of the main research question. The research methods to answer each supported question and the results are described.

Chapter 2 will explore what the specific or spatial needs, behavior, and psychology of people in various stages of dementia are. Every stage has its own specific or spatial requirements and needs for the person with dementia but also the caregivers. These are investigated to gain information about the target group. The main research methods used in this part are literature study and interviews. Before the designing stage, it is necessary to understand the various stages of dementia with the existing literature study.

During the fieldwork, caregivers and managers were interviewed about the specific needs of individuals with dementia and the role of the specific buildings they work in. These interviews are held at the Habion Liv-Inn, Amaris Alporti in Hilversum and Haags Ontmoeten in Laak. There is a contrast between these locations because the Liv-Inn is an apartment building with social functions, Alporti is a semi-closed environment. People with severe dementia reside at Alporti, whereas those in the initial stages do so at the Liv-Inn.

The architectural principles (micro-scale) which can assist and add value to people with dementia will be studied in chapter 3. Principles like colors, behavior, wayfinding, etc. will be investigated with the use of literature. The research methods used in this part are literature study. The information about architectural principles will be gained from secondary sources like books, scientific papers, and own interviews in the fieldwork.

Chapter 4 will look into a Case study. This project is the Alzheimer Village by North Architects. This project in Dax is to establish a secure atmosphere for residents, family members, and healthcare professionals. This is a crucial condition for delivering high-quality care. The project is analyzed to find and extract dementia-friendly design principles. This reference project is analyzed with the use of drawings which abstract the essence of a design principle.

Chapter 5 explores the idea of a dementia-friendly neighborhood and the concept of aging in place with literature study. The findings are used to find new macro-scale implementations in a neighborhood context. The micro-scale guidelines are used as a foundation and act as a starting point to find possibilities to implement these on a larger scale. This approach is chosen, because there are a lot of studies about micro-scale principles. On the macro level there is a lack of studies and reference projects.
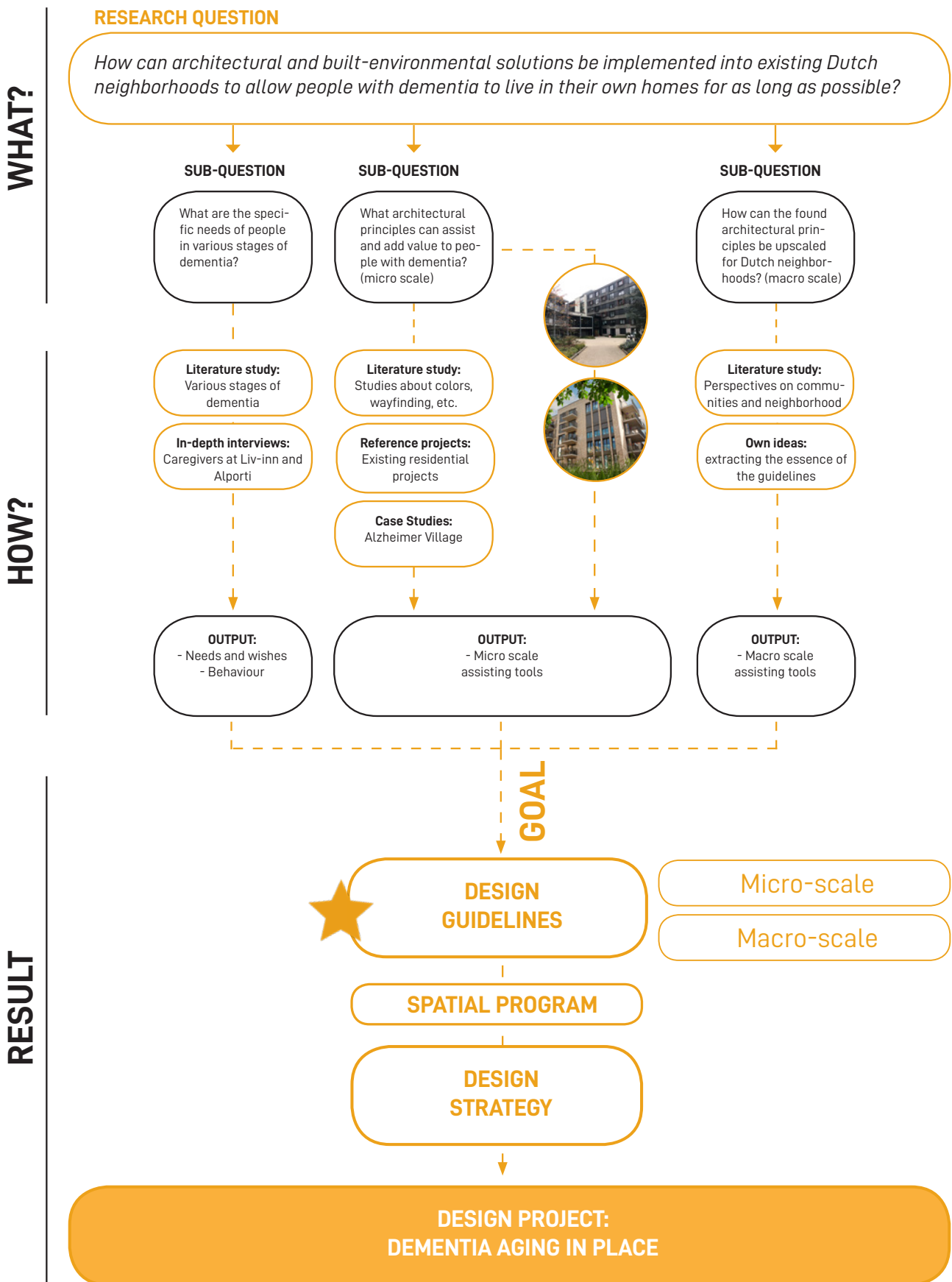
WHAT?

How can architectural and built-environmental solutions be implemented into existing Dutch neighborhoods to allow people with dementia to live in their own homes for as long as possible?

SUB-QUESTION

What are the specific needs of people in various stages of dementia?

SUB-QUESTION

What architectural principles can assist and add value to people with dementia? (micro scale)

SUB-QUESTION

How can the found architectural principles be upscaled for Dutch neighborhoods? (macro scale)

HOW?

Literature study:
Various stages of dementia

Literature study:
Studies about colors, wayfinding, etc.

Literature study:
Perspectives on communities and neighborhood

In-depth interviews:
Caregivers at Liv-inn and Alporti

Reference projects:
Existing residential projects

Own ideas:
extracting the essence of the guidelines

Case Studies:
Alzheimer Village

OUTPUT:
- Needs and wishes
- Behaviour

OUTPUT:
- Micro scale assisting tools

OUTPUT:
- Macro scale assisting tools

GOAL

RESULT

DESIGN GUIDELINES

Micro-scale

Macro-scale

SPATIAL PROGRAM

DESIGN STRATEGY

DESIGN PROJECT:
DEMENTIA AGING IN PLACE

figure 1.4.1 - Research Diagram

DEFINITIONS

Dementia
In dementia, nerve cells in the brain break down. (Alzheimer Nederland, n.d.) The connections between the nerve cells might occasionally fail instead of the nerve cells themselves. The brain starts to operate less and less effectively because of this cell loss. Some people experience deterioration quite rapidly. Others can continue to lead quite typical lifestyles for years. The effects of dementia eventually make a person exceedingly feeble.

Elderly
Elderly is a subjective term and often used for people who are 65 years or older. Its main traits include unemployment and age-related impairments. (NHS England, n.d.)

Macro-scale
A broad scale that emphasizes overarching structures or processes above specifics (Oxford English Dictionary, n.d.). In the context of this research, macro-scale is the neighborhood and city level.

Micro-scale
A scale that is reasonably relatively small or precise. (Oxford English Dictionary, n.d.). In the context of this research, micro-scale is the building level.

Nursing Home
In a nursing home, intensive care and medical care is offered. A nursing home is meant for people who have severe physical or psychological disabilities. You do not need to be in a hospital (anymore) but (still) need treatment. Caregivers and nurses are around 24 hours a day. (Verzorgingshuis of verpleeghuis? Wat is het verschil?, 2020)

RIVM
The Dutch National Institute for Public Health and the Environment. In the Netherlands, the RIVM carries out studies on public health and the environment. Additionally, the RIVM advises the government. (RIVM, n.d.)

Social isolation
When someone has few or no (meaningful, helpful) contacts, we talk about them being socially isolated. Loneliness is distinct from social isolation. It may, however, coincide. Loneliness is a state of being, whereas social isolation is a circumstance. (Ministerie van Volksgezondheid, Welzijn en Sport, 2019)

Upscaling
To raise to a higher level or improve the quality (Oxford English Dictionary, n.d.). In the context of this research, upscaling is looking for solutions to implement the micro-scale design principles on a larger scale in a neighborhood context.

Stages &
Needs

02

2.1 INTRODUCTION

To allow people with dementia to live in their own homes for as long as possible, it is important to explore the properties and restrictions of dementia in order to understand the target group and to make appropriate assumptions for the design project. Dementia is a progressive disease, which results in the increase of the effects of the disease in severity and the number of symptoms (Alzheimer Nederland, n.d.). Because of this, it is not possible to address the entire group with one golden solution.

Taking care of someone with dementia often requires a lot of time and energy. Caregivers can be divided into informal and formal caregivers (Li et al, 2019). These also have requirements and preferences when providing care for someone. Because of this, when creating a dementia-friendly neighborhood, it is also important to consider the caregivers.

In this chapter the wishes and needs of the target groups are explored with literature study and fieldwork interviews. The wishes and needs are translated into possible architectural solutions at the end of the paragraph.
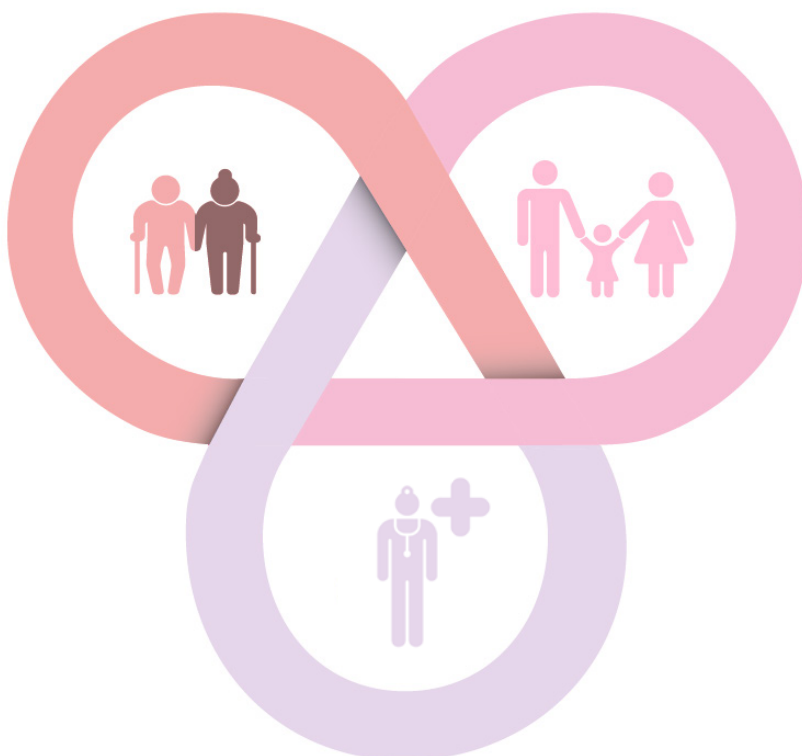
figure 2.1.1 - The three target groups

2.2 STAGES OF DEMENTIA

The development of dementia varies from one form of dementia to another and from one person to another. It isn't a distinct illness, but rather an umbrella term of signs and symptoms that can be caused on by several health issues. Alzheimer's disease is the most prevalent type of dementia, however there are many other types include vascular dementia, Lewy body dementia, and frontotemporal dementia. Dementia's specific cause is unknown, however it is believed to be a result of a mix of genetic, environmental, and lifestyle factors. The probability of acquiring dementia greatly increases beyond the age of 65, making aging another important risk factor. (Alzheimer Nederland, n.d.).

Symptoms become apparent as the disease progresses. Although an individual's case of dementia develops differently, dementia is sometimes broken down into phases. This can guide medical practitioners in terms of what to look for or improve care in making decisions regarding medicine or therapy. Early stage, middle stage, and late stage are common terms used to define the phases. (Alzheimer Nederland, n.d.).

Early Stage
The earliest subtle changes in behavior, functionality, and personality appear in the early stages of dementia. These alterations might appear as memory issues, repeated little strokes, speech issues, melancholy, or egocentric and callous conduct. A significant life event, burnout, or old age might also be blamed for these changes. Consequently, it's not always simple to make a diagnosis at this point. (Alzheimer Nederland, n.d.). Another characteristic of early-stage dementia is poor orientation. Even in a familiar location, a person may become disoriented and lose their bearings. Additionally, some people may experience visual-perceptual issues. This may make it difficult to judge distances, such as while climbing stairs. At this point, a lot of people continue to be largely autonomous and just require minimal daily support. Instead of taking over and doing things for the person, it's crucial to concentrate on what they can do. (Alzheimer's Society, 2020)
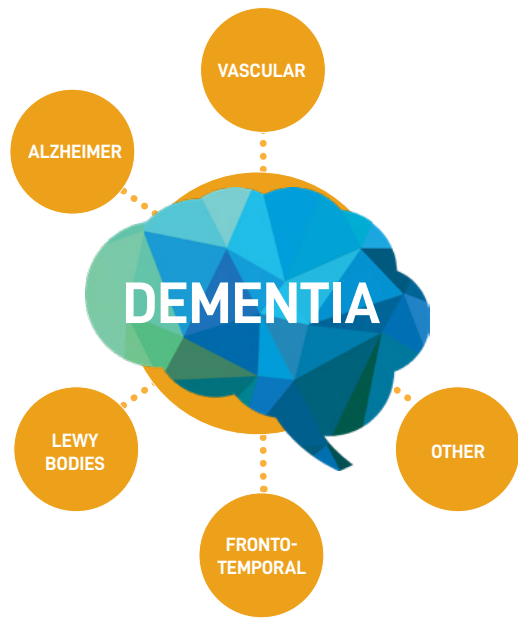
Middle Stage
The symptoms of dementia worsen and increase throughout this period. Because they are no longer always able to carry out simple tasks independently, the person with dementia becomes more and more reliant. Simple daily tasks like eating, bathing, dressing, and using the restroom on your own become challenging. The chores that fall to the informal caregiver increase over time (Alzheimer Nederland, n.d.).
In middle-stage dementia, behavioral and physical changes occur. These can be restlessness, screaming, repetitive behavior, disturbed sleep patterns and problems with orientation also become more severe. The individual can be confused about the time of the day or the place they are.

Late Stage
Complete dependency is a feature of Alzheimer's disease in its latter stages. Severe memory loss occurs and a person's physical condition also gets worse. Walking becomes challenging, and one may stumble or stop entirely. A person eventually becomes immobile and needs 24-hour care. Typically, this phase is the shortest. It lasts, on average, between one and two years. People may also lose their ability to recognize familiar surroundings, things, and people. In a mirror, one might not recognize oneself or a close friend or relative. People with advanced dementia frequently react more to their senses than to language. They could love listening to music or interacting with textures, such as how various materials feel. In this phase the person with dementia spends most time in a chair or bed. (Alzheimer's Society, 2020)

In addition to this classification, there are other ways to classify dementia into stages. Another commonly used classification in the Netherlands is the description of dementia in four phases. Cora van der Kooij, a nurse and care historian, made contributions to the creation of experience-based care for dementia patients. She classified the progression of dementia into four phases, each of which had a distinct I-experience. There is a distinct strategy for each I-experience (STUDiO iBiZZ, n.d.). These phases are divided into the threatened self; the lost self; the hidden self and the sunken self. These categories focus on the way a person with dementia perceives themselves and their environment. This classification gives the neighbor or caregiver some understanding of the person with dementia's experiential reality.

