

MASTER

The Therapeutic Power of Nature

Designing a 24h-Care Farm to Promote Health and Well-Being in People with Dementia

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The Therapeutic Power of Nature:

Designing a 24h-Care Farm to Promote Health and Well-Being in People with Dementia



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Stimulating Healthy Environments (SHE)

Architecture Speaks with People with Dementia

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PREFACE



PREFACE

With great pride, I present this thesis concerning the Graduation studio Stimulating Healthy Environments for my Master Architecture, Building and Planning at Eindhoven University of Technology.

Firstly, I want to express my sincere appreciation to my supervisors, Masi Mohammadi, Leonie van Buuren, and Maarten Willems, for their guidance and feedback during the graduation studio. Their support and advice have inspired and motivated me throughout this journey.

Secondly, I would like to extend my gratitude to the dedicated healthcare workers who generously took the time to provide guided tours of their 24h-care farms, despite their demanding schedules. Their willingness to share their valuable insights and experiences has been invaluable to my research.

I would also like to express my sincere appreciation to the healthcare workers who assisted me throughout the experiment, helping me test and evaluate the design. I am deeply grateful to my three participants who willingly volunteered their time and actively participated in the experiment, contributing significantly to the success of my research.

Moreover, I owe a great deal of gratitude to my family, including my parents, Renata and Frank Martens, my partner Chiel van der Looy, my siblings, my grandmother Riet Driessen, other family members and my friends. They supported, encouraged, and inspired me, which played a significant role in helping me achieve my goal of graduation.

Lastly, I want to dedicate this thesis to my grandmother, Marietje Cuppen. She owned the agricultural property Repelsvoort and sadly suffered from dementia in the final stage of her life.

SUMMARY



SUMMARY

The number of people with dementia is projected to increase significantly in the Netherlands, leading to a rising demand for nursing homes and specialized care. Traditional nursing homes often fall short in meeting the psychosocial needs of individuals with dementia, resulting in unmet needs, challenging behavior, and overuse of antipsychotic drugs. With an increasing recognition of the therapeutic potential of outdoor spaces in dementia care, there is a growing need for the availability of suitable outdoor areas and unrestricted access to enhance the well-being of individuals with dementia. However, many traditional nursing homes lack these essential features. This has led to a call for innovations in long-term dementia care, such as the integration of Green Care activities and small-scale living in 24h-care farms in the Netherlands.

This research aimed to design a 24h-care farm that stimulates people with dementia to get outdoors, connect with nature, do meaningful activities, and exercise to improve their quality of life. Using a user-centered and research-based approach, design principles were developed to create a therapeutic environment tailored to the specific needs of individuals with dementia, aiming to promote their well-being.

A comprehensive methodology, including literature review, site visits with interviews, case studies, and comparative analysis provided valuable insights into designing outdoor spaces, transition spaces, and 24h-care farms. The research identified specific challenges faced by individuals with dementia in outdoor environments, emphasizing the need for design solutions tailored to their specific needs, to maximize utilization of outdoor spaces.

The formulated design guidelines prioritized the creation of therapeutic outdoor spaces and comfortable transition spaces between the interior and exterior environments. Validation involving individuals with dementia and a healthcare worker, through testing various design options, confirmed the effectiveness and identified the preferred design elements for transition spaces. A comprehensive location analysis was conducted to guide the redevelopment of a vacant agricultural property into a 24h-care farm, ensuring the preservation of historic characteristics, maintaining the quality of the outdoor space, and meeting the specific needs of the target group. The final design of the 24h-care farm includes outdoor spaces, daycare facilities, a respite home, and four residences accommodating seven residents per home. Therapeutic elements such as person-centered care, meaningful activities, and nature immersion were incorporated.

This research contributes valuable insights to the design of 24h-care farms that promote well-being and engagement for individuals with dementia, addressing their psychological needs and harnessing the therapeutic power of nature.

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1

INTRODUCTION



1. INTRODUCTION

Since society is aging and life expectancy is rising, the estimated number of people with dementia in the Netherlands is projected to increase from 290,000 in 2021 to 620,000 in 2050 (Alzheimer Nederland, n.d.). Consequently, there will be a sharp rise in the number of people requiring care in nursing homes, expected to reach about 261,000 in 2040, compared to 128,000 in 2017 (van der Schot et al., 2020). Individuals with dementia often transition to nursing homes when their needs become too complex to remain in their own homes.

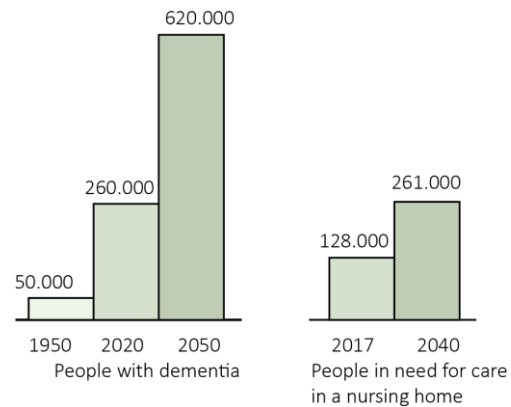


Figure 1.1 | Increasing population with dementia

In order to provide appropriate care, it is important to understand the needs of people with dementia. Several studies are done on how well the needs of people with dementia are met within a traditional nursing home (Hancock et al., 2006; Miranda-Castillo et al., 2013; Cadieux et al., 2013). In traditional nursing homes, basic physical needs such as nutrition, hygiene, medical care, and appropriate accommodation are usually met, while the psychosocial needs of people with dementia often remain unmet (Hancock et al., 2006). Unmet needs include mental health, social stimulation, purpose, meaningful relationships, daytime activities, and addressing sensory or physical disabilities (Hancock et al., 2006). These unmet needs are associated with psychological problems like anxiety, boredom, and depression (Hancock et al., 2006). A study showed that higher levels of unmet needs in residents with dementia are linked to increased challenging behavior (Cadieux et al., 2013). Challenging behavior often leads to the prescription of antipsychotic drugs, which can have severe health consequences, increase the risk of stroke and falls, and yield minimal positive outcomes (Pollock & Marshall, 2012).

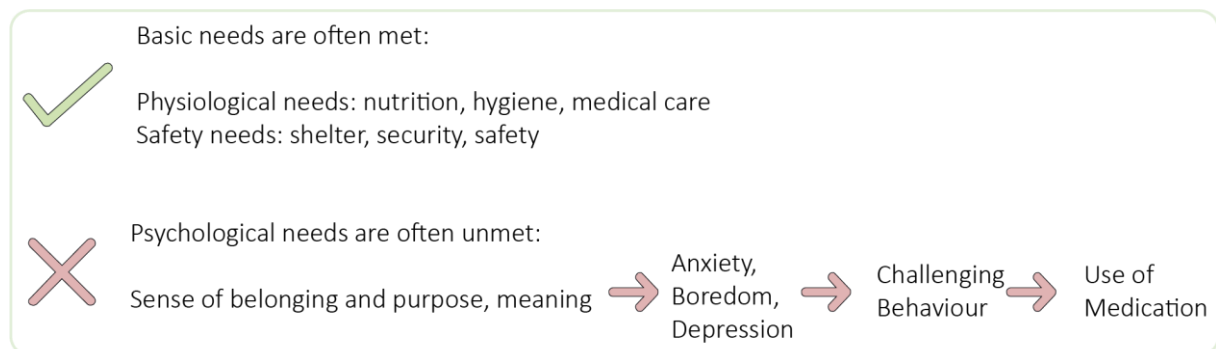


Figure 1.2 | Unmet needs of people with dementia in traditional nursing homes
(Original text sources: Cadieux, et al., 2013; Hancock, et al., 2006)

Care workers in traditional nursing homes feel particularly incapable to meet the social, psychological, and emotional needs of residents (Cadieux et al., 2013). To keep the care of people with dementia workable in the future and maintain quality of life, people in the dementia care field are looking for non-pharmacological interventions and ways to reduce the workload on staff without compromising the quality of care (Van den Boer, 2014). Several studies suggest that a green environment, with suitable outdoor spaces in nursing homes, can greatly contribute to addressing these unmet needs (Van den Boer, 2014; Pollock & Marshall, 2012).

Therefore, current guidelines for dementia care facilities emphasize the crucial role of the physical living environment, with particular attention given to the design of outdoor spaces (Whear et al., 2014). This

recognition stems from a growing understanding of the therapeutic potential of the outdoors in promoting health and well-being, especially for individuals with dementia (Pollock & Marshall, 2012). For people with dementia is contact with nature and spending time in a natural environment associated with feelings of self-worth, an identity, a sense of autonomy, reduction of incidence of falls and agitation, improved quality of life, mood and sleep (de Bruin et al., 2020). Studies show less challenging behavior in people with dementia, when they have open access to the outdoors. (Namazi & Johnson, 1992). Many people with dementia in nursing homes have behavior that challenges those around them. It is important that the environment helps staff in efforts to reduce challenging behavior. Non-pharmacological approaches, such as the outdoor environment can reduce challenging behavior (Pollock & Marshall, 2012).

In traditional nursing homes, designers and professionals in the dementia care field often failed to recognize the importance of outdoor spaces for individuals with dementia. Many nursing homes lack suitable outdoor areas or have designs that make accessing these spaces challenging, often with locked doors (Pollock & Marshall, 2012). The outdoor spaces in these homes are typically small courtyards located at the entrance or within the building, mainly serving the purpose of providing light to the interior (Pollock & Marshall, 2012). This limited access to the outdoors results in a lack of physical activity, lethargy, physical frailty, and poor sleep patterns for residents (Pollock & Marshall, 2012). A study by the Mental Welfare Commission in Scotland (2009) noted that half of all people in the nursing homes they observed never went outdoors and 25% rarely went outdoors. 52% of care homes did have a garden, which were accessible and safe, but they were not necessarily suitable for people with dementia. The few people who went out regularly were relying on family and friends.

Traditional nursing homes are often over-restrictive (Pollock & Marshall, 2012). When people with dementia lose judgement, it may be less safe for them to go out. To prevent them from going missing, nursing homes often restrict outdoor access. However, this confinement can make them feel imprisoned, as they lack control and a sense of belonging (Pollock & Marshall, 2012). According to a study by Graneheim and Jansson (2006) show people with dementia challenging behavior when they feel trapped by restriction. They experience a sense of feeling locked up in the ward, feeling overprotected and being treated like a child. Participants with dementia mentioned that they miss the freedom to come and go the way they want and felt overprotected when a care worker accompanied them outside the ward.

Most cases of residents going missing are usually when they 'wander' outside (Pollock & Marshall, 2012). However, studies show that wandering is not so much a symptom or syndrome of dementia, but a sign of distress (Pollock & Marshall, 2012). Therefore, instead of solely focusing on stopping wandering, it's important to address the distress causing it. If the resident does not feel at home, feel locked up or not comfortable in a nursing home, it can be a sensible reason to try to escape (Pollock & Marshall, 2012). Therefore, nursing homes should aim to provide opportunities for individuals with dementia to safely enjoy the outdoors, rather than confining them and allowing aimless wandering within the facility (Pollock & Marshall, 2012). This can improve their mental well-being and give them a sense of control. Seniors, including those with dementia, value the ability to stay active and to get out and about (Mental Welfare Commission, 2009).

Research suggests that getting outdoors should be central to a person's care and not an optional extra (Pollock & Marshall, 2012). The person's past and present needs and feelings must be taken into account. That is critical in helping the person achieve the benefit of being outside (Pollock & Marshall, 2012). According to Sandra Weintraub (2005) must the nature of symptoms of people with dementia be well understood, to decide which strategies work best. There is no such thing as 'one size fits all in dementia care and treatment. Understanding and addressing individual symptoms and distinctive

neuropsychological profiles can improve quality of life and daily functioning for people with dementia and their family (Weintraub et al., 2015). It is important to identify the type of dementia a person has, to understand some of the behaviors, but most important should always be to see the person first, then the dementia. Pat Hobson (2019, p.91) writes: "Dementia is unique to the person and no two people with dementia are the same." Each person will be unique in the way they will communicate and respond (Hobson, 2019). What someone likes to do in the outdoor spaces can differ for everyone. Someone can love walking, gardening, the other loves sitting in the sun, enjoying the peaceful and quiet atmosphere, while other ones love flowers, feeding chickens or watching birds. An environment where there are many choices on what to do and where to go is important. Providing person-centered care can sometimes be a problem in large facilities of traditional nursing homes. Large-scale living in an institution often does not match the needs and wishes of seniors with dementia. It appears to be difficult for many seniors with dementia to experience a sense of 'home' (te Boekhorst, 2007).

Most seniors have health problems of some sort, often associated with aging. For people with dementia, which are mainly seniors, it is vital that their general health is as good as possible to allow them to deal positively with this chronic disease. Most seniors experience impaired sight, hearing and mobility, these are exacerbated for seniors with dementia, because they might forget they have these impairments and may be unable to understand and deal with those impairments. The physical environment needs to help them (Pollock & Marshall, 2012).

There has been a growing awareness and acknowledgment of the important role that the design of the physical environment plays in the care and support of individuals with dementia. The design of their living environment plays a crucial role in promoting their well-being and functioning (Day et al., 2000). Providing individuals with dementia unconfined access to a suitable and secure outdoor space offers numerous therapeutic benefits (Pollock & Marshall, 2012). This highlights the importance of designing the physical environment (the care facility with outdoor space), with a focus on creating spaces that promote well-being and can be referred to as 'therapeutic design'. This approach involves tailoring spaces to meet the specific needs and impairments of individuals with dementia, aiming to maximize the utilization of therapeutic benefits derived from the outdoors.

In addition to the lack of suitable outdoor spaces in traditional nursing homes, there is also a lack of meaningful activities in traditional nursing homes. People with dementia often feel set aside, they feel being left alone, lose meaning and feel empty (Graneheim & Jansson, 2006). They miss someone to talk to, something to do, sometimes because they do not know what they were able to do. They also sometimes feel not included, feeling appreciated or needed. Being invited to participate in meaningful dialogue and activities makes them feel appreciated (Graneheim & Jansson, 2006). In the recent years, there is an increasing interest in the need for more activities in the care of dementia. Nowadays people in the care field are more aware of research about the importance of activity for people with dementia and the negative consequences of boredom. Lack of activity and lack of pleasure in activity are associated with higher rates of mortality or depression, physical wellbeing, reduction in social functioning, increased isolation and loss of quality of life (Pollock & Marshall, 2012). Meaningful activities are central to well-being in people with dementia (Roland, 2015). Suitable outdoor spaces can also provide a huge diversity in activities, often ones that are familiar and simple. Providing the opportunity to do activities outdoors engages the people with dementia and add pleasure and quality to their day (Pollock & Marshall, 2012).

This growing recognition that traditional nursing homes fall short for people with dementia and their caregivers, have led to a call for innovations in long-term dementia care. An approach is needed where the primary focus is no longer only on the physical health of people with dementia, but also on their psychosocial needs. The therapeutic design of the physical environment should address the challenges present in traditional nursing homes, as summarized in Figure 1.3.

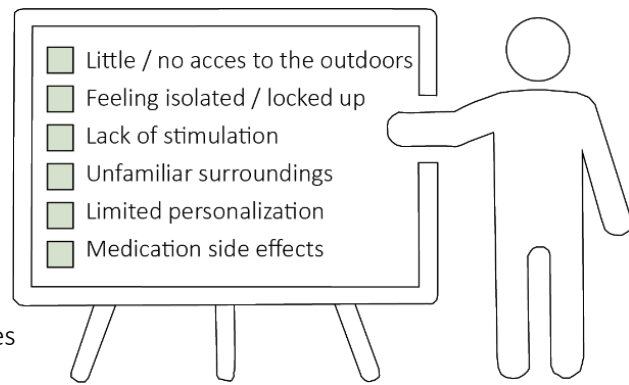


Figure 1.3 | Problems in Traditional Nursing Homes
(Original text sources: Graneheim & Jansson, 2006; Hancock, et al., 2006; Pollock & Marshall, 2012; te Boekhorst, 2007)

Several of these innovations include Green Care activities, such as horticultural therapy, animal assisted interventions or a therapeutic garden. 'Green care' is the umbrella term for activities related to health promotion or providing care in a natural setting (Elings, 2011). In the Netherlands, the changed approach to dementia care has resulted in the implementation of an Green Care concept called "care farming." Care farms are farms that combine agricultural activities with care and support services for a variety of clients, including people with mental health problems, troubled youth or people with dementia. Care farms have a wide range of health-promoting (therapeutic) environmental characteristics, including the presence of outdoor spaces, vegetable garden, animals, plants, familiar and home-like environment. These characteristics are naturally present in the farm environment and are therefore extensively used in the wide range of activities offered by the care farm (de Bruin et al., 2020).

In 1998 there were 75 care farms in the Netherlands. The number has now grown to over 1000, of which around 200 are care farms with daycare for people with dementia. In other European countries there is also a significant growth in the number of care farms (Elings, 2011; de Boer, 2017). In the Netherlands there are only a few (about 10) care farms that provide 24-hour nursing home care for the people with dementia, meaning that they live on the farm in the same way as people live in other nursing homes, which is unique in the world (de Boer, 2017). Studies concluded that seniors with dementia have a strong need for a familiar, recognizable living environment with a home-like atmosphere (te Boekhorst, 2007). A 24h-care farm offers such an environment. Characteristic for the care of people with dementia on 24h-care farms is the small scale. It usually involves 6 to 10 residents per home. The people with dementia experience the stay on the farm as normal life. They do daily activities that they used to do at home, for example cooking together and raking leaves (Elings, 2011).

In recent years, much experience has been gained with daytime activities on care farms for people with dementia. Various studies show that care farms are valued by people with dementia and their caregivers. (Elings, 2011). Research shows that activity engagement and required physical effort to participate in activities at care farms are usually higher than activities in traditional care homes (de Bruin et al., 2020). Different Dutch and Norwegian studies have concluded that farmers and other staff are very well able to organize meaningful activities for people with dementia, which align with their personal needs, support a sense of mastery and facilitate engagement of participants (de Bruin et al., 2020). Only two scientific researches has been conducted on 24h-care farms, the first study was conducted by Bram de Boer in 2017, which suggested that residents at 24h-care farms have a more active daily life, in which they have more social interactions, and come outdoors more often compared to traditional nursing homes (de Boer, 2017). Care farms can serve residents of different stages of dementia, sexes, ages and backgrounds (de Bruin et al., 2020). Care farms provide daycare for people with mild to moderate

dementia. 24h-care farms can also provide service to people with dementia in the later stage, they can remain at the care farm until death (de Bruin et al., 2020).

The provision of 24h-care farms for people with dementia means an increase in the number of options where they can go for care. This reinforces the freedom of choice that they and their caregivers have. Due to the large increase in people with dementia, there will be more demand for 24h-care farms in the coming years. This context leads to the formulation of the following research question:

“How can the design of a 24h-care farm stimulate people with dementia to get outdoors, connect with nature, do meaningful activities and exercise, to improve the quality of life?”

1.1. Research Question

General problem

Since the society is aging and life expectancy is rising, the estimated number of people with dementia in the Netherlands will rise from 290,000 in 2021 to 620,000 in 2050.

General objective

Due to the increasing number of people with dementia, there is a growing demand for nursing homes, where people with dementia can live a contented life.

Actual problem

To improve the quality of life of people with dementia, addressing their psychological needs is crucial. While basic needs are met in traditional nursing homes, their psychological needs for belonging and purpose are often neglected, leading to anxiety, boredom, and depression. Studies have shown that getting outdoors every day can have multiple positive effects on their health and well-being, including addressing these psychological needs. Unfortunately, access to a suitable outdoor space is limited in traditional homes, hindering the benefits. In the Netherlands, 24h-care farms provide a promising intervention, focusing on outdoor activities and nature connection, positively impacting the health and well-being of people with dementia. However, the number of residential 24h-care farms remains limited despite growing demand.

Research question

How can the design of a 24h-care farm stimulate people with dementia to get outdoors, connect with nature, do meaningful activities and exercise, to improve the quality of life?

Main objective

Develop design guide lines to stimulate people to get outdoors, connect with nature, do activities and exercise in a 24h-care farm.

Sub questions

- 1) What is dementia and what are its common symptoms, stages, housing typologies?
- 2) What are the problems of traditional nursing homes for people with dementia?
- 3) What are the needs of people with dementia in nursing homes?
- 4) What are the benefits of spending time outdoors for people with dementia?
- 5) What are the needs and issues of getting outdoors for people with dementia?
- 6) What are the current interventions aimed at problems in traditional nursing homes?
- 7) What is a 24h-care farm, and how does it differ from traditional nursing homes?
- 8) How is the design of currently existing 24h-care farms structured and arranged?
- 9) What are the key design principles of outdoor spaces that effectively address the needs and issues of getting outdoors for people with dementia?
- 10) How do the existing 24h-care farms incorporate these design principles into their outdoor spaces for people with dementia?
- 11) How can the design of existing 24h-care farms be improved, to enhance the outdoor experience for people with dementia?
- 12) How can the design of indoor spaces with transition spaces for people with dementia incorporate elements that facilitate a seamless and comfortable transition to outdoor spaces?
- 13) How are different design elements of transition spaces perceived by individuals with dementia?
- 14) What is the extent of agricultural property vacancy in North Brabant, and what are the current initiatives aimed at utilizing or repurposing vacant agricultural properties?
- 15) What are the existing features and characteristics of the vacant agricultural real estate that could be incorporated into the design of the 24h-care farm?

2

METHODOLOGY



2. METHODOLOGY

2.1. User-centered and research-based design

This thesis followed a user-centered and research-based approach to design a suitable living environment for people with dementia. People with dementia perceive the world differently due to the decline of cognitive skills. The physical environment could enable people with dementia to continue performing their daily activities. The aim was to design a suitable living environment for this growing target group.

The set-up of this thesis is:

1. Conducting research (Explore)
2. Developing guide lines (Translate)
3. Designing a stimulating and healthy environment (Process)
4. Testing the design (Validate)

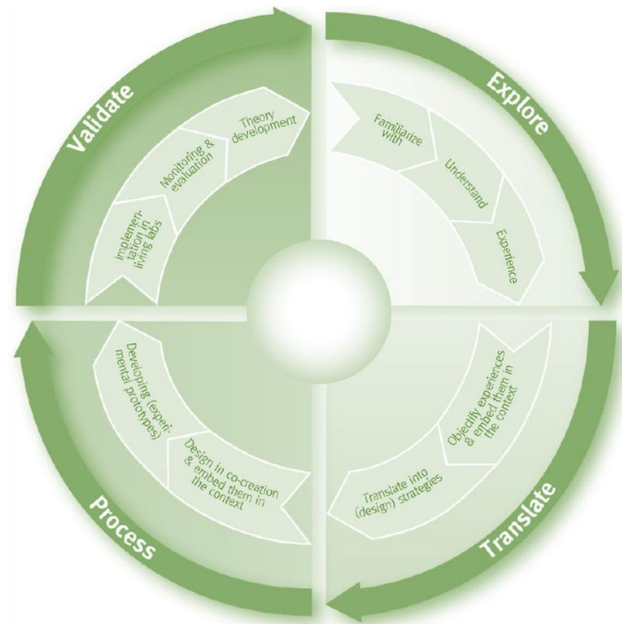


Figure 2.1 | Emphatic Design Framework (Mohammadi, 2017)

The conceptual framework designed by Masi Mohammadi (2017), depicted in Figure 2.1, was utilized for this research. This framework consisted of four phases: Explore, Translate, Process, and Validate. It served as a means to understand and immerse oneself in the living situation and culture within the care field for people with dementia (Mohammadi, 2017). The exploration phase involved activities such as literature study, site visits with interviews, case studies, and comparative analysis. The translation phase encompassed the derivation of design guidelines from the exploration phase. In the process phase, design concepts were developed and refined, while validation was conducted through usability and preference testing. This method combined theoretical exploration, practical observations, and iterative design to create effective solutions for a therapeutic environment for people with dementia.

During the Explore phase, we, as students of the graduation studio Stimulating Healthy Environments (SHE), engaged in a workshop where we wore aging suits, glasses simulating visual impairments, and navigated through the school in wheelchairs, aiming to empathize with the physical condition of the user. Additionally, we conducted extensive exploration of documentaries, films, and literature to deepen our understanding of the user's physical, mental, and emotional states. The aim of the exploration phase was to empathize with the target group, develop the research question, and establish the methodology.



Figure 2.2 | Workshop experience Wheelchairs

2.2. Research Scheme

Exploration problem field		Explore
1) What is dementia and what are its common symptoms, stages, housing typologies?	→ Literature study	
2) What are the problems of traditional nursing homes for people with dementia?	→ Literature study	
3) What are the needs of people with dementia in nursing homes?	→ Literature study	
Spending time outdoors		
4) What are the benefits of spending time outdoors for people with dementia?	→ Literature study	
5) What are the needs and issues of getting outdoors for people with dementia?	→ Literature study	
Current interventions on problems traditional nursing homes		
6) What are the current interventions aimed at problems in traditional nursing homes?	→ Literature study	
7) What is a 24h-care farm, and how does it differ from traditional nursing homes?	→ Literature study	
8) How is the design of currently existing 24h-care farms structured and arranged?	→ Site visit with Guided tour Case study and Comparative Analysis	
Location Analysis		
9) What is the extent of agricultural property vacancy in North Brabant, and what are the current initiatives aimed at utilizing or repurposing vacant agricultural properties?	→ Literature study	
Design principles designing outdoor spaces for people with dementia		Translate
10) What are the key design principles of outdoor spaces that effectively address the needs and issues of getting outdoors for people with dementia?	→ Literature study	
11) How do the existing 24h-care farms incorporate these design principles into their outdoor spaces for people with dementia?		Explore
12) How can the design of existing 24h-care farms be improved, to enhance the outdoor experience for people with dementia?	Comparative Analysis Comparative Analysis	
Design principles connection indoor / outdoor: transition spaces		Translate
13) How can the design of indoor spaces with transition spaces for people with dementia incorporate elements that facilitate a seamless and comfortable transition to outdoor spaces?	→ Literature study and Case study	
Making design options transition spaces		Process
14) Making design options of a residence with the use of the design guide lines		
Testing design options of different modes of transition spaces		Validate
15) How are different design elements of transition spaces perceived by individuals with dementia?	→ Usability and Preference testing	
Location analysis		Explore
16) What are the existing features and characteristics of the vacant agricultural real estate that could be incorporated into the design of the 24h-care farm?	→ Site visit, Photo exploration and Drawing Analysis	
New design guide lines transition spaces		Translate

Figure 2.3 | Research Scheme

2.3. Exploration phase

2.3.1. Literature study

A comprehensive review of existing literature was conducted to gather relevant information and insights related to people with dementia, their needs, therapeutic benefits of the outdoors, problems in traditional nursing homes, current interventions on those problems, 24h-care farms, designing outdoor spaces, transition spaces and creating an effective flow between indoors and outdoors. Various academic sources, scholarly articles, research papers, books, and reputable online resources were examined to explore the theoretical framework and previous studies relevant to the research topic. The literature study aimed to establish a solid foundation of knowledge, identify gaps in current understanding. The information obtained from the literature study played a crucial role in shaping the research objectives and formulating research questions.

2.3.2. Site visit with guided tour

In the Netherlands there are about 10 24h-care farms. Variations were found in number of residents, construction year, availability of daycare, and real estate development.

24h-care farm for people with dementia	Number of residents	Year of construction	Daycare for people living at home	Transformation existing farm or newly built
1 'Ouderenlandgoed Grootenhout' in Mariahout	48	2009	yes	both
2 'De Hagert' in Wijchen	18 and 12(ID)	2006	yes	transformation
3 'Stichting Reigershoeve' in Heemskerk	27	2013	yes	newly built
4 'Woonzorgboerderij Zeilberg' in Deurne	28	2019	no	newly built
5 'Westersypen' in Scharsterbrug	11	2007	yes	transformation
6 'BuitenGewoon' in Delfsgauw	14	2005	yes	transformation
7 'De Wierickehoeve' in Bodegraven	13	2014	no	transformation
8 'Zorgerf Buiten-Verblijf' in Putten	48	2009	yes	newly built
9 't Boerenerf' in Emmeloord / Tollebeek	8 and 19	2007	yes	newly built
10 'De Port Zorgt' in Kelpen-Oler	27	2013	yes	transformation

Figure 2.4 | Overview 24h-care farms in the Netherlands

To ensure a focused and in-depth investigation, a subset of four 24h-care farms were chosen for visitation and analysis: 'Ouderenlandgoed Grootenhout', 'De Hagert', 'Stichting Reigershoeve', and 'Woonzorgboerderij Zeilberg'. These four farms were specifically selected because, despite being small-scale in nature, these farms accommodated a greater number of residents (27-48) compared to other 24h-care farms in the Netherlands. Additionally, one of the farms included a combination of individuals with dementia and intellectual disabilities, offering an opportunity to explore the unique dynamics of such a setting. The construction year of the farms was also taken into consideration, with one farm standing out for its recent completion in 2019. Additionally, the evaluation encompassed whether the farms were newly constructed or transformed from existing structures. Another aspect that was considered was the availability of daycare services for individuals with dementia who still lived at home.



Figure 2.5 | visited 24h-care farms in the Netherlands

The four selected 24h-care farms were visited, allowing for an exploration of their facilities and observation of daily operations through guided tours facilitated by a healthcare worker. This firsthand experience offered valuable insights into the physical environment, activities, and interactions within the care farms. During the guided tour, in-depth discussions were provided on the design, operational

aspects, challenges, successes, and the care philosophy. They shared their expertise and perspectives on how the 24h-care farm model enhances the well-being of individuals with dementia. These exchanges provided valuable insights into the practical implementation and effectiveness of the 24h-care farm approach.

Transcriptions of the interviews with the healthcare workers conducted during the guided tour can be obtained from the author upon request.

2.3.3. Case studies

Case study 24h-Care Farms

In Chapter 6 (24h-Care Farms), the case study of the four visited 24h-care farms was performed based on the information obtained during the guided tour, and provided existing floorplans. The case study includes an analysis of various aspects such as the site plan, layout of the buildings, floorplans, indoor and outdoor activities, as well as the vision and general information of the 24h-care farms. A comparative analysis was conducted specifically on the floorplans and functions of the different farms, highlighting similarities and differences in their design. This analysis provides insights into how the physical layouts of the farms contribute to the overall functioning and effectiveness of the care environment.

Case study Transition Spaces

In Chapter 9 (Designing An Indoor / Outdoor Relationship With Transition Spaces), the case study was performed based on a literature study and drawings online. In this case study, the focus is on exploring the design of transition spaces in an existing nursing home for individuals with dementia. The study specifically examines the physical forms of these transition spaces, including their circulation patterns indoors and outdoors, as well as their visual and physical access. The aim is to understand how these spaces can enhance outdoor activities, promote a connection with nature, and optimize the overall functionality and accessibility of the nursing home environment. The case study is conducted with a nursing home located in the northern hemisphere, taking into consideration the specific geographical context and climate conditions.

2.3.4. Comparative Analysis

In Chapter 7 (Designing Outdoor Spaces For People With Dementia), a comprehensive comparative analysis was undertaken of the outdoor space design in the 24h-care farms, comparing it to established design principles for outdoor spaces for people with dementia found in the literature study. By studying the outdoor spaces, valuable insights are gained into how the 24h-care farms utilize nature and therapeutic elements to create a supportive and engaging environment for individuals with dementia. This analysis aimed to identify areas for improvement and incorporate evidence-based principles into the final design of the 24h-care farms.

2.3.5. Location Analysis

In Chapter 11 (Location Analysis), a thorough location analysis was conducted for this study, focusing on Graafsedijk 19 in Beers, which is a vacant agricultural plot of land. It encompassed various methods, including a site visit, photo exploration, and drawing analysis.

Site visit

Given my personal situation of residing in close proximity to the location, I have developed a profound familiarity and understanding of its characteristics. This firsthand knowledge, gained through my close proximity and personal experiences, has provided valuable insights into the area's dynamics, surroundings, and potential opportunities and challenges. The unique advantage of living next to the

location has allowed me to have an intimate understanding of its context, which enriches the depth of analysis and evaluation conducted in this study.

Photo exploration

A photo exploration was conducted, capturing images of different aspects of the location. These photographs served as visual documentation, providing a detailed visual record of the site's features, surroundings, and potential challenges or opportunities.

Drawing analysis

Furthermore, a drawing analysis was conducted, which involved studying the existing buildings, drawings, maps, or plans related to the location. These documents were analyzed to extract relevant information about the site's layout, cultural historical values, boundaries, accessibility, and any existing structures or features, which were visualized in drawings and diagrams.

By combining the findings from the site visit, photo exploration, and drawing analysis, a comprehensive location analysis was performed. This analysis aimed to evaluate the suitability of repurposing the existing agricultural real estate into a 24h-care farm.

2.4. Translation phase

This phase focuses on translating the insights gained from the exploration phase into design guide lines. It aims to bridge the gap between research findings and practical design solutions that cater to the unique needs of individuals with dementia. During the translation phase, data collected from literature studies, case studies, site visit and guided tours, comparative analysis are analyzed to identify key themes and design considerations. The key themes of designing the therapeutic outdoor space include orientation, accessibility, comfort, socialization, meaningful activity, reminiscence, sensory stimulation, safe and secure perimeter, and maintenance. The key themes of designing a pleasant transition between indoors and outdoors. include points of connection, ground plane, overhead structures, movement, visual and material flow, building form & layout, furniture, familiar exterior.

2.5. Design process phase

The design process phase builds upon the design principles established during the translation phase. This phase involves the creation and refinement of design concepts that incorporate the identified design principles.

Nine different design options for transition spaces were developed, by using the design principles of the translation phase to create a pleasant transition between indoors and outdoors. The design options were created in Sketch-up and a video was made using the render program Escape. The video forms a realistic representation, a simulation of someone walking from the inside to the outside and vice versa.

2.6. Validation phase

In the validation phase, the design options for transition spaces were tested and evaluated based on feedback from individuals with dementia and a healthcare worker, through usability and preference testing. The goal was to ensure that the design elements effectively facilitated a comfortable transition, promoting outdoor activities and nature connection. The feedback collected helped refine the design options, ensuring they met the specific needs and preferences of individuals with dementia.

2.6.1. Preference & usability testing

Experiment Procedure: Designing Transition Spaces

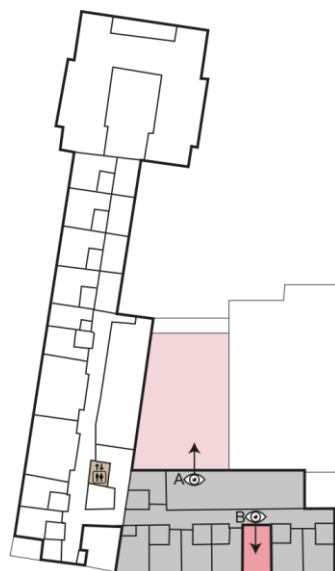
This experiment built upon a literature study on transition spaces in a nursing home for individuals with dementia. The goal of the literature study was to explore the role of transition spaces in facilitating outdoor activities and promoting nature connection for people with dementia. The study identified design principles that created a pleasant transition between indoors and outdoors. The experiment aimed to determine an appropriate design solution by testing various design options of transition spaces in a residence for people with dementia and evaluating their impact on the well-being, comfort, and orientation of individuals with dementia. Specifically, the experiment addressed the following research question: *How are the different design elements of transition spaces perceived by individuals with dementia?*

Recruitment:

Two individuals with dementia and one healthcare worker were recruited from the nursing home 'Castella' in Cuijk, a large care center with 140 residents. The initial recruitment plan involved multiple participants from two nursing homes, one being a traditional nursing home and the other a 24h-care farm. However, the 24h-care farm withdrew from the study at the last moment, leading to a modification of the plan.

Participants were selected based on their willingness to participate in the study and their ability to complete the tasks, including watching videos and answering questions. Both participants had been diagnosed with Alzheimer's dementia. Participant 1 was in the mild stage of the disease, exhibiting symptoms of amnesia. Participant 2 was in the mild/moderate stage of the disease, experiencing amnesia, disorientation in time and space, and changes in behavior or emotions. Prior to the study, the participants were carefully informed about the purpose of the study and provided their consent to participate. Throughout the study, participants were under constant supervision, if desired, by healthcare workers to ensure their safety and well-being. Informed consent was obtained from the 3 participants or their legal representatives before the study commenced.

The participants recruited are living on the second floor of the care facility Castella. They live in a residential group of 6 persons, where they have their own bedroom, bathroom and a communal living room and kitchen. The residents have unconfined access to a small roof terrace, which can be reached from the hall. On the first floor a larger courtyard garden is located, but this garden has only guided access through the elevator or stairs. This could provide a more restrictive environment, which could impact the experience of participants and perception of the design variants.



2nd floor, Residential group (6 persons)



View A, garden 1st floor, guided access via the elevator or stairs.



View B, roof terrace, unconfined access via the hall, same floor

Figure 2.6 | Nursing home Castella in Cuijk

Design Options:

Nine design options for transition spaces were created, varying in the degree of enclosure, transparency, and materialization. These design options were based on the design principles identified during the translation phase. These different design elements can impact sense of comfort, orientation, and sensory stimulation. Sketch-up was used to modify the models, resulting in 9 design options. These design options are further elaborated upon in Chapter 10 (Experiment: Transition Spaces), providing a comprehensive exploration of their characteristics and implications.