2.3.1 Dementia as umbrella term (own illustration)

Phases	Body	Mind	Behaviour	Needs
1. Threatened self	Less alert Faster exhausted Movements slower	Sometimes forgets names, activities. Powerlessness Actions take a long time	Withdraws home Talk less and unclearly Sometimes no response less social and/or activities. Suspicious	Assistance sometimes Familiar patterns Stimulate fun activities Assistance in showing location, room and date Change of tempo
2. The lost self	Exhausted Less alert Clumsier Less depth-perception Sometimes incontinent fine motor skills worsen	Worse orientation in place and time. Forgets activity of the day past feels recent	Withdraws home more Accuse others Talk less & more slowly Fewer gestures.	Regular contact Conversations in pleasant environments. Clear information Orientation with visual aids Clear day structure Emotional support
3. The hidden self	Repeating movements stiff and tense muscles Slow movements body is restless skin problems	No longer recognize others or things. No longer recognize structure in time, place and person.	Fully withdraws home No response to others No shame Participates only in known activities	much support needed in daily tasks Assistance in day and night rhythm Stimulate known fun activities Safe & calm environment Distraction Do not question perception
4. The sunken self	incontinent no energy and sleep entire day muscles tense can't walk anymore no more resistance. losing ability to chew and swallow	forgets with occasional exception everything and everyone around. Anxious at times	Withdraw completely No longer talks Does not participate in activities. occasionally react to movements and sounds.	Total dependance Aids like wheelchairs and hoist Safe & calm environment Sensory stimuli Fresh air Emotional support Check on hunger & feces

2.3.2 The four stages of dementia (I-experience)

There are also considerable disadvantages to staging dementia. The categorization classifies all people with dementia into a few broad categories. As a result, it pays less attention to what a person can still achieve and desires. Less consideration is also given to individual requirements and preferences. Dementia care that is person-centered emphasizes the personal and distinctive experiences of the dementia sufferer and their loved one. The diagnosis of dementia places a lot of demands on the surroundings as well as the affected individual. People must adjust to the new situation. They need to develop coping mechanisms for both the disease and loss (Alzheimer Nederland, n.d.).

According to Kitwood (1997), the treatment of dementia patients is overly medical and nursing-focused. Both the difficulties of dementia and the individual with dementia are given little attention. According to Kitwood's theory, we must pay attention to six psychological requirements while providing care and assistance for those who have dementia: love, comfort, identity, occupation, inclusion, and attachment. This offers another approach to the psychological aspect of the requirements of people with dementia.

As the graph (figure 2.3.3) shows, at a certain point, an individual with dementia can no longer stay independent and will rely on a caregiver. If there is no informal caregiver, this person is forced to move out of their home.

INDEPENDENCE

THREATENED SELF

SYMPTOMS
CONFUSION
MEMORY LOSS
PERSONALITY
CHANGE
SPATIAL
DISORIENTATION

NEEDS
SMALL ASSISTANCE
SOCIAL
INTERACTION
FUN ACTIVITIES

LOST SELF

SYMPTOMS
WITHDRAWS
HOME MORE
TALK LESS
CONFUSION
INSOMNIA

NEEDS
REGULAR CONTACT
PLEASANT
ENVIRONMENTS
VISUAL AIDS
DAY STRUCTURE

HIDDEN SELF

SYMPTOMS
RESISTIVENESS
INCONTINENCE
LESS EATING
MOTOR IMPAIRMENT

NEEDS
MUCH
SUPPORT
ASSISTANCE DAY
& NIGHT RHYTM
SAFE & CALM
ENVIRONMENT

SUNKEN SELF

SYMPTOMS
BEDRIDDEN
MUTE
INFECTIONS
ANXIOUS
INCONTINENCE

NEEDS
TOTAL DEPENDANCE
WHEELCHAIR
BED HOIST
SAFE & CALM
ENVIRONMENT
FRESH AIR

TIME

2.3.3 The four stages of dementia

2.3 INFORMAL CAREGIVERS

In the Netherlands, about 320,000 informal caregivers provide care for people with dementia. The majority of them provide daily care for a loved one. Unfortunately, informal caregivers often carry a heavy responsibility. Informal caregivers are partners, children, family, friends and other acquaintances who provide care and support to a loved one. This is done voluntarily and unpaid (Zorg voor Beter, 2022). Admission to a nursing or care facility is frequently justified by the informal caregiver's inability to continue providing support. To make it possible to allow people with dementia to live in their own homes for as long as possible, it is important to also take informal caregivers into account.

For many informal carers, it is challenging because of the dementia sufferer's declining functionality and behavioral changes (Brodaty & Donkin, 2009). Additionally, it takes a lot of time to care for someone who has dementia. The individual with dementia will need more care as their dementia worsens. The caregiver is often left with little time for themselves, despite the fact that taking time for oneself and getting enough rest are crucial for maintaining care. Caregivers that provide care for a loved one who has dementia may experience feelings of overburden, worry, and sadness. Part of the reason for this is the significant emotional strain that informal carers bear. The decrease in time for themselves also can lead to a decrease in social contact and result in social isolation.

According to Peeters et al. (2013), the most important requirements for their loved one to live at home as long as possible are a case manager, activities for the individual, and assistance with domestic and personal care. Informal caregivers are interested in learning about the care offered, dementia symptoms and progression, restrictions, advantages, and legal implications of (medical) treatment options. More individual attention and more time for the loved one, more appropriate activity supervision and a more extensive range of activities were mentioned most often by caregivers. Informal caregivers further mentioned wishes for activities for the loved one at home, including on days when the loved one does not attend day care to prevent the loved one from becoming lonely.

Day Care Centers (DCC) for people with dementia relieves family caregivers by addressing the requirements of the dementia patient in terms of social interaction, nourishment, physical activity, and structure and variation in daily life. The carers feel more liberated thanks to DDCs, which also enhanced the amount of time they had to take care of their own needs, interact with others, and work or do practical activities without interruption (Tretteteig et al., 2017).

Even if the person with dementia receives public or private support at home, informal caregivers must aid them with organizing their day, recalling appointments, maintaining the house, washing laundry, and other duties. One of the most significant activities at the DCCs was defined as providing nice food and company during mealtimes. Attending a DCC had a favorable impact on the dementia patient, resulting in improved emotions, less nagging, and more tranquility (Tretteteig et al., 2017).

Some iprovement areas for DCCs mentioned by caregivers (Tretteteig et al., 2017) is the need for flexible opening times and less closed days to prevent a break in daily patterns, increasing confusion and adding stress to the family. Other important element is the activities tailored to the interests and requirements of people with dementia to keep them motivated and keep coming back. In order for the dementia patient to remain at home, their own care and assistance were essential. If the caregiver is not able to provide the additional care anymore, utilizing a DCC as the only solution for dementia care is not adequate to meet the demands of the dementia patient. Some of the family caregivers stated that the unexpected delay in the necessity for nursing home placement was caused by the DCC in combination with their own ongoing care.

2.4 FORMAL CAREGIVERS

Formal caregivers are educated medical professionals who provide care for dementia patients as well as those with physical or cognitive disabilities (Li et al, 2019). Their responsibilities might include helping with daily living tasks, managing medications, and administering medical treatments. They could work in hospitals, nursing homes, or home care settings.

Formal caregivers experience a high burden of care. Both caregivers and patients may suffer unfavorable effects as a result of the burden of care. High levels of stress and burnout among caregivers may raise their risk of developing physical and mental health issues, such as depression, anxiety, and cardiovascular disease. Burned-out caregivers may provide patients with care that is of lesser quality and results in worse health. (Czuba, 2015)

According to McCloskey (2004), formal caregivers need a safe setting with a low risk of damage or injury to the residents. In order to prevent residents from wandering or leaving the facility unattended, it is important to design buildings that are simple to navigate and do not provide tripping hazards. As they spend many hours attending to the needs of residents, it is crucial that they work in environments that have easily accessible facilities and are pleasant and encouraging. This entails creating well-lit areas with suitable temperature management, ventilation, and acoustics to reduce noise levels.

The caregivers want areas that can be quickly modified to accommodate residents' changing requirements. Designing areas that are easily adaptable to suit various activities and routines as well as areas that can be adjusted to meet the evolving demands of people as their circumstances deteriorate are examples of this (McCloskey, 2004).

Spaces that encourage interaction and dialogue between residents, staff, and family members are necessary for caregivers. This involves designing areas that encourage social contact, provide individuals chances to participate in worthwhile activities, and facilitate good communication between residents and caregivers (McCloskey, 2004).

Environments that respect residents' privacy and dignity are necessary, as are ones that offer enough monitoring and assistance. This entails creating both communal places that encourage sociability and community development as well as private spaces for individual care. (McCloskey, 2004).

Training for formal caregivers is also important for an adequate treatment of patients. Nurses and doctors can have a lack of knowledge of and handling people with dementia (Alzheimer Nederland, 2019). According to family caregivers, nurses are ill-equipped to interact with to dementia patients. Inadequate treatment can result in the deterioration of the health of the patient.

2.5 INTERVIEWS WITH FORMAL CAREGIVERS

During the graduation studio, two weeks of fieldwork were conducted. This gave me the possibility to stay a week at the Habion Liv-Inn with seniors. During this fieldwork formal caregivers and managers were interviewed about the specific needs of indiviuals with dementia and the role of the specific buildings they work in. These interviews are held at the Habion Liv-Inn, Amaris Alporti in Hilversum and Haags Ontmoeten in Laak. There is a contrast between these locations because the Liv-Inn is an apartment building with social functions, Alporti is a semi-closed environment. People with severe dementia reside at Alporti, whereas those in the initial stages do so at the Liv-Inn. The most important findings are described in this chapter. The goal of the interviews is to find shortcomings and flaws which could be improved.

Amaris Alporti Hilversum

There are 44 residents in the Amaris Alporti building, all of whom have dementia. This is a semi-closed environment where 24/7 care is provided to the residents. Interviews with the manager and caregivers were conducted to learn more about the necessities needed to provide care in this building.

The caregivers and staff are always working with different groups so that the residents are more stimulated. They have to be very creative because every day is different with people with dementia. Informal care from residents contributes minimally and does not alleviate care at all.

At Alporti Hilversum, there is a vision for freedom in which residents enjoy themselves and can do what they want. This is a trade-off between safety and freedom. It is safer if the residents are not allowed to go outside alone, but this limits their freedom. Here the goal is a better quality of life in which residents are happy and content.

Key findings that emerged from the interviews at Alporti were remarks which can contribute to the care and people with dementia.

Architectural Key Findings:
• Building is very limited and contributes little to residents beyond facilitating care.
• 8-9 residents are the ideal composition for group homes. This number makes it financially viable. More than 9 residents would be too large and require more attention. A group of 4 or 5 residents is too small and may cause annoyance among residents.
• It is not possible to walk in circles in dead ending 1-way corridors. This limits movement.
• One elevator is not enough and hinders the care and is causing long waits which makes activities with large groups difficult.
• There should be a garden where residents can safely walk, rest and do activities.
• A Multi-sensory room is missing and could be useful, which could help residents relax.
• No other meeting space than the living room. Families can always visit, but do not have a separate room to stay.
• Kitchen faces wall, so caregivers do not have an overview of the residents
• Residents want control and for example ability to open the windows
• Through Tags, boundaries are defined. This will get you into certain parts of the building. It is not always well understood how the elevator works. When entering, one has to ring the bell of the group.
• Clear routine troughout the day. Residents spend their day in their homes, in the living room or taking a walk outside.

Haags Ontmoeten Laakkwartier

Haags Ontmoeten is a local gathering spot where all elderly persons and their caretakers are welcome. It's a place to gather, exchange stories, and unwind. You can share a drink and/or engage in other activities. Haags Ontmoeten has around 50 locations across The Hague, including care, welfare, and community centers. There are both professionals and volunteers working there. Most locations allow walk-ins without an appointment and can be found in all districts of The Hague. The formal caregivers and the manager in charge of the Centrum and Laak were interviewed and conversations were held with the elderly. This location was chosen because the location of my graduation design project is in Laak.

Key findings that emerged from the interviews at Haags Ontmoeten were remarks which can contribute to the care and people with dementia.

Key Findings:

• Area residents (seniors) come here on a daily base from 9-5.

• This is a group of 23-30 people who have a very close relationship and come regularly. Before COVID the size of the group was 50.

• Daily indoor and outdoor activities. There are no obligations. Lunch (€5 per month) and sometimes dinner is provided by volunteers. Announcements for activities are through posters and through direct contact. Other locations provide courses to informal caregivers.

• Some visitors are attached to caregivers and will not come if they are not there that day.

• District bus picks up everyone and then brings them home again (volunteers). This works well until you leave the district. €5 per month. Some come themselves or are brought by family

• Location of this community center makes it approachable for local residents. Some locations of haags meet are in nursing homes, so people often don't want to go there (negative atmosphere).

• More volunteer help if location is next to a house of worship, temple, church (charity)

• There are 2 types of daycare, medical and non medical daycares. Haags ontmoeten is non medical.

• There is currently no medical day care or nursing home in laak, forcing people to leave their community.

• Rooms for physio or sleeping can be convenient and are not present here.

Liv-Inn Hilversum

Liv inn Hilversum is a senior housing project mixed with students. 150 social housing apartments are realized in this building. Communal living spaces and the possibility to receive care are provided. The residents are both central and in charge, Liv-inn Hilversum was created entirely by the residents themselves. 24/7 care is provided in this building. A formal caregiver is interviewed to understand the provided care and to find shortcomings.

Key Findings:

• 24/7 care is provided to the residents when needed. There are two formal caregivers who are working simultaneously and work on a day/night shift.

• The 4 residents with dementia living here are in the initial phase of dementia.

• The caregivers wash, dress up, provide care for wounds and cook for the residents with dementia.

• There is no guidance and the residents with dementia don't know what to do trough the day. Tailored activities are needed. Some people with dementia are excluded by others here.

• Clients with dementia or other health issues have a special cylinder lock. This makes it possible to access the apartment whenever needed.

• the homes of people with dementia are not modified and are the same as the rest, which is okay.

• Use light colors instead of dark

• Patience is the biggest challenge

2.6 CONCLUSION

Each target group involved with dementia has their own wishes and needs. It is apparent that all three have overarching needs like social interaction and a lack of information. These needs could be met by providing facilities in the neighborhood which facilitates them.

The elderly with dementia are in need of assistance, social interaction and tailored activities to maintain a clear day and night rhytm. Providing them safe and pleasant facilities like a Day Care Center (DCC), community center or dementia information center/cafe can contribute to their independence, knowledge and health. This also applies to the informal caregivers, which will have more time for themselves.

An individual with dementia will eventually be unable to function independently and will require the assistance of a caregiver. If there is no informal caretaker, this individual is compelled to leave their home. A small-scaled group home or dementia hospice can be utilized in the neighborhood so the person still remains in a familiar environment.

For the formal caregivers it is crucial that they work in environments that have easily accessible facilities and are pleasant and encouraging. These are buildings that offer flexibility, are simple to navigate and do not provide tripping hazard as they spend many hours attending to the needs of patients. The lack of a nursing home also results in a lack of 24/7 care. This can be accomodated by implementing nursing stations in the neighborhood which offer this care. Utilizing several nursing stations in the neighborhood can result in a safety net and give an extra sense of safety.

ELDERLY WITH DEMENTIA	INFORMAL CAREGIVERS	FORMAL CAREGIVERS
NEEDS		
Assistance	More personal time	Efficiency in care
Social interaction	Social interaction	Clear overview on patients
Tailored activities	Formal care at home	Fast access to facilities
Clear day rhythm	Information about	Retreat for themselves
Pleasant environments	dementia	Training for dementia
Visual aids	Help from Case Manager	Flexibility
SOLUTION		
WIJKZORG	WIJKZORG + CASE MANAGER	NEARBY FACILITIES IN
INFORMAL CAREGIVER	FORMAL CAREGIVER	NEIGHBORHOOD
INFO CENTER	INFO/COMMUNITY CENTER	INFO CENTER
DAYCARE	DAYCARE	NURSING STATIONS

figure 2.6.1 - Wishes & needs of target groups

Micro-scale Principles

03

3.1 INTRODUCTION

This chapter will cover several micro-scale dementia-friendly design principles. First, it will look at general topics that affect and contribute to individuals with dementia.

The goal of dementia-friendly design is to produce living environments that help individuals with dementia preserve their independence, enhance their quality of life, and encourage social inclusion. These design concepts underline the significance of establishing a secure, approachable, and comfortable environment that lessens uncertainty, worry, and anxiety (Aedes-Actiz, 2018). We can build environments that are inclusive and supportive of persons with dementia and help them live more fulfilled lives by implementing dementia-friendly design principles.

The design principles are found with literature study and categorized into various themes which can aid a person with dementia. The overarching themes in these studies are orientation, light, color, smell, acoustics and recognizability. Some design principles overlap and can affect several themes and factors, this is why the aspect safety is incorporated in all themes.

This chapter for micro-scale architectural principles is made to create an overview and to understand the various themes and principles which must be taken into account for a dementia-friendly design. Although a big part of these themes are covered, there are still more to discover.

figure 3.1.1

3.2 ORIENTATION AND WANDERING

One crucial element of individuals with dementia is the loss of memory-related sense of place, time, and identity. Dementia patients may notice a disruption or even loss in their sense of time. Sometimes they are unable to determine the day or season (Van Steenwinkel et al., 2012). The (daily) habits of a person with dementia could get confused, which is one of the potential effects. Dementia patients require clear room orientation. People frequently forget which door leads to which room or where they are heading. Therefore, it's critical that they can readily locate their objective and are not sidetracked when they have anything in mind to perform.

To improve the orientation of an individual with dementia, various literature sources are used to find design guidelines. These findings can have significant improvement of behavioral and psychological symptoms of dementia and reduce confusion or disorientation.

Design Guidelines
• Room finding increased by 45% when personal front door is personalized with photo or memorabilia. (Nolan et al., 2002)
• Small scale building/living for overview and easy navigation. (Marquardt, 2011)
• Offering direct visual access to relevant places to avoid disorientation and confusion. (Marquardt, 2011)
• Simple decision/reference points. Crossing hallways and several changes in direction should be avoided. (Marquardt, 2011)
• Differentiations in size, form, color, and lighting must be defined in order to distinguish and find rooms with a comparable meaning or function. (Marquardt, 2011)
• Spatial proximity of kitchen, dining, and activity rooms as meaningful reference points. (Marquardt, 2011)
• Successful orientation and navigation in nursing homes requires a basic, transparent floor plan and clearly defined, geometrically simple rooms.
• Mirrored surfaces may confuse someone with dementia, because the individual takes in images very directly and does not process them. (Aedes-Actiz, 2018)
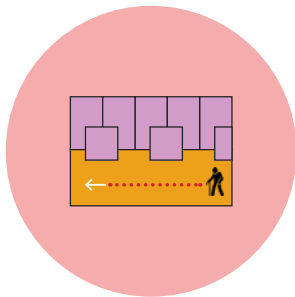
RHYTMIC NICHES IN CORRIDORS
FOR MORE STIMULI
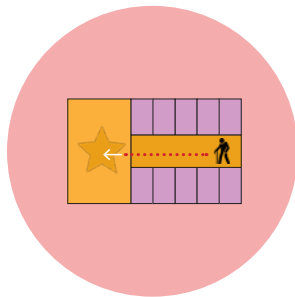
DESTINATION ON THE END
OF THE CORRIDOR
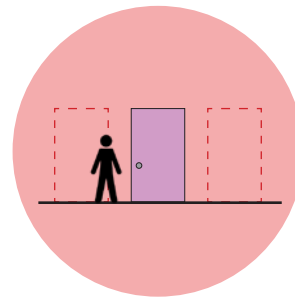
REDUCE AMOUNT OF VISIBLE
DOORS IN CORRIDORS
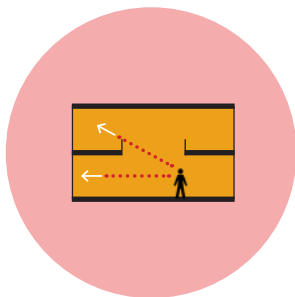
SMALL SCALE BUILDING FOR
OVERVIEW AND EASY NAVIGATION
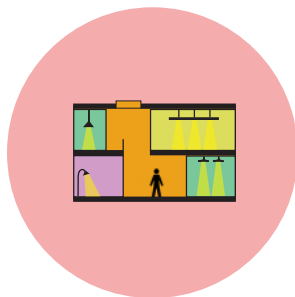
DISTINGUISH ROOMS WITH DIFFE-
RENT CHARACTERISTICS
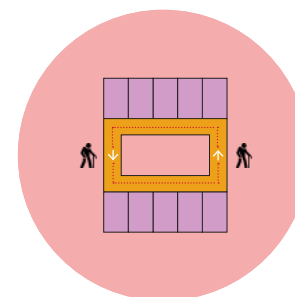
CIRCULAR ROUTES AND
NO DEAD ENDS
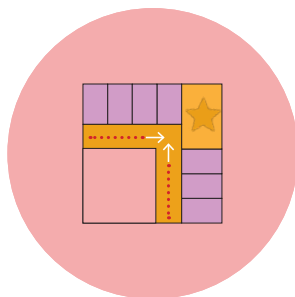
SPECIAL PLACES ON THE
CORNERS IN BUILDING
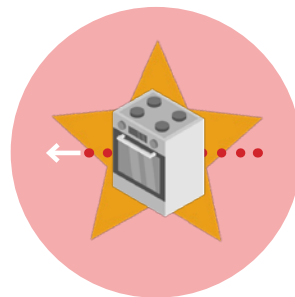
UTILIZE KITCHEN OR DINING
ROOM AS REFERENCE POINT
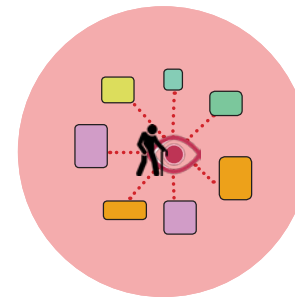
CLEAR VISUAL ACCESS ON
ROOMS AND TOILETS
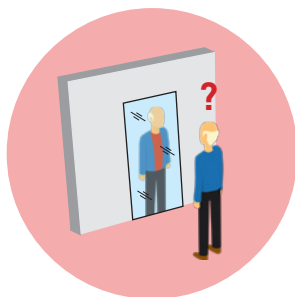
MIRRORED SURFACES
MAY CONFUSE PERSON

PERSONAL (OWN) FURNITURE
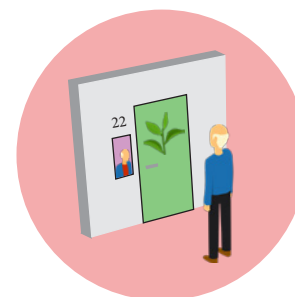
DISTINCTIVE PERSONAL
ELEMENTS

figure 3.2.1

3.3 LIGHT AND DARK

Lighting is the most significant and effective indoor environmental component in the homes of older individuals with dementia in terms of enhancing health and quality of life. The most well-known advantages of illumination are those related to vision, or being able to see, and fall prevention. Additionally, illumination is crucial for controlling a variety of biological and psychological processes in the body, including irregular sleep patterns (van Hoof et al., 2010).

Dementia patients seek out soothing and encouraging stimuli. When enclosed inside a building, a person notices a significant reduction in light: whereas they typically receive 2,000 lux hours inside, they would receive 80,000 lux hours outdoors, which is 40 times as bright. (Habell, 2012)

The need for sunshine exposure stems from the increasing body of research showing that people with Alzheimer's disease directly benefit from it. On a purely physical level, the light contains vitamin D, which is crucial for healthy bones. According to a 2005 research by the Department of Neurology at Miate Hospital in Japan, people with Alzheimer's disease frequently experience fractures, especially hip fractures. It shown that exposure to sunshine decreased the risk of non-vertebral fractures in Alzheimer's patients by almost 70%. Poor cognition and low vitamin D levels are also related to depression (Habell, 2012).

Design Guidelines
•   Use of skylike ceiling tiles (Circadian lighting), gradual nighttime light reduction, calming streaming music, beige walls and oversized clocks in corridors resulted in significant improvement of behavioral and psychological symptoms of dementia. (Bautrant et al., 2019)
•   Use windows with parapets, a window that is flush with the floor gives persons with dementia the impression that they are being cast outdoors and thrown out. (Aedes-Actiz, 2018)
•   Design freely accessible internal areas with strong daylight (Torrington & Tregenza, 2007)
•   Windows should have blinds for excluding low-elevation sunlight (Torrington & Tregenza, 2007)
•   Use uniform lighting to avoid luminance differences between surfaces and diminishes clues to the form of the room. (Torrington & Tregenza, 2007)
•   Lighting or decoration distinctions should be used to distinguish rooms that are identical in design or function. (Torrington & Tregenza, 2007)
•   Glossy surface finishes should be avoided to reduce glare (Torrington & Tregenza, 2007).
•   Placement of seating and gathering spaces next to view windows is recommended. (Torrington & Tregenza, 2007).
•   Utilize views of the nature rather than the built environment (Torrington & Tregenza, 2007).
•   The lighting and ornamentation of paths should change subtly to improve wayfinding. (Torrington & Tregenza, 2007).
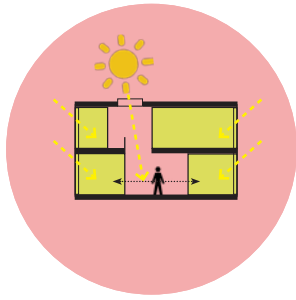
FREELY ACCESSIBLE INTERNAL
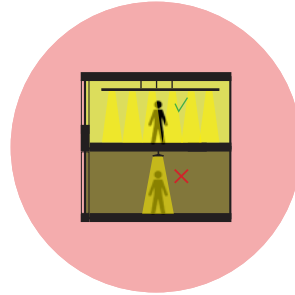AREAS WITH STRONG DAYLIGHT
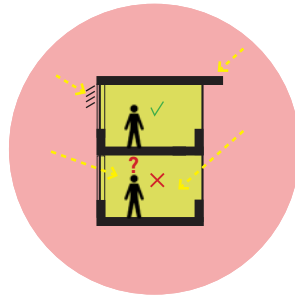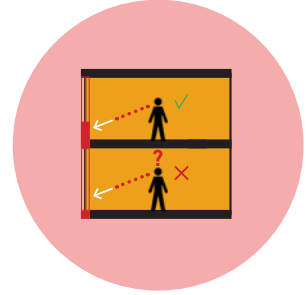
SUNSHADING OR CANOPY
AGAINST LOW-ELEVATION SUN
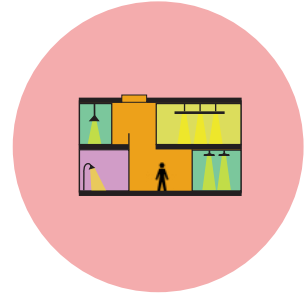
DISTINGUISH ROOMS WITH DIFFE-
RENT CHARACTERISTICS
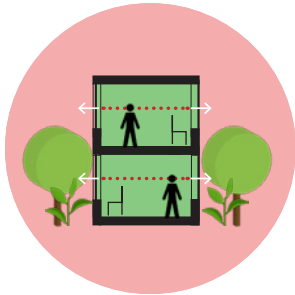
VIEWS OF NATURE + SEATING
NEXT TO WINDOWS

UNIFORM LIGHTING TO AVOID
LUMINANCE DIFFERENCES

WINDOWS WITH PARAPETS TO
EMPHASIZE BOUNDARIES

figure 3.3.1

3.4.1 SENSES | COLOR

In visual perception, color and contrast, in particular, play important functions that either strengthen or diminish environmental visual literacy. From middle age on, color and contrast sensitivity decrease. It is possible for humans to distinguish between contours, depth, form, and objects in the surroundings because to contrast, notably light-dark contrast. Poor ambient lighting can make it even more difficult for us to read visual images and environmental details when contrast levels are minimal (O'Connor, 2020).

There are several theories on the best colors people with dementia. Studies frequently find that old pink is beneficial and pastel colors having a calming effect. Brighter hues like red (warm) and blue (cool) excite and give sensations that, although you can use them sparingly and mindfully, are not suited for fostering calmness. Purple is regarded as a neutral color (Aedes-Actiz, 2018).

Design Guidelines

•   Utilize strong color contrast (Isolation Effect) to distinguish areas, define borders, establish special zones, and aid in orientation and wayfinding. This strategy can be used for interior/exterior landmarks, distinctive interior rooms and walls, and resident doors, flooring and handrails. This is also useful for smaller-scale design components such as toilet seats, tapware, dinnerware, utensils and cutlery. (O'Connor, 2020).

•   Utilize recognizable design archetypes, furniture, fittings, and colors, familiar and homey color design may aid in upholding dignity, competence, and a sense of happiness.

•   Biophilic Design can be used to reference nature and reduce fatigue and stress. Green vegetation walls, scenery of nature, pot plants, green painted textured surfaces, fountains, indoor fountains, and cross-ventilation winds should all be used. (O'Connor, 2020).

•   Avoid shine, dark colors, and pattern, which might be perceived as a physical obstacle, as well as flecks or glittering bits that patients might want to pick up (Buxton, 2015).

•   Wood and other natural-looking elements are helpful in establishing a cozy, familiar atmosphere (Buxton, 2015).

USE WOOD FOR NATURAL, COZY & FAMILIAR ATMOSPHERE
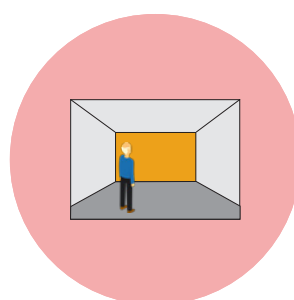
UTILIZE STRONG COLOR CONTRAST TO DISTINGUISH AREAS
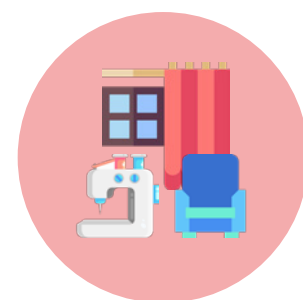
UTILIZE RECOGNIZABLE & HOMELY DESIGN

BIOPHILIC DESIGN WITH PLANTS AND GREEN WALLS

DARK COLORS AND PATTERNS PERCEIVED AS OBSTACLE

figure 3.4.1

3.4.2 SENSES | SMELL

Scents can trigger a wide range of emotions in dementia patients. Smell and memory are connected in the brain, and this connection frequently lasts for a very long period. Scents might bring back memories of former people, occasions, or objects (Aedes-Actiz, 2018). Scents have the ability to refresh our memory and make us recall events, people and, for example, dishes from the past. This can be used in activities with people with dementia to trigger these memories.

Experimental interventions in care homes can be used to stimulate certain memories. For instance, to hang clothes together in the hallway, a task that some of the inhabitants can still recall and complete. The presence of the long laundry line in the hallway breaks up the monotonous area and brings back fond memories and a sense of home. The shared activity also appeared to encourage social contact among the residents, carers, and family members. (Hamers et al., 2018).

Design Guidelines
• Scents should refer to function like a kitchen smelling of food or bathroom smelling of soap (Aedes-Actiz, 2018).
• The source of the smell should be visible to avoid confusion (Aedes-Actiz, 2018).
• Photocatalytic reactions in smart wall and ceiling coatings can absorb unwanted odors. (Mazuch, 2014).
• In some instances, scent emitters can elicit memories from the past. (Mazuch, 2014).

PROVIDE VENTILATION FOR BAD SMELLS AND FRESH AIR

SCENTS CAN PROMPT PAST MEMORIES

SCENTS REFER TO FUNCTION LIKE SOAP & BATHROOM

SOURCE OF SMELL SHOULD BE VISIBLE TO AVOID CONFUSION
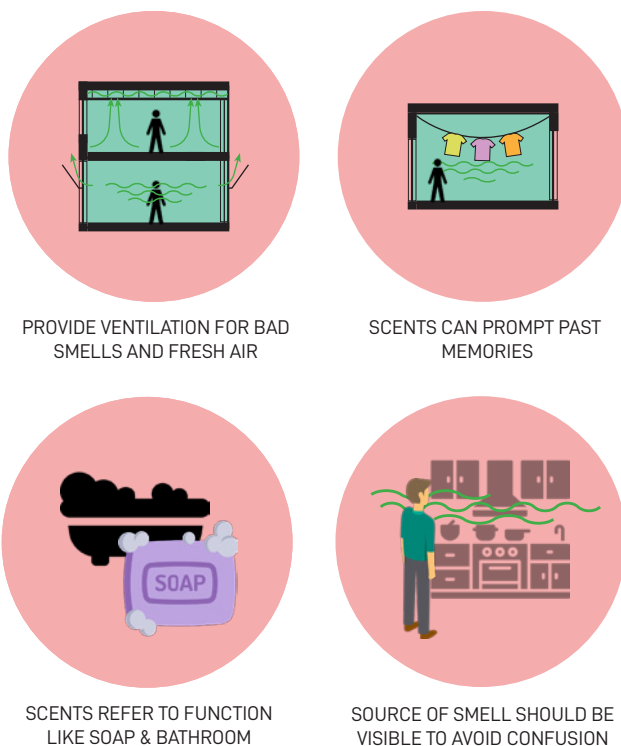
figure 3.4.2

3.4.3 SENSES | ACOUSTICS

Of all the senses, hearing has the most influence on a person's quality of life. People with dementia frequently experience noise hypersensitivity, which can lead to unnecessary stimuli, confusion, worry, and increased stress. Additionally, physiological reactions to sound can cause an increase in heart rate, blood pressure, and fatigue. All of these symptoms may make people with dementia feel socially isolated because they are unable to endure the noise (Beldam et al., 2020).