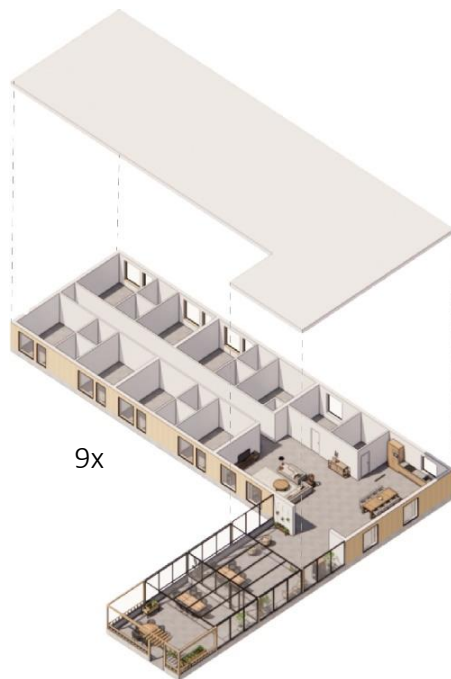


Figure 2.7 | 9 models were created in Sketchup

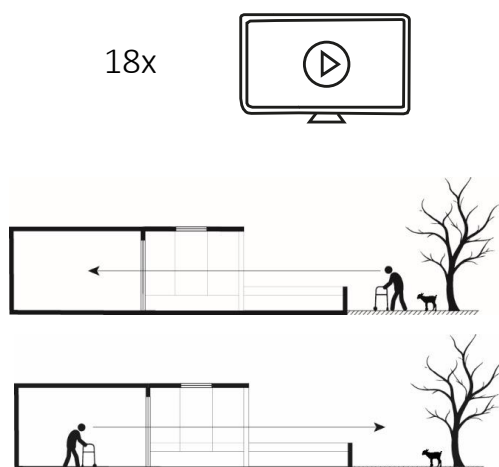


Figure 2.8 | 18 videos were created of the transition from the inside to outside and vice versa

Testing design options, video transition inside / outside

To test design options with people with dementia, the 9 designs were presented through short videos created using the Enscape rendering program for each design option. A total of 18 videos were created, consisting of virtual tours that demonstrated the transition between the inside and outside of each design option. The videos provided a realistic representation of the design by simulating someone walking from the living room to the garden through transition spaces. It was crucial to ensure that the videos were simple, clear, and easy to follow, considering the potential difficulties individuals with dementia may have in processing visual information.

A video was created that showed the transition from inside to outside in a slow and gradual manner, in a simple, clear, and easy-to-follow format. The video was designed to be appropriate for people with dementia, avoiding overwhelming or confusing elements.

Additionally, traditional videos could be watched on a regular TV screen without the need for specialized equipment, which was beneficial for people with dementia who might have difficulties with motor skills or spatial awareness. Using a traditional video for the virtual tour also allowed the participants to watch it multiple times, which was beneficial for people with dementia who might have difficulty remembering the details.

Data Collection:

Usability testing and preference testing were conducted to evaluate the functionality and user-friendliness of the design options. Usability testing assessed how well the design options performed and how easily they could be used by the participants. Preference testing aimed to gather participants' preferences and evaluate different design attributes. Interviews were used as a method to gather detailed information from participants with dementia and healthcare workers. The questions were designed to be simple and specific, ensuring that participants could easily understand and respond. The interviews were conducted in Dutch to ensure clear communication with the participants.

- Experiment with participants with dementia

A set of tasks was set up to test specific aspects of the design, including orientation, feelings of comfort, and preferences. The tasks were adapted to suit the needs of people with dementia, ensuring that they were simplified and manageable.



During the experiment, participants with dementia watched short videos showcasing the transitions between the inside and outside for each design option. Specific tasks were incorporated within the virtual tour to test various aspects of the design.

While watching the video of inside to outside:

Task 1:



Starting the video, the participants were asked to point out the door to the outdoors, the way to the outdoors. The questions asked were: "Kunt u de deur naar buiten vinden?" and "Kunt u de weg naar buiten vinden?"

Task 2:



During the virtual tour, the participants were asked to raise their hand when they felt that they were outside. This was done to gather insights into when they experienced the sensory stimulation of the outside. The question asked was: "Kunt u op het moment dat u zich buiten voelt uw hand opsteken?"

Task 3:



The video was paused at the moment of being in the transition space, and participants were asked if there were objects/elements that they liked or didn't like and why. The questions asked were: "Vindt u de ruimte prettig om te ervaren? Wat vindt u juist prettig? Wat vindt u minder prettig?"

Figure 2.9 | Tasks Experiment

While watching the video of outside to inside:

During the virtual tour from the outside to the inside, participants were asked similar questions to assess their perceptions and experiences.

- Experiment with healthcare worker

The 9 design options were tested with the healthcare worker to gain insights into her experience working with people with dementia and her perspectives on how the design options could impact the well-being of individuals with dementia. Various rating scale questions (on a scale of 1-10) were used, including inquiries about the ease of navigation (whether it was easy or complex to navigate), the comfort level of the transition (whether it was comfortable or uncomfortable), and the perceived length of the route to the outside (whether it was too short or too long), as well as questions about preferred elements and elements to avoid.

Additionally, the healthcare worker was asked to provide a top three ranking of the design options that were most suitable for individuals with dementia, taking into consideration a comfortable transition between indoors and outdoors and the residents' ability to orient themselves in the space and easily find their way outside.

An example of the data collection form utilized with participants diagnosed with dementia, along with a separate form for the healthcare worker participating in the experiment, can be found in the 'Appendix'. These forms provide detailed descriptions of the tasks conducted during the study, enabling the collection of comprehensive data. These forms are presented in Dutch.

Data Analysis:

The collected data from the usability and preference testing was analyzed to identify patterns, trends, and issues with the design options. The results informed recommendations for the design of transition spaces for individuals with dementia, aiming to create more comfortable, accessible, functional, and user-friendly environments. The results guided the final design decisions, ensuring the design met the needs and preferences of the users. A detailed discussion of the results and conclusions can be found in Chapter 10 (Experiment: Transition Spaces).

3

PEOPLE WITH DEMENTIA



3. PEOPLE WITH DEMENTIA

In this Chapter, the topic of dementia is explored, providing an in-depth analysis of its characteristics. First, dementia in general is explained, followed by an exploration of different types of dementia, an overview of the stages of dementia, what the main symptoms are and how dementia affects the individuals' behavior. Additionally, the needs of people with dementia, informal caregivers and staff of nursing homes are examined.

3.1. What is dementia?

Dementia is an umbrella term encompassing numerous brain diseases that can lead to cognitive impairment (Alzheimer Nederland, 2021). It is characterized by the failure of the brain to process information properly, resulting in various symptoms and functional limitations (Alzheimer Nederland, 2021; Harland et al., 2017). The risk of developing dementia increases with age, and while commonly associated with older individuals, there are cases of early-onset dementia in the Netherlands,

affecting approximately 15,000 people under the age of 65 (Alzheimer Nederland, 2021). The prevalence of dementia is expected to rise significantly due to aging populations and increased life expectancy (CBS, 2021). By 2050, the estimated number of dementia patients in the Netherlands is projected to reach 620,000, compared to 290,000 in 2021 (Alzheimer Nederland, 2021). Studies indicate that 1 in 3 women and 1 in 7 men will develop dementia (Alzheimer Nederland, 2021).

Dementia arises from neurodegenerative diseases that progressively damage and destroy brain cells. The different types of dementia lead to different patterns of brain damage, which therefore have different symptoms and affect individuals in different ways (Harland et al., 2017). The specific type of dementia a person has, significantly impacts their functional abilities, with Alzheimer's disease (AD) being the most common form (Weintraub & Morhardt, 2005). AD primarily affects memory, whereas other forms of dementia gradually impair language, reasoning, visuospatial abilities, and aspects of character and personality, particularly in the early stages (Weintraub & Morhardt, 2005).

Despite their differences, all forms of dementia share certain characteristics: the progressive nature of the disease, the involvement of at least two brain regions, the absence of a cure or treatment, and its terminal outcome (Snow, 2022).

Individuals with dementia and their families undergo significant lifestyle adjustments to manage the disease and enhance their quality of life (Weintraub & Morhardt, 2005). Understanding the unique needs and symptoms of each person is crucial for developing effective care strategies (Morhardt et al., 2015). Dementia is now being diagnosed at earlier stages, when cognitive impairments may be limited to specific domains for several years before more generalized decline occurs (Morhardt et al., 2015). This understanding of the nature of the symptoms emphasizes the importance of tailoring care and treatment approaches to each individual's specific needs, rather than adopting a one-size-fits-all approach. It recognizes that the symptoms, progression, and impact of dementia can vary significantly among individuals, and therefore, personalized strategies are necessary to address their unique circumstances effectively (Weintraub & Morhardt, 2005).

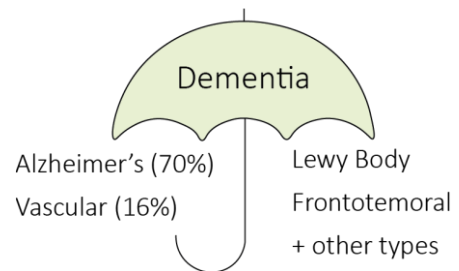


Figure 3.1 | Dementia Umbrella Term

3.2. Types of dementia

Understanding the complexity of dementia syndromes and recognizing the unique nature of each individual's experience highlights the need for personalized approaches in care and treatment (Hobson, 2019). Different types of dementia exhibit distinct symptoms and neuropsychological profiles, emphasizing the importance of tailored interventions (Hobson, 2019). In diagnosing the type of dementia, one can gain a better understanding of behaviors. However, it is crucial to prioritize seeing the person first rather than solely focusing on the clinical picture of dementia (Hobson, 2019).

Alzheimer's Disease (AD)

In the Netherlands, 70% of people with dementia have Alzheimer's Disease (AD). AD is characterized by protein accumulation and subsequent disruption of communication between brain cells. The brains of people with AD are a lot smaller than those of people with healthy brains, due to shrunken brain cells. As the volume of the brain decreases, cognitive functioning continues to decline. Memory difficulties and problems with cognitive functioning, such as judgment and language impairment, are common in AD (Prabakar & Porkumaran, 2012). Life expectancy for people with AD can range from three to twenty years. Research shows that average life expectancy is 6.5 years (Alzheimer Nederland, n.d.-d).

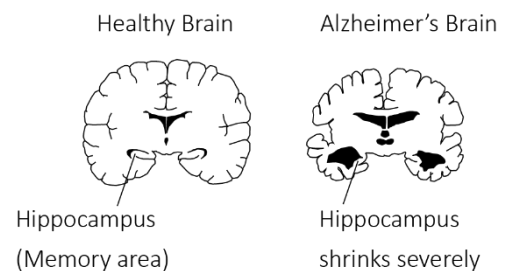


Figure 3.2 | Hippocampus Alzheimer's Brain
(Adopted from Neurologen-Alrijne, n.d.)

Mild cognitive impairment (MCI)

Mild cognitive impairment (MCI) refers to cognitive disorders that are not severe enough to be classified as dementia, and individuals with MCI may experience memory loss or impairment in other brain functions.

Vascular dementia (VaD)

Vascular dementia (VaD) results from reduced blood flow to the brain and can cause problems with reasoning, planning, judgement, and memory (Akhter et al., 2021). Life expectancy with vascular dementia varies, typically ranging from 5 to 15 years after diagnosis, depending on factors such as age, disease severity, and comorbidities. Stroke or heart attack often contribute to mortality due to the compromised vascular system. In the Netherlands, vascular dementia is the second most common type of dementia, with around 50,000 cases (Alzheimer Nederland, n.d.-c; Alzheimer Nederland, n.d.-a)

Lewy-body dementia (LBD)

Lewy-body dementia (LBD) and Parkinson disease dementia (PDD) are associated with an excess of Lewy bodies in the brain, leading to motor symptoms, paralysis, and eventually dementia (Barker et al., 2002; Armstrong, 2019). There are around 30,000 cases of LBD and PDD in the Netherlands, making it the third most common dementia (Alzheimer Nederland, n.d) On average, individuals diagnosed with Parkinson's disease can expect a lifespan of five to twelve years following their diagnosis (Barker et al., 2002).

Frontotemporal dementia (FTD)

Frontotemporal dementia (FTD) is characterized by the formation of abnormal proteins in the frontal and temporal lobes of the brain, affecting language, behavior, and planning abilities (Verhey et al., 2009). In the Netherlands, there are around 12,000 patients with diagnosed FTD (Alzheimer Nederland, n.d-a)

Korsakoff syndrome (KS)

Korsakoff syndrome (KS), often caused by alcohol abuse and thiamine deficiency, results in cognitive disorders and cerebral atrophy. In the Netherlands, there are around 8000 patients with diagnosed KS (Alzheimer Nederland, n.d)

Huntington disease (HD)

Huntington disease (HD) is a genetic condition characterized by motor deficits, cognitive decline, and psychiatric abnormalities (Nguyen & Weydt, 2018). The disease progresses over fifteen to twenty years (Nguyen & Weydt, 2018). HD is considered to be a rare condition. In the Netherlands, there are an estimate of 1,700 persons with HD (Alzheimer Nederland, n.d).

Creutzfeldt-Jakob disease (CJD)

Creutzfeldt-Jakob disease (CJD) is a rare brain disease that leads to rapid deterioration of brain cells, affecting movement, speech, and visual processing (Salehian & Moudi, 2021). The disease starts slow, but after a few weeks people regress rapidly. After the dormant start, most people with CJD can live up to six weeks to a year. In the Netherlands, ten to 25 people are diagnosed yearly with CJD (RIVM, 2020).

Each type of dementia has its own characteristics and prognosis, with varying life expectancies. Personalized interventions that address specific symptoms and cater to individual needs are essential in improving the quality of life for individuals with dementia (Hobson, 2019).

3.3. Stages of dementia

Stages of dementia can be assessed using different systems. The commonly used system includes three stages: early, moderate, and late. Another widely used scale, known as the Reisberg scale or Global Deterioration Scale (GDS), developed by Dr. Barry Reisberg, consists of seven stages focusing on cognitive abilities (Dementia Care Central, 2020). Additionally, Naomi Feil and Rien Verduult have introduced person-centered scales that provide insights into the experiences and needs of individuals with dementia (Hobson, 2019; Interzorg, n.d.).

Early stage (mild):

In the early stage of dementia, individuals can still function independently, although they may experience light forgetfulness and disorientation, such as forgetting names or words and getting lost sometimes (Alzheimer's Association, n.d.). Symptoms will not be widely noticeable at this stage, but family and close friends will notice it and a doctor will be able to identify symptoms using certain tools.

Middle stage (moderate):

The middle stage is typically the longest and is characterized by increasing dependence on care, noticeable symptoms such as anger, frustration, confusion in speech, and unpredictable behavior. Additionally, forgetfulness and disorientation worsen, and the ability to express thoughts and perform routine tasks without assistance becomes more challenging (Dementia Care Central, 2020).

Late stage (severe):

In the late stage, symptoms become severe, including the loss of environmental responsiveness, inability to control movement, active participation in conversations becomes impossible (Blandin, n.d.). Communication is limited to small phrases or single words. Memory and cognitive skills continue to decline, and personality changes become apparent. Extensive care becomes necessary to meet their needs (Blandin, n.d.). Despite limited responsiveness to the environment, individuals living with

dementia can still benefit from certain interactions, such as receiving gentle touch or listening to relaxing music, which provide comfort (Alzheimer's Association, n.d.).

Additionally, the Reisberg scale provides a more detailed description of dementia stages based on cognitive decline and physical abilities. It ranges from stage 1 (no noticeable cognitive impairment) to stage 7 (complete loss of walking and communication, requiring full care) (Tardiff, 2018). Naomi Feil's person-centered scale focuses on the gradual progression of dementia, emphasizing the individual's experiences and developing strategies to support them and their caregivers (Hobson, 2019). Rien Verdult's scale offers a first-person perspective of the person with dementia, outlining four stages: Threatened me, Lost me, Hidden me, and Sunk me, each describing specific characteristics and abilities (Interzorg, n.d.; Hobson, 2019).

These various scales aid in understanding and communicating the stages of dementia, helping healthcare professionals, caregivers, and families provide appropriate care and support to individuals with dementia.

3.4. Symptoms and behavior

Dementia is a syndrome characterized by a combination of symptoms (Alzheimer Nederland, n.d.-b). Various symptoms indicate the presence of dementia, and they worsen as the condition progresses. The main types of symptoms include forgetfulness, disorientation/mistaking time and place, confabulation, problems with daily activities, language problems, bad judgment, changes in character and behavior (Alzheimer Nederland, n.d.-b). **Forgetfulness** is a common early symptom, primarily affecting short-term memory (Alzheimer Nederland, n.d.-b). Examples include forgetting important dates, losing items, repeating questions, and forgetting recent visits. **Disorientation** can lead to mistaking time, losing the day and night rhythm, having difficulties with placing (recent) events in the right chronological order, forgetting familiar people and getting lost (Alzheimer Nederland, n.d.-b). **Confabulation** may cause individuals to have false memories or mix up past and present memories (Denny, 2017). **Difficulties with daily activities** arise as dementia progresses, leading to dependence on others for tasks like dressing, personal hygiene, and maintaining routines (Alzheimer Nederland, n.d.-b). **Language problems** manifest as difficulties finding words, following conversations, and speaking coherently (Alzheimer Nederland, n.d.-b). **Judgment impairment** can result in challenges estimating situations and making decisions, including financial ones (Alzheimer Nederland, n.d.-b). **Changes in character and behavior**, such as increased emotionality, mood swings, or aggression, may occur (Alzheimer Nederland, n.d.-b).

These symptoms can have a significant impact on the mental health and well-being of individuals with dementia. They may experience sadness, depression, anxiety, hallucinations, and delusions (Alzheimer's Society, n.d.; dementie.nl, n.d.). Some symptoms, such as impaired judgment, forgetfulness, and disorientation, can also lead to dangerous situations, such as traffic accidents or leaving the gas on in the kitchen. As dementia progresses, individuals become increasingly dependent on others for their care (Koenders, 2022).

The many symptoms that dementia brings often affect the behavior of a person with dementia. Behavioral changes are common in dementia, and understanding behavior and communication becomes crucial for caregivers (Alzheimer Nederland, n.d.-b). Effective communication involves both verbal and non-verbal cues, as language difficulties may arise (Alzheimer Nederland, n.d.-b).

Behavioral and psychological symptoms of dementia (BPSD) refer to a diverse range of non-cognitive symptoms and behaviors experienced by individuals with dementia (Iacobacci, 2017). These symptoms have significant effects on dementia patients. Common BPSD include **depression and apathy**, which can lead to feelings of sadness, hopelessness, and reduced interest in daily activities (Iacobacci, 2017). **Emotional disturbances** may arise as depression symptoms are often concealed by dementia, making it challenging for patients to express typical feelings of sadness, hopelessness, and loss of self-esteem (Prado-Jean et al., 2010). **Delusions**, characterized by strongly held false beliefs, and perceptual disturbances, such as hallucinations or illusions, can also occur (Jeste et al., 2006; McKeith et al., 2005). **Motor function disturbances**, manifested as changes in activity levels, are directly observable (Cohen-Mansfield et al., 2010). **Extreme pathologies**, like mistrust and feelings of betrayal, may arise, along with **disturbances in sleep patterns, appetite changes, and gender-related differences** in symptoms (Cerejeira et al., 2012; Rongve et al., 2010).

Several factors contribute to the occurrence of BPSD. The psychosocial and physical environment, including crowded housing conditions and attitudes of caregivers, can influence the development of symptoms (Zuidema et al., 2007). Restraining patients or subjecting them to frequent moves and procedures can also contribute to BPSD, particularly wandering and aggression (Kunik et al., 2010).

3.5. Needs of people with dementia

In the Netherlands, people with dementia are placed in nursing homes when their needs become too complex to remain in their own homes. The timing of this transition can vary for each individual, as every situation is unique. Sometimes, this need arises suddenly, such as when the person with dementia experiences a rapid decline or becomes a danger to themselves. Other times, it may be due to physical issues faced by the caregiver, making it impossible for them to continue providing the necessary care (Alzheimer Nederland, 2023).

In order to provide appropriate care in a nursing home, it is important to understand the needs of people with dementia. Several studies are conducted on how well the needs of people with dementia are met within a nursing home. Studies show that environmental and physical health needs are usually met, such as food and appropriate accommodation. However sensory or physical disability (mobility and incontinence) needs, mental health needs and social needs, such as company and daytime activities, were often unmet. Other unmet needs included needs for assistance with memory problems and help with hearing or eyesight. These unmet needs are associated with psychological problems, such as anxiety and depression (Hancock et al., 2006). According to a study on the needs of people with dementia living at home were the most frequent unmet needs in the areas of daytime activity, company and psychological distress (Miranda-Castillo et al., 2013). A study showed that a higher score on unmet needs in residents with dementia is associated with an increase in challenging behavior (Cadieux et al., 2013).

People with dementia face challenges in expressing their needs, resulting in potential misunderstandings and unmet needs. Unmet needs negatively impact their quality of life and contribute to mental health issues and dissatisfaction with care. Unmet needs refer to significant problems that have potential solutions through appropriate interventions. To effectively meet the needs of people with dementia, a person-centered approach is crucial, considering their unique wishes, preferences, and abilities (Hancock et al., 2006).

According to Graneheim and Jansson (2006), people with dementia exhibit challenging behavior when they feel trapped, set aside, or excluded. They experience a sense of confinement in the ward, feeling overprotected and treated like children when they feel trapped by restrictions. They long for the freedom to come and go as they please and may feel homesick, missing their independence and longing for familiar routines and meaningful interactions. When they feel set aside, they feel alone, lose a sense of purpose, and yearn for social engagement and meaningful activities. Being included and invited to participate in dialogue and activities makes them feel appreciated. Seniors, in general, value the ability to stay active and engaged (Raynes et al., 2006).

People with dementia face challenges in dealing with the disease, as it is a new and unfamiliar experience for them. They may struggle with tasks they were once able to do independently. Maintaining good general health becomes crucial for seniors with dementia to cope positively with their condition. Impaired sight, hearing, and mobility are common among seniors, and these difficulties are further exacerbated for those with dementia who may forget about their impairments and struggle to understand and manage them (Pollock & Marshall, 2012). Their environment should support them in coping with these impairments. Research indicates that having the freedom to move around and engage in physical activities, such as walking, is highly valued by individuals with dementia, despite their cognitive and health challenges (Bartlett & Brannelly, 2019).

Contact with nature and spending time in a natural environment is associated with a sense of self-worth, identity, and autonomy for people with dementia (de Bruin et al., 2020). The specific outdoor preferences can vary, with some individuals enjoying walking or gardening, while others prefer sitting in the sun and appreciating a peaceful atmosphere. Seniors with dementia have a strong need for a familiar and home-like living environment (te Boekhorst, 2007). Research indicates that people with dementia often desire a change of environment during the day and do not wish to stay in their house or room all day (de Bruin et al., 2017).

It is important to adopt a person-centered approach that addresses the psychosocial needs of people with dementia, going beyond the traditional focus on physical needs in long-term care facilities. Understanding and responding to their needs is crucial for improving their quality of life. Effective interventions are needed to ensure that the specific needs of people with dementia are met.

3.6. Needs of informal caregivers

Dementia not only affects people with dementia, but also has a major impact on the lives of the family of people with dementia. Caring for a person with dementia can be a large physical and emotional burden, and when the care becomes too heavy and complex, it may be necessary to admit the person with dementia to a nursing home. Admitting people with dementia to a nursing home has been described as the most difficult decision for informal caregivers. (de Boer et al., 2019)

Studies show that caring for a person with dementia is burdensome. 38% of family caregivers felt heavily burdened and 13% felt more heavily burdened or overburdened (de Bruin et al., 2015). Informal caregivers see daycare as an important form of support for themselves and their loved ones with dementia, but only 7% use a facility for daytime activities or meeting (de Bruin et al., 2015). An explanation for this low percentage is the resistance of the person with dementia, feelings of guilt on the part of the informal caregiver or the lack of facilities and activities that suit the person with dementia. Informal caregivers indicated in the study that the most important reason for using daycare

for themselves consisted of reducing their care burden and facilitating their own activities and social contacts and increasing their freedom (de Bruin et al., 2015).

When the caregiver, for example, needs to undergo surgery or is at risk of becoming burdened, the person with dementia can also be temporarily admitted. This temporary care is called respite care (replacement care). The person with dementia can be admitted to a nursing home for a few days or weeks during this period (Kennisplein Zorg voor Beter, 2021).

3.7. Needs of staff of nursing homes

In the Netherlands, there is a notable trend towards extramuralisation, wherein individuals with dementia nowadays expected to live at home for as long as possible and only move to a nursing home if there is a greater need for care. This shift has resulted in an increased complexity of care within nursing homes, thereby placing additional demands on the staff. Consequently, the workload for staff members may appear somewhat higher due to the evolving needs and requirements of residents in these settings (van der Schot et al., 2020).

The needs of staff in nursing homes are crucial for providing quality care to residents. A study showed that care workers often feel incapable in meeting residents' social, psychological, and emotional needs (Cadieux et al., 2013). To address this challenge, it is important to create a physical environment in care facilities that supports the staff in organizing meaningful activities and promoting residents' well-being. Improving the physical environment of nursing homes helps staff better meet residents' needs.

3.8. Sub-Conclusion: Target group

This Chapter provided a comprehensive exploration of dementia, including its characteristics, different types, stages, symptoms, and behavioral aspects. Personalized care approaches that consider the specific symptoms and circumstances of each person are crucial for improving their quality of life. Moreover, recognizing the various types and stages of dementia helps healthcare professionals and caregivers provide appropriate support and interventions. The Chapter emphasized the significance of creating dementia-friendly environments and improving the physical conditions of traditional nursing homes to better meet the needs of both individuals with dementia and their caregivers.

In this research, the target group will consist of individuals with dementia, including seniors and those under 65 years of age, who fall within the first to seventh stages of dementia. These stages include mild, moderate, and late stages of dementia. The aim of this research is to develop a therapeutic design for a 24h-care farm that caters to the needs of people with dementia, incorporating residences offering 24h-care, suitable outdoor spaces, respite care and daycare services

Providing additional features, such as outdoor spaces, daycare and respite care options, is crucial for alleviating the burden and guilt experienced by individuals with dementia and their caregivers. Respite care, such as short-term admission to a nursing home, can be a beneficial additional solution for caregivers' needs. By offering these additional services, the well-being of both individuals with dementia and their caregivers can be improved.

Overall, a holistic and person-centered approach is essential in enhancing the well-being and care of people with dementia.

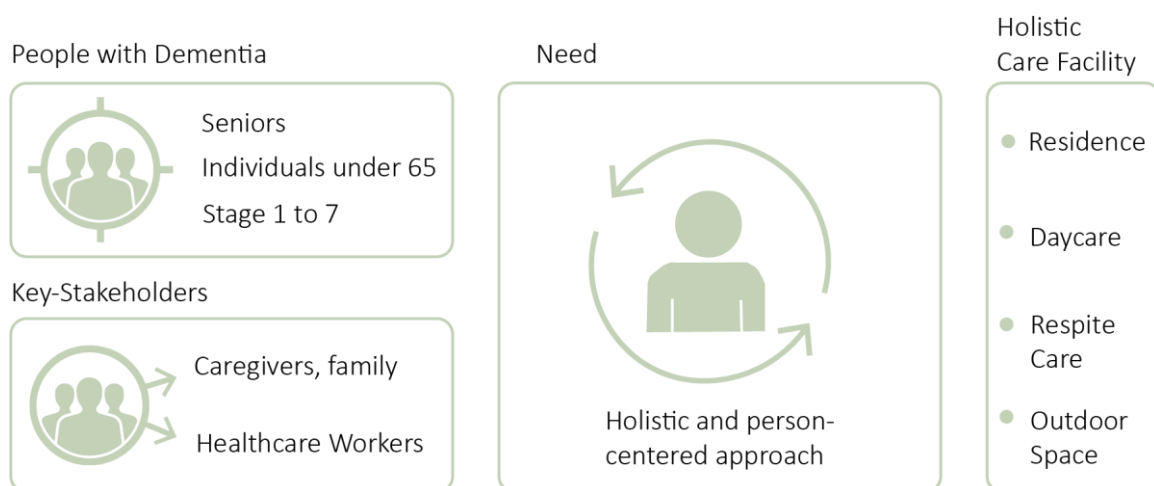


Figure 3.3 | Target group, Stakeholders, and Holistic and person-centered approach

4

THERAPEUTIC BENEFITS OUTDOORS



4. THERAPEUTIC BENEFITS OF THE OUTDOORS FOR PEOPLE WITH DEMENTIA

Current guidelines for dementia care facilities emphasize the crucial role of the physical living environment, with particular attention given to the design of outdoor spaces (Whear et al., 2014). This recognition stems from a growing understanding of the therapeutic potential of the outdoors in promoting health and well-being, especially for individuals with dementia (Pollock & Marshall, 2012). The therapeutic potential of the outdoors refers to the specific benefits and positive effects that outdoor experiences and interactions with nature can have on individuals with dementia. Despite facing challenges such as memory loss, confusion, and disorientation, individuals with dementia can greatly benefit from spending time outdoors. Designing a suitable and secure outdoor space plays a crucial role in promoting the overall health of individuals with dementia and should be prioritized in the design of their physical environment (Pollock & Marshall, 2012).

This Chapter aims to explore the therapeutic benefits of outdoor spaces for people with dementia, encompassing both physical and psychosocial benefits. Specifically, this Chapter will explore the impact of natural light, physical activity, vitamin D, the natural environment, social interaction, and unconfined access to the outdoors on reducing medication dependency and enhancing the overall well-being of individuals with dementia. By comprehending and harnessing these therapeutic benefits, the care and quality of life for people living with dementia can be improved.








Summary Therapeutic benefits of the outdoors for people with dementia		
	Natural Light	stabilize circadian rhythm, regulate sleep patterns, improve overall sleep quality, increase energy levels, improves mood, reduce stress, reduce depression, reduce anxiety, reduce agitation
	Physical activity	reduces risk of new diseases , preventing overweight, improve muscle & fitness, being less tired, enhance mood, reduce aggression, improve sleep patterns, improve circadian rhythm, slows bone degeneration, reduce risk of falls and injury, slows down cognitive decline, reduce urinary and fecal incontinence
	Vitamin D	improves bone production, reduce risks of falls
	Natural environment	reduces stress, reduces anxiety, improves mood, provide sense of purpose and meaning, sensory stimulation, sense of calm and relaxation, improves appetite, feeling of self-worth
	Social interaction	reduce feeling of loneliness, reduce feeling of isolation, sense of belonging
	Unconfined access outdoors	less challenging behavior, increase sense of freedom, increase sense of independence, increase sense of autonomy, increase sense of control, reduce feelings of boredom, reduce frustration.
	Reduction use of drugs	Huge saving in the cost of care of people with dementia. reduce risk of falls.
Claassen, 2018; de Bruin, 2020; Clark et al., 2013; Dionyssiotis, 2012; Lovell et al., 1995; Holmberg,1997; Namazi & Johnson, 1992; Pollock & Marshall, 2012		

Figure 4.1 | Therapeutic benefits of the outdoors for people with dementia



4.1. Benefits of natural light

Spending time outdoors, particularly in natural light, has been found to have a positive impact on individuals with dementia (Pollock & Marshall, 2012). Natural light helps regulate sleep patterns, improves sleep quality, and boosts energy levels, thereby alleviating some dementia symptoms. It also enhances mood, reduces stress, depression, and anxiety. Scheduled exposure to bright light and darkness stabilizes the circadian rhythm, leading to improved sleep patterns and reduced challenging behaviors (Pollock & Marshall, 2012; Brawley, 2007). Morning light exposure triggers an energy burst, promoting activity (Claassen et al., 2018). Furthermore, exposure to bright morning light reduces agitation among people with dementia (Lovell et al., 1995).



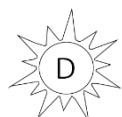
4.2. Benefits of physical activity

Spending time outdoors can encourage physical activity, which is particularly important for individuals with dementia. Engaging in activities such as walking, gardening, and exercise can have significant health benefits for people with dementia. A study conducted at the Martin Luther Alzheimer garden in Holt, USA, found that residents who spent more than 10 minutes each day participating in unprogrammed activities in the garden during the summer months showed significant improvements in various variables, including behavior, medication usage, pulse rate, blood pressure, and weight change (Galbraith & Westphal, 2003).

Physical activity has positive health effects for individuals with dementia:

- It reduces the risk of developing cardiovascular diseases, high blood pressure, and arterial stiffness, and it lowers the risk of heart attacks, strokes, and overweight;
- Engaging in physical activity improves muscle strength and fitness;
- Reduces fatigue, enhances mood, and can help prevent and treat depression and stress;
- It also decreases aggression, as demonstrated by research showing reduced aggression among people with dementia who participated in group walking sessions (Holmberg, 1997).
- Physical activity improves sleep patterns and the circadian rhythm,
- Helps with lower back pain, slows bone degeneration
- Reduces the risk of falls and injuries;
- Physical activity reduces urinary and faecal incontinence. Mobility challenges can lead to incontinence if individuals struggle to reach the toilet, undress, and sit down promptly. Additionally, spatial memory plays a role in locating the toilet, further influencing one's ability to find their way.
- Additionally, exercise and activity can slow down cognitive decline in individuals with dementia. (Pollock & Marshall, 2012; Claassen et al., 2018).

However, dementia often leads to inactivity due to a lack of initiative and memory loss. People with dementia may find it challenging to organize activities or may feel embarrassed about participating in group activities (Claassen et al., 2018). Therefore, they require support and encouragement from their physical environment and caregivers.



4.3. Benefits of vitamin D

Spending time outdoors is beneficial for individuals with dementia as it helps increase vitamin D levels, which has numerous health benefits. Vitamin D, produced in the body through sunlight exposure, is crucial for maintaining healthy bones, boosting immunity, and improving mental health. Glass and plastic absorb the critical ultraviolet (UV) wavelengths of light, therefore it is necessary to go outdoors to be directly exposed to sunlight, so that the body can start to produce vitamin D. In addition, seniors need a longer exposure to sunlight to make vitamin D (Pollock & Marshall, 2012).

Seniors in nursing homes often experience vitamin D deficiency, which can contribute to a decline in physical and cognitive function (Venning, 2005). To address this, researchers recommend 5 to 10 minutes of direct sunlight exposure on the arms and legs between 10 am and 3 pm during spring, summer, and autumn, along with increased dietary and supplemental vitamin D intake (Holick, 2006; Holick, 2004). Adequate vitamin D levels can reduce falls, improve muscle function, and lower the risk of serious injuries among seniors (Dionyssiatis, 2012; Pollock & Marshall, 2012).



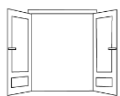
4.4. Benefits of the natural environment

Spending time in nature has a calming and restorative effect on the mind and body. For individuals with dementia, it is associated with feelings of self-worth, identity, and autonomy, as well as a reduction in falls, agitation, and improved quality of life, mood, and sleep (de Bruin et al., 2020). Contact with nature stimulates the mind and engages the senses, leading to potential improvements in cognitive function (Chalfont, 2008). Nature serves as a valuable distraction, alleviating stress, pain, and anxiety, and promoting a sense of calm and relaxation among people with dementia (Pollock & Marshall, 2012). Furthermore, being outdoors enhances appetite, which, in turn, boosts energy levels and improves sleep. Enjoying meals in appealing and sociable outdoor settings, such as barbecues, snacks, or picnics, can effectively stimulate appetite (Pollock & Marshall, 2012).



4.5. Social benefits

Spending time outdoors offers opportunities for socialization and engagement, which can effectively reduce feelings of loneliness and isolation in individuals with dementia. In the report "Dementia 2012" by the Alzheimer's Society, a survey was conducted among people in the early stages of dementia who still resided in their own homes. The findings revealed that 61% of the respondents experienced feelings of loneliness some or all of the time, indicating a need to address the lack of social interaction (Alzheimer's Society, 2012). Engaging in activities outdoors fosters a sense of belonging, friendship, kinship, and community benefit, while also facilitating chance positive social encounters (Clark et al., 2013).



4.6. Benefits having unconfined access outdoors

Studies indicate that the most challenging aspects of caregiving for individuals with dementia include communication difficulties (18%) and managing aggressive behavior (17%) (Pollock & Marshall, 2012). Boredom, frustration, and being confined indoors can contribute to the emergence of challenging behaviors. A study by Namazi and Johnson (1992) found that providing open access to the outdoors reduced challenging behavior in individuals with dementia. The mental health of individuals with dementia is greatly impacted by their ability to pursue their desires and have the freedom to go outdoors (Pollock & Marshall, 2012). Access to the outdoors can offer a sense of freedom and independence for individuals with dementia, as being confined to a care facility or limited indoor environment can lead to feelings of isolation, boredom, and loss of control (Pollock & Marshall, 2012).



4.7. Reduction in the use of drugs

Spending time outdoors can reduce the need for medication by effectively managing symptoms such as agitation and anxiety in individuals with dementia. Challenging behavior, stemming from factors like boredom, disrupted sleep patterns, pain, limited outdoor access, and depression, often leads to the prescription of antipsychotic drugs (Pollock & Marshall, 2012). However, these medications can have severe health consequences, increase the risk of stroke and falls, and yield minimal positive outcomes. Antipsychotic drugs are very expensive, and the side effects they cause can result in additional medical expenses. By reducing the use of these drugs, significant cost savings can be achieved in the care of individuals with dementia. These savings can then be allocated to enhance staffing levels and create outdoor spaces that better meet the needs of individuals with dementia (Pollock & Marshall, 2012).

Reduction in the use of falls

Studies have identified various risk factors for falls among seniors, including depression, cognitive impairments, visual problems, balance issues, reduced muscle strength, and polypharmacy (the use of multiple medications). Effective interventions targeting these risk factors involve engaging in physical activities like walking and minimizing the use of psychotropic drugs, resulting in significant reductions in falls, injuries, and hospitalization rates. Falls pose a common and serious problem among older adults, with annual incidences ranging from 30% among individuals aged 65 and older to 50% among those aged 80 and older. Approximately 10% of seniors who fall sustain severe injuries such as hip fractures, joint dislocations, or head injuries, contributing to a loss of confidence and functional decline. Despite efforts to identify and eliminate environmental hazards, falls among seniors remain a possibility even in well-designed settings and with attentive staff (Gill et al., 2000; Brawley, 2007).

4.8. Sub-Conclusion: Therapeutic benefits of the outdoors

In conclusion, this Chapter highlights the importance of including outdoor spaces in the design of care facilities for individuals with dementia. The therapeutic benefits of the outdoors, including natural light, physical activity, vitamin D, the natural environment, social interaction, and unconfined access, play a significant role in promoting the well-being and quality of life of people with dementia. By understanding and harnessing these benefits, the care and support provided to individuals with dementia can be improved.

However, to fully harness these benefits, it is crucial that the design of the physical environment aligns with the unique needs of people with dementia. This necessitates further research and exploration into how the care facility and outdoor space should be designed to ensure safety, accessibility, and an inviting environment for individuals with dementia. Understanding how individuals with dementia can make the most of the outdoor space and obtain these benefits is essential for creating an effective therapeutic design.

The design should integrate therapeutic principles, enabling individuals with dementia to maximize outdoor space utilization and gain numerous benefits.

Figure 4.2 | Therapeutic Design of the Outdoor Space

5

CURRENT INTERVENTIONS ON PROBLEMS



5. INTERVENTIONS ON PROBLEMS TRADITIONAL NURSING HOMES

As dementia progresses, living at home is often not possible and approximately 30% are admitted to nursing homes, where the people with dementia require complex care (de Boer, 2017). In traditional nursing homes, there are often challenges that need to be addressed. The institutional nature of these settings with a sterile and impersonal atmosphere, long hallways, institutional furniture, lack of homeliness, lack of suitable outdoor spaces, limited autonomy and loss of independence can contribute to feelings of disorientation, stress, and isolation among residents. In many traditional nursing homes, rigid schedules, lack of choice in daily activities, and limited access to the outdoors can hinder their ability to maintain a sense of personal freedom and engagement.

To overcome the challenges in traditional nursing homes, innovative interventions have been developed. Two examples of such interventions are small-scale living and Green Care. These approaches build on the principles of therapeutic design and emphasize personalized care, social connections, and interaction with nature.

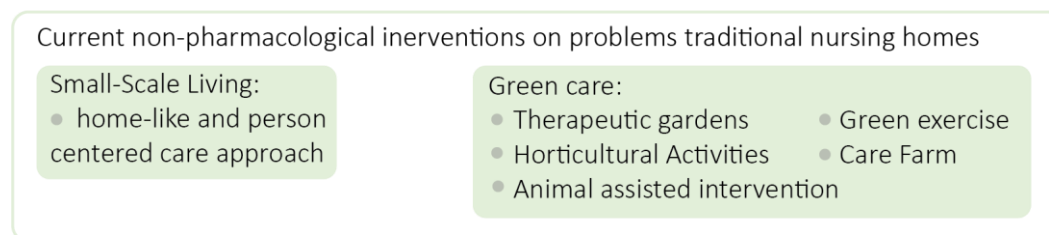


Figure 5.1 | Current non-pharmacological interventions on problems in traditional nursing homes

5.1. Small scale living: home-like and person centered care approach

In recent years, the care approach for individuals with dementia has evolved to encompass their emotional needs in addition to their physical needs. Recognizing that each person with dementia is unique, the care environment should uphold their dignity and respect, while allowing autonomy for expressing and fulfilling their specific needs (Hobson, 2019). Dementia is a condition that varies from person to person, making each individual's communication and response unique. Therefore, person-centered communication, which focuses on understanding and adapting to an individual's preferred way of communication, is crucial (Hobson, 2019).

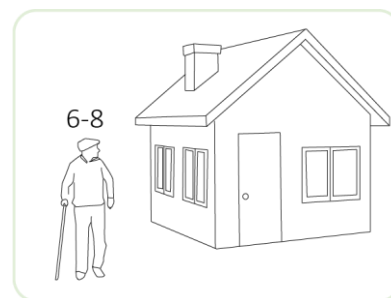


Figure 5.2 | Small-scale living, 6-8 persons per home

Physical Environment

Large-scale institutional living often fails to meet the needs and desires of seniors with dementia, as they struggle to experience a sense of "home" (te Boekhorst, 2007). To address this, the concept of small-scale living has been introduced, aiming to provide nursing home care in a homely environment for a small group of individuals with dementia. This approach aligns with person-centered care principles and has been successfully implemented for other populations for years, such as chronically psychiatric and mentally disabled individuals (te Boekhorst, 2007). Small-scale care involves providing an environment that resembles a home and maintaining small groups of six to eight residents (van der Schot et al., 2020). There are small-scale residential facilities that have been specially built and equipped for this purpose, but small-scale care can also be provided in large-scale facilities (van der Schot et al., 2020).

Activities

This home-like environment is created, for example, by giving residents the opportunity to furnish their room with their own furniture. In addition, daily household tasks, such as cooking with residents, are seen as part of small-scale care facilities (van der Schot et al., 2020). Studies have indicated that living in small-scale, home-like environments has positive effects on the behavioral and psychological symptoms of people with dementia. In comparison to traditional care homes, residents in small-scale environments require less support with daily activities, exhibit higher social engagement, require fewer psychotropic medications, experience reduced apathy and anxiety over time, display less agitation, and have lower rates of physical restraints. Additionally, individuals in small-scale environments report higher scores in terms of quality of life and engagement in activities (Kok, 2016; te Boekhorst, 2007).

5.2. Green care

Engaging with the outdoors in a therapeutic manner involves creating an environment that is intentionally designed to support the well-being of individuals with dementia. One current intervention that aligns with this approach is 'Green Care'. 'Green Care' is a developing term in Western European countries (Haubenhofers et al., 2010). It is an umbrella term for activities related to health promotion or providing care in a natural setting. This term has been used in several studies (Elings, 2011; Haubenhofers et al., 2010). In order to address the issues and limitations associated with differing language within this care field was a questionnaire survey conducted by Natural England to explore the current use of terms 'ecotherapy' vs 'green care' vs 'nature-based interventions'. The research showed that there was no preference for a collective name, however some negative comments were received about ecotherapy and there were some concerns about not continuing to use the term 'green care'. (Bragg & Atkins, 2016)

Green care includes therapeutic gardens, social and therapeutic horticulture (STH), Horticultural therapy (HT), Therapeutic Horticulture (TH), animal-assisted interventions (AAI), care farming, and facilitated green exercise, which became widely known and integrated. (Haubenhofers et al., 2010). What these forms of green care have in common is the use of natural elements to produce health, social or educational benefits.

Green care is not the only healthcare solution, the care might not be appropriate if the client does not have any affinity or interest with natural elements, for example when someone afraid or allergic to certain natural elements.

There are different forms of green care in the countries of Europe. In the UK they are primarily focused on concepts such as STH, horticultural therapy (HT) and green exercise as treatment. In for example Finland and Norway they prefer AAI. In the Netherlands and Norway is care farming a thriving sector and is highly developed, compared to other countries. Green care connects aspects of the traditional care homes to gardening, agriculture, animal keeping, or animal husbandry (Haubenhofers et al., 2010).

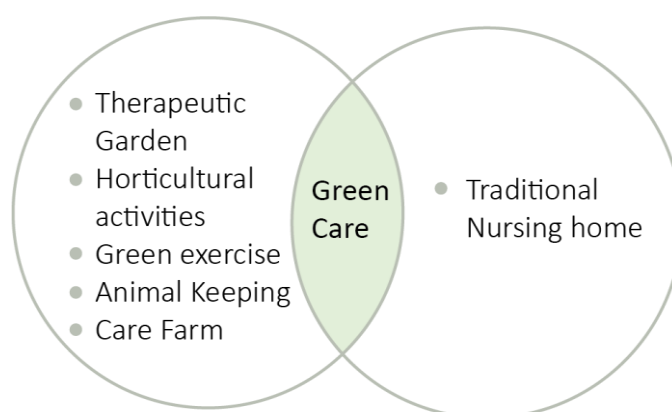


Figure 5.3 | Green care as a link between traditional care and nature based-activities (Adapted from Haubenhofers, 2010)

5.2.1. Therapeutic Gardens

Although all gardens have some therapeutic potential, a therapeutic garden is specifically designed with the intention of achieving goals for those who use it. A design achieving a garden with therapeutic qualities (Chalfont, 2008). A therapeutic garden for people with dementia is specifically designed to meet the needs of individuals living with dementia. These gardens are often created with the aim of providing sensory stimulation, promoting relaxation, reducing agitation, and enhancing overall well-being (Chalfont, 2008). There are also gardens specific for people with Alzheimer's disease to stimulate senses and to evoke



Figure 5.4 | Therapeutic garden

positive memories and emotions, which can be described as sensory gardens (Singh & Tiwari, 2020). A sensory garden stimulates all five senses, sight, sound, smell, taste and touch. The plants and other materials are specifically chosen for their color, texture, scent and edibility (Cochrane, 2010).

Physical environment

The design and layout of therapeutic gardens for people with dementia take into consideration their cognitive abilities, physical limitations, and safety concerns. They may incorporate elements such as comfortable seating areas, sensory plants, familiar scents, tactile elements, and clear paths to facilitate safe wandering. These elements create a sensory-rich environment that encourages relaxation, reminiscence, and exploration (Chalfont, 2008).

Activities

A range of purposeful activities is integrated into the therapeutic garden, fostering engagement and cognitive stimulation for individuals with dementia. People can be passive by observing, listening, sitting or be active and stroll or explore through the garden. (Singh & Tiwari, 2020).

5.2.2. Horticultural activities

Social therapeutic horticulture (STH), Therapeutic Horticulture (TH), and horticultural therapy (HT) are approaches that promote the well-being of people with dementia through engagement in garden activities (Cochrane, 2010). While they share common goals, there are some differences between STH, TH and HT.



Figure 5.5 | Horticultural activities

Horticultural therapy (HT)

HT is a structured form of cognitive therapy with predefined clinical goals. It focuses on the client's learning of new skills or regaining lost ones, with plants serving as the medium for therapy (Gonzalez & Kirkevold, 2014).

Therapeutic horticulture (TH)

On the other hand, TH offers a more open program, allowing participants to improve their well-being through passive or active involvement in garden-related activities (Gonzalez & Kirkevold, 2014).

Social and therapeutic horticulture (STH)

STH emphasizes the role of social interactions in developing well-being through plant and horticulture involvement. STH involves vulnerable individuals participating in organized group activities centered around horticulture and gardening, differing from domestic gardening in its formalized and structured environment (Haubehofer et al., 2010).

Studies indicate that horticultural activities reduce agitation and increase engagement levels in people with dementia (Motealleh et al., 2019). These activities have a positive impact on various aspects, such as mood, emotional well-being, self-esteem, intellectual and sensory stimulation, physical and cognitive functioning, exercise, socialization, and more (Chalfont, 2008).

Physical environment

To facilitate horticultural activities, appropriate physical environments are required, including outdoors and indoors. Indoor horticulture environments should have access to natural light and be well-furnished. Ideally, a bright, daylit space with a glass roof, such as a conservatory or atrium, is preferred for year-round activities and plant growth (Chalfont, 2008).

Activities

Horticultural activities can be carried out by volunteers, staff, and family caregivers, focusing on enjoyment and benefits rather than specific therapeutic goals. Examples of these activities include potting up plants, arranging flowers, growing herbs or vegetables, and planting seeds. Growing food on-site not only provides nutritional value but also offers exercise, fresh air, and sunshine when individuals go outside to harvest or dig (Chalfont, 2008).

5.2.3. Green exercise

Green exercise can be described as doing physical activities while being directly exposed to nature. Green exercise is mainly health-promoting, but when facilitated in a care facility, it can be used as therapy, whereby the clients can achieve certain therapy goals. (Haubehofer et al., 2010). Studies show that regular exercise is associated with a delay in onset of dementia and Alzheimer's disease (Chalfont, 2008). Studies suggests that green exercise improves self-esteem, reduces anger, confusion and depression (Haubehofer et al., 2010).

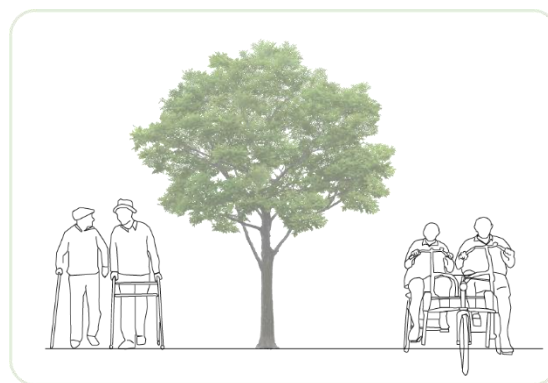


Figure 5.6 | Green exercise

Physical environment

In order to encourage someone to go outdoors, it is helpful to develop incentives or purposes with which someone can easily identify (Chalfont, 2008). Design a dementia friendly-outdoor space, including paths and destinations with attractive and comfortable features.

Activities

Green exercise activities include walking, cycling, gardening, which can be done in a group.

5.2.4. Animal assisted intervention

Animal assisted intervention (AAI) includes companion animals and farm animals as part of a therapy or environment (Haubenhofner et al., 2010). Connecting individuals with dementia with animals add a familiar, enjoyable, living dimension to daily life, with the potential for friendship, stimulation, pleasure, distraction and unconditional love (Chalfont, 2008).



Figure 5.7 | Animal assisted intervention

Physical environment

Provide physical surroundings that support animal ownership, such as fenced outdoor green areas for animals and nearby ground floor access to the outside. (Chalfont, 2008).

Activities

Animal assisted intervention activities include feeding animals, petting animals, observing animals.

5.2.5. Care farms

Care farms are farms that combine agricultural activities with care and support services for a variety of clients, including people with mental health problems, addiction issues, troubled youth and people with dementia (de Boer, 2017; de Bruin et al., 2020). Care farms offers daytime activities, social involvement, therapeutic goals and a place to live (Haubenhofner et al., 2010).

The number of care farms in the Netherlands has experienced significant growth, from 75 in 1998 to over 1,000 today (de Bruin et al., 2017). Other European countries have also seen an increase in care farms (Elings, 2011; de Boer, 2017). The nature of care farms can vary in terms of the balance between farming and care, and types of farming activities (de Bruin et al., 2017). These farms can engage in both animal-based and crop-based agricultural production, with income generated from care activities and the sale of agricultural products contributing to funding (Haubenhofner et al., 2010). Some care farms focus more on agricultural production, while others prioritize care, with limited emphasis on production (de Bruin et al., 2017). In the Netherlands, care farms operate as agriculturally productive farms offering care services, with income derived from both agricultural and care activities. However, in Germany, care farms are always connected to care settings, and there are no farms solely dedicated to agricultural production. Subsidies for care in Germany are only available for interventions serving over 300 clients, which explains the prevalence of large-scale care farms tied to healthcare institutions (Haubenhofner et al., 2010).

Care farms for people with dementia

The Netherlands has the highest number of care farms, including approximately 200 care farms specifically for people with dementia, followed by Norway, Belgium, Austria, and Italy with a few hundred care farms each (de Boer, 2017; Haubenhofner et al., 2010). Research indicates that care farms have a positive impact on socialization and engagement among individuals with dementia (Motealleh et al., 2019). Care farms cater to individuals with dementia at different stages of the disease, typically providing day care for those with mild to moderate dementia (de Bruin et al., 2020). Daytime activities on care farms for people with dementia have gained significant experience and are valued by both individuals with dementia and their caregivers (Elings, 2011).

24h-care farm for people with dementia

24h-care farms can also provide care to people that are in later stages of dementia, here people with dementia can remain at the farm until death (de Bruin et al., 2020). In the Netherlands there are only a few (about 10) care farms that provide 24-hour nursing home care for the people with dementia, meaning that they live on the farm in the same way as people live in other nursing homes, which is unique in the world (de Boer, 2017). The 24h-care farms prioritize care, with limited or no emphasis on agricultural production. Only two scientific researches has been conducted on 24h-care farms, the first study was conducted by Bram de Boer in 2017 , which suggested that residents at 24h-care farms have a more active daily life, in which they have more social interactions, and come outdoors more often compared to traditional nursing homes (de Boer, 2017). In the Netherlands, regular nursing homes for people with dementia are often funded through the 'Wet Langdurige zorg' (WLZ). This funding mechanism may also apply to 24h-care farms, making them a viable additional option for dementia care.

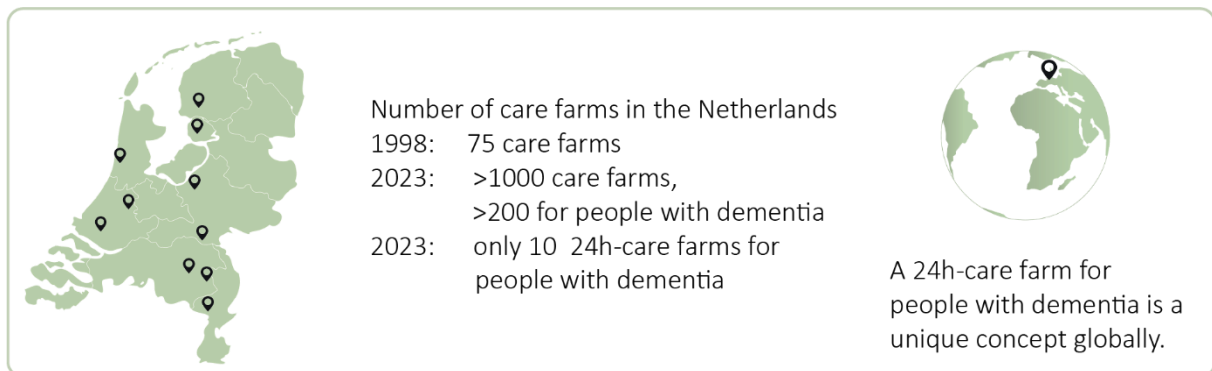


Figure 5.8 | Number of 24h-care farms for people with dementia
(Original text sources: de Bruin et al., 2017; de Boer, 2017)

Physical environment

24h-care farms have a wide range of health-promoting environmental characteristics, including the presence of outdoor spaces, vegetable garden, animals, plants, familiar and home-like environment. These characteristics are naturally present in the farm environment and are therefore extensively used in the wide range of activities offered by the care farm (de Bruin et al., 2020). The familiar and home-like living environment is characterized by small-scale residences accommodating 6 to 10 residents, allowing individuals with dementia to engage in daily activities they used to do at home (Elings, 2011). The physical environment of care farms encourages active participation and exercise in a green setting (de Bruin et al., 2015). Due to the physical environment, farmers and other staff members are well able in organizing meaningful activities aligned with the personal needs of people with dementia, fostering a sense of mastery and promoting engagement (de Bruin et al., 2020).

Activities

Participants can engage in various activities such as gardening, animal care (such as feeding animals, cleaning stables), walking, domestic activities (dishwashing or cooking using crops from the farm), social activities (dinner or a coffee break) and leisure activities (playing games, listening to music) (de Bruin et al., 2017; de Boer, 2017). These activities are incorporated in normal daily life activities (de Boer, 2017). People with dementia find the activities on care farms meaningful and beneficial, contributing to their sense of belonging and the belief that they can still make a difference (de Bruin et al., 2015). Research indicates that engagement levels and physical effort required for activities on care farms are generally higher compared to traditional care homes (de Bruin et al., 2020).

5.3. Sub-Conclusion: Current interventions on problems

This Chapter highlights the importance of person-centered care and Green Care activities in improving the quality of life for people with dementia in nursing homes. Both small-scale living and Green Care exemplify the principles of therapeutic design by creating environments that prioritize the unique needs and experiences of individuals with dementia.

Small-scale living with person-centered care aims to create a homely environment that is tailored to the individual's needs and preferences. In addition, Green Care activities have been shown to have a positive impact on the wellbeing of people with dementia. These activities can include horticultural activities, therapeutic gardens, green exercise, animal-assisted intervention, and care farming.

The combination of small-scale living and Green Care activities has resulted in the development of the current intervention known as 24h-care farms. Research has shown their positive impact on people with dementia. (de Boer, 2017; de Bruin et al., 2020).

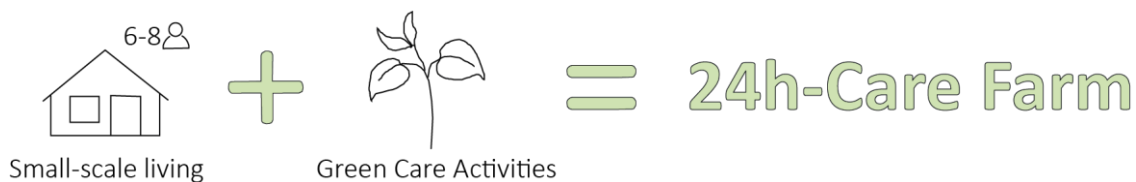


Figure 5.9 | A 24h-Care Farm combines Small-Scale living and Green Care Activities

In conclusion, 24h-care farms offer alternatives to the traditional institutional setting, promoting person-centered care, social interaction, autonomy, and a connection with nature, all of which contribute to enhancing the overall quality of life for individuals living with dementia.

6

24H-CARE FARMS



6. 24H-CARE FARMS

This Chapter provides a comprehensive exploration of the concept of 24h-care farms, focusing on their architectural, organizational, and social qualities as revealed through a literature review. It also presents a comprehensive case study of four existing 24h-care farms, offering insights into their implementation and design. The case study includes detailed examinations of site plans, floor plans, functional analysis, indoor-outdoor activities, and the incorporation of therapeutic elements. Furthermore, the Chapter discusses the limitations and challenges of 24h-care farms, drawing from the findings of the case study and guided tour.

6.1. Qualities 24h-care farm

Studies show that 24h-care farms have several qualities that affect the health and well-being of people with dementia and create a non-medical atmosphere. These care farms provide a supportive environment that combines social, architectural, and organizational qualities to create a holistic approach to care.

Social Qualities:

Social Community:

The 24h-care farms offers a supportive and social community where residents with dementia can connect with each other, staff members, volunteers and family. A 24h-care farm promotes social interaction and engagement through group activities, shared meals, and recreational programs. Having social relationships is essential for a human being (Elings, 2011). The enthusiasm of the staff and volunteers encourages participants to connect with it. The focus is on the work and activities that needs to be done. Participants experience that what they do is important and that it is appreciated (Elings & Goede, 2012).

Meaningful Activities:

A care farm offers meaningful and diverse activities; a variety of household and outdoor activities. The meaningful activities are continuously and simultaneously present. The activities are integrated into the daily routine, there are varied activities, many require physical exertion and are stimulating (de Bruin et al., 2017). According to research by de Bruin et al. (2020) on care farming for people with dementia are the activities on a care farm regarded as stimulating and meaningful. A care farm offers varying activities in a natural way, through the presence of the outdoor space, a familiar and homelike environment, farm and companion animals, plants and daily life stimuli. These characteristics are naturally present in the environment and therefore extensively used in the wide range of activities (de Bruin et al., 2020). These meaningful activities include walking outside, horticultural activities, meal preparation, feeding and observing the animals, gardening, sweeping leaves, and woodworking.

Increase in number of options in daycare and nursing home

The provision of care on farms means an increase in the number of options available to people with dementia. This reinforces the freedom of choice that people with dementia and caregivers have, enhancing the overall experience and well-being of residents (Elings, 2011). Diversity in the range of daytime activities is important, depending on their age, gender and background, people with dementia have different needs and possibilities (de Bruin et al., 2015). A study suggested that day care on care farms seem to appeal mainly to men (Elings & Goede, 2012). However, research shows that 24h-care farms do not intend to attract a distinctive client group. They serve people with dementia of different sexes, ages and backgrounds (de Bruin, 2020).

Architectural Qualities:

Green and Spatial Environment:

The green and spatial environment of care farms encompasses various health-promoting characteristics. These include the presence of outdoor spaces, animals, vegetable gardens, and plants (de Bruin et al., 2020). Contact with nature and access to outdoor spaces have been shown to positively influence individuals' health and well-being (Chapter 4). Care farms provide multiple options for residents to engage with the outdoors, benefiting from the tranquility and space, which reduces the likelihood of conflicts among clients. In case of a need for solitude, clients can easily withdraw themselves (Elings & Goede, 2012). The environment on a care farm offers activities that encourage physical exercise, opportunities for outdoor engagement, and meaningful tasks (de Bruin et al., 2015). The presence of animals and familiar stimuli, along with the homely atmosphere, contribute to a comforting environment. Care farms provide unconfined access to diverse indoor and outdoor spaces, enabling residents to explore and engage with their surroundings (de Bruin et al., 2017).

'Normal Life' Homelike Atmosphere:

Research has shown that seniors with dementia have a strong need for a familiar, recognizable living environment with a home-like atmosphere (te Boekhorst, 2007). People with dementia experience the stay on a care farm as 'normal life' (Elings, 2011). The daily rhythm is naturally present on a care farm. The residents do daily activities that they used to do at home, such as light cleaning duties and cooking together (Elings, 2011). In addition, the use of familiar elements, personal belongings, familiar scents create a warm and comforting atmosphere. This helps residents feel more at ease and promotes a sense of normalcy. Qualities that provide an informal context that resembles 'normal life' are attitude and involvement of the staff, volunteers and family, the social community, meaningful and diverse activities and the green environment (Elings & Goede, 2012).

Organizational Qualities:

Small-Scale and Person-Centered:

Characteristic of care on care farms is the small scale, it usually involves 6-10 residents per home (Elings & Goede, 2012). Aligning activities, preferences and wishes of people with dementia, freedom of choice and stimulation of mutual interactions is possible in small-scale living (de Bruin et al., 2017). Exploring the possibilities of daily activities and discussing them with clients and caregivers is important, so that they can make an informed choice that matches their wishes and possibilities. Respect for the lifestyles and preferences of people with dementia is important. (de Bruin et al., 2015).

Open Door Policy

The home-like, green and spatial environment supports the open-door policy. In the Netherlands, the act 'Wet van Zorg en Dwang' (Wzd) came into effect on January 1, 2020. This act protects people with a psychogeriatric disorder (such as dementia) or an intellectual disability against unnecessary involuntary care, including physical restraints (restriction of freedom of movement) and behavior-influencing drugs. The Wzd operates on the principle of 'No, unless,' meaning involuntary care is not allowed, unless there is otherwise a threat of serious harm and there are no other solutions (Innovatiekring Dementie, 2022). Restricting freedom of movement, such as keeping residents behind closed doors or locked areas, limits their autonomy and freedom. Many healthcare institutions and family members are concerned about safety. Family is often calmer when they know that nothing can happen to their loved one (Alzheimer Nederland, 2022).

However, research suggests that an open doors policy promotes residents' well-being, reduces anxiety and isolation, and encourages physical activity (Alzheimer Nederland, 2022). In addition, for many

people the idea that you can leave is often enough. Although embracing an open-door policy necessitates a cultural shift in the existing traditional care facilities and the integration of healthcare technology, such as wristbands with sensors and GPS trackers (Alzheimer Nederland, 2022; Innovatiekring Dementie, 2022), some progress has already been made in certain 24h-care farms. Notably, facilities like 'de Hagert' in Wijchen, 'Reigershoeve' in Heemskerk and 'Grootenhout' in Mariahout have implemented an open-door policy, allowing residents the freedom to leave while ensuring their safety through the use of GPS-enabled sensors. Health care workers are notified when residents leave the driveway, allowing them to supervise and accompany residents on walks before returning to the care farm without any safety issues.

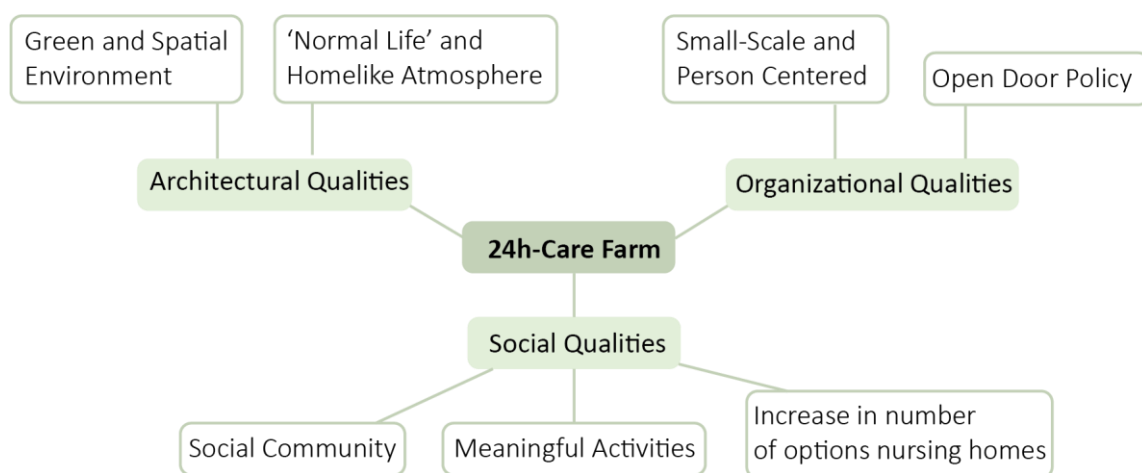


Figure 6.1 | Qualities 24h-Care Farm

6.2. Case studies 24h-Care Farms

24h-care farms have been shown to possess qualities that positively impact the health and well-being of individuals with dementia. However, the existing literature lacks comprehensive information on the layout of 24h-care farms, design principles, challenges and present therapeutic elements. To address this gap a comprehensive case study on 24h-care farms is necessary to gain practical insights, identify challenges, and discover innovative design principles and therapeutic elements present in the 24h-care farms. The information for this case study is obtained during the guided tour and site visit and provided existing floorplans of four existing 24h-care farms: 'Ouderenlandgoed Grootenhout', 'De Hagert', 'Stichting Reigershoeve', and 'Woonzorgboerderij Zeilberg'.

The aim of the case study is to provide valuable information for improving the implementation and effectiveness of 24h-care farms, ultimately enhancing the care provided to individuals with dementia.

6.2.1. 24h-Care Farm Zeilberg

Location: Deurne, The Netherlands
Scope: 4.990 m², 28 residents
Year: 2019
Architect: RAFFAAN
Typology: 24h-care farm for seniors with dementia and seniors with a physical disability



Figure 6.2 | Woonzorgboerderij Zeilberg (Raffaan NXT, 2021)

A 24h-care farm has been developed in Deurne since the beginning of 2019. The 24h-care farm consists of four newly built rural homes that are intended for seniors with dementia and seniors with a physical disability, who can no longer live independently at home. The 24h-care farm offers single storey housing for a total of 28 residents. 7 residents live in each house, where 24-hour care is provided. The houses are a modern translations of the 'Brabantse langgevel' farms. The facility has a fenced outdoor area with closed gates and operates under a closed policy.

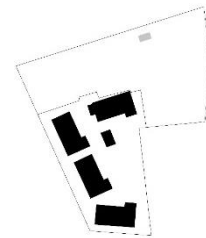


Figure 6.3 | Layout buildings



Figure 6.4 | Site plan

Vision

Their vision is focused on rural living, being able to go outside in the garden, there is no architectural production or taking care of animals. There is an adjacent pasture with sheep and deer, but this is owned by their neighbor. The aim of the care facility is to outsource as much as possible, so not taking care of own animals.

There is a small vegetable garden, intended for the meals of the residents. Residents can work in the vegetable garden, but the gardening group does most of the work. Sometimes there is a daycare group with young people who take care of the vegetable garden. There is a gardening group of 5 volunteers who maintain the garden every week. In addition to the gardening group, there is a total of 50 volunteers who contribute their time and efforts to various tasks, such as baking cakes.

There is a closed policy, there are often residents who want to go out or seek a way to escape, but they are not allowed to do so. There is no daycare for non-residents with dementia, they are interested in providing daycare in the future, but there is not enough space at the moment.

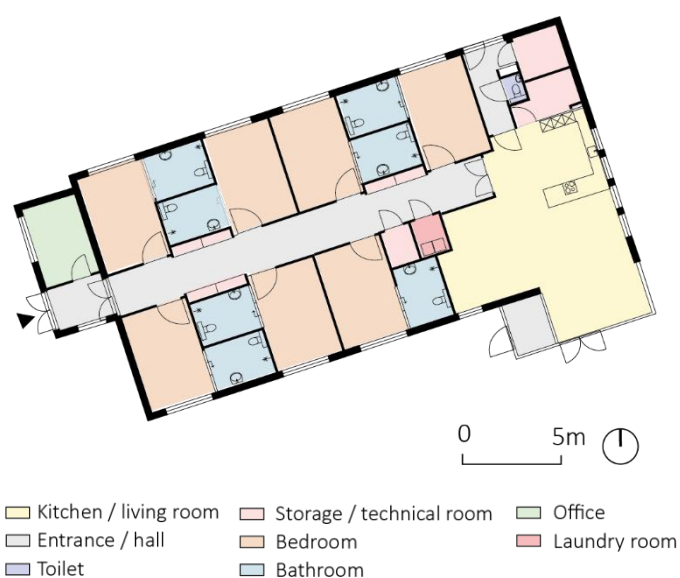


Figure 6.5 | Floorplan

Layout residence

The four residences have the same layout. Each resident has their own bedroom and bathroom. There is a common living room and kitchen. Each residence has their own paved terrace with tables and chairs and in the summer an awning for shade. Most residents spend the whole day in the common room, they often also take their rest in their own room, but in general they are together in the living room.

Indoor activities:

The residents follow a daily routine that includes engaging in domestic activities such as cooking, reading the newspaper, and having meals like breakfast, lunch, and dinner. In addition to these daily household tasks, they have established an association life in the form of various clubs. For instance, there is the Rik club on Mondays, a singing club on Thursday mornings, an exercise club, and baking activities on Monday afternoons. These clubs are open to all residents of each house, providing opportunities for shared interests and social interaction. Additionally, there are activities like painting and crafting available for residents to enjoy.

Outdoor activities:

Outdoor activities include walking, working in the vegetable garden, sitting and relaxing on the terrace, and picking flowers from raised flower boxes. In the summer, there are weekly music evenings held in the garden. Special events are also organized during holidays, such as Easter, where children from the neighborhood association come to the garden to hunt for eggs.

6.2.2. 24h-Care Farm De Hagert

Location:	Wijchen, The Netherlands
Scope:	47.797 m ² , 30 residents
Year:	2006
Architect:	unknown
Typology:	24h-care farm for 18 seniors with dementia & 12 individuals with intellectual disabilities. Including 20 individuals for daycare



Figure 6.6 | Woonzorgboerderij De Hagert, (Woonzorgboerderij De Hagert Leur, n.d.)

De Hagert is a small-scale 24h-care farm situated in Wijchen, providing services for individuals with dementia and intellectual disabilities, and a nursery. They repurposed the historic T-farm, piggery, and barn in 2006 to create single-story residences and daycare spaces, accommodating a total of 30 residents. The central square houses three homes for individuals with dementia, with six residents per home, and three homes for individuals with intellectual disabilities, with four residents per home. The farm also offers daycare services for 20 individuals with dementia who still reside in their own homes. Nestled in a rural area, the farm features a long tree-lined driveway and natural boundaries such as greenery and ditches. The only possible escape route is through the long driveway.

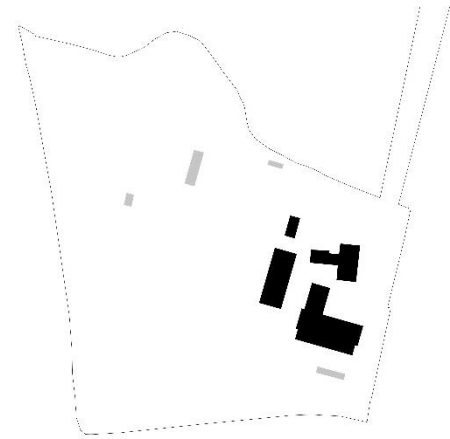


Figure 6.7 | Layout buildings



Figure 6.8 | Site plan

Vision

The farm provides a homely environment in a peaceful and green setting. Residents with dementia and those with intellectual disabilities live separately but have opportunities to interact outdoors, which works well. The Care Farm and the nursery are two separate entities. At the nursery, 10 people from Wijchen rent a piece of land. They, along with 79 other volunteers, assist in maintaining the garden and caring for the animals. The Hagert consists of 70 staff members and invests heavily in volunteers, organizing annual events for staff and volunteers, sending newsletters, relying on word-of-mouth advertising, and assigning tasks based on their preferences. This approach has been successful, partially due to its close proximity to the larger village of Wijchen. The farm is home to chickens, dogs, rabbits, cows, sheep, goats, and horses. Residents are allowed to bring their own pets.

The rhythm of the day and the changing seasons are important aspects of life at the farm. There is no agricultural production, allowing staff to focus on providing meaningful activities for everyone. There is an open door policy. Residents with dementia wear a tracking system in their shoe soles, enabling doors to open automatically for them and alerting staff when they approach the driveway.

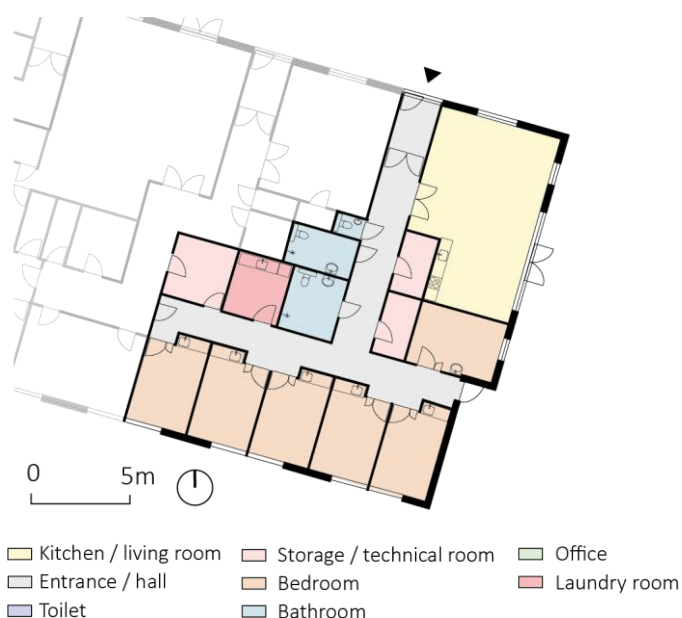


Figure 6.9 | Floorplan

Layout residence

The three residences share a similar layout, featuring private bedrooms with a small kitchen and sink for each resident. Two shared bathrooms and a separate toilet are available. Additionally, there is a common living room and kitchen. The hallway connects the rooms, the outdoors and the adjacent home, giving the impression of a larger facility despite its small-scale nature.

Indoor activities:

Activities mainly consist of simple everyday tasks, such as reading the newspaper, watching TV, cooking, and more. There is no strict schedule of activities assigned to specific days, except for making jam on Fridays. Residents and visitors go to the day care space from 8:30 am to 3:30 pm in one building and from 9:00 am to 4:00 pm in the other building. The program is closed on Wednesday afternoons and Friday afternoons. Residents enjoy their meals in their own homes in the evenings.

Outdoor activities:

In terms of outdoor activities, residents engage in activities such as walking and feeding the animals. In the stable, the feeding troughs are prepared and ready for use. The maintenance of the large vegetable garden is primarily carried out by volunteers from the nursery and individuals with intellectual disabilities, rather than those with dementia. However, residents with dementia can participate by assisting with tasks such as holding the wheelbarrow, allowing them to feel a sense of involvement and purpose.

6.2.3. 24h-Care Farm Reigershoeve

Location:	Heemskerk, The Netherlands
Scope:	11.625m ² , 27 residents + 3 respite guests
Year:	2013
Architect:	Ons Architecten
Typology:	24h-care farm for 21 seniors with dementia And 6 individuals with dementia under 65 years, respite care and daycare



Figure 6.10 | Woonzorgboerderij Reigershoeve
(Stichting Reigershoeve, n.d.)