Dementia patients could also lack stimulus. They may scream as a result of their discomfort and the sensations that are produced by their scream's vibrations. Typically, this is unpleasant. Situations like these may be avoided by splitting communal areas into rooms. (Aedes-Actiz, 2018).

Design Guidelines

• Facilities for dementia care should be placed away from significant external sources of noise.

• To reduce the effects of noise, certain rooms might have the possibility to be closed off (Hayne et al., 2014).

• To lessen resonance and boost privacy, acoustic absorption should be placed into strategic places like ceilings of corridors and circulation rooms. (Hayne et al., 2014).

• There shouldn't be any bedrooms that open directly into the dining room, a busy area, or a huge gathering place (Hayne et al., 2014).

• Bedrooms must be isolated from other interior areas using walls, floors, ceilings, and doors that are planned and built to produce suitable sound absorption (Hayne et al., 2014).

• Less foot circulation through the dining room, social rooms, and activity areas should be achieved through the architectural design (Hayne et al., 2014).

• The size of the rooms should be restricted such that the maximum number of persons allowed in each area (8-12 people) (Grigorescu, 2016) may be accommodated without overcrowding (Hayne et al., 2014).

• Ceiling heights shouldn't be high since it's important to keep the reverberation time in rooms under control (Hayne et al., 2014).

• Plants absorb sound very well and also have other positive effects, such as a healthy moisture balance in the air and more oxygen (Aedes-Actiz, 2018).

• Utilize differences in sound absorption in spaces for better orientation. Warm soft sounds inside (good absorption) and longer reverberation time in circulation spaces.
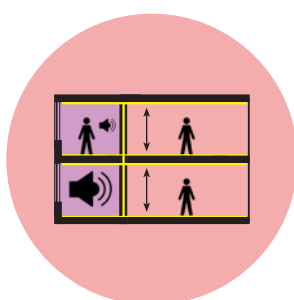
ACOUSTIC INSULATION & LOWER CEILINGS FOR LESS RESONANCE

SMALL ROOMS TO RESTRICT AMOUNT OF PEOPLE IN ROOM
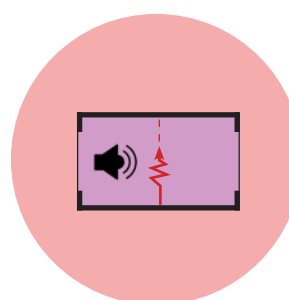
TO REDUCE NOISE, ROOMS CAN BE CLOSED OFF
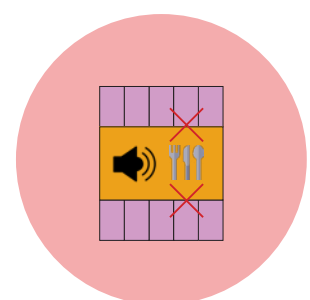
BEDROOMS SHOULDN'T OPEN DIRECTLY INTO DINING ROOM

figure 3.4.3

3.5 RECOGNIZABILITY

When a person has dementia, familiar locations and things from their early years are easier for them to utilize and appreciate. Building design, furniture, fittings, and colors can contribute to this. The surroundings must represent the individuals' individual origins. It is also encouraged for an individual with dementia to take part in personalizing the surroundings with their beloved items (Bennett & Fleming, 2017).

The implicit memories that go along with it (such as atmosphere) are made at a certain period of time with a specific set of traditions, trends, colors, etc. As the time advances, the aesthetics and characteristics of familiarity shifts for the elderly. The majority of senior residents in the nursing home have associations with items from a certain period of time. A kitchen with brown and orange hues, tiled floors, a wooden dish brush, a hanging light above the dining table are examples of the types of details that trigger implicit memory and communicate that the setting is familiar, calming the senses and reducing anxiety (Ontwerpen voor dementie, n.d.).

Designing for people from backgrounds can be challenging. It is crucial to examine the composition of the resident group which the design of a residential environment for that target group is meant for. This environment should match the range of cultural backgrounds as much as possible, in which, there are not only differences, but also many similarities (Ontwerpen voor dementie, n.d.).

PERSONAL (OWN) FURNITURE

DISTINCTIVE PERSONAL ELEMENTS
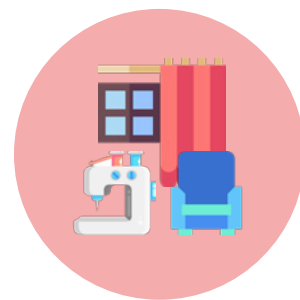
UTILIZE RECOGNIZABLE & HOMELY DESIGN

figure 3.5.1

3.6 MICRO-SCALE GUIDELINES OVERVIEW
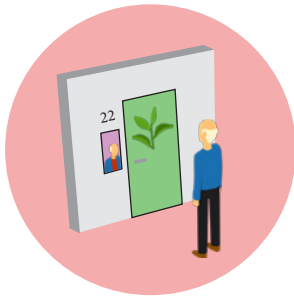
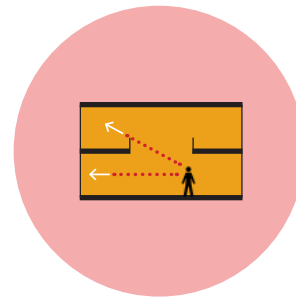DISTINCTIVE PERSONAL
ELEMENTS
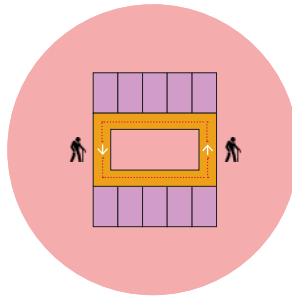
CIRCULAR ROUTES AND
NO DEAD ENDS
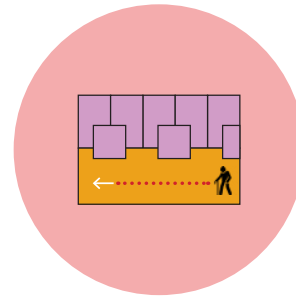
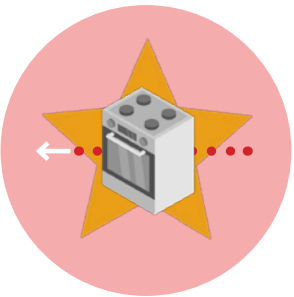RHYTMIC NICHES IN CORRIDORS
FOR MORE STIMULI
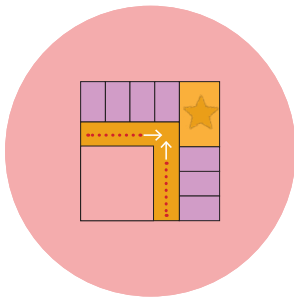
SPECIAL PLACES ON THE
CORNERS IN BUILDING
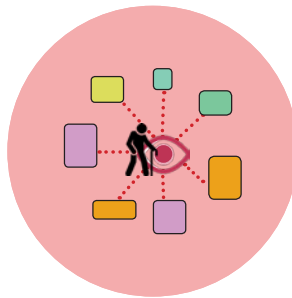
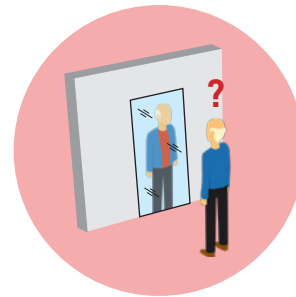CLEAR VISUAL ACCESS ON
ROOMS AND TOILETS

SMALL SCALE BUILDING FOR
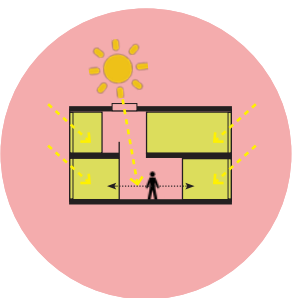OVERVIEW AND EASY NAVIGATION
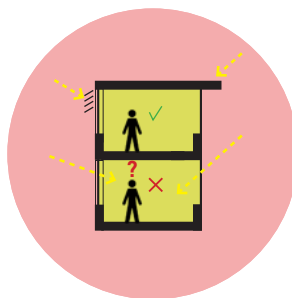
UTILIZE KITCHEN OR DINING
ROOM AS REFERENCE POINT

PERSONAL (OWN) FURNITURE

MIRRORED SURFACES
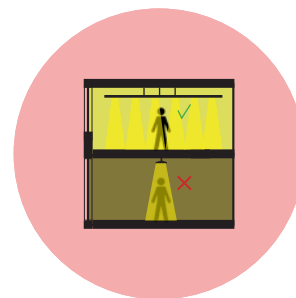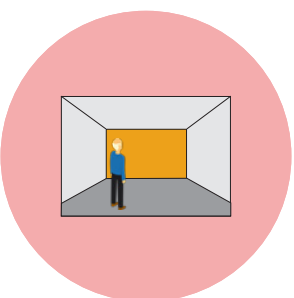MAY CONFUSE PERSON
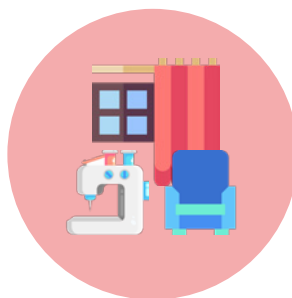
FREELY ACCESSIBLE INTERNAL
AREAS WITH STRONG DAYLIGHT

SUNSHADING OR CANOPY
AGAINST LOW-ELEVATION SUN
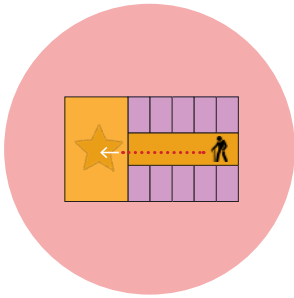
UNIFORM LIGHTING TO AVOID
LUMINANCE DIFFERENCES

UTILIZE STRONG COLOR CON-
TRAST TO DISTINGUISH AREAS

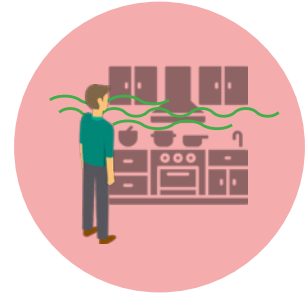UTILIZE RECOGNIZABLE &
HOMELY DESIGN

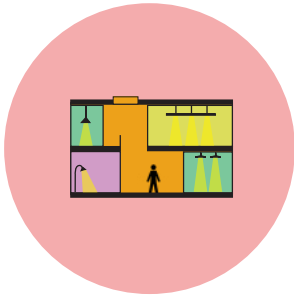BIOPHILIC DESIGN WITH PLANTS
AND GREEN WALLS

DESTINATION ON THE END
OF THE CORRIDOR

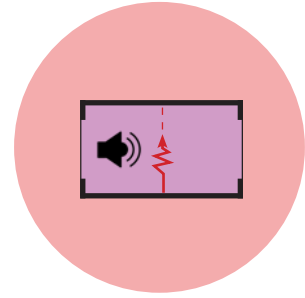USE WOOD FOR NATURAL, COZY &
FAMILIAR ATMOSPHERE

SOURCE OF SMELL SHOULD BE
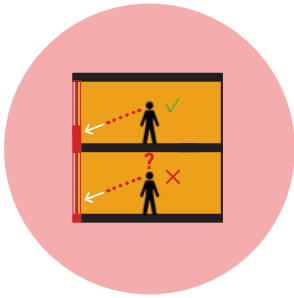VISIBLE TO AVOID CONFUSION
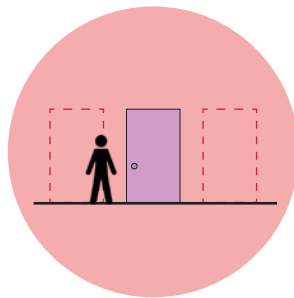
DISTINGUISH ROOMS WITH DIFFE-
RENT CHARACTERISTICS

SCENTS REFER TO FUNCTION
LIKE SOAP & BATHROOM

TO REDUCE NOISE, ROOMS CAN
BE CLOSED OFF

WINDOWS WITH PARAPETS TO
EMPHASIZE BOUNDARIES

REDUCE AMOUNT OF VISIBLE
DOORS IN CORRIDORS
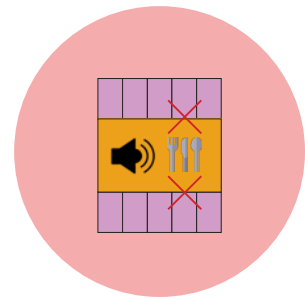
BEDROOMS SHOULDN'T OPEN
DIRECTLY INTO DINING ROOM
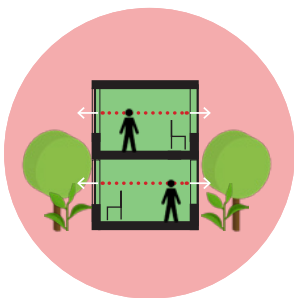
VIEWS OF NATURE + SEATING
NEXT TO WINDOWS

PROVIDE VENTILATION FOR BAD
SMELLS AND FRESH AIR
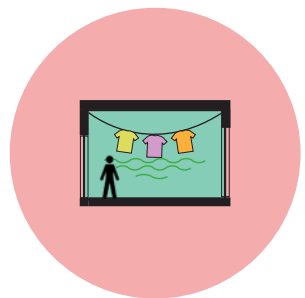
SCENTS CAN PROMPT PAST
MEMORIES

DARK COLORS AND PATTERNS
PERCEIVED AS OBSTACLE
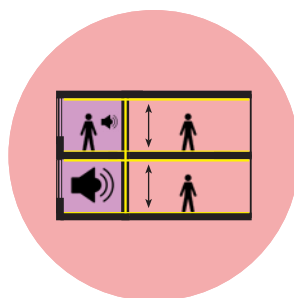
ACOUSTIC INSULATION & LOWER
CEILINGS FOR LESS RESONANCE

SMALL ROOMS TO RESTRICT
AMOUNT OF PEOPLE IN ROOM

*Case
Study*

04

4.1 INTRODUCTION

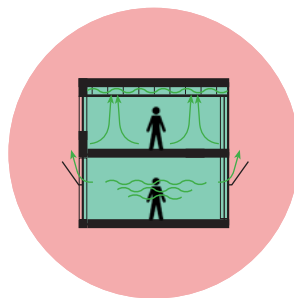This chapter explores the Alzheimer Village by Nord architects as a case study. This case study was chosen because the individual residents, health care professionals, local culture and nature are all taken into account in the design (Pintos, 2022). Alzheimer Village promotes living in an environment that prioritizes dignified aging. Although this project is not in an urban context, lessons can be learned to utilize in buildings or neighborhoods.

Clustering, functions, routing and materials are all investigated in this study. This finally leads to design recommendations for a dementia-friendly design.