The 24h-care farm, realized in 2013, provides a newly built accommodation for 27 individuals with intensive care needs due to dementia. They are housed in four single storey group homes, with one specifically for individuals who developed dementia at a young age (under 65 years old). The farm consists of a green and spatial environment with a variety of farm animals, creating a lively and engaging environment. In addition to residential care, the farm offers daycare and respite care services for individuals with dementia who still live at home. In 2022, a respite care facility was introduced, where three guests can stay for 2 days to 3 weeks, providing relief for caregivers. With an open-door policy, the farm fosters a welcoming atmosphere where residents and visitors have the freedom to go, promoting a sense of comfort and belonging. The premises are secured with a gated entrance, and residents who wish to walk outside are equipped with GPS trackers, although they often choose to enjoy the spacious environment within the perimeter.

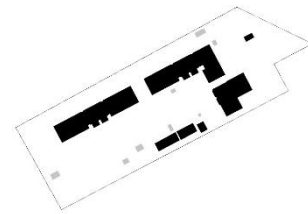


Figure 6.11 | Layout buildings

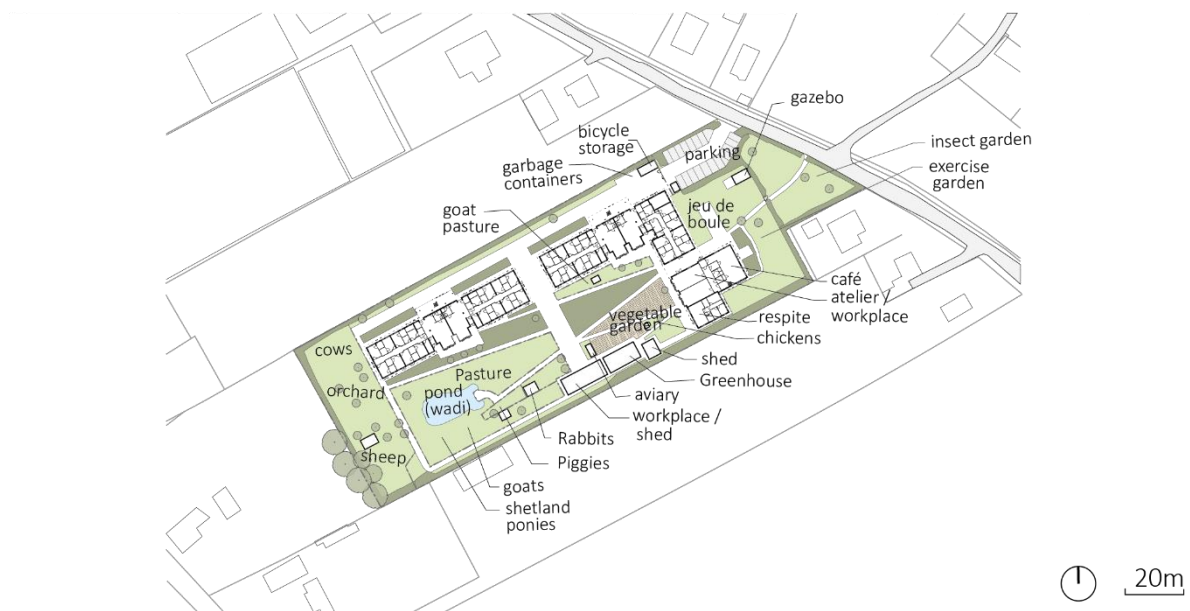
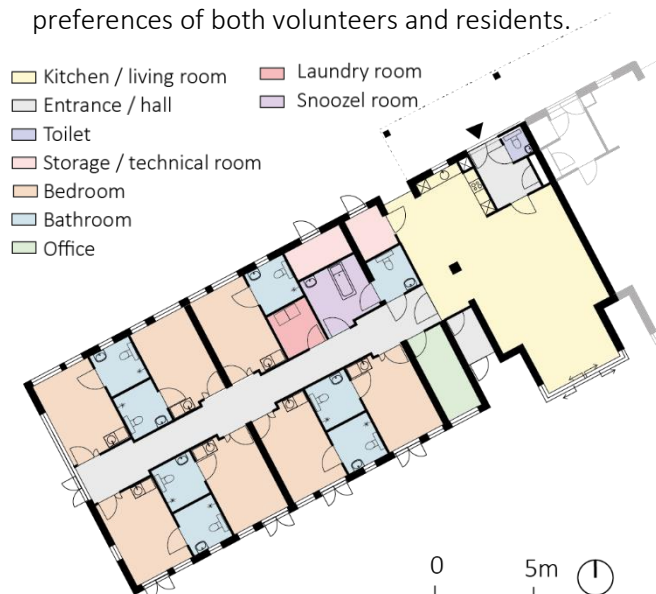


Figure 6.12 | Site plan

Vision:

The vision of the 24h-care farm revolves around meeting the needs and preferences of the residents, providing them with meaningful daily activities. The spacious and green environment offers numerous opportunities for engaging experiences. In the lively "Vrolijke Merrie" building, there is a café, meeting place, atelier, workshop, and on the first floor, a small shop, beauty salon, hairdresser, gym equipment, and a bedroom for participants of the day care program. These spaces are available for both residents and day care participants. The residences are on the ground floor, while the first floor houses the office, a training room, and two guest rooms for overnight stays, for example, for family members. There are 70 volunteers, including garden maintenance and support for the day program, who contribute to a vibrant atmosphere. Activities are tailored to the preferences of both volunteers and residents.



Residence Layout:

The residence features a shared kitchen and living room with a small conservatory. There is a laundry room for washing, a separate space for administrative tasks and medication storage. Each bedroom is equipped with a kitchenette and refrigerator, allowing residents to make their own coffee if desired. They also have a private bathroom and a snoozel room. Residents enjoy socializing in the common area, but also appreciate spending time in their individual rooms. The main entrance through a hallway with a WC and coat rack creates a welcoming and homely atmosphere.

Indoor activities:

Residents engage in household activities with the staff, such as playing games and other homely tasks within their homes. The 'ontmoetingsplek' is often bustling with day care participants until 4:00 pm, where they enjoy activities like drinking coffee, baking cakes, making soup, reading the newspaper, exercising, and crafting or participating in the choir. In addition to individual activities with guidance for residents, such as painting, group activities are organized for residents who are interested, such as swimming on Mondays, dining out in the "Vrolijke Merrie" on Tuesday evenings, attending the creative studio on Wednesdays, and participating in the choir on Thursdays, or engage in reminiscence activities or brain training using a suitcase filled with nostalgic items or themed sessions. On Saturday evenings, there is a movie night or the café is open for residents to enjoy a drink.

Outdoor activities:

There are numerous seating areas outside, residents often take walks, cycle, take care of animals, gather produce from the vegetable garden for cooking, and pick fruits for baking apple pies, making applesauce, or creating pear sauce from harvested pears. On Fridays, there is a walking club that caters to different levels of walking, accommodating both faster and slower walkers. The greenhouse is used for cultivation and provides seating areas. Each living group is responsible for a group of animals, and with the assistance of volunteers or staff, they provide fresh water, feed the animals, and check for eggs in the chicken coop. Many people enjoy sitting in front of their own door during the summer, as they have their own seating area. They are also allowed to bring their pets. Employees also bring their dogs.

6.2.4. 24h-Care Farm Ouderenlandgoed Grootenhout

Location:	Mariahout, The Netherlands
Scope:	48.925 m ² , 48 residents
Year:	2009
Architect:	unknown
Typology:	24h-care farm for 48 individuals with dementia And daycare for 40 individuals with dementia



Figure 6.14 | Ouderenlandgoed Grootenhout
Source: (Werkgroep Leefbaarheid Gerwen, 2023)

Since 2009, a 24h-care farm in Mariahout has been realized to providing dementia care and horse breeding. The farm encompasses a total of 9 farm homes, resulting in a combined resident count of 75. The main care farm facility 'Grootenhout' offers 6 single and two-story houses, accommodating a total of 48 residents. These houses are specifically designed for individuals with dementia, including seniors and individuals under 65. Furthermore, the farm provides day care services for 40 people with dementia who reside at home. Residents benefit from an open-door policy, contributing to an enhanced overall experience.

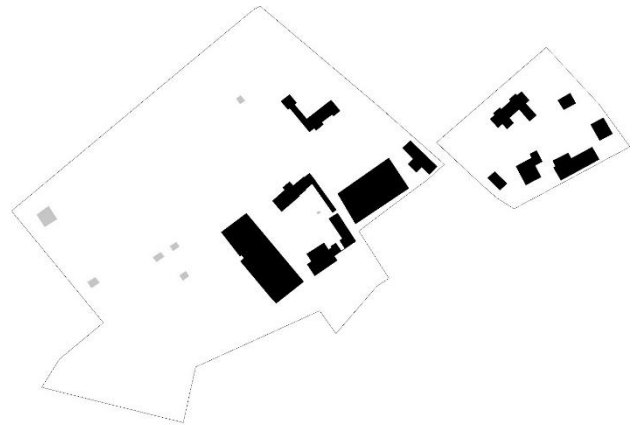


Figure 6.15 | Layout buildings



Figure 6.16 | Site Plan

Vision

The vision of the 24h-care farm revolves around providing care and horse breeding in a homely and pleasant environment. The staff aims to create moments of happiness for residents and visitors during their day experiences, prioritizing safety. The cozy and familiar atmosphere instills confidence in individuals with dementia, who often experience anxiety and confusion. These moments of happiness can be as simple as petting a dog, enjoying tasty food, sitting in the sun, or receiving kind and loving attention. The farm also offers a unique "coming home experience" through daily daycare at another location from 11:00 to 17:00. Additionally, it extends daycare services to 40 individuals who live at home, operating from 11:00 to 19:00. With an open-door policy, the farm creates a welcoming atmosphere, allowing residents to leave if they wish but striving to make their stay so enjoyable that they choose to stay willingly. The farm employs approximately 90 staff members. Given its remote location, attracting volunteers is challenging.



Figure 6.17 | Floorplan

Residence Layout:

The six residences feature different layouts, with newly built homes being single-story and renovated homes being two-story. Bathrooms in residences differ from being private or shared. Bedrooms often have an open toilet and sink for convenience and cost efficiency, instead of a private bathroom. Each residence includes a shared living room and kitchen. There is also a staff bedroom where they can sleep during their night shift. Residents have their own paved terrace and access to a veranda for shade in the summer. The aim was to design a home without long corridors and with clear sightlines to the exit doors from the living room.

Indoor activities:

At 11 AM, after breakfast, the residents proceed to a separate building called the 'dagbeleving'. Residents and visitors spend the day together, enjoying a warm meal and coffee. In the afternoon, there is always an activity. After 5 PM, the residents return to their own homes where they can watch TV, chat, or play games. Domestic activities such as peeling potatoes, cutting vegetables, sorting utensils, or baking cakes take place. Every Sunday afternoon, there is a music performance at the care farm, open to everyone. The 'dagbeleving' locations are located in different areas, some busier with more stimuli like a café, while others are quieter and smaller, such as the workshop. There are facilities like a hair salon, workshop, atelier, kitchens, and stables for people to engage with.

Outdoor activities:

Residents participate in activities such as walking, picking fruits, sweeping leaves, cleaning the sidewalks, jeu de boules, watering plants, working in the vegetable garden, feeding horses, and maintaining the stables.

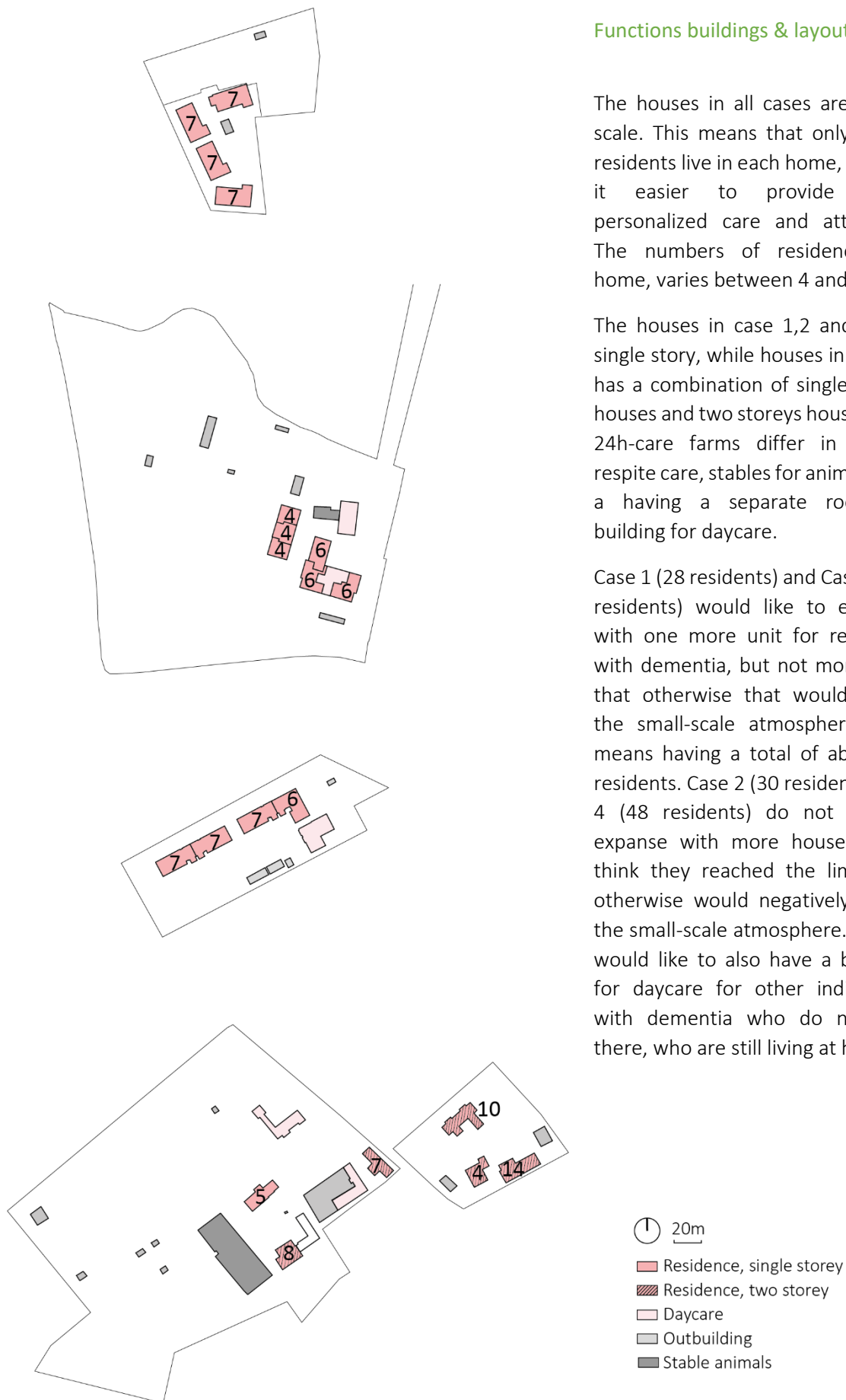
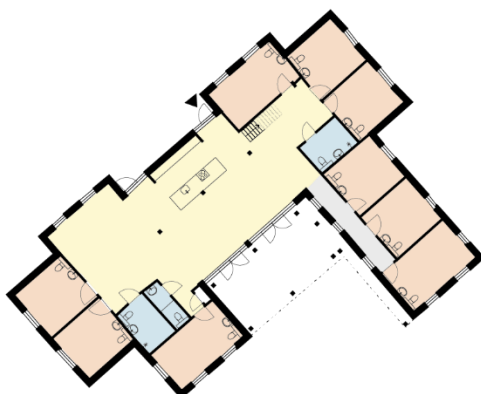


Figure 6.18 | Comparative Analysis: Functions Buildings & Layout



Floorplans

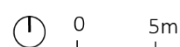
In all cases the houses are small-scale and designed to create a homely and familiar environment. They are furnished with furniture and decorations similar to what the residents would have had at home.

The houses are designed in such a way that residents can easily move around and orient themselves. For example, due to an open layout, no long corridors or too many doors.

all houses have a shared living room and kitchen where residents can do daily activities such as having breakfast, lunch, cooking and eating dinner, playing games, watching TV or just socializing together.

All cases have facilities for care staff, such as a separate room for storage of medical equipment. Case 4 has also a bedroom for the staff, where they can sleep during their night shift. In the other cases the staff are awake during their night shift. Case 1,2,3 have small office room for the staff.

In case 1 and 3 residents have their own bathroom. In case 4 residents have the toilet situated open in the bedroom and have a common bathroom which they share with 4/5 residents. In case 2 they share a bathroom with 3 residents. In case 2 and 3 they also have a kitchen with sink in the bedroom. Case 3 also has a Snoezel room.



 Kitchen / living room	 Bathroom
 Entrance / hall	 Office
 Toilet	 Laundry room
 Storage / technical room	 Snoozel room
 Bedroom	

Figure 6.19 | Comparative Analysis: Floorplans

6.3. Therapeutic Elements in existing 24h-Care Farms for People with Dementia:

Through the comprehensive case study, it has been observed that 24h-care farms can serve as an effective design for a therapeutic environment for people with dementia. The following explanation highlights how the therapeutic elements are incorporated in the existing 24h-care farms, based on the findings of the case study:



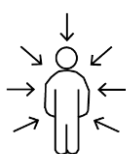
Nature Immersion:

24h-Care farms are typically situated in a rural or semi-rural setting, surrounded by natural landscapes and agricultural areas. This provides individuals with dementia the opportunity to immerse themselves in nature, which has shown therapeutic benefits such as reducing stress, improving mood, and increasing overall well-being.



Meaningful activities:

24h-Care farms offer various meaningful activities related to gardening, walking and animal care. Engaging in these activities can promote a sense of purpose, accomplishment, and connection with the natural world. Tasks like watering plants, raking leaves, feeding animals, or harvesting crops can provide a structured daily routine and opportunities for physical exercise.



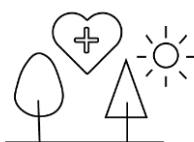
Multi-sensory experiences:

24h-Care farms provide a rich multi-sensory environment, with sights, sounds, smells, and tactile experiences that stimulate the senses. The diversity of natural elements, such as flowers, trees, animals, and the changing seasons, offers a range of sensory stimuli that can help individuals with dementia engage and connect with their surroundings.



Social interactions:

24h-Care farms foster social interactions and a sense of community. Individuals with dementia can interact with staff, volunteers, other residents, and farm animals, facilitating socialization and reducing feelings of isolation. Group activities, communal meals, or shared spaces can further encourage social engagement.



Therapeutic landscapes:

24h-Care farms are designed to include therapeutic landscapes, such as sensory gardens or walking paths. These spaces provide opportunities for individuals with dementia to engage in gentle exercise, enjoy the outdoors, and experience calming and sensory-stimulating elements, like scented plants, textured surfaces, or relaxing seating areas and experiencing the seasonal and weather changes.



Animal-assisted therapy:

Most of the studied 24h-care farms incorporate animals into their programs, which can provide therapeutic benefits for individuals with dementia. Interacting with animals, such as petting them, can promote emotional well-being, reduce anxiety, and enhance social connections.



Independent outdoor access:

A crucial therapeutic element in the design of a 24h-care farm is facilitating independent outdoor access for individuals with dementia. Providing a safe environment that allows them to go outdoors independently promotes their sense of autonomy, empowerment, and connection with nature.



Connection to agricultural rhythms:

24h-care farms follow the natural rhythms of agricultural life, such as planting, harvesting, or tending to animals. This connection to the cyclical patterns of nature can help individuals with dementia establish routines, provide a sense of stability, and enhance their overall sense of time and purpose.



Person-centered care:

Person-centered care recognizes and respects the unique preferences, needs, and abilities of each individual with dementia. The design allows for personalization and customization of the environment, accommodating individual routines, and considering personal preferences in the selection of activities and spaces. Person-centered care ensures that their individuality is honored, leading to more meaningful and fulfilling experiences within the therapeutic environment.



Recognizable environment with homely atmosphere:

Creating a recognizable environment with a homely atmosphere is another therapeutic element in 24h-Care farms for individuals with dementia. These farms strive to provide a sense of familiarity and comfort by incorporating elements that resemble a home setting. This includes cozy and inviting spaces, personalized decorations, familiar furniture arrangements, and communal areas that encourage socialization and a sense of belonging. By evoking a homely atmosphere, individuals with dementia can feel more secure and at ease, which can help reduce anxiety and promote overall well-being. Additionally, a recognizable environment with a homely atmosphere can aid in memory recall, as familiar cues and surroundings can trigger positive associations and evoke a sense of nostalgia.

By combining the therapeutic benefits of the physical environment, a 24h-care farm offers a holistic and therapeutic environment for people with dementia.

6.4. Limitations and Challenges of 24h-Care Farms

While 24h-care farms can provide a unique and therapeutic environment for individuals with dementia, there are also several potential limitations and challenges that may arise.

Limited accessibility

24h-care farms are often located in rural areas, which can make it more difficult for family and friends to visit on a regular basis compared to nursing homes that are located in more urban areas. Care farms must have appropriate protocols in place to handle medical emergencies and provide necessary medical care to residents. The limited accessibility poses a challenge in attracting a large number of volunteers.

Limited availability

The number of 24h-care farms is limited, making it challenging for everyone with dementia to access such facilities. This limitation can lead to a lack of options and availability for individuals seeking this type of care. There is also a long waiting list at the available 24h-care farms.

Individual Preferences and Dislikes

Not all individuals may have an affinity for nature or nature-based group activities. Some individuals may prefer indoor activities or have limited interest in outdoor engagements. It can be challenging to cater to the diverse preferences and interests of residents, especially if the care farm primarily focuses on nature-based activities.

Health Conditions and Physical Limitations

Seniors with dementia and seniors in general have certain health conditions and physical limitations, which may present challenges in participating in specific activities offered on care farms. Motor difficulties, balance issues, or reduced mobility may limit individuals' ability to engage in physically demanding tasks or navigate uneven terrains. Care farms need to consider the accessibility and adaptability of activities to accommodate individuals with different health conditions. Additionally, individuals with allergies or sensitivities to outdoor elements may face difficulties in participating in outdoor activities, further complicating their engagement with the care farm environment.

Reliance on available resources

The success and quality of care on a 24h-care farm heavily depend on the available resources, including many volunteers, funding, enthusiastic staffing, and community support. Limited resources or lack of sustainable funding may impact the level of care and services provided, potentially affecting the overall experience for residents.

Staffing and Training

Finding and retaining skilled and knowledgeable staff for 24h-care farms can be a challenge. Care farm staff require a unique skill set that combines dementia care expertise, agricultural knowledge, and an understanding of person-centered approaches. Ongoing training and professional development programs are necessary to ensure staff are equipped to provide quality care.

6.5. Sub-Conclusion: Case study 24h-care farms

In conclusion, the case study of 24h-care farms in the Netherlands demonstrates their effectiveness in providing a comprehensive approach to dementia care. These farms offer a wide range of activities, including animal care, horticulture, and green exercise, which contribute to the well-being of individuals with dementia. The vision of these care farms centers around creating a safe and welcoming environment that fosters connections with nature, animals, and fellow residents. The observed waiting lists for residency further demonstrate the positive outcomes and desirability of these farms.

Through therapeutic elements such as nature immersion, meaningful activities, social interactions, and person-centered care, 24h-care farms offer a holistic approach to dementia care. However, challenges such as limited accessibility, availability, individual preferences, health conditions, resource constraints, and staffing issues need to be addressed. By overcoming these challenges and continuing to prioritize the well-being of residents, 24h-care farms can continue to provide valuable care approach for individuals with dementia.

The case study revealed that the most suitable arrangement for 24h-care farms is to have 4 or 5 residences with around 7 residents per unit. This configuration maintains a small-scale and homely atmosphere, which is essential for providing personalized care and a strong sense of community.

The layout of the homes in these care farms strikes a balance between promoting independence and ensuring residents' safety. However, there are opportunities for improvement, such as providing more personal space in the bedrooms, including private bathrooms and a sitting area. Expanding the living room area with diverse seating options, both private and communal, and maximizing views to the outdoor spaces can enhance the overall experience for residents.

To gain a deeper understanding of the design of outdoor spaces in 24h-care farms, a comprehensive comparative analysis is necessary. This analysis should take into account the specific needs and challenges faced by individuals with dementia when outdoors and identify design principles that effectively address these requirements. The subsequent Chapter will explore this topic in detail, offering insights into optimizing outdoor spaces for therapeutic purposes.

7

DESIGNING OUTDOOR SPACES



7. DESIGNING OUTDOOR SPACES FOR PEOPLE WITH DEMENTIA

Although there is widespread agreement regarding the positive impact of outdoor spaces on the health and quality of life of individuals with dementia as previously discussed in Chapter 4 (Therapeutic Benefits of the Outdoors for People with Dementia), gardens and outside spaces in care facilities often fall short in delivering these benefits. While the gardens and outside spaces in care facilities may be aesthetically pleasing, they are often not effectively utilized by residents with dementia (Brawley, 2007).

This Chapter focuses on issues and needs of people with dementia when getting or being outdoors. It also explores design principles that directly target these concerns. The aim is to create an effective therapeutic design of the outdoor spaces for people with dementia, that is customized to meet their unique needs and promote their overall well-being.

In addition to the focus on the design principles of outdoor spaces addressing these issues and needs of people with dementia, a comparative analysis will be conducted. This analysis will examine the design of outdoor spaces in four 24h-care farms in the Netherlands, which were previously discussed in Chapter 6 (24h-Care Farms).

The purpose of this comparative analysis is to assess how each design principle is addressed in the existing outdoor spaces of these 24h-care farms. It is important to note that the previous case study in Chapter 6 did not thoroughly examine the design principles specifically tailored to meet the needs and issues of people with dementia when being outdoors. Therefore, this additional analysis aims to fill that gap by identifying how the design principles align with the existing outdoor space designs in the 24h-care farms. This analysis will contribute to informing the development of effective design strategies that prioritize the well-being of individuals with dementia in outdoor environments.

This Chapter is structured based on categories, including orientation, accessibility, comfort, socialization, meaningful activity, reminiscence, sensory stimulation, safe and secure perimeter, and maintenance. Each category provides a detailed description of the specific needs and issues experienced by people with dementia when being outdoors. Following, design principles addressing these needs and issues, derived from a literature study, are presented. In addition, a comparative analysis is conducted.

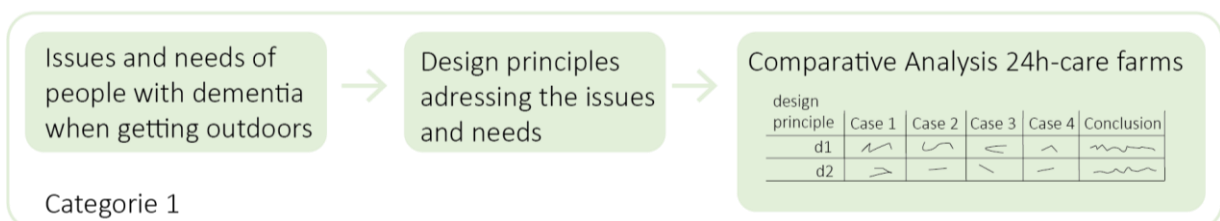


Figure 7.1 | Structure Chapter 7 on designing outdoor spaces for people with dementia

7.1. Orientation



ISSUES OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- **Disorientation**

People with dementia experience troubles locating and wayfinding (Singh & Tiwari, 2020). These impairments reduce person's ability to understand the surrounding and follow a route, recognize when they are lost or to relocate the correct route (Mitchell et al., 2003).

- **Memory loss**

People with dementia don't remember where they are going to and from where they have come, this can be confining and inhibit when they are outdoors (Cochrane, 2010).

- **Confusion and Anxiety**

People with dementia can get confused and anxious, due to changes in their environment. (Alzheimer's Association, 2021)

DESIGN PRINCIPLES ADDRESSING THESE NEEDS AND ISSUES:

Legibility:

People with dementia need help to understand where they are and identify which way they need to go, alleviating spatial disorientation, confusion and anxiety (Pollock & Marshall, 2012).

- **Simplified layout:**

The layout must be easily understood and simplified to help people with dementia navigate the space independently (Brawley, 2007).

- **Simple, Clear and easy-to-follow path system**

This can be achieved with a simple looped path system leading the users along a route of interesting focal points and then they can return where they began (Cochrane, 2010). The walk route might be circular, looped, in a figure-eight shape, or bisected (Marcus, 2007).

- **Avoid pathways with dead ends and puzzling options to choose from** (Singh & Tiwari, 2020).

People with dementia get disoriented at decision points such as corners and junctions (Mitchell et al., 2003)

- **Visible outdoor space**

The outdoor space and activities should be easily viewed from the inside to encourage individuals with dementia to venture out (Cochrane, 2010; Pollock & Marshall, 2012).

- **Visible entrance / exit**

The entrance and exit should be obvious, clearly marked and open at all times to ensure that the residents feel in control and do not feel trapped (Cochrane, 2010). The entrance and exit can be marked with a transition space.

- **Visible destination points**

Place destination points and objects where they can be seen from numerous points to encourage users to explore and so that they can orientate themselves (Cochrane, 2010).

- **Clear signage:**

Signage in the outdoor space should be clear and consistent, using large fonts, high contrast colors, and simple language to help individuals with dementia navigate the space (Pollock & Marshall, 2012). Use of signs that lead residents to key locations or entrances (Cochrane, 2010).

- **Providing cues:**

The design of the outdoor space should enable people with dementia to orientate themselves through visual cues, then they will gain a sense of control and confidence (Cochrane, 2010). The use of sensory cues, such as fragrant plants, wind chimes, and colorful flowers, can help individuals with dementia orient themselves and provide a sense of familiarity and comfort.

Interesting objects help people with dementia navigate through their environment by providing 'memory triggers'. Interesting objects are generally more effective than signs in aiding orientation and wayfinding (Mitchell et al., 2003). This can be a water feature, bird baths, benches, bright flowering, trees or a shelter with seating (Pollock & Marshall, 2012). Trees are most effective, when striking and look similar throughout the year (Pollock & Marshall, 2012).

Familiarity:

A familiar environment is critical in preventing and treating spatial disorientation, memory problems, and confusion (Mitchell et al., 2003).

- **Include familiar, simple, domestic elements**

Incorporating familiar elements, such as features from the person's past, their cultural background, or things they enjoy, can help create a sense of familiarity and help individuals with dementia feel more comfortable and at ease in the outdoor space. For many seniors are outside spaces functional spaces, rather than spaces just for sitting and admiring flowers and shrubs. In the Netherlands there is often a setting of a house and a backyard, where family and friends are having a drink at a barbeque, with kids playing in the garden, with clothes hanging on the clothes line, space for storage and maybe a small veggie patch. It is not always complex landscaping, it is often simple, domestic and familiar. Other people had no private outdoor spaces and would have used municipal parks for socializing and exercise. Grass, a plain lawn gives a good visual access between inside and outside. So the residents can see the garden from the inside and go there, and from the garden they can see the inside and return (Pollock & Marshall, 2012).

- **Simple, small domestic-style homes**

Simple, small domestic-style homes, as opposed to large-scale facilities, can provide a more familiar, comfortable, and understandable living environment. Certain modernistic styles, such as a glass sliding door, can be misinterpreted as a window by people with dementia. People with dementia should be able to recognize and understand the architectural facades and features in the design (Mitchell et al., 2003).

Transition spaces:

- **Transition spaces**

Transition spaces serve as an invite for people with dementia to move and use the outdoor space (Singh & Tiwari, 2020). Transition spaces ease the transition between inside and outside. A transition space acts as points of entry and departure. It enables the resident to step from one environment to another, or one condition to another. (Sparke et al., 2018). The transition space helps to understand the physical boundaries between inside and outside and provide cues and landmarks to orient individuals with dementia within the environment.

COMPARATIVE ANALYSIS CASE STUDY 24H-CARE FARMS

	Orientation	1: Zeilbeg	2: De Hagert	3: Reigershoeve	4: Grootenhout	Conclusion
Legibility	Simplified layout					Case 2 and 4 feature large outdoor spaces, where a lot of outdoor areas are located away from the houses. Both case 2 and 4 have a courtyard between the houses. In contrast, Case 1 and 3 feature a more compact outdoor space, with the main outdoor area located between the houses.
	Simple, easy-to-follow path system					Case 1 has an easy-to follow path system, which is quite small, compared to the other cases. Case 2 and 4 have a complex path system. Case 3 has a continuous loop system, with a main path in the middle, leading to narrower diagonal paths.
	No dead ends and puzzling options					Case 1 has three dead ends, leading to a closed gate, and only a few puzzling options. Case 2, 3, 4 have 3 to more dead ends and many puzzling options to choose from.
	Visible outdoor space (from main living space)					In Case 1 and 3, the whole outdoor space is visible from the main living spaces due to the courtyard-like system. However, in Case 3, only the square between the buildings is visible and not the other outdoor areas around it. In Case 4, the adjacent courtyards are visible, but other areas of the outdoor space are not.
	Visible entrance / exit					In all cases analyzed, doors with glass were implemented in the design.
	Visible destination points					In Case 1 and 3, the destination points are situated in visible courtyards, allowing them to be easily seen from the main living spaces. Conversely, in Case 2 and 4, numerous destination points are located deeper within the outdoor space and require residents to venture further to see them.
	Clear signage					House numbers are used by the doors in all cases. However, in Case 3 and 4, additional signs are implemented to facilitate navigation to specific destinations such as the stables, greenhouse, café, etc. Furthermore, in Case 4, signs are placed within flower boxes to indicate where flowers can be picked.
	Providing cues					In all cases analyzed, cues are placed such as colorful flowers, large trees, animals, furniture and freestanding overhead structures such as pergolas and gazebo's. Case 2, 3, 4 include a pond within their outdoor spaces.
Familiarity	Familiar, simple, domestic elements					All analyzed cases features familiar, simple, domestic elements, such as a lawn, plants, trees, outdoor furniture, barbecue, parasol, bird boxes, drying rack with clothes drying.
	Simple domestic-style homes					All analyzed cases consist of simple domestic-style rural homes.
	Different fronts of facades					There are no differences in the facades of different houses in Cases 1, 2, and 3. In contrast, Case 4 features different facades for each home. Having unique facades of each home could serve as distinctive landmarks to aid in navigation.
Transition space	Transition space					All cases features draught lobbies where residents can hang their coats. Cases 1, 2, and 3 feature direct transitions through doors from the living room to access the outdoor space, whereas some homes in Case 4 include verandas. Furthermore, some cases include freestanding built structures, such as gazebos, greenhouses, and pergolas.

Figure 7.2 | Comparative Analysis 24h-Care Farms: Orientation

7.2. Accessibility



ISSUES OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- **Physical impairment**
People with dementia have issues with physical mobility, endurance, balance and coordination, weakness of vision, risk of falling (Signh & Tiwari, 2020). Seniors have approximately half the strength and stamina of a thirty year old. Fragility is often even greater for people with dementia because cognitive symptoms are associated with a gradual and physical decline (Mitchell et al., 2003).
- **Locked doors**
Locked doors increase frustration, who resent being confined, which may lead to aggressive behavior (Brawley, 2007).

DESIGN PRINCIPLES ADDRESSING THESE NEEDS AND ISSUES:

The outdoor space should be accessible for individuals with dementia by removing the mental and physical barriers (Cochrane, 2010).

Physical connection:

- **Highly visible doors, unrestricted physical access**

Unlocked doors to the outdoor space should be highly visible and easy to use. They need to be fixed open or at least have a slow door mechanism. The doors should be glazed to allow visual access for staff and residents (Pollock & Marshall, 2012). Highly visible doors make it easier for staff to keep an eye on the residents.

- **Providing multiple easily accessible, unlocked doors increase the access to the outdoors**

Providing multiple doors can also cause problems as most individuals with dementia would disorient, it is possible when having recognizable clues to get back to safe and recognizable areas or with need for assistance (Signh & Tiwari, 2020; Brawley, 2007).

- **Thresholds**

Thresholds should be level without abrupt changes in the color of the flooring (Pollock & Marshall, 2012).

Visual connection

- **Visual access to the outdoor space**

Windows can be used for visual connections. The next best thing to being able to go outside, or being inside when the weather is poor, is at least to be able to view the outdoors and remain aware of what is going on outdoors. Some people are happier watching activities or elements outside then actually being there and participating. People with the severe stage of dementia mostly only sit and watch (Signh & Tiwari, 2020; Motealleh, et al. 2019). Residents must be aware that the outdoor space is available for use by viewing it from a well-used interior space, such as the living or dining room (Marcus, 2007).

- **Seating near windows**

Seating areas should be placed, where the walls and windows are designed to optimize their seated views (Chalfont, 2008).

Walking paths

- Walking paths should lead somewhere, such as around an interesting object, to the entrance door or to a destination point, not to dead ends or locked gates (Pollock & Marshall, 2012).
- Implementation of handrails or waist height-structures for support (Motealleh, et al. 2019)
- Smooth and even surfaces and non-slip paving materials, not too rough-textured that they impede movement (Cochrane, 2010 ; Pollock & Marshall, 2012).
- Paving material should be tinted to minimize problems with glare, using consistent color, unless when the aim is to deter people. Seniors have a lower tolerance for glare caused by light bouncing off light-colored materials. The walking paths should be made of tinted, brushed concrete with clearly defined edges. (Marcus, 2007 ; Pollock & Marshall, 2012)
- Ensure primary pathways are wide enough and easy passable for wheelchair users (Cochrane, 2010). The path should ideally be at least 1,80 wide (Marcus, 2007).
- Walking paths should be clear and easy to follow, with clear markings, good lighting.
- Avoid physical barriers that could impede mobility or cause accidents, such as steps, steep inclines, and other obstacles that could make it difficult for people with mobility impairments.

Paved areas

- Avoid large paved areas directly outside bedroom windows, or other rooms where privacy and security may be compromised (Pollock & Marshall, 2012)
- Patio's should be large enough for tables and chairs for activities such as eating (Pollock & Marshall, 2012).
- These areas need protection from elements to ensure maximum usage, such as shelter from direct sun, wind and rain (Pollock & Marshall, 2012).