4.2 ALZHEIMER VILLAGE

Dax, France
Nord Architects
2020
10700m^2
120 patients

figure 4.2.1

The village consist of four communal living areas and one 'town centre' where alll the usual everyday necessities are found.
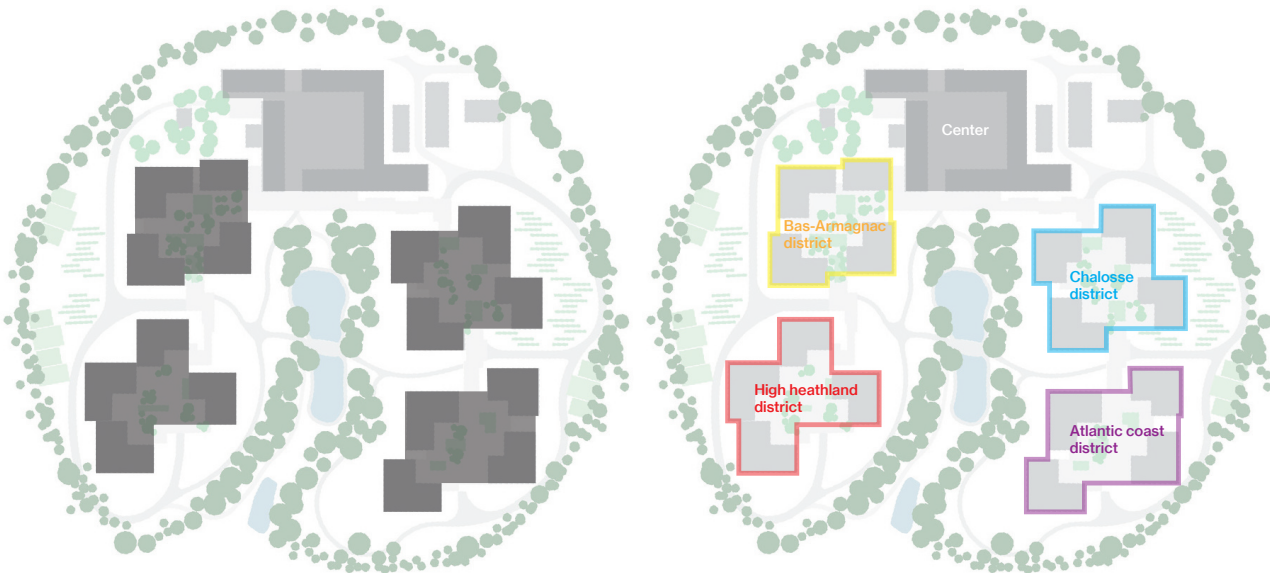
figure 4.2.2

In the village there is a place for 120 residents, 120 volunteers, 120 professionals and the families of the patients

| 120 RESIDENTS | 120 VOLUNTEERS | 120 PROFESSIONALS | FAMILIES OF PATIENTS |

figure 4.2.3

figure 4.2.4
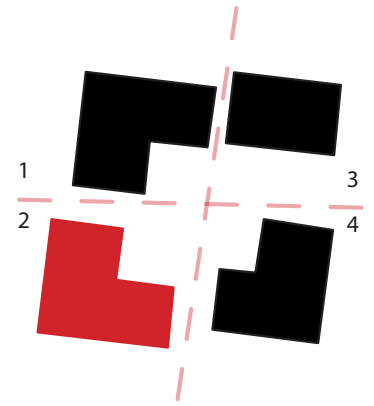
CLUSTER
FREE TYPOLOGY
REPETITION
BROKEN VOLUMES
SUB-CLUSTERS
30 RESIDENTS
120 RESIDENTS TOTAL

figure 4.2.5

COURTYARDS
CONNECTED WITH
OTHER CLUSTERS

figure 4.2.6

SUB-CLUSTERS
SUB-CLUSTERS
CONNECTED WITH OWN
INNER COURTYARD

CO-LIVING
SHARED FUNCTIONS
IN SUB-CLUSTERS
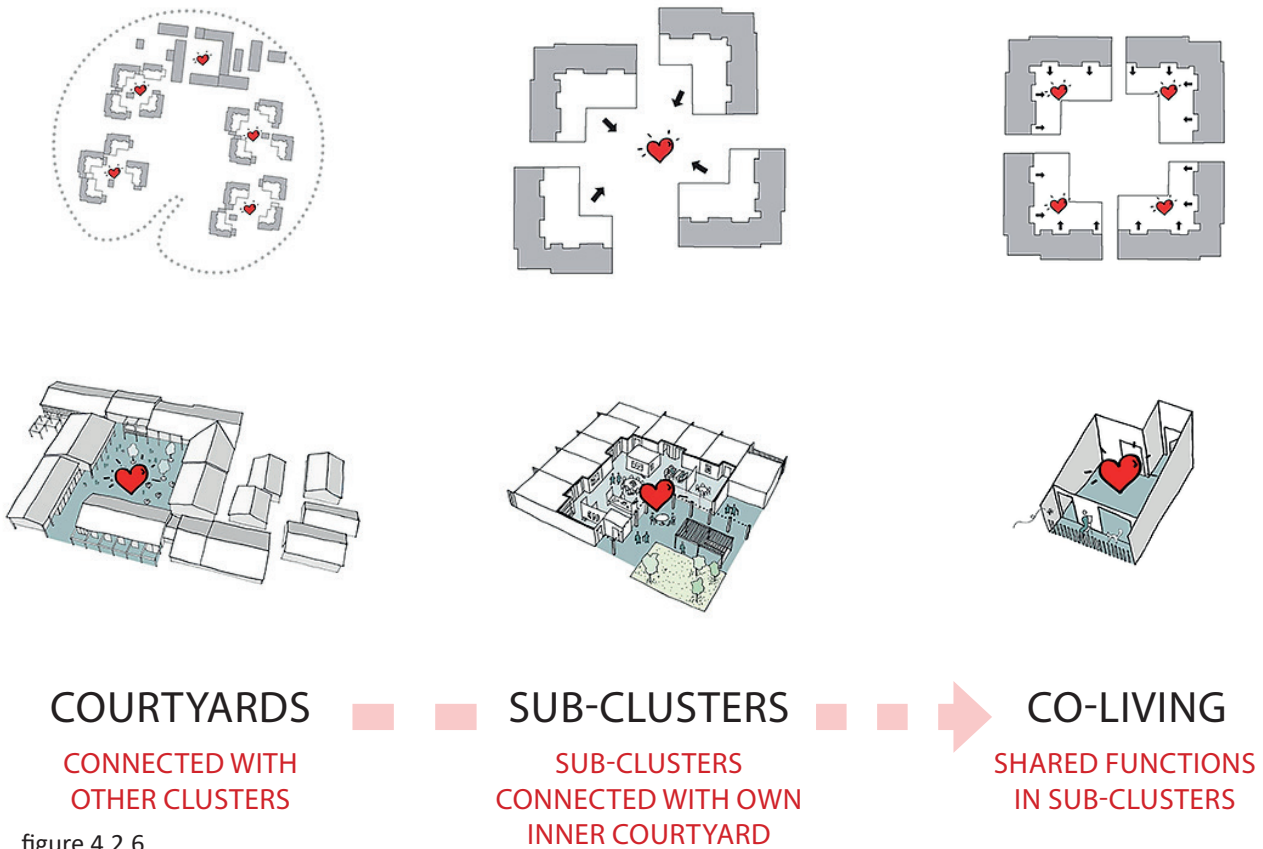
The village is made out of several clusters on different scale levels. The clusters all have their own central heart where people are able to meet and connect. Each cluster houses 30 residents.

Routing
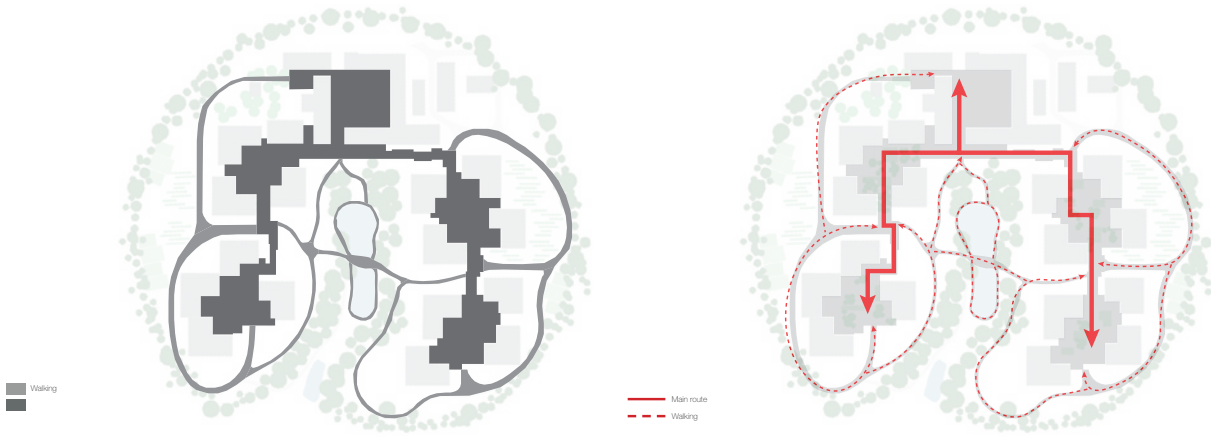
figure 4.2.7

There are two types of routes through the village The main rout that directly goes from the centre to the living clusters and the walking paths who take you though the villages. The architects made sure that there are never any dead ends so the patients will never get lost.

figure 4.2.8

From their homes, the residents have direct access to the nature that surrounds the project site and the clusters. Several pine trees were cut down for the construction of the Alzheimer's Village. The pine trees surrounding the project site were kept as a green barrier. The clusters fold around a lake in the center of the project area.

VIEW FROM HOUSE   VIEW IN COURTYARDS   VIEW FROM THE LOOP PATH

figure 4.2.9

Program

■ Auditorium	■ Wellness room	■ Pharmacy	■ Infirmary	■ Physiotherapy room	
■ Hairdressing salon	■ Facilitators' office	■ Library	■ Handicraft activities	■ Reception	
■ Consulting rooms	■ Restaurant	■ Supermarket			
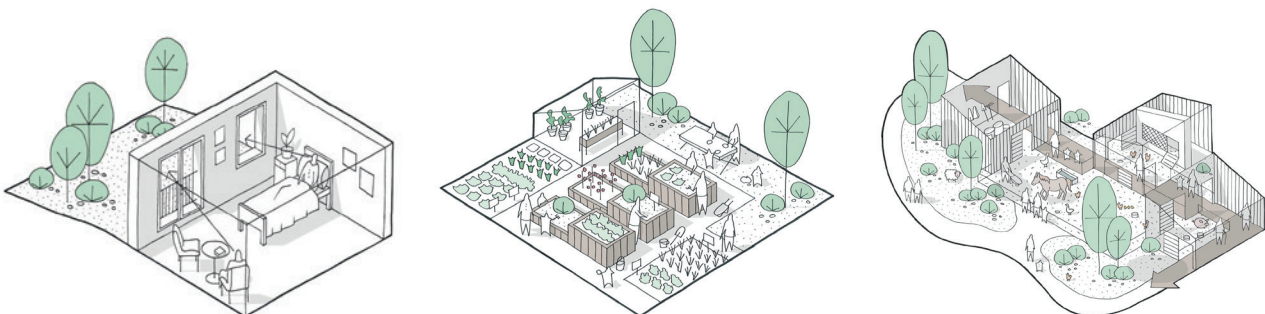
figure 4.2.10
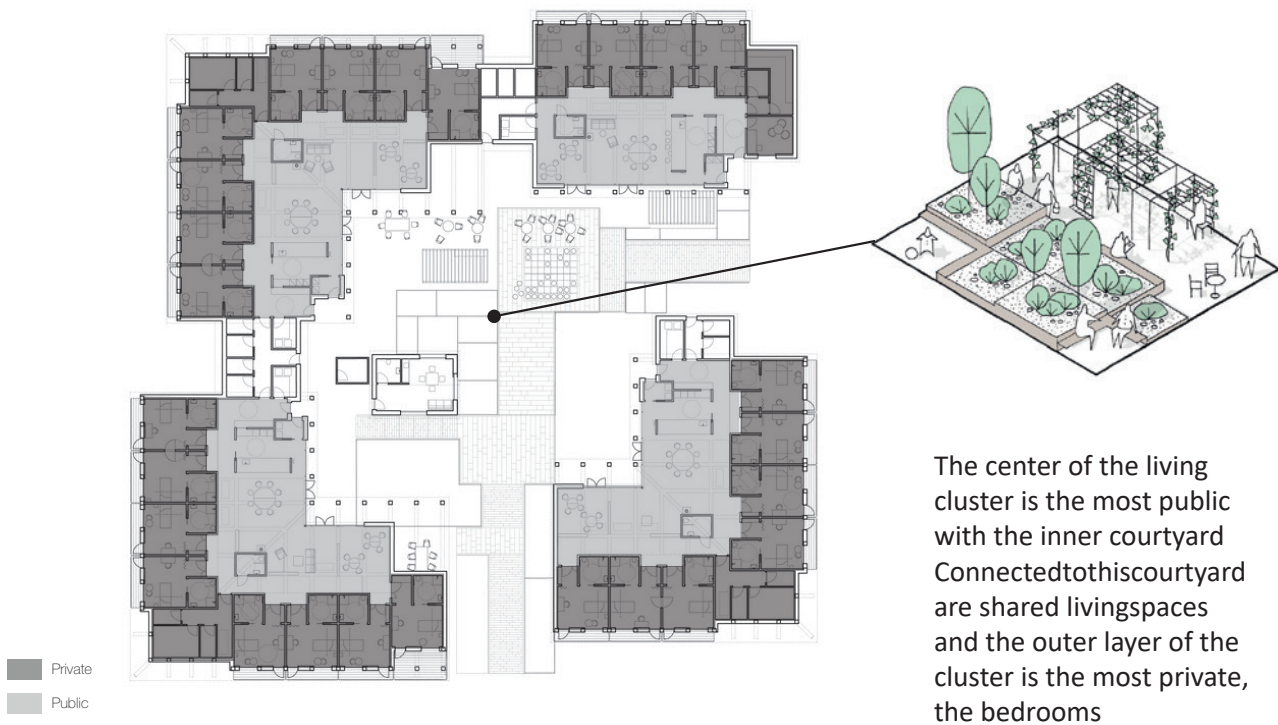
■ Private
■ Public

figure 4.2.11

The center of the living cluster is the most public with the inner courtyard Connectedtothiscourtyard are shared livingspaces and the outer layer of the cluster is the most private, the bedrooms

| Bedroom | Bathroom | Circulation area | Shared livingroom | Storage | Shared kitchen |
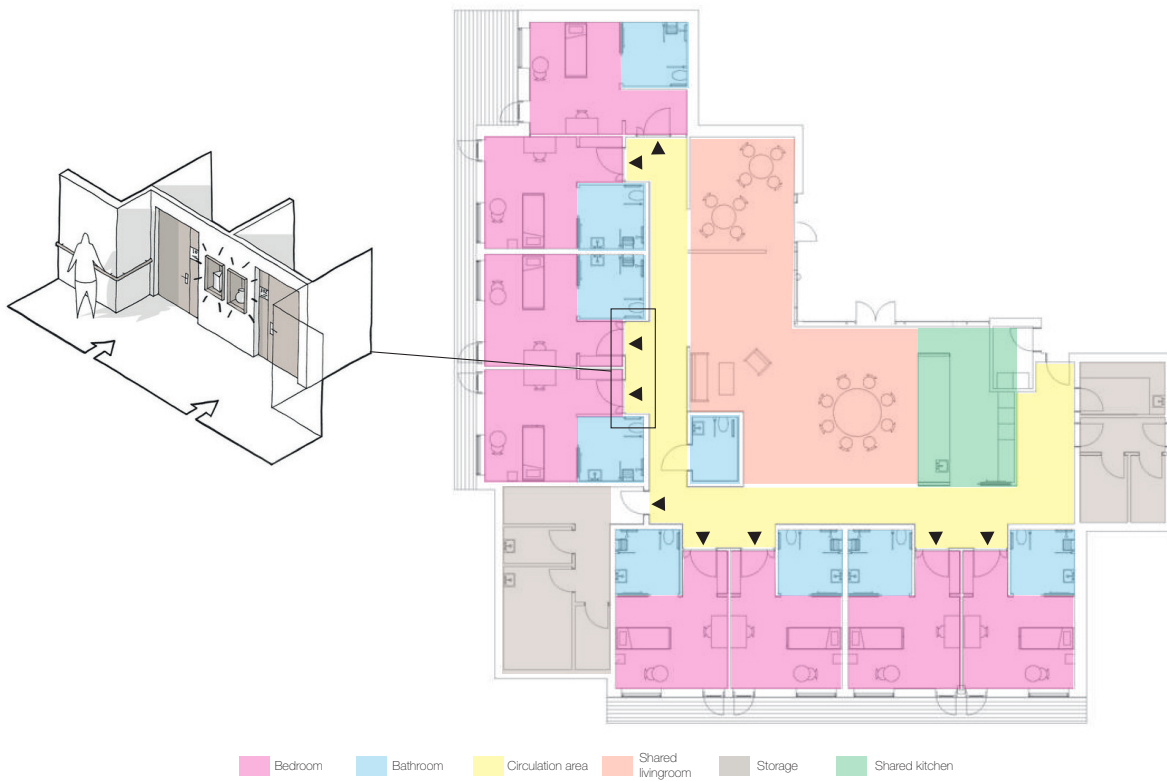
figure 4.2.12

The architects added a feature to the entrance doors of the bedrooms. There is space for a recognisable item that will help the residents to recognise their own door.

figure 4.2.13

HOMES
ALWAYS VIEW ON OUTER GARDEN
WINDOW NEXT TO BED
VIEW FROM SEATED POSITION
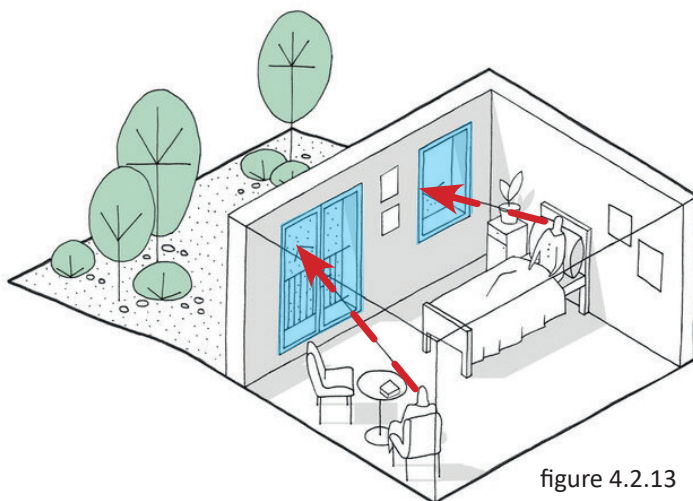
figure 4.2.14

In the bedrooms the residents have a view of nature from both their bed as well as from a seated position.
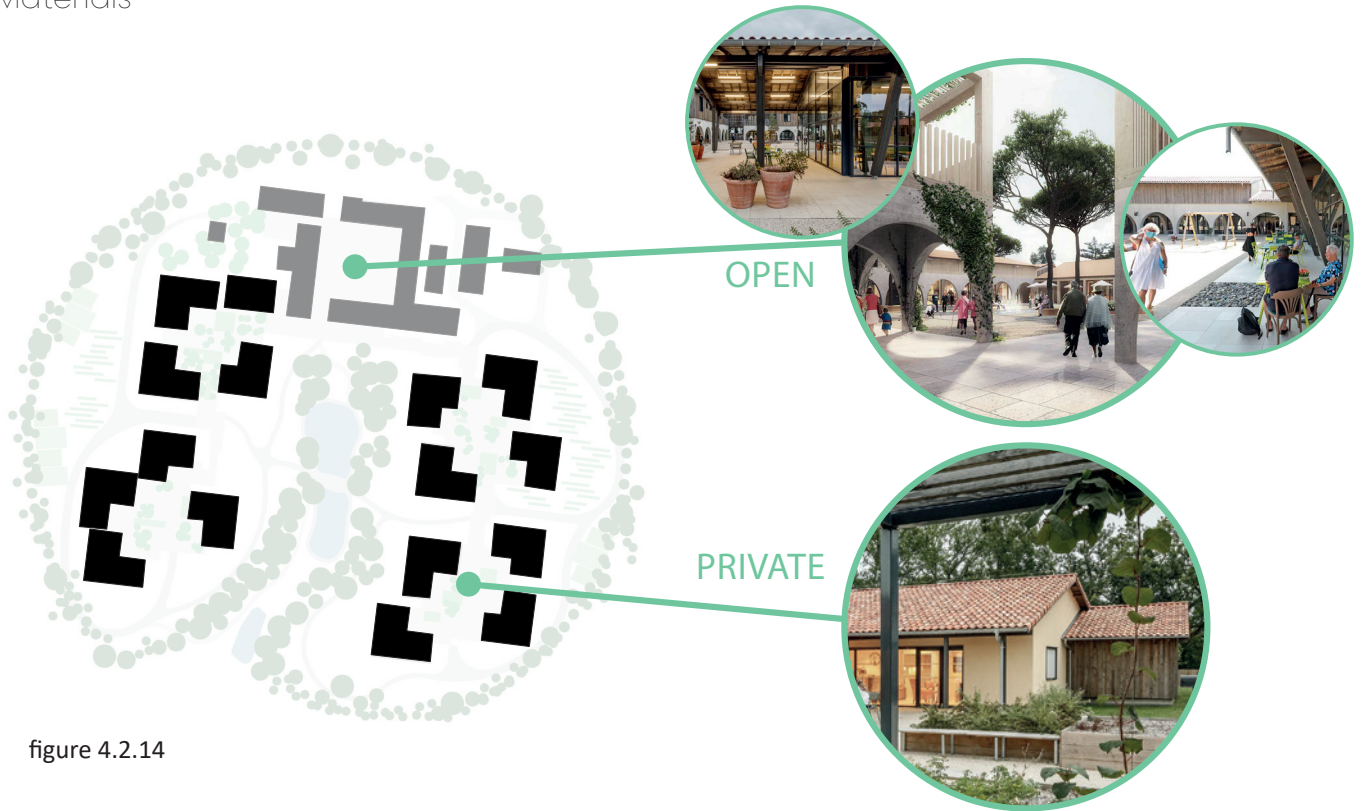
OPEN

PRIVATE

figure 4.2.14

The more public areas of the village have a more open character and the private areas are more closed. The materials that were used by the architects are very local and thus recognisable for the residents.

CONCRETE STRUCTURE

STEEL STRUCTURE

WOODEN STRUCTURE

WOODEN FACADES

PLASTERED FACADES

WOODEN ROOFS

figure 4.2.15

GREEN GARDENS WITH CONCRETE GRAVEL PATHS

DIFFERENT CONCRETE GRAVEL COLORS AND NATURAL STONE

figure 4.2.16

At the project site, different pavement materials were used to indicate the functions. The area features lots of greenery through which runs a looped walking lane made of concrete gravel. Because of this indication, the residents with Alzheimer's always know how to find their way back. Inside the clusters, the concrete gravel flows into concrete tiles. These tiles are used around the public functions. This creates a clear distinction between walking paths and seating areas/activity zones. The concrete tile zones also include gravel.
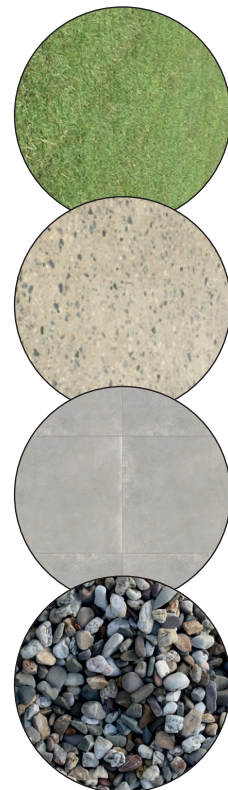
figure 4.2.17

4.3 CONCLUSION

The Alzheimer Village in Dax offers the residents and caregivers a safe and controlled environment to live in. A familiar environment is created with the use of local materials and building styles. Making clusters results in smaller communities within. These can be distinguishable with different themes and colors. A clear distinction in the use of materials between the public and private areas and a variety in pavement marks the boundaries and helps with orientation. The direct visual and physical access to nature helps the residents calm down.

The village offers place for 120 patients and 120 formal caregivers. The ratio is 1:1 which makes this project very expensive to maintain. With the current shortage in the Netherlands in formal caregivers, this is not a feasible approach. Unfortunately, the location of this village is also excluded from society and the old communities of the residents.

RHYTMIC NICHES IN CORRIDORS FOR MORE STIMULI	SMALL SCALE BUILDING FOR OVERVIEW AND EASY NAVIGATION	USE WOOD FOR NATURAL, COZY & FAMILIAR ATMOSPHERE	DISTINCTIVE PERSONAL ELEMENTS	UTILIZE RECOGNIZABLE & HOMELY DESIGN
BIOPHILIC DESIGN AND URBAN GREEN CAN REDUCE STRESS	UTILIZE SOCIAL PLACES AND PLACES FOR RETREAT.	DEMENTIA WALKING ROUTES/ ZONES IN NEIGHBORHOOD	UTILIZE NON REFLECTIVE PAVEMENT	VIEWS OF NATURE + SEATING NEXT TO WINDOWS
DISTINCTIVE PERSONAL ELEMENTS	OFFER VARIETY IN PAVEMENT TO MARK BOUNDARIES			

figure 4.3.1

Macro-scale Principles

05

5.1 INTRODUCTION

Neighborhoods and communities are vital in our lives. They give possibilities for social engagement, support, and mutual aid, as well as a sense of belonging and connection to others. Feeling a part of a community can improve our physical and mental health, as well as our overall well-being. (Cramm et al., 2013). To make aging in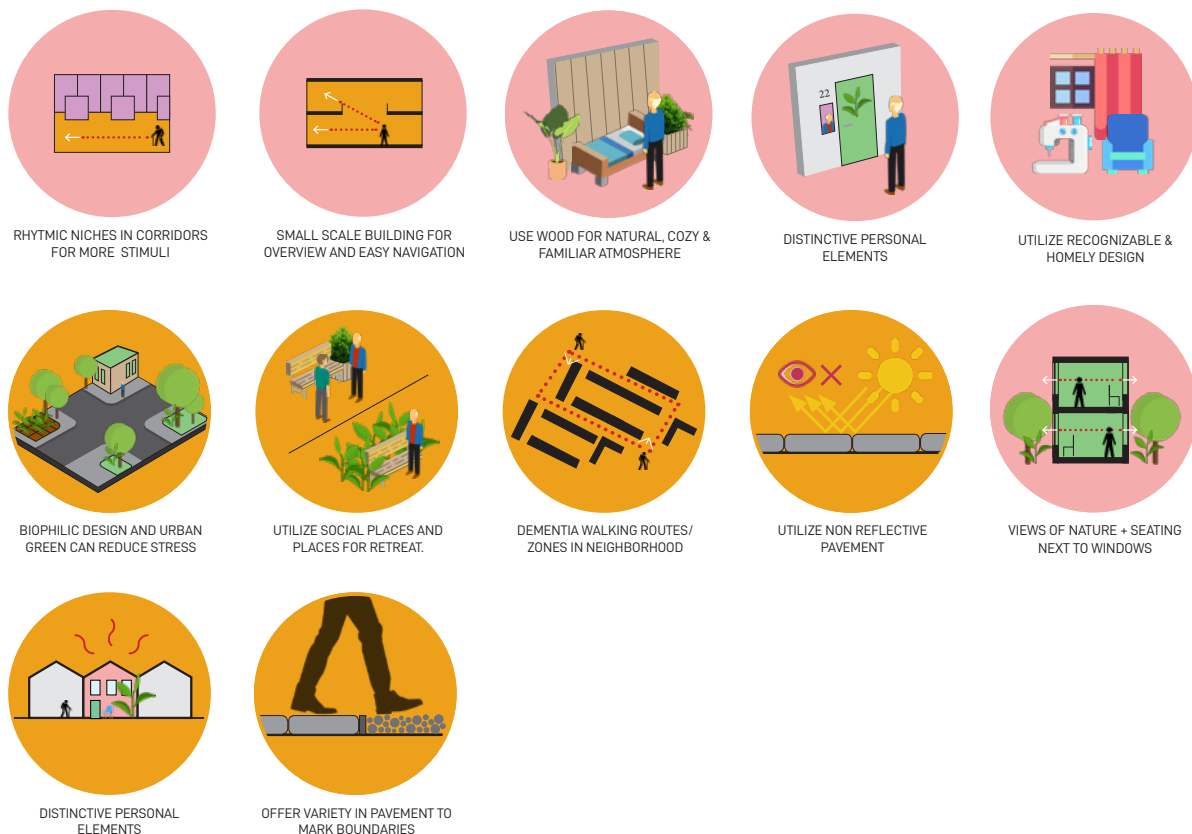 place possible, it is important to transform existing Dutch neighborhoods into inclusive living environments. Currently there are often a lack of amenities, which make neighborhoods unsafe or unfit for people with dementia.

Dementia-friendly neighborhoods can provide a supportive and nurturing environment for elderly individuals and people with dementia, offering a sense of community, safety, and familiarity that can enhance their quality of life. (Mitchell et al., 2004).

This chapter explores the idea of a dementia-friendly neighborhood and the concept of aging in place with literature study. The findings are used to find new macro-scale implementations in a neighborhood context. The micro-scale guidelines are used as a foundation and act as a starting point to find possibilities to implement these on a larger scale. This approach is chosen, because there are a lot of studies about micro-scale principles. On the macro level there is a lack of studies and reference projects.

A tier list ranking each of the specific design principles is created at the end of the chapter. Their perceived worth or quality is used to determine the ranking. This list is intended to serve as advice and suggestions for others.

5.2 DEMENTIA FRIENDLY NEIGHBORHOOD

A dementia-friendly neighborhood is defined as one where there is an eye and ear for local residents with dementia and their caregivers. People with dementia can continue to engage as much as possible in their neighborhood and have similar lifestyles as before, thanks to a dementia-friendly environment. One way to enable aging in place for people with dementia is to adapt their existing home and living environment.

People with dementia actively contribute to the continuous creation and upkeep of neighborhoods as relational, interconnected spaces. Being socially integrated into communities that are set up in this way gives one the chance to stay active. Maintaining connections emphasizes the value of contacts in terms of ongoing communication, nonverbal cues of recognition, and the ability to see and be seen. Being a part of a larger network of relationships might provide a sort of metaphorical safety net of resources to turn to in case of emergency (Clark et al., 2020).

Getting outside is crucial for the health and wellbeing of people with dementia, despite concerns that they might get lost or hurt themselves while doing so. Maintaining independence and self-respect requires being able to go for walks or to take care of basic requirements like buying food. According to the research of Mitchell & Burton (2010), Participants with dementia comprehend locations, streets, structures, and other details in designs that are familiar to them. Instead of style, whether traditional or modern, it seemed that simplicity of use and function were the most important aspects. Individuals with dementia frequently have difficulty understanding the cues that indicate how to utilize buildings, where doors are, what behavior is appropriate for them, or the intentions of those around them.

People with dementia often have problems at crossroads when attempting to take an unknown path or when they become preoccupied. Long, straight streets, streets that match surrounding streets, and streets with a uniform architectural style also contribute to disorientation (Mitchell & Burton, 2010).

According to Seetharaman et al. (2020), the memories of both familiar and new neighborhood settings, as well as the ability to recall details about well-known routes, were all thought to be strengthened by landmarks. Neighborhood redevelopment-related changes, such as the closure of neighborhood businesses and the elimination of well-known locations are cited as a barrier by individuals with dementia. Unique shape, vivid color, distinct material quality, proper scale, and clear and identifiable signage are among the important criteria stated. The meaningfulness of the landmarks are also important to have a connection to personal interest. It is probable that people will not consider landmarks to be relevant if they lack a clear function, are difficult to identify, or cannot be simply described as something having a known purpose.

Silverman (2020) makes suggestions from a carers' perspective of a dementia-friendly neighborhood which also correspond with the Dementia-friendly neighborhood guidelines of Yuen et al. (2020). These guidelines are:

• Raise awareness by encouraging the community, organizations, and companies to become dementia-friends by spreading information about dementia and adopting dementia-friendly aids.

• Intergenerational public spaces like playgrounds, community gardens that facilitates interactions and activities by bringing individuals of various ages together.

• Facilities for daily activities to support people with dementia in maintaining daily routines, outdoor physical activities and social gatherings for various requirements.

• Outdoor seating should be placed every 100 to 125 meters, be shaded, have an armrest, and be made of materials that are easily recognizable.

• Landmarks at junctions

• Recognize and make use of informal open spaces like empty parking lots and voids between buildings.

• Design continuous circulation loops without dead ends or opaque borders, with destination points.

• Implement clearly marked, obstacle-free paths for movement to encourage people-to-people interaction and outdoor walking

• Utilize a variety of close-by outdoor locations so that people have a choice between being alone or with others. (Silverman, 2020)

• Find solutions to help lessen the effects of severe weather in order to stimulate people with dementia and their caregivers' efforts to remain active even during the winter. (Silverman, 2020)

• Communities should figure out ways to benefit from dogs' potential as beneficial social connectors. (Silverman, 2020)

5.3 MOBILITY AND ACCESSIBILITY

Understanding the connection between the built environment and aging in place depends on mobility and accessibility. The elderly want to continue living at home with their loved ones and being active for as long as possible (Farber et al. 2011). Ageing in place is crucial for serving the needs of elderly because people feel more connected to their communities as they get older and have less residential mobility (Gilleard et al., 2007).

To remain independent, it is important to have facilities within reach. As people age, their mobility decreases and result in mobility limitations, such as difficulty walking, carrying a bag, or standing up or bending over. This means they rely on nearby facilities. According to the kind of service, Carstens (1993) outlines two separate ranges: 400/500 meters for those that are deemed important and often utilized, and 800/1000 meters for those that are deemed desirable but less frequently used. In regard to the two distances, it may be considered that 10 and 20 minutes travel time are realistic for older persons (Santinha et al., 2020). For instance, (non-institutionalized) older persons were willing to walk a maximum of 1101 m to get to food stores according to a research by Prins et al. (2014).