Outdoor furniture

- Providing a variety of seating options
People with dementia are frequently restless, pacing, taking a short rest, and then pacing again. It is critical to provide a variety of seating options, including fixed, movable, glider, and swing seats. The chairs should be placed in various locations, with a preference for sun or shade. (Marcus, 2007).
- For seniors who are fragile, modernistic outdoor furniture may be improper and harmful. Oversized or poorly made furniture can be uncomfortable and difficult to get out of (Brawley, 2007).
- Provide raised garden beds of different heights, for ease of access (Motealleh, et al. 2019).
- Solid, robust benches with arms, tables that are stable and suitable for wheelchair users (Pollock & Marshall, 2012).
- Supplying the outdoors with tools, requiring slight strength for the use of seniors with dementia (Motealleh, et al. 2019).

Year round accessibility

Ensure accessibility of the outdoor space all year round by incorporating transition spaces, such as conservatories, sunrooms and providing indoor gardening activities (Cochrane, 2010; Motealleh, et al. 2019). People with dementia should get the chance to feel the summer sun and the cold winter chill, watch the spring growth and the autumn leaves fall (Pollock & Marshall, 2012).

Toilets: the proximity of a toilet will give people with dementia the confidence to go outdoors without worrying. An outside toilet could be placed, this was also used in the younger days of seniors with dementia. The toilet door needs to be clearly identifiable with color contrast and a sign (Pollock & Marshall, 2012).

COMPARATIVE ANALYSIS CASE STUDY 24H-CARE FARMS

	Accessibility	1: Zeilbeg	2: De Hagert	3: Reigershoeve	4: Grootenhout	Conclusion
Physical Connection	Highly visible, Glass doors					In all cases, the majority of exterior doors are unlocked and glazed, facilitating visual access for both staff and residents.
	Providing multiple easily accessible, unlocked doors					Case 1, 2, and 4 only offer access points through the living room/hallway. In contrast, Case 3 provides numerous access points through the living room, hallway, and bedrooms, including a private entrance for the residents.
Visual Con.	Visual access to the outdoor space (especially main living spaces)					In all cases, the living room has two out of four sides that lack visual access to the outdoors, with the majority of the living room area positioned along the width, resulting in fewer sightlines towards the outdoor space.
	Avoid large paved areas or busy walkways directly outside bedrooms					Case 1, 2, and 4 offer vibrant paved areas near the entrances and living rooms, which are not adjacent to the bedrooms. In contrast, in Case 3, a bustling sidewalk where visitors and residents walk is directly placed next to the bedrooms, compromising privacy.
Paved areas	Shelter from elements					Case 1 provides shelter through an awning and gazebo, whereas Case 2 relies solely on parasols. In contrast, both Case 3 and Case 4 offer additional structures for shelter, including pergolas and verandas.
	Walking path leading to destination points					In all cases, the walking paths lead to various destination points, with Case 1 having fewer options for destinations compared to the other cases.
Walking path	Handrails or waist-height structures for support					Case 1 lacks handrails or waist-height structures for support. However, Cases 1, 2, and 3 feature waist-height structures due to the fencing around the animal pastures.
	Even surface, non-slipping material and tinted to minimize glare					In all cases, cobblestones were used, which create gaps where weeds can grow and an uneven surface. Additionally, Case 2 and Case 3 feature sand paths, which are also not smooth and even.
	Easily passable for wheelchair users >1800mm					Case 1, 2, and 3 includes walking paths that are smaller than 1800mm, posing difficulties for wheelchair users to pass through. However, Case 2 offers wider paths, exceeding 1800mm in width.
	Avoid steps or steep inclines					In all cases, there are no outdoor stairs present.
Outdoor furniture	Variety of seating options					Case 1 primarily offers group seating options near the residence. Case 2 has mostly group seating options near the residents and daycare, along with two options for 1-2 persons. Case 3 provides a variety of group and private seating options near the building and at the pond. Case 4 features group seating options near the residences, as well as private seating options along walking paths.
	Robust benches with arms					All cases incorporate seating options that are robust and feature arms; however, they also include poorly designed benches lacking sturdy arms.
Year-round	Year-round accessibility, with a greenhouse or conservatory					Case 1 features a gazebo that is enclosed with glass, providing year-round accessibility. In contrast, Cases 2, 3, and 4 include greenhouses, allowing residents to engage in outdoor activities throughout the year.
	Toilet					In Case 2 and Case 4, an outdoor toilet is provided. The toilet door is designed with color contrast and includes a clear sign for easy identification.

Figure 7.3 | Comparative Analysis 24h-Care Farms: Accessibility

7.3. Comfort



ISSUES OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- Discomfort due to microclimate issues

People with dementia can experience discomfort caused by microclimate issues (Singh & Tiwari, 2020). Weather-related problems, including excessive heat, strong winds, too cold, heavy rain, or intense sunlight, have been identified as one of the primary reasons why individuals refrain from using garden spaces in facilities (Cohenmansfield, 2007).

- Discomfort due to changes in light levels

People with dementia can also experience discomfort of different light levels due to the transition indoors and outdoors. Seniors with dementia, as well as seniors in general have difficulties adjusting from indoor light levels to bright sunlight (Marcus, 2007).

- Physical disabilities

Some people with dementia have certain incapacities and lack the stamina to even walk; for them, a place to sit nearby the entrance of the building, such as a transition space, can be a place where they can observe various activities in the garden (Singh & Tiwari, 2020). "

NEEDS OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- Need for sense of enclosure (familiarity and security):

In addition to physical discomfort, individuals with dementia also have a need for psychological comfort when transitioning from indoor to outdoor spaces. This includes experiencing a sense of enclosure, security, and familiarity during the shift from a fully enclosed environment to a fully exposed one. When transitioning from indoors to the open outdoors, they may feel exposed, vulnerable, and uneasy. Some individuals with dementia prefer to stay close to the building, observing garden activities from nearby, while others prefer to step outside without being fully exposed to the elements (Marcus, 2007; Pollock & Marshall, 2012). Enclosed spaces can provide a feeling of security and familiarity, making individuals with dementia more comfortable (Chalfont, 2006).

- Need for sunlight

A study showed the positive impact of sunlight on people's well-being, highlighting their preference for sunlight in their living spaces (Littlefair, 2011). Sunlight not only illuminates and brightens a room but also imparts warmth, creating a cheerful ambiance that offers therapeutic advantages. For individuals with dementia, who may have reduced mobility, maintaining a temperature of 21-23 degrees Celsius is generally considered comfortable (Pollock & Marshall, 2012). Moreover, since vitamin D cannot be synthesized through glass, it is essential for individuals to spend time outdoors, sitting in the sunlight, to obtain this vital nutrient and fully enjoy its benefits.

DESIGN PRINCIPLES ADDRESSING THESE NEEDS AND ISSUES:

Transition space

Transition spaces serve as an invitation for people with dementia to move to and enjoy the outdoors. A transition space is a place for pleasant transition between inside and outside or for an enjoyable stay (Shahlaei & Mohajeri, 2015).

- **Terrace with outdoor furniture**

A terrace or patio just outside the entrance, featuring a BBQ, chairs and tables for activities like a barbecue and crafts.

- **Overhead structures for shelter from sun, wind, rain**

To ensure outdoor spaces can be enjoyed regardless of weather conditions, it is important to maximize shelter from the sun, wind, and rain (Pollock & Marshall, 2012). Shelter needs to be provided by built features such as walls, roofs or vegetation. Such built feature is also referred to as a transition space. Providing enough shade spaces for summer and warm, cozy places for the winter in the outdoor space (Motealleh, et al. 2019). These built features include umbrellas, trees, veranda's pergola's, and gazebos.

- **Avoid slatted roofs and combination of light and dark paving**

Slatted roofs, like the combination of light and dark paving, should be avoided because they can be seen on the paving and can be confusing (Marcus, 2007)

- **Objects creating a sense of enclosure**

Designing the outdoor space with a sense of enclosure, such as with low walls or planters, can help individuals with dementia feel more secure and reduce the sense of being lost or disoriented (Cochrane, 2010). Design the outdoor space with structures and amenities comfort, such as seating, clothing line, garden tools, water feature (Chalfont, 2006).

- **Thresholds at entrances**

Shelter thresholds at entrances to allow resident's eyes time to adjust to the change in lighting levels. (Cochrane, 2010).

- **Maximizing sun access at all times of the day**

To optimize sun exposure throughout the day, it is recommended to incorporate multiple transition spaces in different orientations. East-facing areas can be utilized for morning activities, while south-facing spaces are ideal for most of the day. In the evening during the summer, north-west-facing areas can provide a comfortable environment. The amount of sunlight and shade experienced in these spaces is influenced by factors such as the orientation of the sun, the shape and size of the structures, surrounding walls, and vegetation (Pollock & Marshall, 2012). By carefully considering these elements, the design can ensure that individuals with dementia have access to suitable sunlit areas at various times of the day.

COMPARATIVE ANALYSIS CASE STUDY 24H-CARE FARMS

Comfort	1: Zeilbeg	2: De Hagert	3: Reigershoeve	4: Grootenhout	Conclusion
Transition space					
Terrace with outdoor furniture, nearby entrance					In all cases, a paved terrace furnished with chairs and tables is situated near the entrance doors of the living room.
Overhead structures for shelter from sun, wind, rain attached to building					Case 1 incorporates an awning for shelter, whereas Case 2 does not have any overhead structures connected to the building. Both Case 3 and Case 4 feature verandas (covered terraces) providing additional protected outdoor spaces.
Freestanding Overhead structures for shelter from sun, wind, rain					Each case features one or more freestanding overhead structures used to provide shelter from the sun, wind, and rain. These structures may include options such as gazebos, parasols, greenhouses, and pergolas.
Objects creating a sense of enclosure					Each case incorporates various elements that contribute to a sense of enclosure, including a birdhouse, clothesline, barbecue, tables and seating, low hedges, planters, trees, and bushes.
Thresholds at entrances					Case 3 and Case 4 feature entrance thresholds that facilitate a seamless transition in light levels, enhancing the comfort when moving between indoor and outdoor environments.
Maximizing sunlight access					In all cases, the residences include paved terraces on 1 or two sides of the building. However, not all of these spaces are south facing, resulting in limited sunlight exposure. To further enhance the experience of the seating areas, it would be beneficial to consider placing additional seating options on different sides of the building, maximizing sun access and offering diverse seating experiences.

Figure 7.4 | Comparative Analysis 24h-Care Farms: Comfort

7.4. Socialization



NEEDS OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- **Social interaction**

Being outdoors can provide an opportunity for social interaction and companionship for people with dementia, which is important for their emotional well-being (Pollock & Marshall, 2012).

ISSUES OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- **Mood swings and restless behavior** (Singh & Tiwari, 2020).

DESIGN PRINCIPLES ADDRESSING THESE NEEDS AND ISSUES:

Providing interactive elements

Providing interactive elements in the outdoor space that bring people together and encourage social interaction between residents, staff, family, children, or animals to improve their quality of life (Motealleh, et al. 2019; Cochrane, 2010).

- **Vegetable garden**

Incorporating a vegetable garden, featuring raised garden beds (Cochrane, 2010). Raised garden beds can make gardening more accessible, particularly for individuals with mobility issues, as they minimize the need for bending or kneeling.

- **Animals**

Providing small pastures for animals with sheds, including farm animals like chickens, goats, sheep's, Shetland ponies, rabbits, pigs, an aviary and alpacas.

- **Playground for children**

Providing a playground for children can not only keep them engaged and entertained during visits but also be enjoyable for everyone involved. However, it is essential to prioritize the safety of individuals with dementia when selecting appropriate play equipment (Pollock & Marshall, 2012; Cochrane, 2010).

- **Place for attractive and social setting**

Provide an attractive and social setting for a snack, picnic or barbeque. The smell of food cooking, can trigger appetite (Pollock & Marshall, 2012).

- **Place for retreat**

To accommodate different needs, large outdoor spaces can be divided into areas of varying sizes and privacy levels, catering to socialization as well as quiet and private areas (Cochrane, 2010). For individuals with dementia, it is crucial to have quiet spaces where they can retreat, which could be surrounded by plants that evoke memories and soothing scents (Pollock & Marshall, 2012).

- **Provide suitable furniture to increase social interaction** (Motealleh, et al. 2019).

Providing seating areas under trees or overhead structures, which offer shaded areas for protection from the sun, can enhance opportunities for social interaction (Brawley, 2007).

- **year-round sheltered area for social interactions**

Include a year-round sheltered outdoor entertaining area for celebrations, family visits, and outdoor group activities (Cochrane, 2010).

COMPARATIVE ANALYSIS CASE STUDY 24H-CARE FARMS









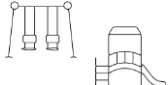







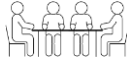

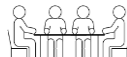





Socialization		1: Zeilbeg	2: De Hagert	3: Reigershoeve	4: Grootenhout	Conclusion
Transition space	Vegetable garden					In all cases, vegetable gardens are present, devoid of raised beds, and vary in size. De Hagert features a significantly large nursery primarily utilized by individuals with intellectual disabilities, volunteers, and those who rent a piece of land there. The other cases feature small vegetable gardens for people with dementia; however, the maintenance of these gardens is largely carried out by the gardening group and volunteers.
	Animals					Case 1 includes animals; however, they are not freely accessible and residents must leave the enclosed perimeter to interact with the animals. In contrast, all the other cases have a variety of animals within the perimeter. The animals have a small pasture enclosed by fencing, along with a shed.
	Playground for children					Case 4 is the only one that features a playground for children. The playground is equipped with relatively simple equipment and is conveniently located adjacent to the café and bustling outdoor terrace.
	Place for attractive social setting					In all cases, appealing social settings are positioned next to the buildings, comprising paved terraces furnished with chairs and tables.
	Place for solitude and privacy					In each case, there are no private spaces directly adjoining the residences. Instead, these spaces are situated within the outdoor area, featuring benches near animal pastures and a tree with a round bench in case 4.
	Provide suitable furniture for social interaction					In all cases, tables accommodating more than six individuals are strategically placed to foster suitable settings for social interaction.
	Year-round sheltered area for social interactions					In Case 1, there is only a compact enclosed gazebo available for social gatherings, accommodating no more than 10 individuals. However, Cases 2, 3, and 4 feature café spaces capable of accommodating over 40 people. Additionally, they feature areas dedicated to social interaction such as workspaces, studios, and other communal living room spaces that can accommodate larger groups of people.

Figure 7.5 | Comparative Analysis 24h-Care Farms: Socialization

7.5. Safe and secure perimeter



NEEDS OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- Supporting independency and sense of autonomy

Despite their memory and cognitive difficulties, many people with dementia still desire to maintain their independence and make their own decisions as much as possible. Allowing for independence and autonomy can help improve the person's sense of self-esteem, dignity, and well-being. It can also help reduce feelings of isolation and depression, and promote a more positive outlook on life.

- Need for constant supervision by staff

The staff should also feel relaxed and comfortable in encouraging residents to get outdoors. The outdoor space must be a safe environment without hurting the feelings of the residents, without demeaning them. The residents should not get a feeling of imprisonment or "fenced in". Making them feel imprisoned is a way to encourage them to escape (Pollock & Marshall, 2012; Singh & Tiwari, 2020).

ISSUES OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- Lack of awareness and reflection

People with dementia do not always have the ability to know what is safe and secure and what is not (Pollock & Marshall, 2012; Singh & Tiwari, 2020).

DESIGN PRINCIPLES ADDRESSING THESE NEEDS AND ISSUES:

- Visibility of the outdoor space to the staff

Ensure that the outdoor space is visible to the staff, allowing them to feel comfortable with providing unrestricted access for individuals with dementia (Cochrane, 2010).

- Avoid poisonous plants(Cochrane, 2010)

Poisonous plants should be avoided since people with dementia have a tendency to put things in their mouth (Marcus, 2007).

Fencing

- Enclosed area

The outdoor space should be securely enclosed with a fence or vegetation to prevent residents from wandering off (Marcus, 2007).

- Low fences

The height and the design of a fence and other barriers are critical factors in this feeling of imprisonment. The fence should be as low as possible to avoid feeling of imprisonment (Pollock & Marshall, 2012).

- Natural boundaries

The feeling of imprisonment can be minimized by drawing their attention away from the perimeter, by concealing them with vegetation (Pollock & Marshall, 2012).

- Impeding climbing

Ensuring a safe garden environment requires preventing any potential footholds on the site (Pollock & Marshall, 2012). When installing fencing, it is important to place the posts on the outside, carefully eliminating any footholds (Cochrane, 2010).

- Concealed gates

To promote a secure environment, gates should be locked and camouflaged to seamlessly blend with the fence, avoiding any visible indication of a locked gate that could cause frustration and confusion (Pollock & Marshall, 2012). Entrances and exits not intended for residents should be disguised, with inconspicuous handles and locks (Cochrane, 2010).

COMPARATIVE ANALYSIS CASE STUDY 24H-CARE FARMS



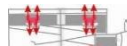

















Safe & Secure Perimeter	1: Zeilbeg	2: De Hagert	3: Reigershoeve	4: Grootenhout	Conclusion
Visibility of the outdoor space to the staff					In Case 1 and 3, the whole outdoor space is visible from the main living spaces due to the courtyard-like system. However, in Case 3, only the square between the buildings is visible and not the other outdoor areas around it. In Case 4, the adjacent courtyards are visible, but other areas of the outdoor space are not.
Man-made fencing					Case 1, 3, and 4 primarily feature man-made fencing to enclose the perimeter. In Case 1, a taller fence with wire mesh is used to enclose and secure the residents, creating an 'fenced in' feeling to the residents.
Man-made fencing					Case 2, on the other hand, utilizes man-made fencing made mainly of wire mesh and timber for only the animal pastures. The perimeter is primarily enclosed using natural boundaries, such as hedging.
Natural boundaries					In Case 3, the animal pastures are enclosed with timber fencing, while the perimeter is fenced with wire mesh, cleverly adorned with plants (natural boundary) to create a more inviting atmosphere.
Concealed gates					In Case 4, there is a significant amount of man-made fencing, but it is designed to be more friendly with low timber fencing. In Cases 2, 3, and 4, some of the animal pastures themselves serve as boundaries, contributing to a friendly environment for the residents.

Figure 7.6 | Comparative Analysis 24h-Care Farms: Safe and Secure Perimeter

1 | (Dagbesteding op de Hagert, n.d.) 2 | (Raffaan NXT, 2021) 3 | (Google Maps, 2023) 4 | (Google Maps, 2023)

7.6. Meaningful activity



NEEDS OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- **Being involved in society**

People with dementia still want to be active and involved in society. People develop activities and interests, likes and dislikes, skills and talents throughout their lives, which give structure and meaning to their lives and provide a sense of worth. These activities can be recreational or domestic, such as cooking or maintaining a daily routine (Cochrane, 2010).

- **Watching activities**

People with dementia enjoy watching activity outdoors and being near the entrance of the building (Chalfont, 2008).

- **Physical activity**

Regular physical activity is important for people with dementia and can improve their overall health and well-being, it slows down the process of the disease and promotes appetite and sleeping.

ISSUES OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- **Lack of motivation and initiative**

People with dementia have several insecurities which lead to seclusion from surroundings and have less to no willingness or any drive to get out (Singh & Tiwari, 2020).

DESIGN PRINCIPLES ADDRESSING THESE NEEDS AND ISSUES:

- **Provide walking paths leading to destination points.**

Design a safe walking path to encourage people with dementia to exercise. Walking routes that are only aimed at walking fail to its objectives because restless residents often keep walking if they do not encounter anything along the way, which can lead to fatigue and thus to falls. By creating meaningful destinations at the beginning, middle and end of a walking route, 'wandering' can be changed into walking with a purpose (Vos, 2013). Meaningful destinations can be interactive elements that residents can interact with rather than just looking at it, such as feeding (a chicken coop) or petting animals and picking strawberries from the vegetable garden. (Vos, 2013).

- **Provide seating areas next to interactive elements**

Designing an inviting seating area that allows for birdwatching, listening to the soothing sounds of tinkling water, or sitting under a tree can help individuals reconnect with nature, promoting psychological stability (Singh & Tiwari, 2020). Additionally, creating seating areas under a pergola, in a gazebo, or in a greenhouse can encourage people to engage in physical activity (Pollock & Marshall, 2012).

- **Creating a route that loops both inside and outside**

Design a looping route that encompasses both indoor and outdoor spaces to provide a more engaging and stimulating experience (Cochrane, 2010)

- **Providing equipment's for exercise and physical activity**

Being outdoors can provide an opportunity for exercise and physical activity, such as walking, gardening, or playing games (Brawley, 2007). Include games such as a Jeu de Boule court or exercise equipment as valuable additions to the garden.

- **Include home-like activities in the garden**

Engaging in activities such as raking leaves, sweeping sidewalks, feeding animals, watering flowers, gardening, or hanging clothing on a line can help stimulate long-term memories of home life (Brawley, 2007; Cochrane, 2010).

- **Include garden elements that necessitate daily interaction**

Incorporate garden elements that encourage daily interaction, such as planters for watering plants and animal feeding (Cochrane, 2010). Animals can serve as a reason for individuals to venture outdoors (Pollock & Marshall, 2012).

- **Vegetable garden**

Create an area for gardening and plants, including raised beds and seating, allowing residents to actively participate in food production (Singh & Tiwari, 2020; Brawley, 2007; Cochrane, 2010). This promotes a sense of community involvement, self-esteem, and provides opportunities for residents to enjoy growing vegetables, herbs, fruits, and flowers (Pollock & Marshall, 2012).

- **Water features**

Water can be an appealing feature in outdoor spaces, but safety measures must be taken. Ponds can serve as habitats for fish and water sources for birds, but the presence of a fence or wall can deter residents from accessing them. Additionally, the presence of moving water, such as in a soothing fountain, can provide enjoyment. A waist-high "trickling" fountain can be pleasant to listen to and touch, but it is important to consider its proximity to toilet facilities due to the potential urge to urinate (Pollock & Marshall, 2012).

COMPARATIVE ANALYSIS CASE STUDY 24H-CARE FARMS


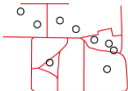
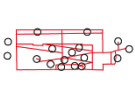



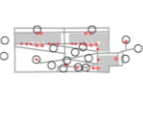


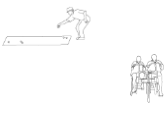






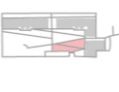





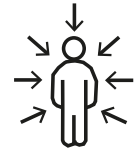
	Meaningful activity	1: Zeilbeg	2: De Hagert	3: Reigershoeve	4: Grootenhout	Conclusion
Transition space	Walking Paths leading to destination points (interactive elements)					In all cases, the walking paths guide residents to different destination points. However, in Case 1, there are fewer options for destinations compared to the other cases.
	Seating areas near interactive elements					In all cases, seating is strategically placed next to meaningful destination points. However, there are also destination points that do not include any seating options.
	Providing exercise equipment's					In Case 3 and Case 4, a Jeu de boules court is available for residents, along with tricycles and duo bicycles for cycling. Additionally, in all cases, residents have access to garden equipment such as wheelbarrows, watering cans, and other essential tools.
	Include home-like and daily activities in the garden					In all cases, residents are engaged in home-like activities, including tasks such as raking leaves, sweeping walkways, feeding animals, and watering plants.
	Vegetable garden					In all cases, vegetable gardens are present, devoid of raised beds, and vary in size. De Hagert features a significantly large nursery primarily utilized by individuals with intellectual disabilities, volunteers, and those who rent a piece of land there. The other cases feature small vegetable gardens for people with dementia; however, the maintenance of these gardens is largely carried out by the gardening group and volunteers.
	Water feature					In Cases 2, 3, and 4, ponds are included as attractive water features. In Case 3 and 4, seating is placed near the ponds, providing residents with the opportunity to sit and enjoy the presence of ducks and fish.

Figure 7.7 | Comparative Analysis 24h-Care Farms: Meaningful Activity

7.7. Sensory stimulation



NEEDS OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- **Sensory stimulation**

People with dementia need a choice of levels of stimulation, offered by the outdoor space and need opportunities to independently choose and access these different stimulation levels (Chalfont, 2008). Sensory stimulation is important for an individual's emotional well-being. Sensory stimulation can help them communicate and convey emotional support, affection, and respect. Sensory stimulation is defined as the use of any of the five senses: sight, sound, taste, touch, and smell (Cochrane, 2010).

ISSUES OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- **Sensory overload**

Overstimulation from bright lights, loud noises, or large crowds can be overwhelming for people with dementia and cause agitation or distress.

DESIGN PRINCIPLES ADDRESSING THESE NEEDS AND ISSUES:

Sensory garden

Create an outdoor space that engages all five senses by incorporating scent, color, texture, sound, taste, and seasonal changes. (Cochrane, 2010).

- **interactive elements**

Include interactive and engaging garden elements for people with dementia, such as a water feature, animals, and wind chimes. (Cochrane, 2010).

- **Visibility from the inside**

Make sure that the outdoor space can be viewed from inside, so that watching the wind in the trees or rain can be enjoyed when it's cold outside. (Cochrane, 2010).

- **Planters and raised beds at various heights**

Installing flower or plant beds at various heights for ease of touching, smelling and observing (Motealleh, et al. 2019). Include pottery of plants at various heights (raised beds and hanging pots) to allow people with dementia to touch, smell, or taste it. (Cochrane, 2010).

- **Activity program on stimulating five senses**

Work with staff to create an activity program that focuses on stimulating the five senses. (Cochrane, 2010).

Planting

- **Popular plants during the youth of the residents**

Including plants that were either popular during the youth of the residents or have attractive perfume (Pollock & Marshall, 2012). Plants that may trigger memories by their type or perfume: roses, clematis, stocks, mint, thyme, jasmine, lavender, rosemary, lemongrass

- **Plants that attract birds and wildlife**

Incorporate trees and plants that attract native birds and wildlife, which can provide endless entertainment (Cochrane, 2010; Pollock & Marshall, 2012). Examples of such plants include Bottlebrush, lavender, and Butterfly bush.

- **Plants with year-round interest:**

Trees that announce the seasons, such as spring flowers, summer flowers and autumn color (Pollock & Marshall, 2012). Examples of such trees include Magnolia, Ornamental pear, Maple, Ash tree, Camellia.

- **Evergreen plants**

Evergreen plants are known for their ability to retain their foliage throughout the year, adding greenery to the landscape. Examples of such plants is the Conifer.

- **Edible plants**

Edible plants, such as fruit trees, herbs and vegetables (Pollock & Marshall, 2012).

- **Plants with different textures**

Plants that have different textures in the foliage and flowers: eucalypt tree, wattle and grevilleas (Pollock & Marshall, 2012).

- **Plants to touch**

Plants to touch, such as bark of a tree and the conifer.

- **Plants with sound**

Plants that produce sound can add an enchanting element to the surroundings. Examples of such plants include fountain grass and trees with rustling leaves.

- **Warm colored plants**

Warm colored plants, as eyes of seniors can more easily discern colors in the white / yellow / orange / red range than blue or lavender ranges (Pollock & Marshall, 2012).

- **Thorny and poisonous plants should be avoided**

Poisonous plants should be avoid, because people with dementia might eat them (Pollock & Marshall, 2012).

- **Different tree sizes**

Choose trees of different sizes, favoring small and medium-sized ones, unless there is a spacious park-like area where larger trees can thrive. When planting trees near walking paths, avoid species with heavy leaf gall that can make surfaces slippery, and select trees that don't produce fruits or seeds that may cause harm to those sitting underneath (Pollock & Marshall, 2012).

- **Grass / lawn areas**

Grass / lawn areas encourage people to walk on it without shoes and sit and smell the freshly mown grass (Pollock & Marshall, 2012).

Lighting

- **Night lighting**

Include night lighting for viewing from inside and for night use. (Cochrane, 2010; Motealleh, et al. 2019). High-level downlighting, like traditional street lights or mounted on the building is appreciated, low lighting can cause confusing shadows (Pollock & Marshall, 2012).

COMPARATIVE ANALYSIS CASE STUDY 24H-CARE FARMS



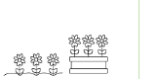
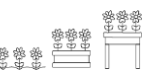









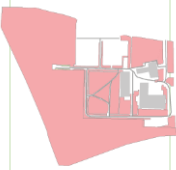

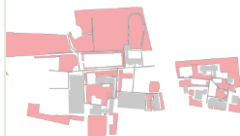
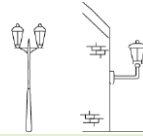
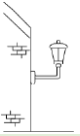
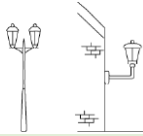
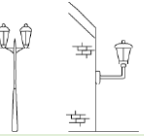
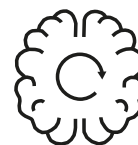
Sensory Stimulation	1: Zeilbeg	2: De Hagert	3: Reigershoeve	4: Grootenhout	Conclusion
Planters and raised beds at various heights					Flowers are often planted in raised planters, while vegetables and herbs are cultivated in ground-level vegetable gardens. Different sizes of pots are arranged at varying heights to accommodate a diverse range of plants.
Plants that stimulates the 5 senses					In the gardens of all cases, trees, flowers, vegetables, herbs, and bushes are arranged to engage and stimulate the five senses.
Different tree sizes					In Case 1, only three very small trees are placed. In Case 2, a greater number of trees of different sizes are incorporated, including an orchard. In Case 3, smaller trees are planted as they are still in their early stages of growth. In Case 4, numerous large trees create a lush and inviting atmosphere, adding to the overall greenery.
Grass / lawn areas					All cases feature extensive lawn areas, facilitating easy oversight of the outdoor space for both staff and residents. This design choice not only creates a sense of spaciousness but also contributes to a vibrant and green ambiance.
Night Lighting					In all cases, familiar-looking lampposts are incorporated into the design. These lampposts are both freestanding and attached to the walls of the residences.

Figure 7.8 | Comparative Analysis 24h-Care Farms: Sensory Stimulation

7.8. Reminiscence



NEEDS OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:

- **Memory stimulation**

Encouragement of reminiscence can be beneficial to the well-being of people with dementia. Reminiscence can include sharing memories with others as well as passing on knowledge, skills, and wisdom. By providing reminiscence objects and activities, people with dementia can maintain a sense of worth, importance, peace, and belonging (Cochrane, 2010).

DESIGN PRINCIPLES ADDRESSING THESE NEEDS AND ISSUES:

- **Include objects that bring back memories**

Because many people with dementia remember details from their childhood, the design should include plants and reminiscence objects that may trigger long-forgotten memories. Many people's homes are reflected in their lawns (Marcus, 2007). Include objects that bring back memories, such as bird baths, pottery, clothe line, brooms for sweeping paths, watering cans, other gardening equipment, barbeque, old cars, familiar plants, and wheelbarrows(Cochrane, 2010; Motealleh, et al. 2019; Marcus, 2007). Also items such as post boxes, bus shelters can be useful as reminiscence objects in the garden (Pollock & Marshall, 2012). Ensure that garden elements are of a style and material that the users are familiar with (Cochrane, 2010).

- **Activity program to evoke memories**

Create an outdoor activity program for people with dementia that evokes memories (Cochrane, 2010).

COMPARATIVE ANALYSIS CASE STUDY 24H-CARE FARMS

Reminiscence objects	1: Zeilbeg	2: De Hagert	3: Reigershoeve	4:Grootenhout	Conclusion
Familiar objects that bring back memories					<p>In all cases, reminiscence objects are thoughtfully incorporated, such as clothing lines, plants in pottery, BBQ areas, bird boxes, and vintage garden equipment. In Case 3 and 4, a bus shelter is also included for added nostalgia. In Case 4, an experiential garden is designed, featuring objects like an old car. Additionally, a mailbox from Post NL is placed to allow residents to post letters.</p>

Figure 7.9 | Comparative Analysis 24h-Care Farms: Reminiscence Objects

7.9. Maintenance

NEED OF PEOPLE WITH DEMENTIA WHEN GETTING OR BEING OUTDOORS:



The maintenance needs in a garden for people with dementia are primarily related to the staff, volunteers, and gardening groups responsible for tending to the garden. Therefore, the focus should be on meeting their needs. Since the gardening group in 24h-care farms often consists of volunteers, it is advisable to design a self-sufficient garden with low-maintenance plants. This will help ensure that the garden can be easily managed and cared for by the volunteers, reducing the burden of maintenance tasks.

DESIGN PRINCIPLES

- Use of low maintenance plants except in the interactive raised beds used for horticultural activities or sensory stimulation (Cochrane, 2010).
- Ensure that the design of the garden is self-sufficient (Cochrane, 2010). Implementing an automated irrigation system and a drainage system, like a wadi, can enhance the garden's functionality and water management.
- To maintain the garden effectively, it is advisable to form a regular gardening group and provide a nearby shed for easy maintenance (Cochrane, 2010).
- Proper care and attention should be given to all animals (Pollock & Marshall, 2012).
- Water features, like ponds, require regular treatment and maintenance to ensure their health and vitality (Pollock & Marshall, 2012).









Maintenace	1: Zeilbeg	2: De Hagert	3: Reigershoeve	4:Grootenhout	Conclusion
Drainage system			Pond = wadi 		In Case 3, there is a pond in the outdoor area that serves as a wadi, storing water. A wadi is designed to collect and retain water, helping to manage runoff and promote water conservation. The pond-wadi serves both functional and aesthetic purposes, providing water storage while adding visual appeal to the garden.
Regular Gardening Group					In Case 1, 2, and 3, there is a dedicated gardening group comprised of volunteers who take care of the garden maintenance. However, in Case 4, the garden is maintained by employed staff members.
Care for animals					In Case 1, the animals on the care farm are not directly cared for by the residents and staff. Instead, their neighbor takes care of the animals on his own property. However, in Cases 2, 3, and 4, the animals are primarily cared for by the residents and staff themselves. Feeding and watering the animals is integrated into their daily routine.

Figure 7.10 | Comparative Analysis 24h-Care Farms: Maintenance

7.10. Sub-Conclusion: Comparative analysis

In conclusion, this chapter delved into the identification of issues and needs faced by individuals with dementia when being outdoors, along with exploring design principles to address these needs through a comprehensive literature review. The design principles encompassed various categories, including orientation, accessibility, comfort, socialization, meaningful activity, reminiscence, sensory stimulation, safe and secure perimeter, and maintenance. Upon analyzing the implementation of these design principles in four existing 24h-care farms, variations in their application across different cases were observed. It is essential to recognize the areas where improvements can be made as well as the aspects that are well-implemented within each design category.

Orientation:

The existing 24h-care farms have implemented various design principles to support orientation, such as simplified layouts, visible entrance and exit points, clear signage, and the inclusion of cues and familiar elements. However, there are opportunities for improvement, including reducing dead ends and puzzling options, and enhancing the visibility of outdoor spaces and destination points.

Accessibility:

The analyzed 24h-care farms show varying levels of implementation of accessibility design principles. While some aspects, such as highly visible glazed doors, are well-implemented, improvements can be made in areas like having more physical access points and visual access from living spaces, avoiding busy communal paved areas near bedrooms, and providing smoother and more even surfaces. Additionally, there is a need for wider pathways for wheelchair users and more robust seating options.

Comfort:

The analyzed 24h-care farms have effectively implemented design principles of comfort by providing paved terraces with outdoor furniture, overhead structures for shelter, and objects creating a sense of enclosure. However, improvements can be made by introducing entrance thresholds for seamless light transitions and maximizing sun access through multiple transition spaces in different orientations. Additionally, adding more seating options on different sides of the building in the transition spaces would enhance the experience and maximize sun exposure. These enhancements would further improve the comfort and well-being of individuals with dementia when they are outdoors.

Safe and Secure Perimeter:

In contrast to the enclosed areas with concealed gates mentioned in the literature study, the 24h-care farms provide visible gates or even no gates, allowing residents the freedom to leave and move around more independently. The incorporation of natural boundaries and low timber fences contributes to a warm and inviting atmosphere.

Socialization:

The analyzed 24h-care farms have effectively implemented design principles for socialization through features such as vegetable gardens, animals, playgrounds, attractive social settings, and seating areas. Suggestions for improvement include enhancing the accessibility of vegetable gardens, and creating private spaces for solitude, and incorporating more year-round sheltered areas for social interactions (transition spaces).

Meaningful Activity:

The examined 24h-care farms have successfully implemented design principles for meaningful activity by incorporating walking paths with interactive elements, seating areas near these elements, exercise equipment, home-like activities, vegetable gardens, and water features. However, there is room for

improvement in terms of expanding destination options along the walking paths without being too distant and ensuring the availability of seating at all points of interest.

Sensory Stimulation:

The 24h-care farms offer a range of sensory experiences that engage all five senses. However, there is potential for improvement by expanding the variety of plants and incorporating raised beds accessible for seniors with physical impairments, specifically with the inclusion of edible plants. These enhancements would further enrich the sensory stimulation for individuals with dementia.

Reminiscence:

The 24h-care farms have effectively implemented design principles for reminiscence by including familiar objects that evoke memories, such as clothing lines, plants in pottery, BBQ areas, and vintage garden equipment. Some farms even feature additional elements like bus shelters, a mailbox and an old car. These objects create a nostalgic atmosphere and facilitate reminiscing for people with dementia.

Maintenance:

The 24h-care farms have effectively implemented maintenance design principles, including the use of a drainage system and the presence of dedicated gardening groups and sheds. However, there is room for improvement in terms of increasing self-sufficiency.

By taking into account the specific needs and issues faced by individuals with dementia when outdoors and implementing appropriate design principles, outdoor spaces can be optimized to support their well-being, independence, and engagement. Referring to the findings from this Chapter can be beneficial for designers and individuals working in the dementia care field. It serves as a valuable resource in creating therapeutic outdoor environments that enhance the quality of life for individuals with dementia.

8

HOW TO IMPROVE 24H- CARE FARMS



8. HOW COULD EXISTING 24H-CARE FARMS BE IMPROVED?

By referring back to the Sub-Conclusion of the previous Chapter on designing outdoor spaces for people with dementia, it becomes evident that improvements are necessary in various design categories to enhance 24h-care farms. The analysis of existing 24h-care farms revealed variations in the implementation of design principles, highlighting both well-implemented aspects and areas for enhancement. By recognizing these factors and utilizing the findings from Chapter 7 on 'Designing Outdoor Spaces for People with Dementia' as a valuable resource, it becomes possible to design outdoor environments that significantly improve the quality of life for individuals with dementia.

One recurring area for improvement, identified in multiple design categories such as comfort, accessibility, socialization, and orientation, is the design of transition spaces. Therefore, it is crucial to focus on creating effective transition spaces that establish a stronger connection between indoor and outdoor environments. This entails enhancing visual and physical access to facilitate a seamless transition from inside to outside, maximizing sun exposure, and offering a diverse range of seating options, communal and private, to enhance overall well-being.