Santinha et al. (2020) evaluates six main categories for services and amenities that are between 400 and 800 meters from the facilities under consideration: services linked to food, open public areas, general services, health and well-being, transportation, and others. It is crucial to take into account the overall condition of the surroundings as well as any potential obstacles. Five elements that affect older individuals' desire to walk can be distinguished by connectivity, convenience, comfort, salience and conviviality.

A senior's sensitivity to their physical environment might help or impede them from leading healthy lifestyles and participating fully in society. As a result, aging in place strategies emphasize that older persons' well-being is likely to depend on how effectively their area and home meet their requirements (Santinha et al., 2020).
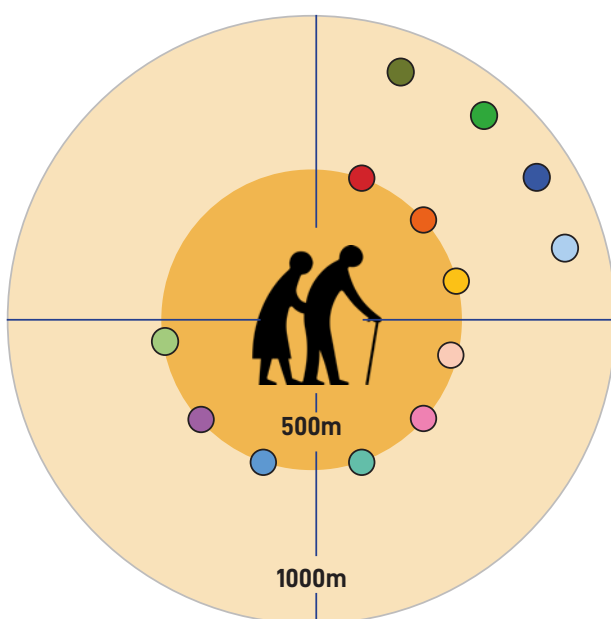
5.2.1 Two separate ranges for facilities

5.4 UPSCALING DESIGN PRINCIPLES

The previous findings about dementia-friendly neighborhoods and the concept of aging in place are used to find new macro-scale implementations in a neighborhood context. The micro-scale guidelines are used as a foundation and act as a starting point to find possibilities to implement these on a larger (neighborhood) scale. This approach is chosen, because there are a lot of studies about micro-scale principles. On the macro level there is a lack of studies and reference projects.

The macro-scale principles follow the same themes as the micro-scale principles. The new possibilities can overlap between the themes and are sometimes combined. Some micro-scale principles could not be translated into a larger context. In these columns N/A (not available) is written. Other guidelines which are not highlighted in grey, are more suited for individual buildings or new projects or neighborhoods. These require bigger interventions and are less useful in an existing neighborhood context.

The highlighted principles in the table are visualized and considered as design guidelines in an existing neighborhood context. With the upscaling, 20 new design principles were made. Some of them are combined into one icon, because these can be related.

At the end of chapter 5, a tier list is made to rank these individual design guidelines. The ranking is based on their perceived quality or value. This list is made to provide guidance and recommendations to others.

Micro-Scale Principles	Potential Macro-Scale principles	Extra interpretation / remarks
Orientation		
Room finding increased by 45% when personal front door is personalized with photo or memorabilia. (Nolan et al., 2002)	Personal front door, personal furniture in garden, Distinctive element(s) added to building.	Distictive elements can be extensions for buildings, eye-catching facades or murals.
Small scale building/living for overview and easy navigation. (Marquardt, 2011)	Small-scale street blocks with recognizable designs for buildings and open areas (distinctiveness). The entrances are easily seen, recognized and face the street.	
Offering direct visual access to relevant places to avoid disorientation and confusion. (Marquardt, 2011)	Visual access of buildings and landmarks at least 6 to 30 meters along streets. Where visual access ceases, wayfinding indicators are placed, especially at decision points like crossroads and turns.	Buildings can also act as landmarks, so it is not always necessary to place something.
Simple decision/reference points. Crossing hallways and several changes in direction should be avoided. (Marquardt, 2011)	Direct, continuous routes in neighborhood without blind curves, few branches, or intersections.	Make walking routes in neighborhood with circulation (without dead ends) and dementia-friendly aspects in them.
Differentiations in size, form, color, and lighting must be defined in order to distinguish and find rooms with a comparable meaning or function. (Marquardt, 2011)	Various architectural aspects and street furniture in terms of styles, materials, and colors. Wider streets for key routes and centers and smaller streets for minor and side streets provide a visual hierarchy.	Use wide streets as key walking routes to have more accessibility and safety (also for wheelchair). Every route can differ in colors, plants and furniture.
Spatial proximity of kitchen, dining, and activity rooms as meaningful reference points. (Marquardt, 2011)	Strategic placement of buildings/functions or landmarks acting as reference points in neighborhood.	The walking routes incorporate important or familiar buildings as landmarks. In lack of landmark, place one.
Successful orientation and navigation in nursing homes requires a basic, transparent floor plan and clearly defined, geometrically simple rooms.	Instead of using a uniform grid with 90 degree connections, choose for short streets on a deformed grid design.	The routes can be made more interesting and easier to recognize by choosing streets with a deformed grid design.
Mirrored surfaces may confuse someone with dementia, because the individual takes in images very directly and does not process them. (Aedes-Actiz, 2018)	No reflective film on windows.	
Light and dark		
Use of skylike ceiling tiles (Circadian lighting), skylights, progressive decrease of the illuminance at night. (Bautrant et al., 2019)	N/A	
Use windows with parapets, a window that is flush with the floor gives persons with dementia the impression that they are being cast outdoors and thrown out. (Aedes-Actiz, 2018)	Avoid windows flush with the floors in building plints to emphasize barriers and avoid confusion.	
Design freely accessible internal areas with strong daylight (Torrington & Tregenza, 2007)	N/A	
Windows should have blinds for excluding low-elevation sunlight to avoid glare. (Torrington & Tregenza, 2007)	Seating/benches every 100 meters offering a view, shade, or shelter.	Place benches in the dementia-friendly walking routes.
Use uniform lighting to avoid luminance differences between surfaces and diminishes clues to the form of the room. (Torrington & Tregenza, 2007)	Street lighting that lights the pavement without casting a harsh shadow or producing glare in busy places.	
Lighting or decoration distinctions should be used to distinguish rooms that are identical in design or function. (Torrington & Tregenza, 2007)	Various architectural aspects and street furniture in terms of styles, materials, and colors. Example: different shapes and colors of lampposts per area/zone.	Place colored railings at traffic lights and street signs to lean on while waiting. These can also help with wayfinding at intersections.
Glossy surface finishes should be avoided to reduce glare (Torrington & Tregenza, 2007).	Signs with non-reflective surfaces and non-glare lighting. Non reflective pavement.	Place non-reflective signs on key points like intersections to improve wayfinding. Signs fixed to walls at eye level (~1400-1700mm above floor level).
Placement of seating and gathering spaces next to view windows is recommended. (Torrington & Tregenza, 2007).	Seating/benches every 100 meters offering a view, shade, or shelter.	Place benches in the dementia-friendly walking routes.
Utilize views of the nature rather than the built environment (Torrington & Tregenza, 2007).	Offer easy access to parks and greenery in neighborhood.	Parks are included in walking routes and offer seating.

Table 5.4.1

Micro-Scale Principles	Potential Macro-Scale principles	Extra interpretation / remarks
The lighting and ornamentation of paths should change subtly to improve wayfinding. (Torrington & Tregenza, 2007).	Various architectural aspects and street furniture in terms of styles, materials, and colors. Example: different shapes and colors of lampposts per area/zone.	Lampposts with signs, colors, handrails and hanging flower pots could be used to make a distinction between areas in the neighborhood.
Color		
Utilize strong color contrast (Isolation Effect) to distinguish areas, define borders, establish special zones, and aid in orientation and wayfinding. (O'Connor, 2020).	Use different pavement materials/colors to indicate paths or functions. Example: Distinction between paths with gravel (walking path) and concrete tiles (public functions).	Paving in clear colour contrast and material to buildings. Colored tiles with signs can be used to improve wayfinding.
Utilize recognizable design archetypes, furniture, fittings, and colors, familiar and homey color design may aid in upholding dignity, competence, and a sense of happiness. (O'Connor, 2020).	Implicit cues placed at decision points, such as recognizable, traditionally styled street furniture and flowering/scented trees and bushes.	
Biophilic Design can be used to reference nature and reduce fatigue and stress. (O'Connor, 2020).	Green walls/roofs on buildings, offering greenery in street furniture, parks, community urban farming gardens, green color palette.	
Avoid shine, dark colors, and pattern, which might be perceived as a physical obstacle, as well as flecks or glittering bits that patients might want to pick up (Buxton, 2015)	Pathways and pavement should have consistent color, texture, no reflection and offer secure transitions. Borders are distinguished for increased visibility.	Avoid steep sidewalks and offer secure transitions at intersections. Use wider crosswalks for extra safety.
Wood and other natural-looking elements are helpful in establishing a cozy, familiar atmosphere (Buxton, 2015).	Wooden facades, buildings structures and wooden street furniture.	Use wooden street furniture at dementia-friendly routes.
Smell		
Scents should refer to function like a kitchen smelling of food or bathroom smelling of soap (Aedes-Actiz, 2018).	Avoid garbage and sewer smell in the neighborhood so these do not interfer with other smells.	
The source of the smell should be visible to avoid confusion. (Like the smell of food and a visible kitchen. (Aedes-Actiz, 2018).	Visible and clear use of symbols, logo's, colors or signs which can help associate the function of a building with the smell.	
Photocatalytic reactions in smart wall and ceiling coatings can absorb unwanted odors. (Mazuch, 2014).	N/A	
In some instances, scent emitters can elicit memories from the past. (Mazuch, 2014).	Evocative use of smells by strategic placement of certain buildings/functions like a restaurant or laundromat as tool for reminiscence.	Placement of flowering/scented trees and bushes on a route nearby a park. These same flowers can be used in the park to make a connection.

Table 5.4.2

| Micro-Scale Principles	Potential Macro-Scale principles	Extra interpretation / remarks
Acoustics	56	
Facilities for dementia care should be placed away from significant external sources of noise. (Hayne et al., 2014).	Distance dementia care facilities from busy/noisy main roads.	
To reduce the effects of noise, certain rooms might have the possibility to be closed off (Hayne et al., 2014).	To lessen automobile noise and hazard, utilize pedestrian only districts/streets.	
To lessen resonance and boost privacy, acoustic absorption should be placed into strategic places like ceilings of corridors and circulation rooms. (Hayne et al., 2014).	Planting and fences can act as acoustic barriers to block off background and roadway noise.	Utilize a combination of social places and places where people can retreat.
There shouldn't be any bedrooms that open directly into the dining room, a busy area, or a huge gathering place (Hayne et al., 2014).	Utilize in-between zones acting as buffer between private and public functions.	Green areas with plants and trees result in more distance with cars and result in less noise, more comfort and safety.
Bedrooms must be isolated from other interior areas using walls, floors, ceilings, and doors that are planned and built to produce suitable sound absorption (Hayne et al., 2014).	N/A	
Less foot circulation through the dining room, social rooms, and activity areas should be achieved through the architectural design (Hayne et al., 2014).	Make every route equally interesting in neighborhood to avoid one route being over-crowded.	A route for exercise makes it possible to have more social encounters.
The size of the rooms should be restricted such that the maximum number of persons allowed in each area may be accommodated without overcrowding (Hayne et al., 2014).	Determine maximum amount of people in the social facilities parks/buildings to avoid overstimulation and noise. Offer nearby alternatives to avoid overcrowded areas.	
Ceiling heights shouldn't be high since it's important to keep the reverberation time in rooms under control(Hayne et al., 2014).	N/A	
Plants absorb sound very well and also have other positive effects, such as a healthy moisture balance in the air and more oxygen (Aedes-Actiz, 2018).	Green walls/roofs on buildings, offering greenery in street furniture, parks, community urban farming gardens.	
Recognizability		
The surroundings must represent the individuals' individual origins. It is also encouraged for an individual with dementia to take part in personalizing the surroundings with their beloved items (Bennett & Fleming, 2017).	Personal front door, personal furniture in garden, Distinctive element(s) added to building.	
The majority of senior residents in the nursing home have associations with items from a certain period of time. (Ontwerpen voor dementie, n.d.).	Using historic/familiar buildings as visual cue for wayfinding.	

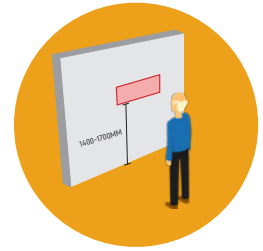Table 5.4.3

5.5 MACRO-SCALE GUIDELINES OVERVIEW

DISTINCTIVE PERSONAL
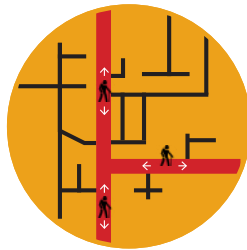ELEMENTS
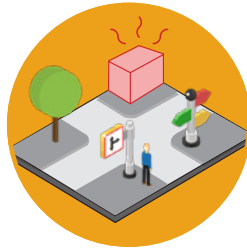
WAYFINDING ELEMENTS
EVERY 30m
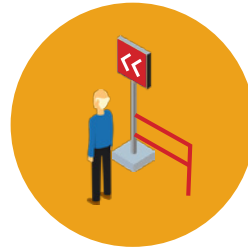
RAILINGS AT SIGNS TO LEAN ON
AT INTERSECTIONS
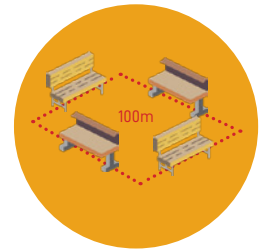
SIGNS ON WALLS ON EYE LEVEL

COLORED ROUTES WITH TILES
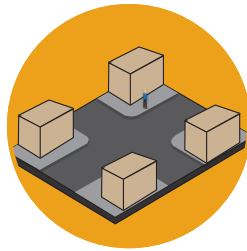AND SIGNS

WIDE STREETS AS KEY
WALKING ROUTES

CIRCULAR WALKING ROUTES
IN NEIGHBORHOOD

BENCHES ON DEMENTIA-
FRIENDLY ROUTE EVERY 100m

LAMPPOST VARIATIONS FOR
WAYFINDING

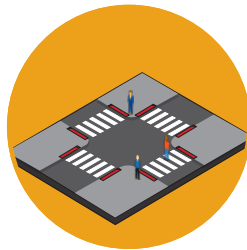CLEAR COLOR CONTRAST
BETWEEN BOUNDARIES

INCLUDE PARKS IN WALKING
ROUTES

SCENTED TREES, BUSHES AND
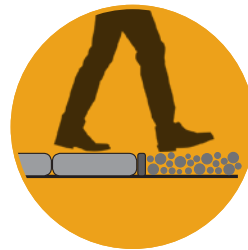FLOWERS AS WAYFINDING CUES

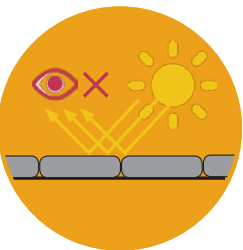BIOPHILIC DESIGN AND URBAN
GREEN CAN REDUCE STRESS

WIDER CROSSWALKS AND
SECURE TRANSITIONS

OFFER VARIETY IN PAVEMENT TO
MARK BOUNDARIES

WOODEN STREET FURNITURE
WITH GREENERY ON ROUTES

UTILIZE NON REFLECTIVE
PAVEMENT

SIGNS OF FACILTIES NEIGHBOR-
HOOD CONTAIN NAME AND ICON

UTILIZE GREEN BUFFER ZONES
FOR MORE SAFETY & LESS NOISE

UTILIZE SOCIAL PLACES AND
PLACES FOR RETREAT.

5.6 MACRO-SCALE TIER LIST

A political process is involved in scaling up dementia-friendly concepts and putting them into practice in the neighborhood or city setting. The money that is available will determine the adjustments that may be made. All neighborhoods should receive the same level of consideration to avoid one neighborhood using all of the funding.

The items on the list are divided into tiers or categories, with the top tier containing the most important items, and the lower tiers containing items of lesser urgency or value. This can be a helpful tool for decision-making or for gaining a better understanding of the relative strengths and weaknesses of different options within a particular category.

The tiers are based on the pyramid of Maslow. In this theory, Prior to attending to higher-level requirements, it is necessary to fulfill the lower-level demands. First the basic needs have to be met. These are the physiological and safety needs. The physiological part is necessary to stay alive can be met with a proper home or care.