To gain a comprehensive understanding of how to design transition spaces for individuals with dementia, conducting a more thorough literature review on creating pleasant transitions between indoors and outdoors is necessary. This will provide valuable insights and design principles for improving the design of transition spaces in 24h-care farms, ultimately enhancing the therapeutic environment for individuals with dementia.

The upcoming Chapter on designing transition spaces will delve further into addressing the identified need for improvement in creating effective connections between indoor and outdoor environments.

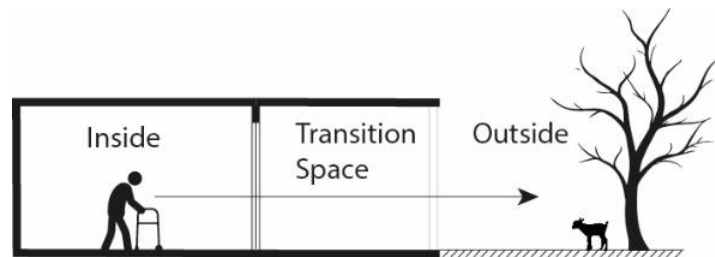


Figure 8.1 | Transition space between indoors and outdoors

9

DESIGNING TRANSITION SPACES



9. DESIGNING AN INDOOR / OUTDOOR RELATIONSHIP WITH TRANSITION SPACES

This Chapter aims to add some knowledge about creating an indoor / outdoor relationship and the design of transition spaces in residences for people with dementia. By first exploring the relationship between inside and outside in architecture and to focus on its transition, boundary and connection. Looking at the potential to blur the boundary between inside and outside. Following, the design principles to create an effective flow between inside and outside have been identified and a case study has been investigated to explore the approaches, purposes, and physical forms of transition spaces. The results and findings can enhance design considerations of transition spaces in architecture of residences for people with dementia.

9.1. Inside, Outside and Transition spaces

Transition spaces play a vital role in facilitating a seamless and comfortable transition between indoor and outdoor environments (George, 2009). Transition spaces can be defined as areas that blur the boundaries between inside and outside, providing a sense of being indoors and outdoors at the same time (George, 2009). Understanding the distinction between inside and outside is crucial to comprehend the significance of transition spaces (Shahlaei & Mohajeri, 2015).

Architecture involves differentiating one space from another, particularly distinguishing the inside from the outside. Although they coexist and are often separated by transparent borders, the inside and outside are distinct worlds that cannot be experienced at the same time, someone is either in one world or the other (Brookes, 2012). Throughout history, architecture has aimed to provide shelter and habitation through indoor spaces while utilizing the natural environment outdoors (Shahlaei & Mohajeri, 2015).

Outside

The outdoors exposes individuals to essential elements required for survival, while natural rhythms and cycles, such as the seasons and day-night cycles, influence human lifestyles. However, the outdoor environment is not always welcoming and can pose threats and undesirable conditions (such as rain, wind, heat and cold), prompting humans to seek refuge inside (Shahlaei & Mohajeri, 2015).

Inside

The indoor environment satisfies the innate human need for shelter, offering protection, privacy, and a secure and intimate setting (Brookes, 2012). The concept of home, representing the inside, has historically been seen as a sanctuary from the larger world and the challenges of society, providing a distinct separation (Sparke et al., 2018).

Boundary, the indoor / outdoor relationship

A relationship means the connection between two things. The inside and outside are parts and the connection is served by elements like openings (doors) and visual access (windows) and has improved over time by incorporating transition spaces to improve quality of life (Brookes, 2012). Transition spaces address both physiological and psychological demands, including the need for light, air, sun, climate control, protection from external hazards, privacy, security, and a sense of identity and orientation

(Brookes, 2012). By integrating these demands within transition spaces, the transition between inside and outside can be facilitated more smoothly.

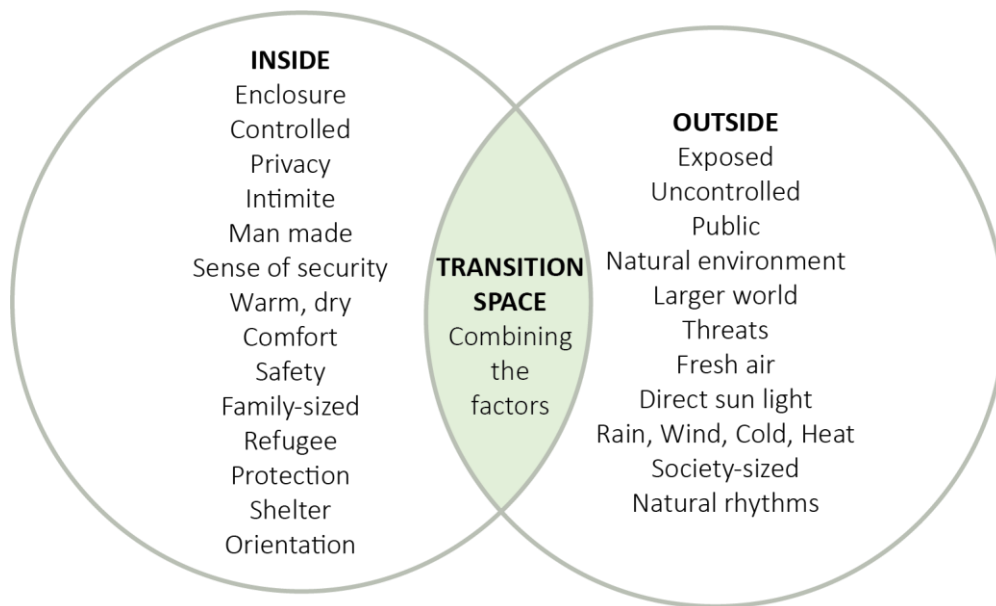


Figure 9.1 | Transition spaces, combining the factors from the inside and outside

The boundary or connection between inside and outside can be divided in three different approaches (Shahlaei & Mohajeri, 2015):

1. Connection through solid two-dimensional elements like doors and windows

The connection between inside and outside can be achieved through two-dimensional elements like doors and plate-glass windows, creating a solid separation. However, this limited connection restricts the utilization of the outdoor environment, which can negatively impact the quality of living spaces (Shahlaei & Mohajeri, 2015).

2. Connection through two-dimensional elements, where the boundary is faded

Another approach involves blurring the line between inside and outside, creating a seamless connection where the boundaries of the building fade away. This conflation of spaces aims to maintain a sense of spatial continuity and can be achieved through design solutions such as slide-away glass doors. However, this approach is dependent on specific climate conditions and is more commonly used in modern architecture, not suitable as a solution for individuals with dementia (Shahlaei & Mohajeri, 2015; Sparke et al., 2018; Mitchell et al., 2003).

3. Connection through three-dimensional transition spaces

Transforming the two-dimensional connection into a three-dimensional transition space can enhance the qualities of both inside and outside simultaneously. This design approach allows for the integration of indoor and outdoor elements, adding pleasure and quality to architectural spaces (Shahlaei & Mohajeri, 2015).

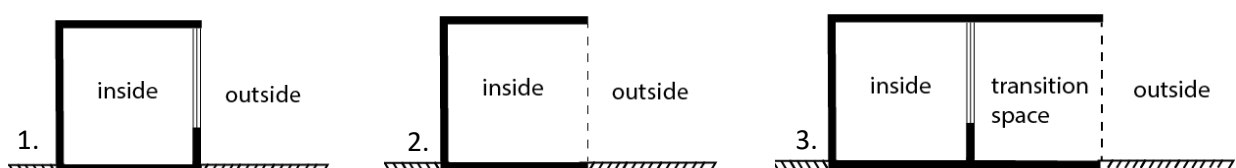


Figure 9.2 | Three approaches of connecting the inside and the outside

Transition space

The transition space, also referred to as in-between space, differentiation, intermediate space, connection, border, threshold, or line of tension, represents an inside-outside space that creates a sense of being simultaneously indoors and outdoors (Shahlaei & Mohajeri, 2015). It can be viewed as a gray area where architecture and the landscape intersect (George, 2009). While the inside space provides shelter and offers physical and psychological comfort, the outdoor environment offers advantages that people require. The transitional space serves as a design solution to fulfill the human need for leveraging both inside and outside environments (Shahlaei & Mohajeri, 2015).

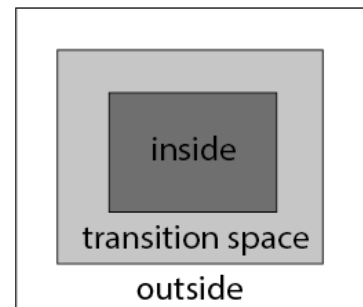


Figure 9.3 | Transition space as a grey area

Unfortunately, the connections between inside and outside are often overlooked and reduced to standardized ideals and components. Many buildings neglect transitional spaces, thereby diminishing the overall quality of the space. In earlier architectural styles, the traditional transition between inside and outside was achieved through standardized components like doors but lacked a seamless continuity between indoors and outdoors in the building's design (Brookes, 2012). However, there is currently a shift in focus towards blending the benefits of both inside and outside, blurring the boundaries between them (Shahlaei & Mohajeri, 2015).

9.2. Benefits of a transition space for people with dementia

Transition spaces play a crucial role in connecting people with dementia to the outdoor environment, serving as an invitation for movement and engagement (Singh & Tiwari, 2020). For individuals with limited mobility, the transition space provides an opportunity to observe and enjoy various activities in the garden (Singh & Tiwari, 2020). A transition space serves as a pleasant intermediary zone between the indoors and outdoors, offering a pleasant transition and a comfortable place to stay for residents. Wind-protected and shaded terraces, for example, allow individuals to step outside while still enjoying the comforts of an indoor room.

Transition spaces provide an area for walking while contemplating the garden and protection from undesirable elements such as extreme temperatures and wind (Shahlaei & Mohajeri, 2015). Transition spaces act as points of entry and departure, facilitating a smooth transition from one environment or condition to another, with fluid relations between indoors and outdoors (Sparke et al., 2018).

The comfort and security experienced indoors extend to the transition space, which provides opportunities for sensory stimulation, nature views, and adjustment of the eyes before going outside. Transition spaces cater to the needs of seniors, offering a thermally comfortable environment and addressing their sensitivity to glare. These spaces can both engage curious individuals and provide comfort to those who may feel nervous or anxious (Chalfont, 2008).

Transition spaces play a significant role in promoting selfhood, social interaction, and sensory stimulation among individuals with dementia (Chalfont, 2008). These spaces facilitate communication and dialogue, with nature acting as a medium for expression and enhancing overall well-being. The

presence of daylight, fresh air, and nature views in transition spaces creates a more engaging and enriching experience compared to indoor environments (Chalfont, 2008).

Furthermore, transition spaces offer enjoyment to individuals with severe visual impairment by providing non-visual stimuli, such as gentle breezes and the refreshing quality of the air. These alternative forms of sensory stimulation contribute to the overall well-being of individuals with dementia (Chalfont, 2006).

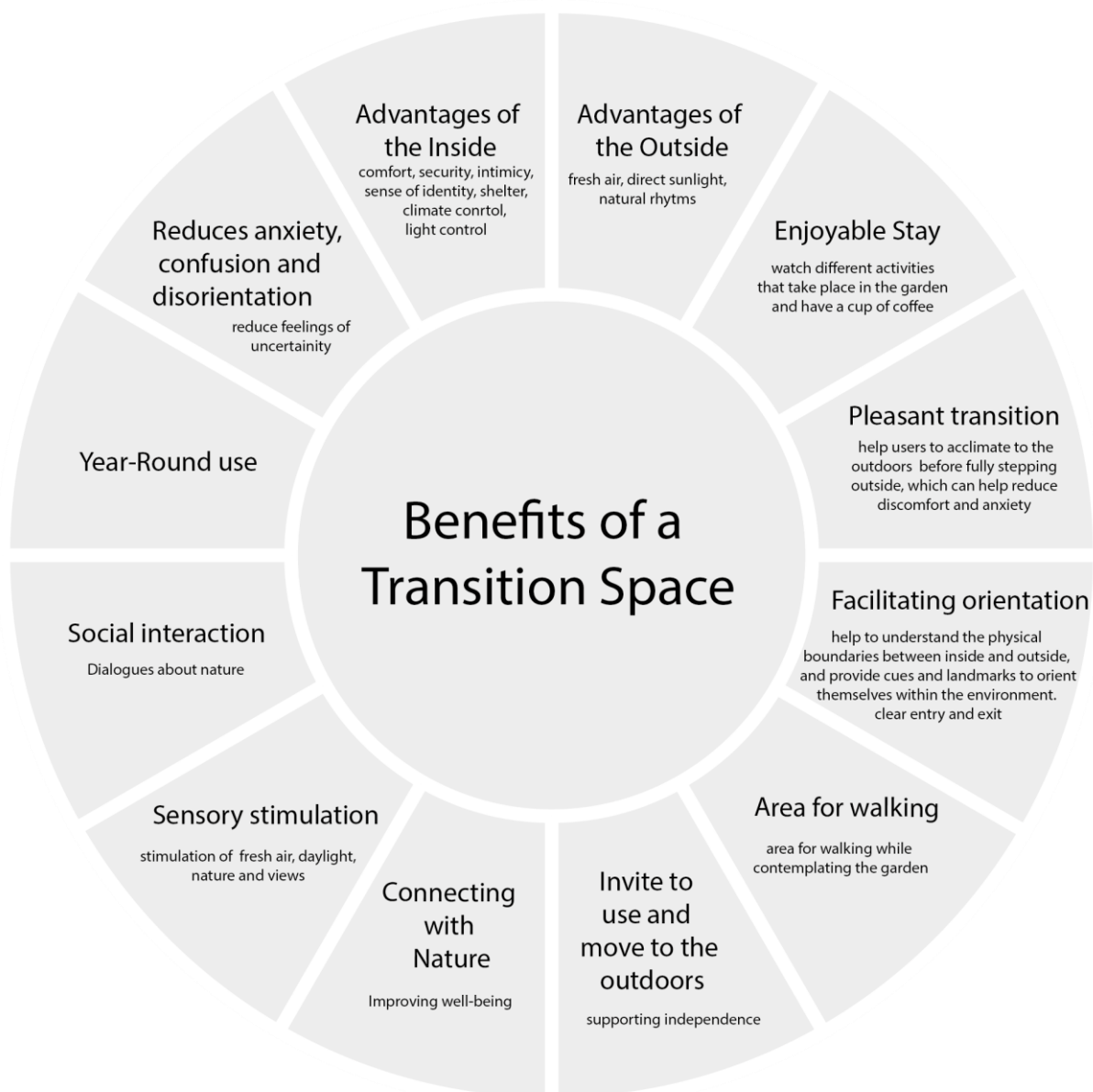


Figure 9.4 | benefits of a transition space for people with dementia

Original text sources: Singh & Tiwari, 2020; Shahlaei & Mohajeri, 2015; Chalfont, 2006; Chalfont, 2008; Sparke et al., 2018

9.3. Principles to create a pleasant transition between indoors and outdoors

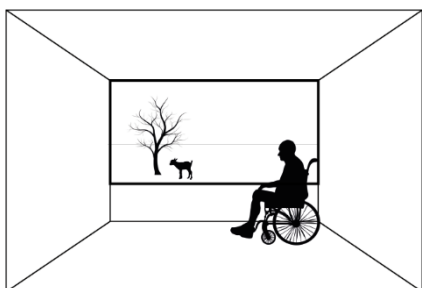
This Chapter explores design principles that promote a seamless flow between indoor and outdoor spaces, emphasizing the presence of transition spaces. The principles are derived from a comprehensive literature study and are presented in a categorized table.

The concept of "flow" is frequently used to describe the relationship between indoor and outdoor spaces (Sparke et al., 2018). It refers to a continuous, uninterrupted movement and fluidity that diminishes the perception of a barrier. Flow encompasses the idea of unrestricted movement within buildings, often facilitated by the presence of transition spaces such as verandas, terraces, and transparent windows and doors (Sparke et al., 2018).

PRINCIPLES TO CREATE AN EFFECTIVE FLOW BETWEEN INSIDE AND OUTSIDE

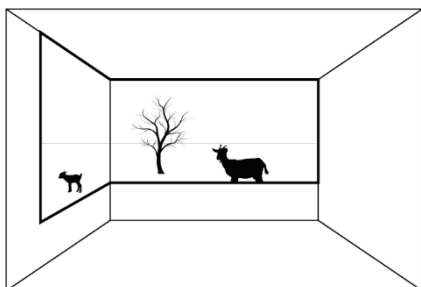
POINTS OF CONNECTION, DOORS AND WINDOWS

Open sight lines from the indoors to the outdoors (visual connection)



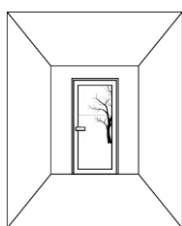
Open sight lines between indoor and outdoor spaces play a crucial role in establishing a connection with the natural environment. By strategically placing windows and doorways, attractive views can be framed and enjoyed (George, 2009). These views not only inspire a desire to venture outdoors but also provide a focal point for contemplation and a means of connecting with nature. Large windows can enhance dining experiences by stimulating conversations and improving appetite. Additionally, doors and windows can frame transient scenes, resembling the edges of a captivating painting (Sparke et al., 2018). Observing the outdoors is a valuable alternative when unable to go outside or during inclement weather. For some individuals, the act of watching brings greater happiness than active participation. In cases of severe dementia, many individuals can find solace in simply sitting and observing gardening activities or animals (Pollock & Marshall, 2012).

Large glass windows with a low wall or windows in the corner of the interior (visual connection)


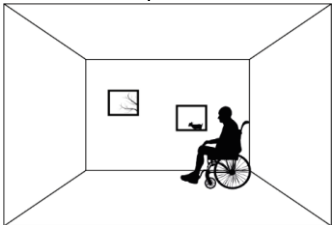
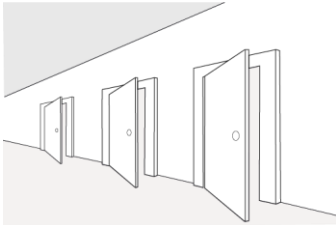
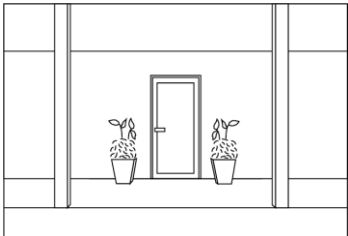
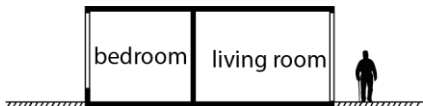



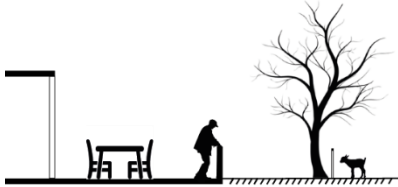
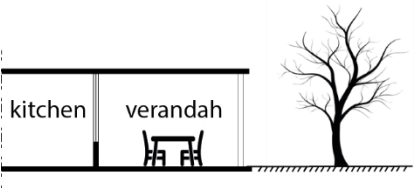
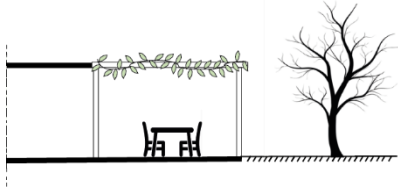
Windows should be large and positioned to provide good daylight and views of the outdoor environment. Excessive use of large glass windows and walls can disrupt the desired flow between inside and outside, compromising privacy and shelter (Sparke et al., 2018). While modern residential architecture emphasizes transparency, it can undermine traditional notions of enclosure and intimacy (Sparke et al., 2018). Critic Bernard Rudofsky argued that all-glass houses are sacrificing comfort, privacy, and conviviality (Sparke et al., 2018). Rather than having complete glass walls, there could be a low wall with a series of windows stretching to the ceiling. Another technique is to use windows at the corner of the interior room, which creates the benefit of opening up a larger viewing angle (George, 2009). Ensure that window sill heights and window dressings, such as blinds or curtains do not interfere with a person's view of the outside when lying or sitting. (Centre for Excellence in Universal Design, n.d.)

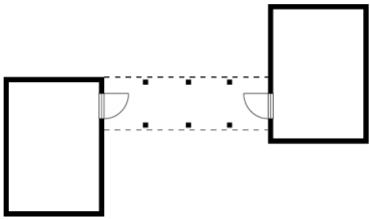
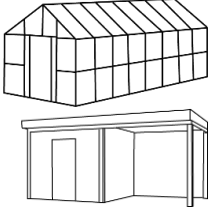
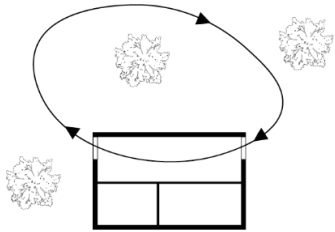
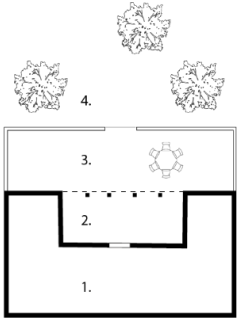
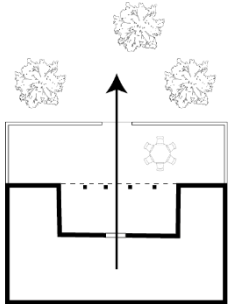
Glass doors (physical connection)

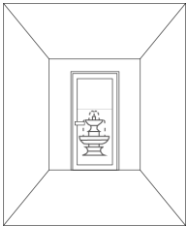
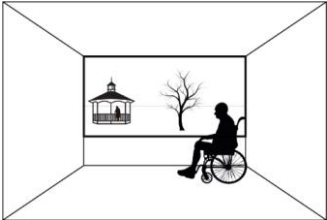
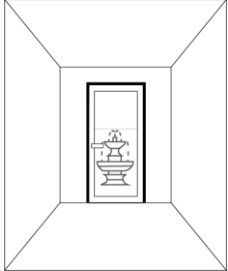
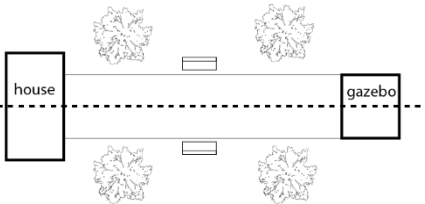
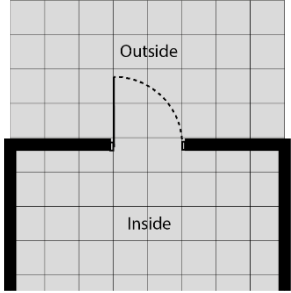



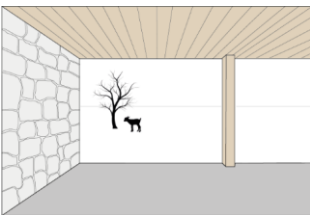
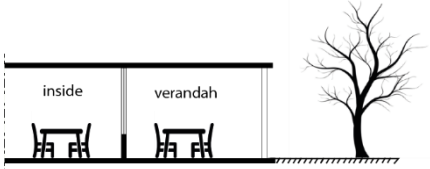

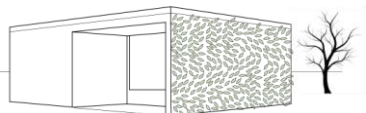
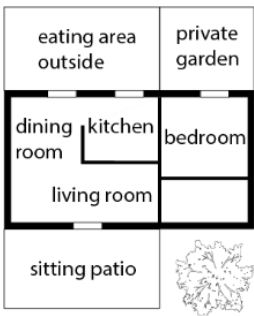
Glass doors strategically placed at the end of a hallway can frame an appealing view and entice individuals to venture into the outdoor space (George, 2009). Fully glazed doors not only provide people with dementia a view of the outdoors but also allow staff to monitor residents outside (Pollock & Marshall, 2012).

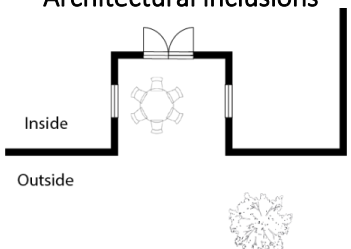
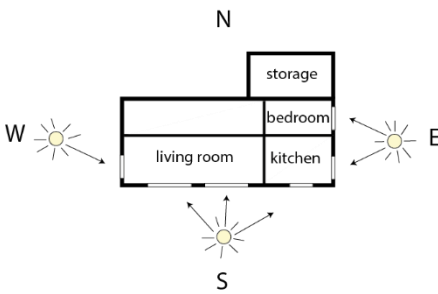
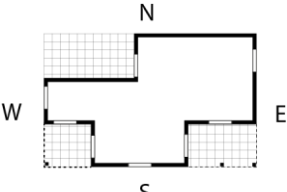

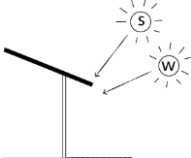
<p>The doors to the outside should be highly visible and easy to use</p> 	<p>Doors should have visible and easy-to-operate handles, and appropriate for wheelchair users. Automatic doors may be confusing for some individuals with dementia, so a slow door closing mechanism can prevent accidents. Keeping doors fixed open encourages individuals with dementia to go outside (Pollock & Marshall, 2012).</p>
<p>Providing a glimpse of the outdoor space</p> 	<p>Small windows strategically placed along a wall, offer glimpses of the outdoor space, creating an enticing and inviting atmosphere. This technique, although not directly physical, has a psychological impact on viewers, inspiring them to move between indoor and outdoor spaces (George, 2009).</p>
<p>Multiple Points of physical connection</p> 	<p>Direct access from bedrooms to outdoor spaces is valued by certain individuals, but it can pose challenges for staff members who may struggle to track residents' movements. Individuals with dementia may mistakenly exit through incorrect doors if all entrances appear similar. To address this issue, the design should ensure that the outdoor area is visible from a communal space where staff can maintain supervision. Additionally, incorporating visual cues that distinguish familiar doors can help prevent confusion and promote safe navigation (Pollock & Marshall, 2012).</p>
<p>Drawing attention to the points of connection</p> 	<p>Drawing attention to the connection points will strengthen the indoor/outdoor relationship by drawing attention to the ability to move between spaces or to emphasis views. This can be done through details like vegetation framing windows and doors, guiding paths, and patterns on the ground, stained glass around doorways, or other decoration (George, 2009).</p>
<p>GROUND PLANE</p>	
<p>Placing the indoor and outdoor spaces on the same elevation</p> 	<p>Aligning indoor and outdoor spaces at the same level promotes visual continuity and facilitates seamless access between the two environments. (George, 2009).</p>
<p>Thresholds and continuity in flooring</p> 	<p>To accommodate individuals with dementia, it is important to address their visuospatial challenges. Avoiding color and contrast changes in flooring and maintaining level thresholds helps prevent confusion and falls. Selecting for crack-resistant and non-glare paving materials, such as tinted concrete surfacing, ensures a safer environment.</p>





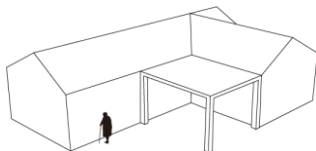

	<p>Consistent coloring of patios and paths eliminates the perception of level changes. Narrow tile joints and avoiding slab joints minimize long-term issues like weed growth and moisture. Creating continuity between indoor and outdoor spaces involves considering materials, forms, patterns, textures, and colors (Pollock & Marshall, 2012; George, 2009).</p>
<p>Terracing</p> 	<p>Terraces seamlessly integrate architecture into the landscape, offering an enjoyable place to stay with captivating views and interconnected spaces for movement. With low walls or railings, they create areas where users can pause, observe, and choose to explore further what the outdoor space has to offer. Terraces can also be standalone areas near the building entrance, providing shaded seating for an inviting outdoor experience (George, 2009; Pollock & Marshall, 2012).</p>
<p>OVERHEAD STRUCTURES</p>	
<p>Overhead structures</p> 	<p>Overhead structures, such as verandas, pergolas, and covered porches, come in various sizes, styles, and materials. They provide different levels of enclosure, ranging from perforated to transparent. These structures can be freestanding or attached to the architecture, offering a sense of security and enclosure similar to indoor spaces. They also provide shelter from the sun and weather, creating protected areas for social activities. For optimal effectiveness, overhead structures should be attached to the home and positioned at a similar height as the interior ceiling. Semi-closed structures should be open on the sun-facing side. When designing conservatory roofs, it is important to avoid glazed roofing that casts confusing shadows on the floor for people with dementia (George, 2009; Pollock & Marshall, 2012).</p>
<p>Vegetation used as overhead</p> 	<p>Vegetation can be utilized to create an overhead structure or add a softer touch to existing overhead structures. Trees and vines serve as effective means to establish an overhead structure. Vines, in particular, can also be used in a conservatory or sunroom to create an overhead (George, 2009).</p>
<p>Avoid confusing shadows through perforated enclosures</p>	<p>The presence of sun rays filtering through perforated walls, roofs, or fences, such as a slatted roof, and casting shadows on the ground or flooring, can create confusion and alarm for individuals with dementia. To mitigate this effect, screen planting can be employed in front of the barrier to minimize the visual impact (Pollock & Marshall, 2012).</p>

<p>Connecting buildings by overhead</p> 	<p>An overhead structure can serve as a connecting element between separate buildings, maintaining a sense of enclosure throughout the entire pathway. By leaving the sides of the structure open, the space remains visually connected to the outdoors. This can be achieved through the use of a covered walkway, such as a colonnaded space, or by incorporating a pergola (George, 2009).</p>
<p>Freestanding overhead structures in the outdoor spaces</p> 	<p>Freestanding overhead structures in the landscape enhance the connection between the building and the outdoor space, blending them seamlessly. These structures offer shelter and visual appeal, whether they are located near or far from the house. Examples include open structures like gazebos, pergolas, and arbors, as well as enclosed structures like greenhouses with glass roofs and walls, allowing for visual connection to the outdoors (George, 2009).</p>
<p>MOVEMENT</p>	
<p>Indoor / outdoor walking route</p> 	<p>Pathways should promote walking in both indoor and outdoor environments, while providing seating areas for rest and social interaction (Singh & Tiwari, 2020). To encourage exercise, design a safe walking route that loops through both indoor and outdoor spaces, creating a stimulating experience for individuals with dementia (Cochrane, 2010)</p>
<p>Gradual transition through a series of enclosures</p> 	<p>A gradual transition from indoor to outdoor spaces can be achieved by incorporating spaces with varying degrees of enclosure. This allows individuals to comfortably move from one space to another and choose the level of enclosure they prefer (George, 2009). Transition spaces can be designed to have different elements of enclosure, connecting them more to either the indoor or outdoor environment (Shahlaei & Mohajeri, 2015). By using overhead structures and walls, users can experience a progression of enclosure levels, starting from the fully enclosed building, moving through the veranda and terrace enclosed with low walls, and finally entering the broader outdoor space (George, 2009).</p>
<p>Linear movement between spaces</p> 	<p>To facilitate a seamless transition through a series of enclosures, it is important to have multiple directly accessible spaces arranged in a linear manner. Incorporating overhead structures and walls can enhance this transition process (George, 2009).</p>

<p>Use of Focal point</p> 	<p>A carefully positioned focal point, whether inside or outside, can capture interest and draw people towards it. It serves as a visual attraction, inspiring movement between the indoor and outdoor spaces (George, 2009).</p>
<p>View on meaningful destination points</p> 	<p>An attractive feature placed at a distance in the outdoor area prompts individuals to venture into the space to explore it. It could be an object, activity, or architectural structure that is visible from indoors, enticing people to step outside, like a gazebo (George, 2009).</p>
<p>Framing</p> 	<p>Framing is a technique that directs attention and facilitates movement between indoor and outdoor spaces. It involves highlighting a specific element or view while excluding less desirable aspects. By framing external views through windows or doorways, or framing connection points like doorways, designers guide the viewer's eye to what they want to be observed. Vegetation can also be used to frame outdoor focal points (George, 2009).</p>
<p>Central Axis</p> 	<p>A central axis serves as a visual guide that runs through the outdoor or indoor space, creating a balanced and symmetrical design. It directs the viewer's gaze and can be utilized to lead the eye through the space. Additionally, the central axis can be combined with a focal point positioned at its end, further enhancing its impact and drawing attention (George, 2009).</p>
<p>VISUAL AND MATERIAL FLOW</p>	
<p>Repetition of pattern and form</p> 	<p>By utilizing consistent materials, especially for ground coverings, a seamless transition between indoor and outdoor spaces can be achieved, effectively blurring the boundaries (Sparke et al., 2018). The repetition of patterns and forms further enhances this integration, creating continuity between indoor and outdoor areas. For instance, employing indoor tiling or flooring patterns in the outdoor ground plane promotes a smooth transition (George, 2009).</p>

<p>Repetition of plants</p> 	<p>Using consistent plant selection and planters between indoor and outdoor spaces enhances visual flow and transforms outdoor areas into inviting living spaces (Sparke et al., 2018). Certain plants like roses, clematis, and stocks can trigger early memories in individuals with dementia (Pollock & Marshall, 2012).</p>
<p>Using natural materials in the transition space</p> 	<p>By incorporating natural materials like stone, wood, water, and plants, the space can establish a stronger connection with the outdoors. This integration creates a more authentic and organic environment, reducing the sense of artificiality (George, 2009).</p>
<p>Use of indoor artifacts in the transition space</p> 	<p>Using consistent furniture pieces in both indoor and transition spaces can facilitate smoother transitions from indoors to outdoors (Sparke et al., 2018). By incorporating familiar indoor artifacts like tables, chairs, and decorative items, the transition space can evoke a sense of comfort and identity similar to the indoor environment (George, 2009).</p>
<p>Using landscape color schemes in transition spaces</p> 	<p>Transition spaces can enhance their connection to the environment by incorporating outdoor-inspired colors (George, 2009).</p>
<p>Gradual integration of landscape and architecture</p> 	<p>Integrating landscape and architecture involves layering and combining elements, such as walls within the landscape or extending the landscape into the architecture. Softening the transition can be achieved with flowering borders or ivy-covered walls (George, 2009).</p>
<p>BUILDING FORM AND LAYOUT</p>	
<p>Place similar or complementary uses next to each other</p> 	<p>To enhance functionality and comfort, it is beneficial to position indoor and outdoor spaces with similar purposes in close proximity. For instance, placing an outdoor dining area adjacent to the kitchen or dining room. Clustering related functions increases the likelihood of seamless movement between indoor and outdoor spaces, improving their usability. Additionally, it is advantageous to position complementary spaces next to each other. For relaxation and contemplation, outdoor sitting areas are often placed near bedrooms, allowing residents to enjoy the outdoors while maintaining privacy (George, 2009).</p>

<p>Architectural inclusions</p> 	<p>An architectural inclusion resembles a small courtyard, enclosed by three walls of the building with one side open to the outdoors. It can be used as a sitting nook or private garden, with a door or windows connecting it to the interior and providing a view through the outdoor space (George, 2009).</p>
<p>Climate consideration in the building form and layout</p> 	<p>Key living spaces should ideally face the south for optimal sunlight exposure. This may require placing buildings further apart to allow sunlight to reach outdoor areas. Orienting the building on an east-west axis ensures at least one side receives direct sunlight. Non-sun facing sides are suitable for building wings, extensions, and garages to minimize overshadowing. East- south facing conservatories benefit from bright morning light and prevent overheating in the afternoon and evening. For kitchens, an east-south orientation captures both morning and afternoon sun (Pollock & Marshall, 2012; Centre for Excellence in Universal Design, n.d.).</p>
<p>Maximizing sun access at all times of the day</p> 	<p>Maximize sun access throughout the day with strategically placed transition spaces. East-facing areas for morning use, south-facing areas for most of the day, and north-west-facing areas for evening use in the summer. Sun exposure and shading depend on factors such as sun orientation, building design, walls, and vegetation (Pollock & Marshall, 2012).</p>
<p>Permanent shade on very sunny sites (south facing side)</p> 	<p>Provide effective shade on sunny sites using verandas and roof overhangs to create permanent shading solutions (Pollock & Marshall, 2012).</p>
<p>Roof overhang with penetration of winter sun</p> 	<p>With careful consideration of the sun angles, overhanging roofs can provide shade from the summer sun and still allow penetration of the winter sun into the area of the building to provide warmth (Pollock & Marshall, 2012).</p>
<p>Be aware of possible loss of daylight to adjacent roof structures</p>	<p>Consider the potential loss of daylight to interior rooms adjacent to roof structures in transition spaces, as they may create shade (Pollock & Marshall, 2012).</p>

FURNITURE	
<p>The use of rocking chairs</p> 	<p>Rocking chairs placed on the veranda can attract residents to the outdoors, encouraging them to relax and observe the garden activities (Brawley, 2007).</p>
<p>Seating and tables</p> 	<p>Sturdy and comfortable furniture, including chairs with back and sturdy arms, is essential to encourage people to spend time outdoors. This furniture provides support for seniors and can be used for various activities such as dining, drinking, and observing garden activities (Pollock & Marshall, 2012).</p>
<p>Use of coat hooks and umbrella stands</p> 	<p>The use of coat hooks and umbrella stands can be placed in the transition space along with shoe benches (Pollock & Marshall, 2012).</p>
<p>Raised beds for potting up plants</p> 	<p>Incorporate wheelchair-accessible raised beds in the transition space to facilitate year-round gardening for seniors (Pollock & Marshall, 2012).</p>
FAMILIAR EXTERIOR OF THE BUILDING In the same way that outside spaces should draw users out, they also must lead users back inside.	
<p>Designing simple, small domestic-style homes</p> 	<p>Designing small, domestic-style homes can create a familiar and comfortable living environment for people with dementia. Avoiding modern styles and using familiar architectural facades and features enhances understanding and reduces confusion (Mitchell et al., 2003).</p>
<p>Distinctive building frontages</p> 	<p>Avoid repetitive building frontages and architectural styles to reduce disorientation and aid wayfinding for people with dementia (Mitchell et al., 2003).</p>


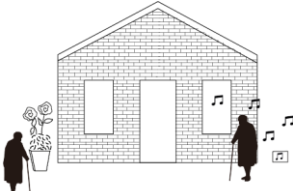

<p>Outdoor spaces with cues</p> 	<p>Outdoor spaces can be designed with visual cues like signage and distinctive elements to help people with dementia recognize their own house. Seniors rely on familiar cues for wayfinding, and their color perception may be affected. Signage can guide them to the entrance door (Mitchell et al., 2003; Pollock & Marshall, 2012).</p>
<p>Smells and sounds to guide people with visual impairments</p> 	<p>Enhance outdoor navigation for individuals with dementia and visual impairment by incorporating sensory cues. Utilize scented plants and audible signals to create familiarity and aid in wayfinding. Placing fragrant plants near windows and doors can create a sensory connection between indoor and outdoor spaces (Mitchell et al., 2003).</p>
<p>Paths leading back to the doors</p> 	<p>Design pathways that guide individuals with dementia towards their residence by leading them back to the corresponding entry doors (Pollock & Marshall, 2012).</p>

Figure 9.5 | Design Principles to create an effective flow between inside and outside

9.4. CASE STUDY TRANSITION SPACE

In this case study, the design of transition spaces in a nursing home for people with dementia is explored. Specifically, on how the physical design of these spaces affected the experiences of residents and staff. By analyzing the design of these transition spaces in detail, the aim is to provide insights into how the physical environment can be used to support outdoor activities and promote connection with nature. The design of transition spaces between inside and outside is based on geography, it is specified to climate and place. The investigated case study is located in the northern hemisphere.

Project: The Living Garden at the Family Life Center
Location: Grand Rapids, Michigan, USA
Function: Day center for people with dementia, schizophrenia, MS, Parkinson's or Huntington's Disease.
 The garden opened in 1999

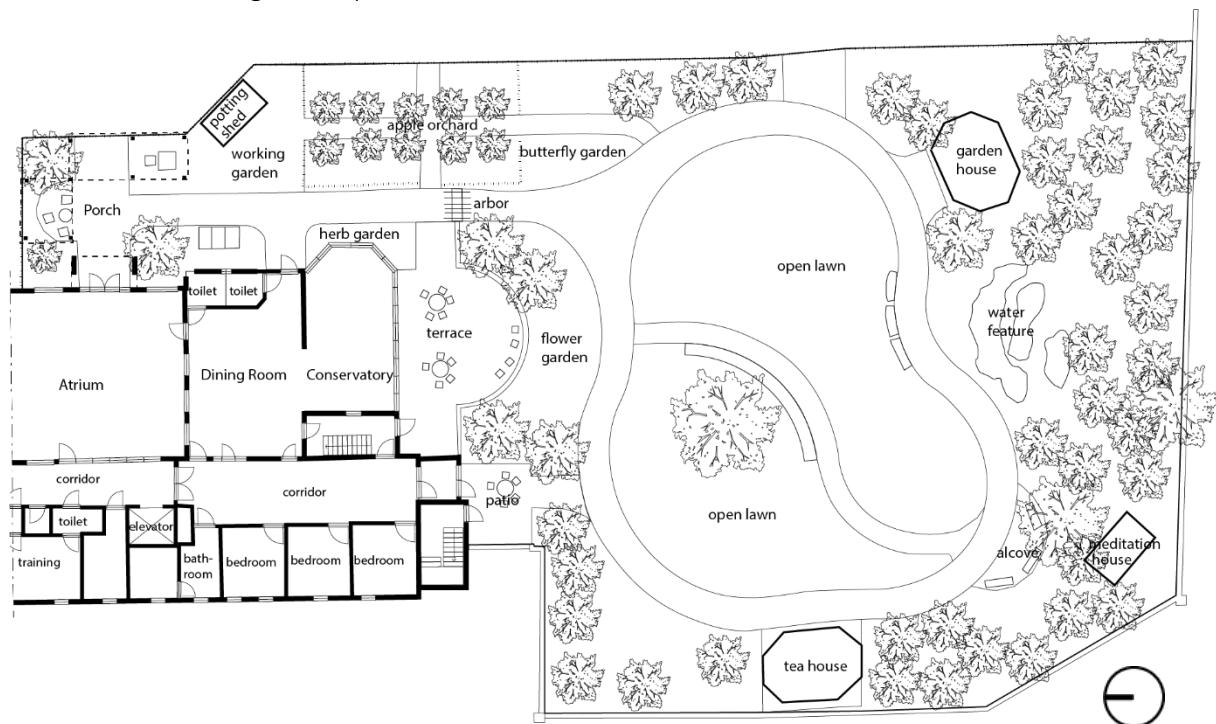


Figure 9.6 | Site plan The Living Garden at the Family Life Center in Michigan, USA (Adapted from Marcus, 2007)

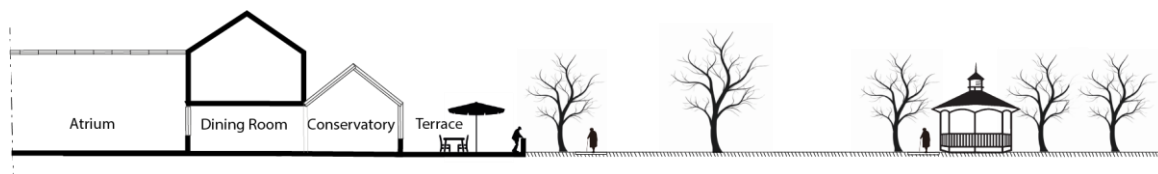


Figure 9.7 | Section The Living Garden at the Family Life Center in Michigan, USA

The outdoor space comprises two main components: the working garden and the strolling/viewing garden. The working garden, situated near the access doors, features raised beds, trellises, a potting area with shade, a sink, and a garden shed, providing space for horticultural activities (Pollock & Marshall, 2012).

The strolling/viewing garden offers various elements such as lawns, concrete paths, a flower garden, an orchard, a butterfly garden, a gazebo, meditation and tea houses, an alcove, a waterfall with a pond, and multiple seating areas. The design incorporates a simple eight-shaped path system, allowing users to easily comprehend the layout at a glance (Marcus, 2007).

Transition space

The dining / activity room is a well-used interior space where people can view the garden and have direct access to it (Marcus, 2007). From here, one can access various transition spaces such as the atrium, conservatory, or porch. Adjacent to the dining room and atrium, the working garden is conveniently located, featuring hard surfacing, tables, and a shed. This working garden serves as both a transition space between the building and the larger strolling garden and an area for horticultural activities. The transition spaces connected to the dining room, such as the atrium and conservatory, are fully enclosed, while the outdoor transition spaces, such as the porch with trellises and winding ivy and the terrace with umbrellas, provide a more open environment. Overall, the interior is surrounded by these transition spaces.

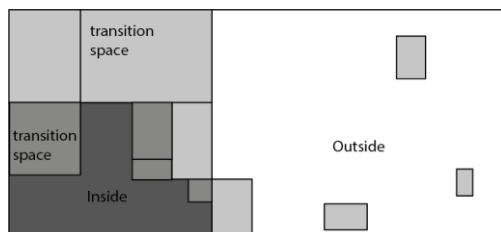
Visual access and physical access

A large conservatory overlooks the entire outdoor space, while the atrium and dining room provide both views to the outside and physical access through doors. The main entrance to the garden is located at the atrium, and it can also be reached from the door in the dining room and the draught lobbies near the corridor. This means there are four options to enter the outdoor space, with the main entrance being the most obvious, marked with a covered entrance and plants.

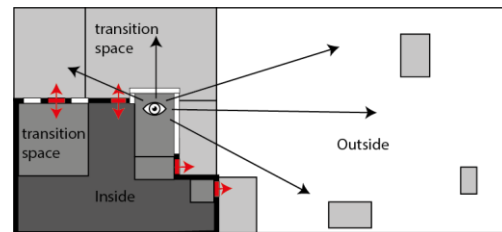
Circulation indoors and outdoors

People with dementia often engage in wandering behavior, so providing plentiful walking spaces is important in both indoor and outdoor designs. Since they struggle with spatial orientation, a path system like the figure-eight design is used outside. This path connects seamlessly to the indoor space through entrances at the atrium and corridor, creating a continuous loop for easy movement (Marcus, 2007).

Inside, Outside and transition spaces:



Visual access and physical access



Circulation indoors and outdoors:

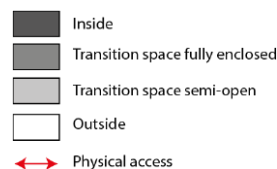
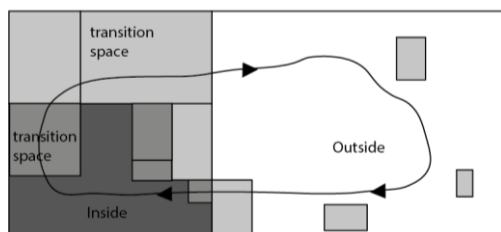


Figure 9.8 | Transition Spaces, Circulation and Visual / Physical Access

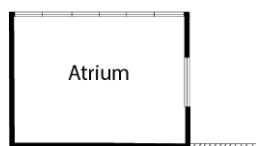
9.5. Physical forms of transition spaces

The physical form of the transition space, the attachment and similarity to the inside or outside and how it establish interaction between the spaces is dependent on several factors. These factors and issues influencing the space are architectural functions, climate situations, cultural and life style issues, aesthetical concerns (Shahlaei & Mohajeri, 2015; Brookes, 2012).

This section explores the various physical forms of transition spaces identified in the literature study, analyzing their design, advantages, and disadvantages. Additionally, it showcases specific transition spaces featured in the case study of The Living Garden at the Family Life Center in Grand Rapids, Michigan, USA. These physical forms encompass atriums, conservatories, draught lobbies, verandas, pergolas, terraces, colonnaded spaces, thresholds, awnings and freestanding overhead structures.

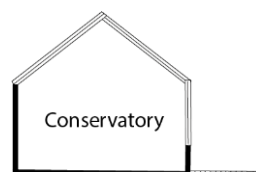
Physical forms transition spaces, ordered from fully enclosed to fully exposed:

Atrium



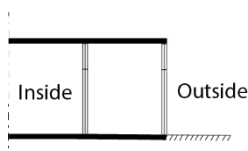
An atrium is a large, open space within a building, typically located at the center and surrounded by other rooms or corridors. It serves as a central focal point and often acts as a transition space between different areas of the building. Atriums are characterized by their expansive, light-filled design, usually achieved through a glazed or transparent roof. The case study included a large glazed roofed atrium, which can be reached from the dining room and corridor, from here people have access to the outside through a marked threshold with glass doors (Marcus, 2007).

Conservatories

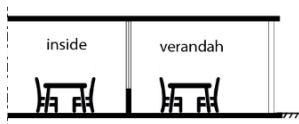


Conservatories create an indoor-outdoor connection with glass walls, providing visual access to the garden. They can be used for horticultural activities or as eating area, attached to dining/living areas (Pollock & Marshall, 2012). Proper design considerations include avoiding confusing shadows, incorporating solar reflective glass and blinds, and addressing potential drawbacks like loss of daylight, overheating, and ventilation needs (Pollock & Marshall, 2012). Southeast-facing orientations are recommended to balance sunlight exposure and sun protection (Buldit, 2022). In the case study, a large conservatory overlooking the outdoor space is used for indoor horticultural activities, providing staff with a view of the entire garden (Marcus, 2007).

Draught lobbies

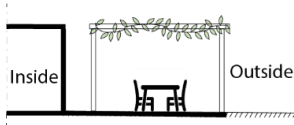


The use of draught lobbies to create air locks to reduce heat loss, which make the use of the outdoor easier. The entrance lobby is familiar to many people, where the toilet is located and a coat rack on which they can hang their coat (Pollock & Marshall, 2012). A draught lobby is used in the case study to create air locks to reduce heat loss.



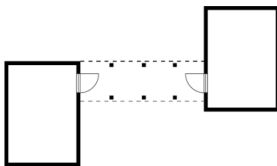
Veranda

Verandas serve as inviting transition spaces, easing residents into the outdoors. They provide shade from the sun, channel wind, and offer an intimate setting. Verandas are particularly useful for individuals with dementia who prefer to stay close to their residence while enjoying views and the fresh air (George, 2009; Brawley, 2007).



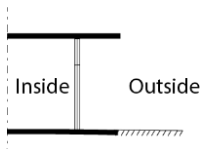
Pergola with vegetation

A pergola with vegetation is a structure covered in climbing plants. It provides shade, and a peaceful atmosphere, while allowing fresh air to flow through. It's a great place to relax and socialize, connecting indoor and outdoor spaces.



Colonnaded space (covered pathways)

A colonnaded space is a covered area that serves as an entrance and connection between buildings. It offers a comfortable transition, providing a sense of being indoors while still being open to the outdoors, allowing easy access to the garden (George, 2009).



Threshold

The threshold acts as a well-designed element that helps people with dementia adjust to the bright outdoor light and serves as a clear entrance marker. In the case study, it is strategically located at the atrium, ensuring a smooth transition between indoor and outdoor spaces (Marcus, 2007).



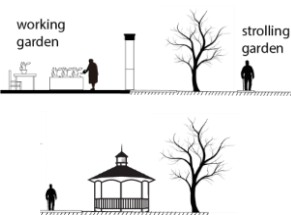
Awnings

Wall fixed and open-sided awnings can provide for occasional shelter and allow forward planning of social events in any weather. Awnings can be seen as a traditional and familiar element to seniors (Pollock & Marshall, 2012)



Terrace

A terrace is a paved seating area attached to a building, often with umbrellas for shade and a railing or low wall for a sense of enclosure. Residents can sit there or lean against the railing and appreciate the garden view.



Freestanding overhead structures

In the case study, the larger garden is accessed through an arbor from the working garden, serving as a transition point. The gazebo in the strolling garden acts as a focal point, inviting visitors to explore further. (Pollock & Marshall, 2012).

Figure 9.9 | Physical forms of transition spaces

9.6. Different design elements transition spaces

The design of transition spaces, which aim to ensure an effective flow, may vary in terms of enclosure, materiality, opacity, and transparency, leading to distinct physical forms. The level of enclosure directly influences factors such as microclimate, intimacy, privacy, and seclusion. In this section, these three design principles are more comprehensively described, offering a foundation for creating diverse design options for transition spaces.

- Degree of enclosure

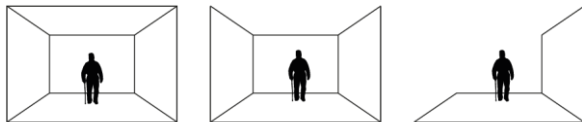


Figure 9.10 | Various degrees of enclosure (Adapted from Ching, 2014)

Any enclosure is defined by a boundary, which can be a floor, wall or ceiling. The degree of enclosure of a boundary is determined by its openings (Chalfont, 2006). The type and degree of enclosure affects a person's experience and use, microclimate and character. An understanding of the needs of the users (people with dementia and staff) is important when designing the space (Dee, 2001).

Enclosure and microclimate and year round use

Enclosure affects the microclimate and comfort of the space (Dee, 2001). Taking into account the climate, affects the suitability for year round use. Designing transition spaces with a comfortable microclimate that extends use through the year by looking at the placement, extent of enclosure and type of materials used (Chalfont, 2008).

Sequence of enclosures

The different single spaces should relate to each other. The spaces should be organized how they might be experienced or used. Transition spaces are places of movement. Considering the sequential experience of moving from one space to the other is important. Spatial sequence can be created using contrast and similarity of scale, proportion, axuality (Dee, 2001).

Wall plane providing intimacy

Walls provide privacy and seclusion. Walls can be used to link the outdoor space with the architecture. Walls can also obscure or obstruct, when used unnecessarily in a design or built to high (Dee, 2001). Walls serve as a barrier that limits movement of people. Openings, such as doorways and windows reestablish continuity between spaces (Ching, 2014).

A 50 cm high wall can define the space, but provides little or no sense of enclosure. A waist-high wall can provide a sense of enclosure, while allowing visual continuity to the other space. A wall on eye level can separate one space from the other. A wall above the height of a person interrupts the visual and spatial continuity between two spaces and therefore provides a strong sense of enclosure (Ching, 2014). Permeable built boundaries, such as fences, trellis and railings enable visual access from one space to another. These are used when physical separation is desired but complete visual separation is not (Dee, 2001).

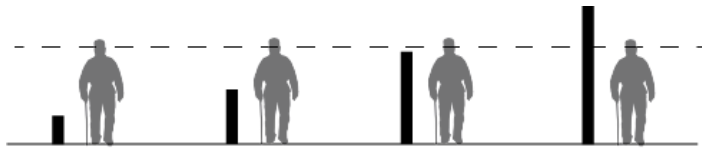


Figure 9.11 | Various heights, providing intimacy (Adapted from Ching, 2014)

Overhead plane

Overhead structures, roof-like structures for enclosing the overhead plane. The use, protection from weather, linking to the building or to create a secluded outdoor space determines the design of the overhead plane (Dee, 2001). The height of the ceiling plane determines the qualities of shelter and intimacy (Ching, 2014). Pergolas and trellises provide a moderate degree of enclosure and allow filtered sunlight and breezes to penetrate (Ching, 2014).

- Materiality

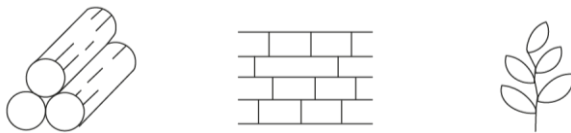


Figure 9.12 | Materiality

The material of enclosing planes plays an important role to defining the character of a space. A solid concrete wall, or a hedge or translucent glass wall have different characters, textures and ways how a place is experienced (Dee, 2001). A leaf overhead structure can create a distinct character of space which attracts people to shelter and stay, particularly in sunny weather (Dee, 2001). Plants can be used as structural elements to create a space. Plants can provide enclosure in the ground plane, wall or sky planes (Ching, 2014).

- Opacity, transparency



Figure 9.13 | Opacity and Transparency

A glass wall or overhead plane weakens the boundary of a space. A glass wall offers expansive views and permits a large amount of daylight to penetrate the space. Sun shading devices may be necessary to reduce glare and overheating (Ching, 2014).

9.7. Sub-Conclusion: Designing transition spaces

The literature emphasizes the significance of transition spaces, situated between indoor and outdoor environments, in meeting the fundamental human need for shelter. Transition spaces blur the boundaries between inside and outside, providing a sense of being simultaneously indoors and outdoors. For people with dementia, these spaces play a crucial role in creating a seamless and comfortable connection between inside and outside.

Transition spaces offer numerous benefits for individuals with dementia, including opportunities for movement, engagement with outdoor activities and nature, and a pleasant sitting area that combines the advantages of both indoor and outdoor settings. Moreover, these spaces contribute to selfhood, social interaction, and sensory stimulation, promoting overall well-being while ensuring a smooth transition between environments, providing a sense of security and comfort.

By integrating the identified design principles that facilitate a seamless flow between the inside and outside, transition spaces can greatly enhance the overall design considerations of residences for people with dementia.

The Chapter also presents a case study of a nursing home with well-designed transition spaces. The case study highlights the importance of visual and physical access between indoor and outdoor spaces, as well as the use of different physical forms of transition spaces such as atriums, conservatories, and verandas. These spaces provide visual connections, protection from the elements, and comfortable areas for residents to enjoy the outdoors.

Further research is needed to understand how individuals with dementia perceive and interact with different designs of transition spaces. This knowledge is crucial for developing more effective and inclusive design principles that meet the specific needs of people with dementia. It is important to investigate the preferred physical environment of transition spaces and how different elements, such as degree of enclosure, materialization, and transparency, are perceived by individuals with dementia.

In the upcoming Chapter, a deeper exploration of designing transition spaces will take place as the conducted experiment is presented. This experiment involved testing various design options of transition spaces with people with dementia, offering valuable insights into their perception and experience of the different design elements.

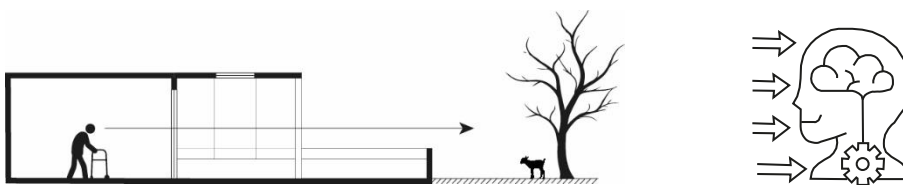
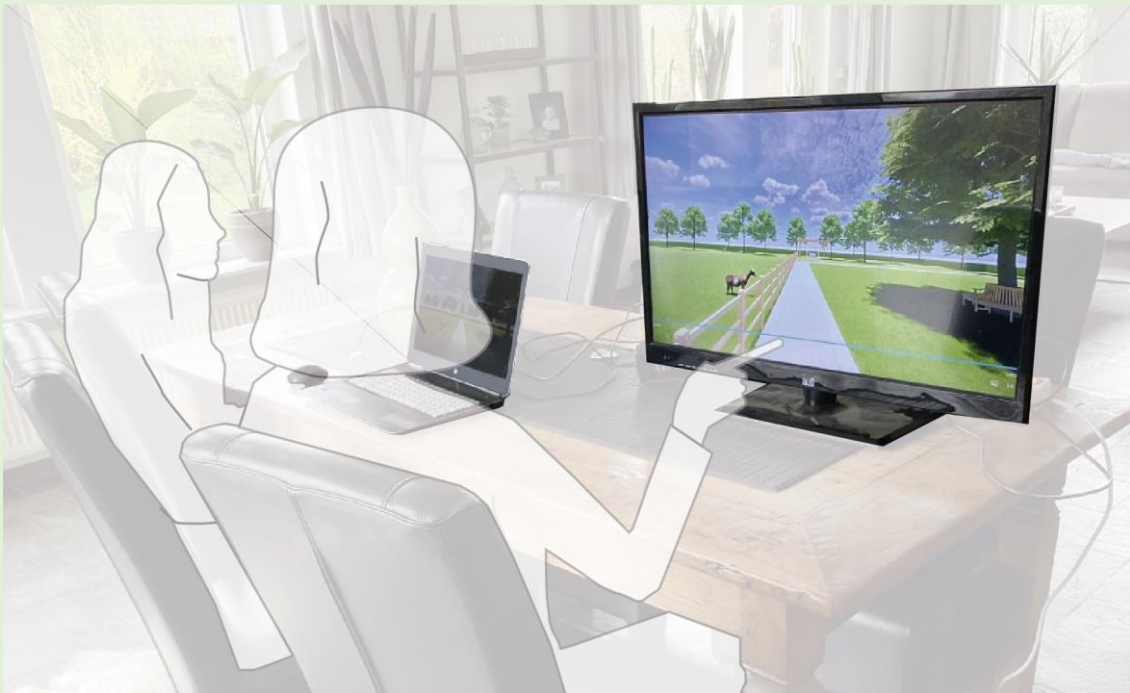


Figure 9.14 | Perception of individuals with dementia when transitioning between indoors and outdoors

10

EXPERIMENT



10. EXPERIMENT: TRANSITION SPACES

In Chapter 2 (Methodology), the experiment procedure was outlined, providing detailed steps and methods employed to investigate the effectiveness of the design options. This Chapter presents the design options, analysis and results obtained from the experiment, offering a deeper understanding of the impact of different design options of transition spaces on individuals with dementia.

To provide context, a brief summary of the experiment procedure will be provided. The experiment builds upon the conclusions from the literature study on transition spaces in a home for people with dementia, as described in the previous Chapter. The literature study aimed to investigate the role of transition spaces in promoting outdoor activities and nature connection for people with dementia, by creating a pleasant transition between the indoors and outdoors and an enjoyable place to stay.

Further research is needed to determine the preferred and most appropriate design solutions for transition spaces for individuals with dementia, and to understand the impact of different design elements on their well-being, feelings of comfort, and orientation and how the designs facilitate or hinder their ability to access outdoor spaces.

To determine the most appropriate and preferred design solution, nine design options will be tested that provide a gradual shift from the inside to outside. Where individuals with dementia can feel a sense of security and comfort and not being directly exposed to the outdoor environment.

The goal is to gather feedback and evaluate the preferences, feelings of comfort, and orientation to provide a design solution which facilitates individuals with dementia in a gradual transition in a comfortable and secure way, to promote outdoor activities and nature connection. Usability tests, preference tests with interviews will provide data to measure user satisfaction and design effectiveness.

The study will use a virtual tour with a traditional video format, going from the inside to outside and vice versa of each design option. The sample size for this study will include two individuals living with dementia in a nursing home, as well as one healthcare worker currently employed at the facility. The design will be tested with the healthcare worker to gain insights into her experience working with people with dementia and her perspectives on how the design can impact the well-being of individuals with dementia.

Specifically, this experiment addresses the following research question:

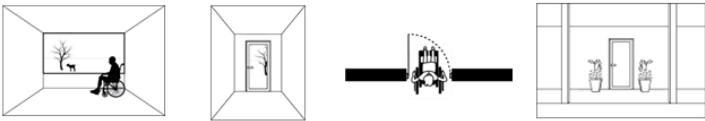

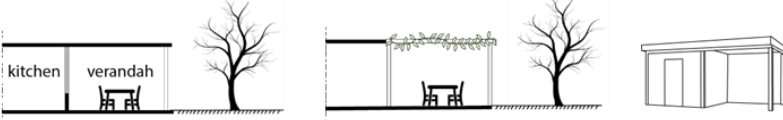
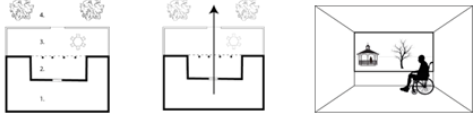
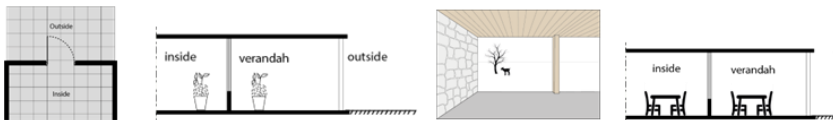
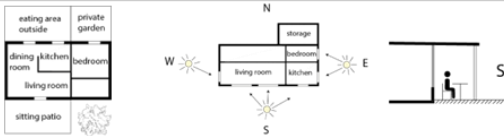


How are the different design elements of transition spaces perceived by individuals with dementia?

For a comprehensive overview of the experiment procedure, please consult Chapter 2 (Methodology) for more information.

With the experimental framework established, this Chapter will now delve into the design options made and a discussion of the results obtained from the experiment.

10.1. 9 Different Design Options

The figure provided below offers a comprehensive overview of the design principles employed as the basis for each design option. These principles aim to create a smooth and uninterrupted connection between indoor and outdoor spaces, as explored in Chapter 9 (Designing an Indoor / Outdoor Relationship with Transition Spaces). It is important to note that not all design principles documented in the Chapter 9 were utilized in this experiment. The focus of this study is on examining various design elements within transition spaces, rather than incorporating features like an indoor/outdoor continuous walking route.

DESIGN PRINCIPLES TO CREATE AN INDOOR-OUTDOOR RELATIONSHIP	
Points of connection, doors and windows	
Groundplane	
Overhead structures	
Movement	
Visual and material flow	
Building form & layout	
Furniture	
Familiar exterior	

(Brawley, 2007; Cochrane, 2010; George, 2009; Marcus, 2007; Mitchell et al., 2003; Pollock & Marshall, 2012; Sparke et al., 2018; Singh & Tiwari, 2020)

Figure 10.1 | Overview Design Principles creating pleasant movement and stay with transition spaces

Based on the findings from the case study and literature review on 24h-care farms, the residence will be constructed as a small-scale home accommodating seven residents. Each resident will have their own private bedroom and bathroom, while sharing a communal kitchen and living room. It is worth noting that the interior design will remain consistent across all options.

Options A to G represent designs of transition spaces from the living room to the "back" garden, while option H focuses on a transition space from the living room to the "front" garden, specifically the entrance area. Option I showcases a unique design by featuring a transition from the bedroom to the 'back' garden through a private terrace.

Sketch-up is used to modify the models. A total of nine options have been designed, incorporating the following features:

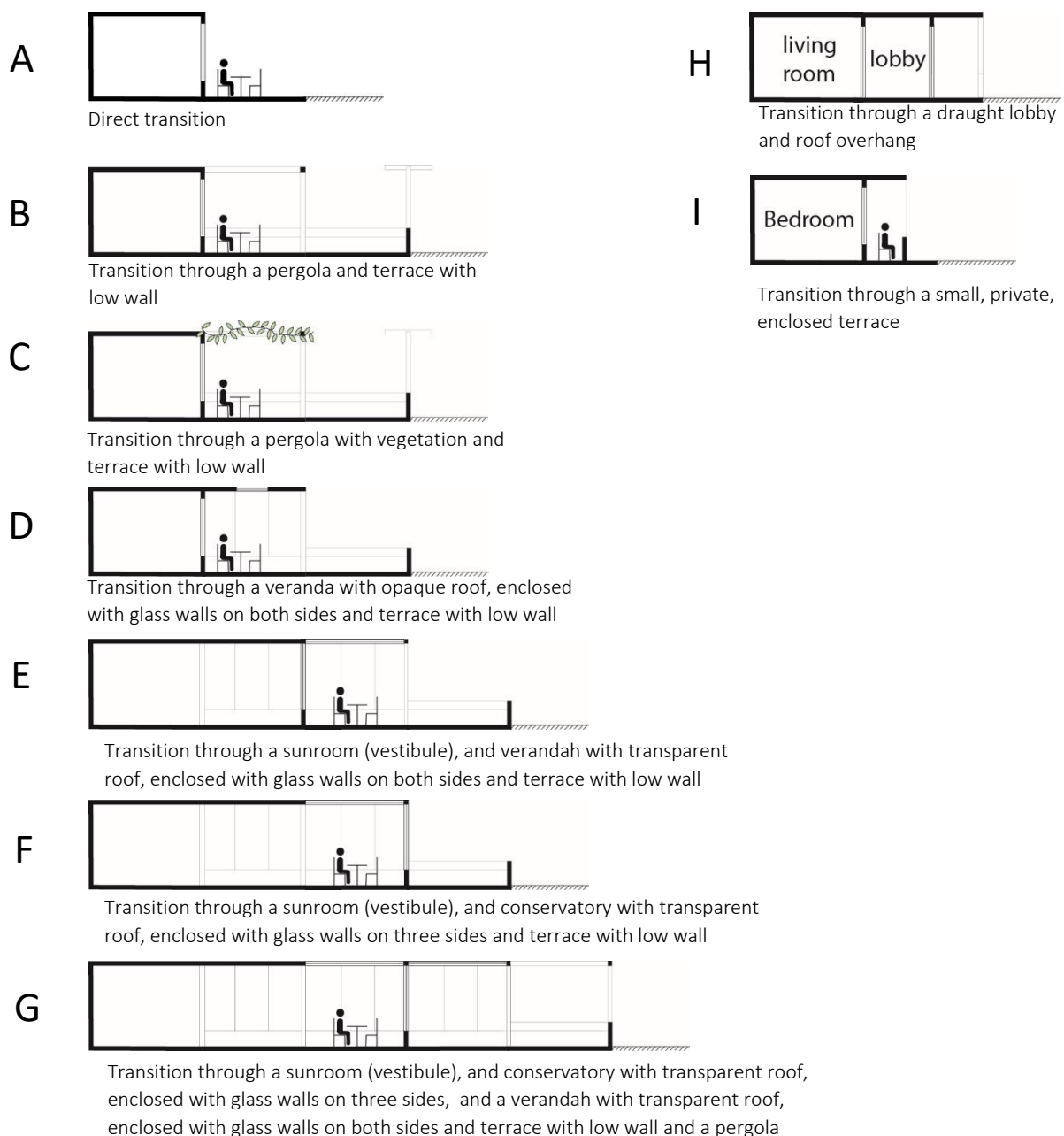


Figure 10.2 | Overview Design options experiment

Here is an example of Design Option G:

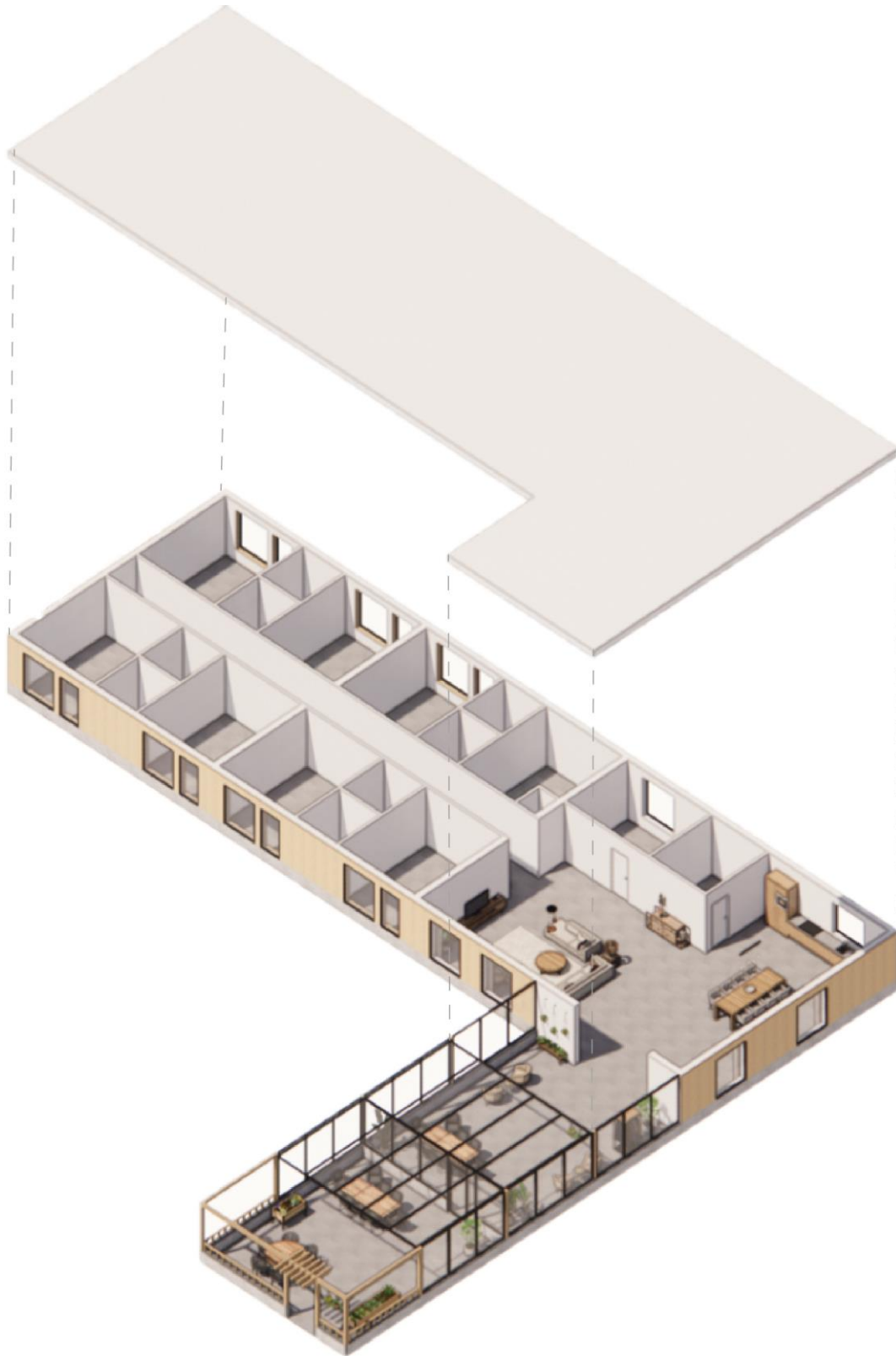


Figure 10.3 | Design Option G, Axonometric view, 3D model in Sketch-Up



Figure 10.4 | Design Option G, Screenshot Video, Transition Space, 3D model in Enscape

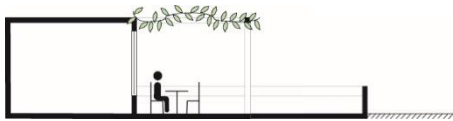


Figure 10.5 | Design Option G, Screenshot Video, Living Room, 3D model in Enscape

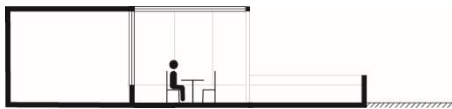
10.2. Data analysis

`Impression`

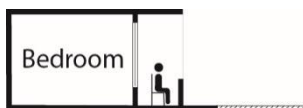
The experiment was conducted in Dutch, and the findings, including the quotes, have been translated into English. The participants expressed their enthusiasm and enjoyment during the interview process, surpassing initial concerns about their ability to watch all the videos. They engaged effectively and provided valuable feedback, highlighting the significance of their involvement in shaping the design considerations.