The safety needs are equally important for a person with dementia. The built-environment in neighborhood context has to be safe and familiar so the person can stay independent and get their required needs like food and social interaction. Since the safety and accessibility of the neighborhood is directly related with providing the accessibility to other levels of the pyramid, this is the priority on the tier list.
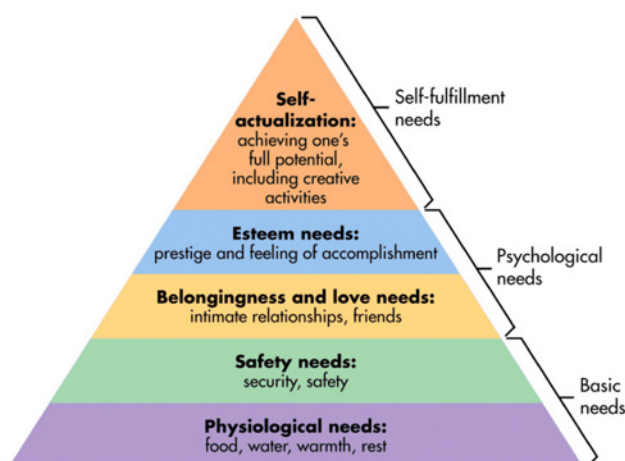
Utilizing main streets as key walking routes in the neighborhood is the first priority. These are wide streets with clear overview. The first step is to transform these streets and making safe adjustments. Colored routes and signs will also be introduced on these main streets to make orientation and wayfinding easier.

The second step is to involve side streets and making continuous dementia-friendly routes which are connected to the main road. These walking routes can be connected to parks or social/medical facilities. It is not feasible and too expensive to transform every part of the neighborhood. The advice is to only transform the main street and ''dementia-friendly'' side streets. Benches on every 100 meters and additional wayfinding elements can be placed on these routes.

The third tier offers measures which can help improve health or social interaction. These are the addition of greenery with biophilic design and utilizing social or places for retreat for the residents of the neighborhood. This can contribute to the psychological needs in the pyramid.

The fourth tier provides extra visual cues and safety measures which can be useful for orientation and wayfinding. Measures like utilizing green buffer zones for more safety and less noise are important, but require bigger interventions and take longer in an existing neighborhood. This can be done at a later stage.

For the self-fulfillment needs, an analysis of an the targeted existing neighborhood has to be done. This is required to find out the missing facilities and accomodations which can aid people with dementia in their daily lives. For example, as described in chapter 2, a Day Care Center (DCC) can be useful.

5.6.1 Pyramid of Maslow

MACRO SCALE TIER LIST

RELEVANCE AND PRIORITY RANKED
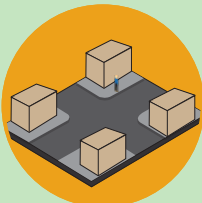### 1 (HIGH) - 4(LOW)

1

SAFETY & ORIENTATION
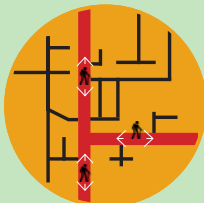
WIDE STREETS AS KEY WALKING ROUTES

COLORED ROUTES WITH TILES AND SIGNS

CLEAR COLOR CONTRAST BETWEEN BOUNDARIES
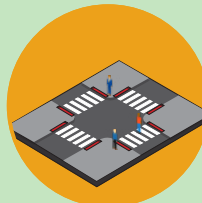
WIDER CROSSWALKS AND SECURE TRANSITIONS
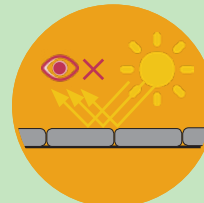
UTILIZE NON REFLECTIVE PAVEMENT

RELATED

2

SAFETY & ORIENTATION

INCLUDE PARKS IN WALKING ROUTES

DEMENTIA WALKING ROUTES/ ZONES IN NEIGHBORHOOD

RAILINGS AT SIGNS TO LEAN ON AT INTERSECTIONS
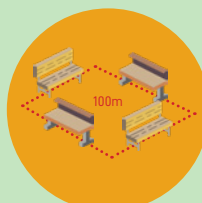
BENCHES ON DEMENTIA-FRIENDLY ROUTE EVERY 100m

WAYFINDING ELEMENTS EVERY 30m

3

VISUAL CUES

BIOPHILIC DESIGN AND URBAN GREEN CAN REDUCE STRESS

UTILIZE SOCIAL PLACES AND PLACES FOR RETREAT.

LAMPPOST VARIATIONS FOR WAYFINDING

SIGNS ON WALLS ON EYE LEVEL

SCENTED TREES, BUSHES AND FLOWERS AS WAYFINDING CUES

4

EXTRA

SIGNS OF FACILTIES NEIGHBOR-HOOD CONTAIN NAME AND ICON

DISTINCTIVE PERSONAL ELEMENTS

WOODEN STREET FURNITURE WITH GREENERY ON ROUTES

OFFER VARIETY IN PAVEMENT TO MARK BOUNDARIES

UTILIZE GREEN BUFFER ZONES FOR MORE SAFETY & LESS NOISE

Figure 5.6.2

Conclusion

06

CONCLUSION

This thesis explored the possibilities of making existing neighborhoods dementia-friendly for a safe and inclusive living environment, which is needed to accommodate the growing group of dementia patients and prevent future problems.

The main research question that needed to be answered was: *'How can architectural and built-environmental solutions be implemented into current Dutch neighborhoods to allow people with dementia to live in their own homes for as long as possible?'*

To understand and design a dementia-friendly neighborhood, understanding the specific or spatial needs of the individuals involved with dementia is crucial. As the time passes, the symptoms increase and require more medical assistance. An independent individual will turn fully dependent on others. People with dementia often need assistance in daily activities, social interaction, tailored activities, a clear day and night rhythm and pleasant environments with visual aids.

Several people are involved in the care and assistance of those with dementia. Caregivers play critical roles in the life of people with dementia which requires a significant investment of time and energy. Caregivers can be divided into informal and formal caregivers. When providing care for someone, they, too, have requirements and preferences. As a result, it is critical to include caregivers while designing a dementia-friendly neighborhood.

The purpose of dementia-friendly design is to create living settings that assist people with dementia in maintaining their independence, improving their quality of life and encouraging social inclusion. The found micro-scale guidelines emphasize the need of creating a safe, accessible, and pleasant environments that reduces uncertainty, fear, and anxiety. This may be done via the use of design guidelines that consider direction and orientation and wandering, light, acoustics, color, smell, recognizability, and safety. By integrating dementia-friendly design concepts, we may create spaces that are inclusive and supportive of people with dementia, allowing them to live more full lives.

The micro-scale principles contribute to a person with dementia, but are not enough to make them live in their own homes for as long as possible. The direct neighborhood context (macro-scale) is equally important. People with dementia can continue to engage as much as possible in their neighborhood and have similar lifestyles as before, thanks to a dementia-friendly environment. Neighborhoods can provide a supportive and nurturing environment for elderly individuals and people with dementia, offering a sense of community, safety, and familiarity that can enhance their quality of life. One way to enable aging in place for people with dementia is to adapt their existing homes and the direct living environment. It is not feasible or realistic to build new neighborhoods everywhere, so the existing ones have to be transformed into dementia-friendly environments. The concept of aging in place with two distances can be used to form a dementia-friendly neighborhood strategy. New social or medical facilities, which are deemed essential, can be placed in the 500 meter range for easy accessibility.

Scaling up dementia-friendly concepts and putting them into reality in the neighborhood or municipal environment is a political effort. The amount of money available will decide the changes that may be done. Every neighborhood should be given the same consideration so that no particular neighborhood consumes all of the funds.

The tier list considers a trade-off between safety, accessibility, orientation and pleasant environments. This list is made to provide guidance and recommendations to others and makes it possible to create a strategy for the transformation of an existing neighborhood.

In conclusion, it is possible to allow people with dementia to live in their own homes for as long as possible. Making existing neighborhoods dementia-friendly will result in a safe and inclusive living environment, which is required to accommodate the rising number of dementia patients and avoid future issues. Architectural solutions and small-scale initiatives can help reduce the progression of dementia and enhance quality of life. Meaningful and supportive settings in neighborhoods or households improve health. Giving people environmental control and fostering strong communal bonds has a positive impact on their well-being. Implementing these procedures guarantees that the elderly with dementia can live in their own homes for as long as feasible. This cuts expenses and puts less strain on the Dutch healthcare system. The findings of this thesis support the hypothesis that it is feasible to design a living environment that supports people with dementia and allows them to stay home as long as possible.

The design project uses this thesis as a design guidebook. A strategy will be made combining the micro- and the macro scale to transform a neighborhood into a dementia-friendly environment. As the research shows, at a certain point, an individual with dementia can no longer stay independent and has to move out. Solutions regarding this problem will also be included.

Discussion

This study included a thorough literature study on how to design for dementia. While there is plenty of information available on micro-scale design concepts, there are limited research and reference projects on dementia-friendly areas. Current studies merely state a few ideas and provide no examples. One possible explanation for the scarcity of research is that dementia-friendly neighborhoods are a relatively new idea. Only recently has there been a greater realization of the need to develop surroundings that are more helpful and accessible for people with dementia. As a result, there is still much to learn about the best effective interventions and techniques for developing dementia-friendly environments.

The tier list is a suggestion and is a trade-off between safety, accessibility, orientation and pleasant environments. The rankings are based on values that are deemed important by me. This may be different for another person, which can result in other possibilities.

Reflection

07

REFLECTION

1. The relationship between graduation project topic, master track (AR) and master programme (MSc AUBS)

The Dutch healthcare is under pressure and the studio 'Designing for Health & Care' gives the perfect opportunity to find new possibilities to future-proof our care. Dementia is a growing problem and can result into problems in the future. Approaching and solving this problem in time can raise awareness, inspire more designers and be helpful for society.

In relation to the Dwelling Graduation Studio: Designing for Health and Care in an inclusive environment, I made a strategy to transform existing neighborhoods into a dementia-friendly and inclusive living environment. The goal is to think forward before we face problems and reduce the pressure on the Dutch healthcare. The theme Health and care is addressed by making a neighborhood strategy and the design of two buildings which will assist and add value to people with dementia and their caregivers. The Architectural design is also in relation with the master track Architecture.

2. How did your research influence your design/ recommendations and how did the design/ recommendations influence your research?

The research acted as a starting point for the design project. The first step was to understand who to design for. Various target groups are involved and each have their own needs and wishes. These needs and wishes are used to make a spatial program for additional facilities in an existing neighborhood. The micro-scale and macro-scale guidelines are both utilized to solve the problems of aging in place on different scales. The micro-scale principles are used to design two dementia-friendly public buildings which are a part of the macro-scale strategy. Dementia-friendly interventions on neighborhood level are made with the use of a tier list. The items on the list are divided into tiers or categories, with the top tier containing the most important items, and the lower tiers containing items of lesser urgency or value. This was a helpful tool for decision-making and making the planning for a dementia-friendly spoorwijk in 5 years.

3. How do you assess the value of your way of working (your approach, your used methods, used methodology)?

My first approach to find a topic for my graduation, was to search for a problem. When I started with the studio I had no idea what topic to choose. It was important for me to find a topic that we can benefit from. This search led to the topic of aging in place with dementia and the future problems we will face.

While there is plenty of information available on micro-scale design concepts, there are limited research and reference projects on dementia-friendly neighborhoods (macro-scale). Current studies merely state a few ideas and provide small examples. This resulted in a lack of literature and projects to analyze as a case study or reference project. The approach here was to make an overview of micro-scale principles and use these as a foundation and act as a starting point to find possibilities to implement these on a larger (neighborhood) scale. The design project makes use of both the micro-scale and macro-scale principles. The used methodology is a combination of literature study, a case study and interviews with caregivers. These methods assisted me in gaining a better knowledge of the target groups and developing design guidelines.

4. How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

Studies about dementia-friendly architecture have been done before. However, studies focusing on upscaling the dementia-friendly design principles to apply in neighborhood context are rare. Current solutions are not perfect, which offers an opportunity to find or improve with this research. For this reason, this study focuses on dementia friendly solutions for current Dutch neighborhoods to allow people with dementia to live in their own homes for as long as possible. As the dementia problem in the Netherlands grows, the relevance and value of this study will increase.

The information gained during my research, fieldwork, interviews and observations made me realize the importance and urgency of the subject. The lack of studies and examples about dementia-friendly neighborhoods made it difficult for me to get a grip on the subject. This made me change my approach which resulted in finding existing dementia-friendly solutions first. These findings are used to find new solutions which can be implemented on a larger scale. With my research, a new strategy is developed to make a neighborhood dementia-friendly in 5 years. The lack of strategies, designs and studies also gave me a lot of motivation to work on this project.

Three target groups are involved with dementia and the main target group is the people with dementia. While the whole design and strategy revolves around this group, it is not possible to interview them due to ethical reasons. This makes it difficult to really understand their wishes and needs. This lack of information is compensated with literature study and interviews with caregivers. This study can be further developed by doing more observations on people with dementia and making persona's of their character behaviour.

5. How do you assess the value of the transferability of your project results?

The result of the graduation project is a strategy to make neighborhoods dementia-friendly in 5 years. The micro-scale and macro-scale principles gained from research are combined to make this strategy in an existing neighborhood in the Netherlands. The used guidelines, tier lists and strategy can be transferrable and implemented in other neighborhoods.

A sidenote here is to make an analysis and overview of the opportunities in the neighborhoods. Not every neighborhood is the same and has different opportunities. Factors like population, building period, typologies, existing facilities and density must be taken into account. The designed buildings are context related and correspond with location, plot, material use and other design choices. These designs are less likely to be transferrable, but the approach can be.

The time constraint resulted in a lack of analysis of various Dutch neighborhoods from different time periods. The project only focuses on Spoorwijk in Den Haag and transformed this neighborhood.

6. Personal reflection

Looking back at the entire process and the designed products for the graduation, I am glad I chose this studio. The studio caught my interest after doing the Health & Care dwelling studio in MSc2, which resulted in my interest to continue on this path.

Finding my topic didn't take long and it motivated me a lot, because there are not much solutions or studies done before. During the research and concept phase I had difficulties to find a proper solution to solve my problem. It took me a few weeks to understand that there is no golden solution. My tutors advised me to visit the project location and look for possibilities and opportunities in the neighborhood. They asked me to act like a specialist who has to give the municipality a fictional advise. Going back to the neighborhood and looking at it from this angle helped me a lot. This made me realize that the answer is to utilize a collection of solutions on various scales.

During the design process I had no real difficulties. The idea was to design several buildings in the neighborhood, but the tutors rather wanted quality over quantity. This made me take a step back and choose two public buildings to focus on and design. The feedback on the design proces was very useful, which made me more satisfied. My technical background also made it easier on the building technology part.

The graduation process was not very smooth for me and had its ups and downs. Still, I am very happy with the result. I learned a lot about dementia, the wishes and needs of the target groups and dementia-friendly design on several scales.

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ILLUSTRATIONS

Source front page image:

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figure 1.3.1 - (own Illustration)
figure 1.4.1 - (own Illustration)
figure 2.1.1 - (own Illustration)
figure 2.3.1 - (own Illustration)
figure 2.5.1 - (own Illustration)

figure 3.1.1 - https://www.freepik.com/premium-vector/confused-old-male-character-for get-address-lost-city-isolated-white-background-forgetful-senior-man-with-alzheimer-di-sease-senility-dementia-concept-cartoon-people-vector-illustration_25487274.html

figure 3.2.1 - (own Illustration)
figure 3.3.1 - (own Illustration)
figure 3.4.1 - (own Illustration)
figure 3.4.2 - (own Illustration)
figure 3.4.3 - (own Illustration)
figure 3.5.1 - (own Illustration)
figure 3.6.1 - (own Illustration)
figure 3.6.2 - (own Illustration)
figure 3.7.1 - (own Illustration)

figure 4.2.1 - 4.2.17 - NORD Architects. Denmark. Alzheimer Village. (n.d.). *NORD Architects live*. https://www.nordarchitects.dk/alzheimer-dax (modified by Atciyurt)

figure 4.3.1 - (own Illustration)
figure 5.2.1 - (own Illustration)
figure 5.4.1 - (own Illustration)
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figure 5.4.3 - (own Illustration)

figure 5.6.1 - Maslow's hierarchy of needs, represented as a pyramid with. (n.d.). ResearchGate. https://www.researchgate.net/figure/Maslows-hierarchy-of-needs-represented-as-a-pyramid-with-the-more-basic-needs-at-the_fig3_324279637

figure 5.6.2 - (own Illustration)