"Unique space, very cozy. Very valuable, beautiful, and spacious with that greenery." -P2



"I find that ideal. That you can still sit outside with nice weather and rain. When it's a bit warm and it's raining a little. I always appreciate having plenty of light." -P1



"A terrace, come on, yes, cozy and nice. Setting up a nice chair, waking up outside in the morning, that would be nice. If that were possible, well, I would like that. In Belgium, I also had a very large lawn in front of my house, and I always loved that." -P1

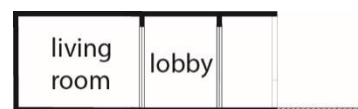
"I find this nice, yes. When you sit there like that. You have it all to yourself. And I think that's also important for older people." -P2

"I don't find that lattice work attractive. It's as if they're renovating behind it and nobody is allowed to see. I prefer more of a stone look. It varies for each person." -P2



















"I wouldn't want to live there. Such a ridiculously large space. It's probably a hotel or something. So empty." -P1

"I prefer more intimacy. Here, everything is sleek and sterile." -P2



















"I had a bungalow with a large garden. All grassy fields, and full of flowers and big trees. You could sit there wonderfully in the sun and in the shade. I lived there beautifully. When I see something like this, it makes me homesick." -P1



"I prefer the toilet to be in the lobby rather than in the living room. That's logical. Here (in Castella) it is connected to the living room. But that's different." -P1

Testing the design variants with people with dementia						
Participant 1						
Location: Zorgcentra Castella in Cuijk		Setting: residential group (6 persons) in a traditional nursing home		Date: 05 -04-2023	Time: 11:15-12:00	
form of dementia: Alzheimer's		Stage of dementia: mild stage in which symptoms are still subtle		Symptoms: Amnesia		
Interests and preferences of the outside: Outdoorsman, she loves flowers, animals and working in the garden						
	inside --> outside		outside --> inside			
	nav.	feeling outside	nav.	feeling inside	preferred elements	unpreferred elements
A	✓		✓		The goat, animals, flowers, and plants. Beautiful sky.	Too few flowers.
B	✓		✓		Blue sky, beautiful view. Nice and spacious, with trees.	The roof is not beautiful, and the rain comes straight through, so it's pointless.
C	✓		✓		Nice green roof. The flowers in the green roof.	Bare and empty living room.
D	✓		✓		A charming and cozy round dining area.	Closed roof. "I think it should have been open." "I am an outdoors person."
E	✓		✓		Lots of glass, plenty of space, and being outdoors is enjoyable. A glass veranda would be ideal. "I always appreciate having plenty of light."	Ugly coat rack, it looks like a wardrobe. The hallway resembles a restaurant entrance, not something you'd find in a home.
F	✓		✓		The sunlight in the conservatory is beautiful. Lovely violets. The hanging flowers are charming.	Bare living room. The space appears to be large.
G	✓		✓		Bloemen en het gras.	Te weinig bloemen.
H	✓		✓		Preferably, the toilet should be located in the hallway rather than the living room.	The door has an ugly color. The hallway is bare.
I	✓		✓		Having a door to the outside in the bedroom is desirable. A cozy terrace with a chair and hanging plants would be nice.	the participant prefers chairs in the bedroom instead of a sofa for when guests visit. The terrace feels a bit bare.
"I used to live in Belgium, in a bungalow with a large garden. It was all green, with flowers and big trees. You could sit there wonderfully, in the sun or in the shade. There was a long driveway in front of the house. I lived there beautifully. When I see something like that, it makes me feel homesick." "I shouldn't see too much of it, it makes me nostalgic." <i>What do you enjoy doing outdoors?</i> "Pottering around in the soil, but at my age, I can't get down on my knees anymore." <i>About the current living location:</i> "I would like to go outside here, but I can't on this upper floor."						
navigation ✓= (the route to the outside obvious)						

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Testing the design variants with people with dementia						
Participant 2						
Location: Zorgcentra Castella in Cuijk		Setting: residential group (6 persons) in a traditional nursing home			Date: 05-04-2023	Time: 12:15-13:00
form of dementia: Alzheimer's		Stage of dementia: mild / moderate stage			Symptoms: Amnesia, disorientation in time and space, changes in behavior or emotions	
Interests and preferences of the outside: city person, who enjoys a view of nature						
	inside --> outside		outside --> inside			
	nav.	feeling outside	nav.	feeling inside	preferred elements	unpreferred elements
A	✓		✓		Beautiful view. Lovely space (living room). The cloud formation, the big tree, the animals.	
B	✓		✓		"I love trees, I always find trees very beautiful."	The space is not entirely pleasant. The shadows of the beams are reflected on the floor and also on the door.
C	✓		✓		Unique space, very cozy. Very valuable, beautiful, and spacious with all that greenery.	Be cautious of critters that may nest there. The wooden pergola passage creates a "zebra stripe" that marks the entrance to the garden but is not bothersome. "I would love to sit there, it's magnificent, especially with those flowers. Yes, very beautiful." No disturbing shadows.
D	✓		✓		View of the magnificent tree and the space around it.	Not enough greenery in the veranda.
E	✓		✓		"Surrounded by beautiful greenery, spacious, very much so. Meant in a positive way." The large flower pot.	"I prefer more intimacy. Here, everything is sleek and sterile. It should be sterile."
F	✓		✓		"More intimacy, and I get a warm feeling from the whole experience" thanks to the enclosure of glass.	The greenery and the glass roof are slightly less pleasant in this section of the structure (from an outside perspective).
G	✓		✓		The dining area is pleasant. The glass veranda section with the wooden pergola is enjoyable to experience. There is space to sit in the sun and in the shade.	The coat rack is not attractive. The corner with the two chairs is also not pleasant. "I find it too sleek." More intimacy is desired.
H	✓		✓		The coat rack in the hallway would look better with more hooks for the coats.	Wooden cladding does not appeal. "I prefer stone more. That's different for every person."
I	✓		✓		Nice spot for yourself. Those little hangers look very cozy.	The lattice work, the color.
Sometimes, before the video started, the participant asked if she was inside or outside while being in the virtual living room. And even when she was outside in the virtual 'garden' with a view of the transitional space, she questioned whether she was outside or inside. "I don't know if I would live here because I am really a city person But you can still enjoy the outskirts outside the city center, but those choices you make." I: <i>Despite having lived in the city again, do you find the greenery and the animals nice to see?</i> "Yes, indeed. We didn't live far from the forests. There was once snow there, and you never forget that." "I used to enjoy working in the garden, but I can't do it anymore, my back is all metal." I: <i>But you would like to sit there and enjoy the view?</i> "Oh, yes, absolutely, no need to think about wanting that."						
navigation ✓= (the route to the outside obvious)						

Testing the design with a healthcare worker											
Participant 3											
Location: Zorgcentra Castellla in Cuijk				Setting: residential group (6 persons) in a traditional nursing				Date: 05-04-2023		Time: 13:15-14:15	
Function: healthcare worker: Verzorgende IG, GVP'er				Experience with different settings: Small scale in Maartenshof, later transformed to group homes in Castella						Experience with working with people with dementia: 15 years, since 2008	
	inside/outside			outside/inside							
	nav	com	len	nav	com	len	tot.	preferred elements	unpreferred elements	remark	
A	9	9	2	9	9	3	41	The view and the outdoor life.		"Navigating from outside to inside is easy. It is also very clear what is outside and inside. I don't think they would get disoriented. I believe it is quite clear."	
B	9	9	4	9	4	5	40		The shadows of the wooden beams from the pergola can be confusing. "I think they might think they need to step over them."	"I think that with this one, they might feel that it suddenly becomes very bright and have the sensation of being outside. Feeling the light and temperature all at once, and experiencing it as 'oh, we're outside.' I don't think they would get disoriented very quickly." "I think people might have difficulty with the shadows, finding them confusing." (applies to both the shadow of the wooden passage and the pergola)	
C	9	9	5	9	9	5	46	The vegetation and flowers.		"It does look cozy. It seems a bit more enclosed, and I think that's comfortable for people. While still maintaining a natural outdoor appearance." "I believe people would appreciate the greenery, as it gives them a bit of an outdoor feel without it being too overwhelming." Using low-maintenance vegetation that doesn't attract strange insects would be ideal.	
D	9	4	4	9	6	3	35		The veranda feels too much like indoors. "Here, you still feel like you're inside, I think that's the feeling they have. And then they only come outside here." The route takes too long.	"I think it takes too long for some people, and it can be confusing for them. I don't think it's confusing for participant 1 and 2, but for those who are further away, it might be confusing or disorienting. The transition is comfortable, but maybe it's confusing. They step out the door and think they're outside, but they're not yet outside, that's the idea. They still have to go a little further." On the way back: "I think they have to take a moment to figure it out because it's darker, and they may feel like they're already inside while they still have to go through a door. So, the route takes too long."	
E	9	8	3	8	8	4	40	A glass roof for the veranda, but without the vestibule. "So that when they step out of the door, they come directly from the living room, immediately have the light, but still feel a bit protected, and then they just step outside."	The coat rack. The vestibule create a longer distance to go outside.	It is suggested to hang the coat rack on the wall, as it is more familiar and convenient. Having a shorter or no entryway can eliminate confusion and make the route to and from outside more efficient. The wall around the vestibule could be made higher to prevent people from accidentally walking into the glass. They should also have a clearer indication of where the door is located. It's important for them to have a distinct sense of being inside or outside, and if they want to go outside, they should have to move to a separate space, making it clear that they are transitioning from indoor to outdoor. For example, the living room can be considered as a strictly indoor space, and the intermediate area should not give the feeling of being outside. In the other design, people are more encouraged to go outside because the distance is shorter.	
F	7	8	4	9	6	4	38	The conservatory, plenty of natural light.	The coat rack, the vestibule, too long of a distance to go outside.	"People will think that this (vestibule) is already the living room. Participant 1 already mentioned that it is very large and that it would feel safer if it were a bit smaller, and that really affects the decoration as well. The atmosphere and decoration play a significant role in the space."	
G	6	5	2	7	6	2	28		"The distance to go outside is far too long, especially with the vestibule."	"The distance to go outside is indeed quite long, and it may take a while before people actually reach the point where they decide to go outside. I think they might become disoriented halfway because they can see through the glass that it's 'outside,' but they can't actually step out yet. It also depends on the mobility of the individuals. If they have to walk that entire distance, they may give up halfway."	
H	9	6	4	8	6	4	37	functional		"It's not a space where you would sit and relax; it's more functional with a coat rack, a restroom, and a passageway."	
I	9	8	4	9	8	4	42	Private entrance and exit, private terrace.		"Yes, having a private entrance and exit is important. It allows people to have their own space and privacy when they want to retreat or when they have guests over. It's great to have a designated area where they can sit and relax as well. I think it's a good feature."	
nav = navigation on a scale of 1-10, com = comfortable transition on a scale of 1-10, len = length of the route on a scale of 1-5											

nav = navigation on a scale of 1-10, com = comfortable transition on a scale of 1-10, len = length of the route on a scale of 1-5

The expertise of the healthcare worker regarding the utilization of outdoor spaces within the care facility Castella and how the residents perceive the transition from indoor to outdoor environments:

The healthcare worker emphasized the importance of allowing individuals with dementia to access outdoor spaces in a care facility. Being able to go outside is seen as a significant benefit, offering a change of environment and a sense of enjoyment. Some individuals may choose to spend time on the balcony. The healthcare worker mentioned that the residents don't experience overstimulation or negative effects when transitioning to the outdoors. Additionally, the healthcare worker noted that the residents do associate the outdoor environment with being outside.

The availability of outdoor spaces varies within the facility. While the first floor has a larger courtyard garden accessible from the living room, residents on the second floor have unconfined access to only communal balcony.

The ability to access outdoor areas is limited, as it requires assistance from volunteers or family members. The healthcare worker expressed the desire for ground-level access to a garden, which would provide a more inviting and accessible environment for residents. The availability of natural daylight is also important for maintaining proper day-night rhythms and reducing restlessness. The current limitations in accessing outdoor spaces can lead to frustration among residents. The healthcare worker expresses regret over the limited access and ease of exiting for residents on higher floors, which can be a missed opportunity for them to enjoy outdoor spaces.

The expertise of the healthcare worker regarding how individuals with dementia experience the transition from indoors to outdoors in the tested design options:

The healthcare worker expressed that in her experience, individuals with dementia may have difficulty navigating long routes to the outside and may be hesitant to venture outside. It is important for the route to the outdoors not to be too long. The mobility of residents varies, and it is important to acknowledge that some individuals are less mobile. However, they still deserve the opportunity to independently access outdoor areas. The healthcare worker emphasized the need for shorter distances from the living room to outdoor spaces, providing covered areas for protection from the elements while still maintaining a sense of being outdoors. Incorporating vegetation creating a feeling of being outside was also highlighted.

The expertise of the healthcare worker regarding the proposal of a plan that includes multiple access points to the outdoors and different designs of transition spaces surrounding the residence with varying sun orientations:

The healthcare worker found it to be an appealing idea. This plan would offer shorter distances to outdoor areas, allowing residents to choose their preferred seating locations, whether near the glass, in the open air, in shaded areas, or in sunny spots. The proposed plan would provide a variety of options and shorter distances, which would also be advantageous for individuals sensitive to sunlight.

Top 3 transition spaces appropriate for people with dementia according to the healthcare worker

- **Option C:** Pergola with vegetation
- **Option E:** Glass veranda connected to the living room (no intermediate space)
- **Option F:** Conservatory directly connected to the living room (no intermediate space)

10.3. Sub-Conclusion: Experiment Transition Spaces

Based on the feedback received from the participants, valuable insights can be gained regarding their preferences, comfort and orientation in relation to the design elements of transition spaces. The subjective experiences of individuals with dementia and their perception of being inside or outside in these spaces are essential considerations in creating supportive environments.

How are the different design elements of transition spaces perceived by individuals with dementia?

The perception of being inside or outside varied between the two participants. Participant 1 clearly felt outside when walking through the door and inside when transitioning through the door from the outside. However, participant 2, who was in a later stage of dementia and experienced orientation difficulties, sometimes struggled to determine her location in the space. She would question whether she was inside or outside while standing in the virtual living room, possibly because she was close to the glass door and caught a glimpse of the outdoors.

Even in longer transition spaces like option G, participant 1 felt it took a while before she sensed being outside, while participant 2 felt outside almost immediately, despite the longer route required to reach the actual outdoors.

However, the feeling of being inside or outside in a transition space can vary for each person, even those without dementia. Transition spaces, being neither fully outdoors nor entirely indoors, contribute to this variation in perception.

Therefore, it is crucial to understand these subjective experiences and address the challenges faced by individuals with dementia when designing transition spaces. This section discusses the preferred elements by participants with dementia and the expertise of the healthcare worker on this perception of being inside and outside in the design options.

Preferred design elements:

- **Short route to the outside**

As previously discussed, individuals with dementia can experience varying perceptions of being inside or outside in a transition space, which can lead to potential disorientation and confusion, especially in longer transition spaces like option G. To address this issue, it is recommended to avoid longer routes to the outside. When individuals with dementia can see through the glass but are unable to immediately access the outdoors, it can further contribute to their disorientation. Additionally, considering their limited mobility, longer distances may discourage them from completing the journey entirely. Therefore, shorter routes from the living area through a single transition space to the garden were preferred. These shorter routes help minimize confusion and facilitate easier movement for individuals with dementia, promoting a greater sense of comfort and orientation within the space.

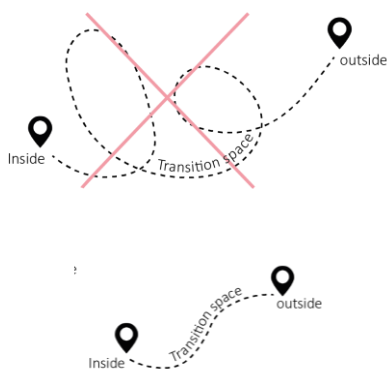


Figure 10.6 | Short route to the outside

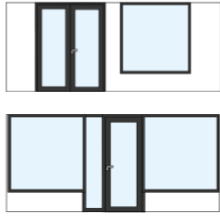


Figure 10.7 | Glass doors

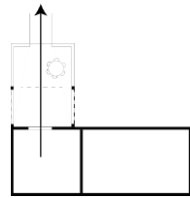


Figure 10.8 | Linear movement

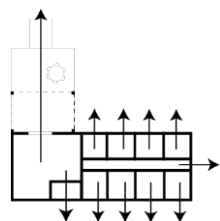


Figure 10.9 | Multiple access routes

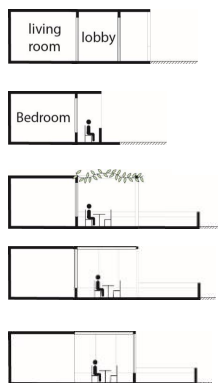


Figure 10.10 | Preferred transition spaces



Figure 10.11 | Seating areas for Socialization and privacy



Figure 10.12 | Preferred design elements

- **Glass Doors, large windows including low walls**

The use of glass doors with dark framing, accompanied by glass windows and low solid walls, provided clear access points to the outside.

- **linear movement**

The linear movement towards the outdoors created a clear walking route, while the path and walls guided participants further into the garden. The location of the doors also made the way back inside easily identifiable.

- **Multiple access routes**

Multiple doors to the outside, allowing for easy access and shorter routes. Easy access through the living room/ kitchen, lobby and bedrooms was appreciated.

- **Having an own entrance**

Participants appreciated having an own entrance to their bedroom, including an private terrace, as it provided them with a sense of ownership and privacy.

- **Familiar lobby:**

The inclusion of a functional lobby with a toilet and wall coat rack was appreciated, as it provided convenience and practicality.

- **Different seating areas**

Providing various seating options, such as sunny spots, shaded areas, and spaces surrounded by vegetation, was favored. Participants enjoyed the experiences offered by different seating areas, including **pergolas with flowering plants**, **glass roof verandas** providing protection from rain while retaining an outdoor feel, and **conservatories** fully enclosed with glass, with ample daylight and having their own **private, enclosed terrace** by themselves.

- **Seating areas for socialization and privacy**

Participants valued seating areas for both socialization and privacy. The presence of a round table with seating for socializing and private terraces at the bedrooms were mentioned as desirable features.

- **Pleasant view of trees and grass, animals, and flower boxes with hanging flowers were also appreciated design elements.**

Points for improvement

- Create a more intimate feeling in the transition spaces with decorative elements

The participants suggested creating a more intimate feeling in the transition spaces through the use of flowers, doormats, and other decorations. Adding personal touches inside will contribute to an enhanced overall experience.

- Create a more familiar feeling of the exterior

They also expressed a preference for less sleek and sterile modern materials on the exterior, opting for a more familiar and homely atmosphere. Additionally, incorporating masonry for the exterior, instead of the timber cladding.

- Create a more intimate feeling inside

Creating a more intimate and familiar atmosphere with decorative elements inside in the living room and kitchen. The participants desired more personal touches such as paintings, books, and pillows to create a warm and inviting ambiance.

- Create a homely main entrance door, at the draught lobby.

Furthermore, the participants emphasized the importance of a homely main entrance door at the draught lobby, including decoration.

- Use a wall coat rack in the lobby

The participants didn't like the coat rack in the living room, it looked like a weird place for a wardrobe.

- Avoid pergola's without vegetation

It is advisable to avoid pergolas without vegetation as they create confusing shadows and serve no functional purpose. Additionally, they provide no protection against rain, allowing water to pour through.

In conclusion, the preferred design options include shorter routes to the outside, multiple doors, different seating areas, pergolas with vegetation, glass roof verandas, glass roof conservatories, private entrance and exit doors with enclosed terraces, functional lobbies, round tables with seating, flower boxes, and a pleasant view of trees, animals and grass. These elements contribute to a comfortable and enjoyable living environment for individuals with dementia.

The findings from this study emphasize the importance of considering individual differences and tailoring design approaches to meet the specific needs and capabilities of individuals with dementia. By doing so, transition spaces can effectively support their well-being and contribute to a more inclusive and accessible environment for all.

11

LOCATION ANALYSIS



11. LOCATION ANALYSIS

This Chapter addresses the issue of increasing vacancy in agricultural real estate in Noord-Brabant, with a particular focus on the municipality of Land van Cuijk. The section aims to shed light on the growing number of unused properties and explore their potential for repurposing.

Specifically, the analysis centers on the vacant agricultural real estate Graafsedijk 19 in Beers, located in Land van Cuijk. Through a thorough location analysis, considering factors such as historical value of the existing buildings, farm layout, accessibility, the study aims to highlight the unique qualities of Graafsedijk 19. The aim is to establish criteria for its repurposing as a 24h-care farm, ensuring a tailored fit to the site's distinctive features.

This research contributes to the broader objective of repurposing vacant agricultural properties in Noord-Brabant, addressing the growing vacancy issue, and promoting sustainable land use practices in the region.

11.1. Vacancy and reuse of agricultural real estate

The province of North Brabant in the Netherlands experienced a significant increase in disused agricultural buildings between 2000 and 2012 (Gies et al., 2016). In this period, a total of 3.7 million m² of agricultural buildings, including residential and business structures such as stables and sheds, became vacant. Among the buildings that became available, approximately 2 million m² of business buildings currently remain vacant. This accounts for approximately 10% of the total area of agricultural buildings. Furthermore, it is projected that by 2030, an additional 8.6 million m² of agricultural buildings will become disused. The study assumes that buildings with a residential function (18%) will remain occupied, while a portion of the business buildings (32%) may be repurposed for agricultural or non-agricultural use. However, it is expected that the majority of vacant business buildings (50%) will remain empty. Considering the current vacancy rate, this implies that around 6 million m² of agricultural business buildings will be vacant by 2030 (Gies et al., 2016).

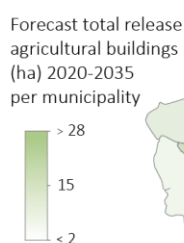


Figure 11.1| Forecast total release agricultural buildings (ha) 2020-2035 per municipality (Adapted from Public Information Map, n.d.)

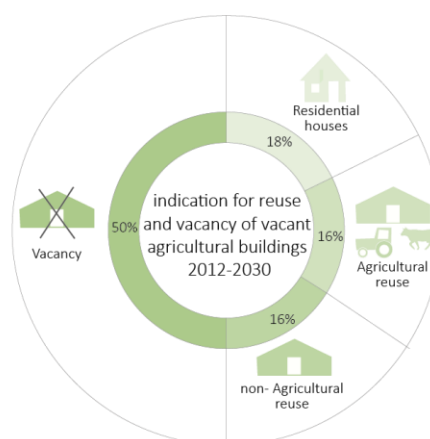


Figure 11.2| Indication for reuse and vacancy of vacant agricultural buildings 2012-2030 (Adapted from Gies et al., 2016)

Vacancy in the municipality of Land van Cuijk

The municipality of Land van Cuijk in Brabant has the highest vacancy area of agricultural buildings between 2017-2020, totaling 88,000m². This is projected to increase to 252,000m² by 2035 (Rutgers & Seghers, 2019).

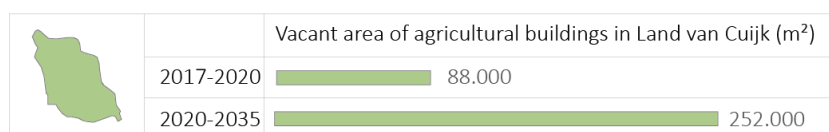


Figure 11.3 | Vacant area of agricultural buildings in Land van Cuijk (m²) (Adapted from Rutgers & Seghers, 2019)

For Land van Cuijk, it is estimated that 82.6 hectares of agricultural real estate will become available by 2030, comprising 32% of the total area. Approximately half of this available real estate is expected to remain vacant (Rutgers & Seghers, 2019). This vacancy not only impacts the vitality and spatial quality of the rural area but also poses health risks due to asbestos roofs (Gies et al., 2016). Many of the vacant agricultural buildings were constructed after 1965, lack visual appeal, and have asbestos roofs, making their reuse challenging (Gies et al., 2016). Repurposing these vacant buildings and demolishing surplus structures can help preserve the rural area's quality and prevent further landscape cluttering.

Regulation for protection and strengthening of rural areas in the Netherlands

To balance development and nature preservation in the rural areas, two regulations are in place: "red for red" and "red for green." The "red for red" regulation encourages demolishing vacant agricultural buildings and allows the construction of new homes on the same site, improving the rural area's spatial quality. The "red for green" regulation focuses on preserving and enhancing green infrastructure, providing fiscal compensation to landowners who contribute their land to green projects like nature reserves or landscape restoration (Rutgers & Seghers, 2019). These regulations promote landscape protection while accommodating new developments, such as a 24h-care farm.

11.2 Site Analysis: Agricultural real estate ‘Repelsvoort’

The former pig farm on the agricultural property, called Repelsvoort, at Graafsedijk 19 in Beers has been vacant since 2012. The farm is located in a rural area of Land van Cuijk and is accessible via a long driveway lined with trees. The farm is situated in the middle of a vast agricultural area that is owned by a tree nursery. The surrounding farmland is currently covered with numerous narrow, young trees planted in rows. The agricultural property at Graafsedijk 19-21 consists of a historic complex of a T-shaped farmhouse and a large barn (langsdeelschuur). Both buildings were constructed at the end of the 19th century. The remaining piggeries were built after 1965 and have asbestos roofs, which are not characteristic or visually appealing. The house next to the farmhouse at Graafsedijk 21 is a relatively recent addition to the historical heritage of the area. This house was built in 1990 as an accompanying company residence. The discontinuation of the pig farm at Graafsedijk 19 was due to personal circumstances of the owners and a lack of succession within the family. As a result, the remaining piggeries, large barn (langsdeelschuur), and the stable area of the farmhouse have become vacant, while the house area of the farmhouse has since been rented out as a residence. The house at Graafsedijk 21 is still inhabited.



Figure 11.4 | Vacant area of agricultural property Graafsedijk 19

In 2018, there was a request for a change in the zoning plan (bestemmingsplan). The zoning plan Graafsedijk 19-21 Beers (2018) was approved by the municipality of Land van Cuijk. This makes it possible to redevelop the two former agricultural company houses (on Graafsedijk 19 and 21) to the destination 'Residential', and to add two residential destinations; in the stable area of the historic T-farm and in the “langsdeelschuur”. According to the municipality, it is important to protect and preserve the cultural-historical value of the agricultural buildings during the redevelopment of these buildings. A building-historical exploration has been carried out on behalf of the owners, performed by a consultancy, which describes the valuable cultural-historical elements that must be preserved. The new residential destinations are possible after the demolition of the vacant pig sheds in the planning area and the addition of an appropriate green area.



Figure 11.5 | Existing entrance gate Repelsvoort



Figure 11.6 | Top view Graafsedijk 19 (Adapted from Ruimtelijkeplannen.nl)



Figure 11.7 | Bird's-eye view Graafsedijk 19

Accessiblilty

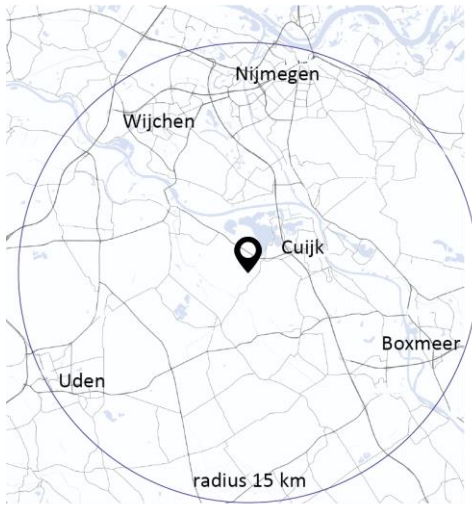


Figure 11.8 | Radius 15 km



Figure 11.9 | Accessibility

The location of Graafsedijk 19 in Beers creates a central point within a 15 km radius where various villages and cities such as Nijmegen, Uden, Boxmeer, Wijchen, and Cuijk are located. The location is easily accessible for people from the city and villages, making it easier for family members and visitors to visit the 24h-care farm. Moreover, the central location of the care farm offers the possibility to provide day care for people who do not permanently reside in the 24h-care farm. This expands the possibilities for care provision and provides more flexibility for families taking care of their loved ones.

With the proximity of the A73 highway and the train station in Cuijk, as well as a bus station in the center of Beers, residents and visitors can easily reach the 24h-care farm. From the bus station in the center of Beers, it is a 21-minute walk to the residential care farm, and it is also possible to take an OV bike from Cuijk station and cycle for 20 minutes to reach the location. In general, the location is easily accessible, which is important for the families of residents and for the staff and caregivers working at the residential care farm. A location that is easy to reach can help attract and retain qualified personnel and can contribute to the quality of care provided.

Farm layout

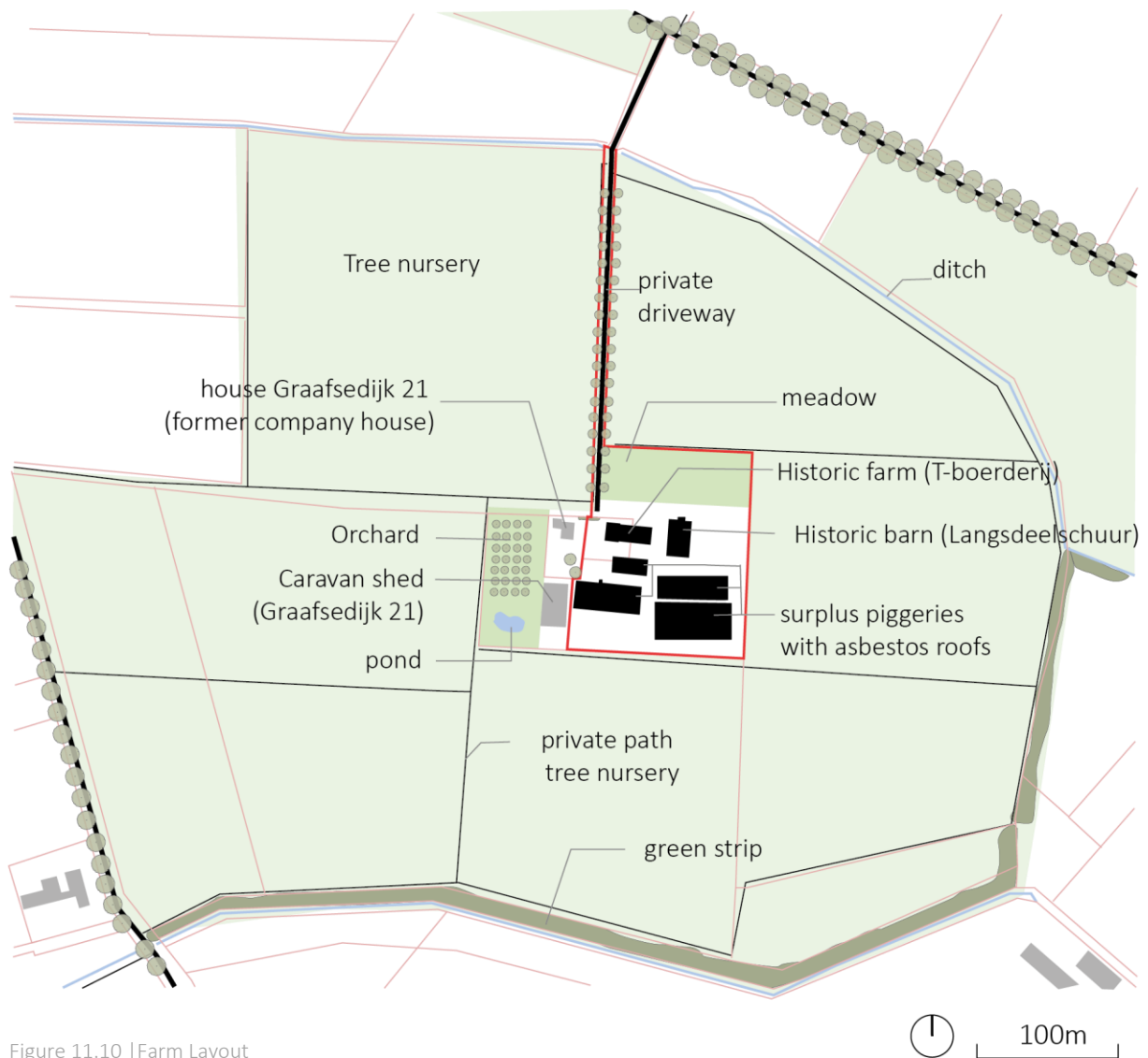


Figure 11.10 | Farm Layout

Total area of agricultural real estate: 18.520m² (outlined in red)

Infrastructure

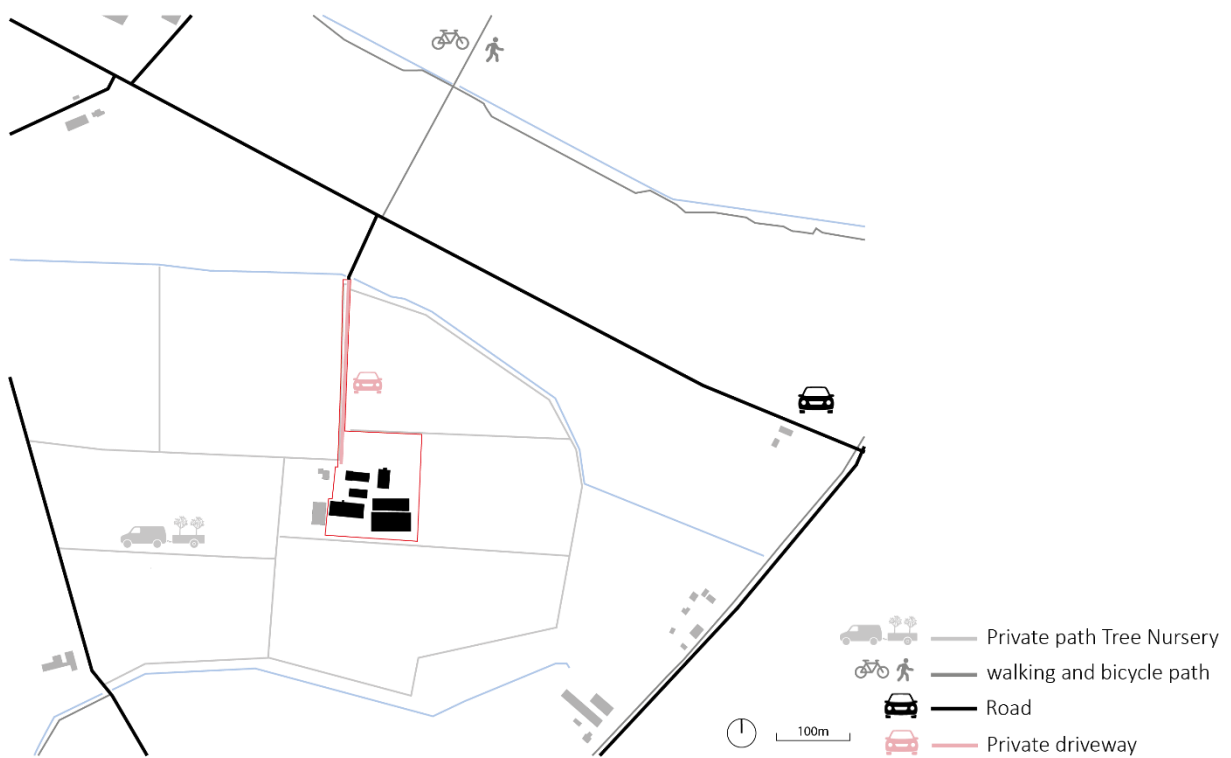


Figure 11.11 | Infrastructure

Agricultural land use



Figure 11.12 | Agricultural land-use

Site analysis photographs

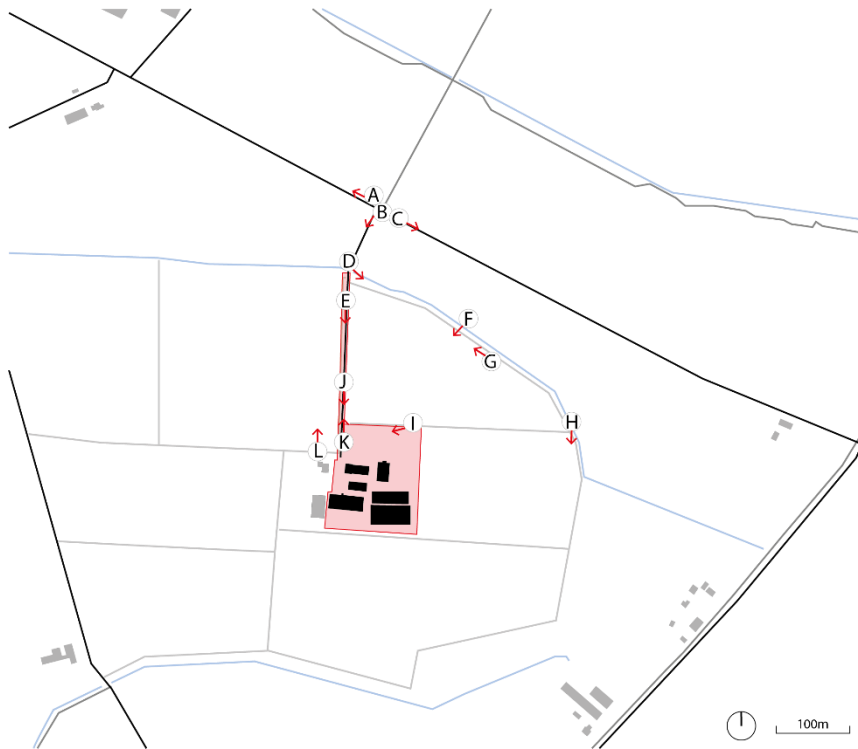


Figure 11.13 | Photo Analysis





11.2. Historical buildings

The farmhouse (T-Boerderij)

The farmhouse consists of a house area and a stable area. The house area is a residential house that has the form and detailing of a village house around 1900. The stable area is built with traditional oak wooden frames and low side walls. The stable area was a stable space for pigs. The stable is constructed with a "middenlangsdeel", meaning that the cattle used to stand against the side walls, and there was a central space called the "deel". The "eindegevel" (east wall) consisted of large doors and on each side a walk-through door. The "eindegevel" of the farmhouse has a hipped end and the sloping sides have brickwork designed to strengthen the wall. The north wall of the stable space was raised in the 1950s/60s. The stable space was originally set up for keeping pigs, and later, several piggeries with feed silos were added. The residential house was renovated in 2016. The farm section ceased operations entirely in 2012.

The high cultural-historical values and positive cultural-historical values of the historical T-Boerderij and Langsdeelschuur are determined by the consultancy Schamp Bouwkundig advies in 2017.

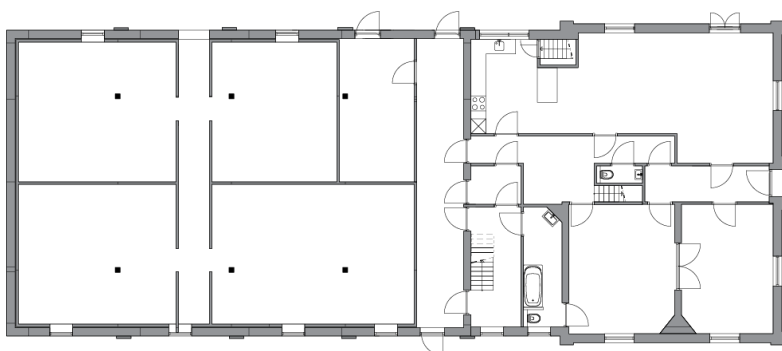
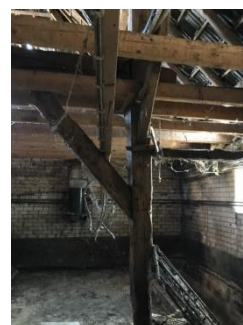


Figure 11.14 | Historical T-Farm Photos and Floorplan

High cultural-historical value (Schamp Bouwkundig advies, 2017)

These are the elements that are very important for the historic building. They must be respected and in case of damage, restoration and preservation should be considered.

- The entire house area, except for the garden doors.
- The building mass of the house area and stable area.
- The end wall, except for the iron beam and construction marks of the elevated part.
- The original low part of the north wall of the long part with the pilasters.
- The part of the south wall of the stable area, except for the chimney
- The fire wall with braiding and old smoke channel
- The “gebint”, timber frame in the stable area.
- The roof structures of the house area and stable area.

(Schamp Bouwkundig advies, 2017)

Positive cultural-historical value

These elements are important for the preservation of the development history of the historical building. Preservation is desirable, but adaptation or change is possible provided that the component remains recognizable.

- The roof of the stable area with its “Mulden” roof tiles.
- The raised part of the north facade.
- The construction traces and iron beam in the “eindgevel”.
- The door opening in the south facade of the stable area.
- The raised part of the stable area on the south side

(Schamp Bouwkundig advies, 2017)

The remaining elements (without color) do not add much or anything to the value of the building or have any significance in the development history. Preservation is not necessary.

In the drawings of the facades and section of the farmhouse, elements are colored to indicate the building-historical value assessment.

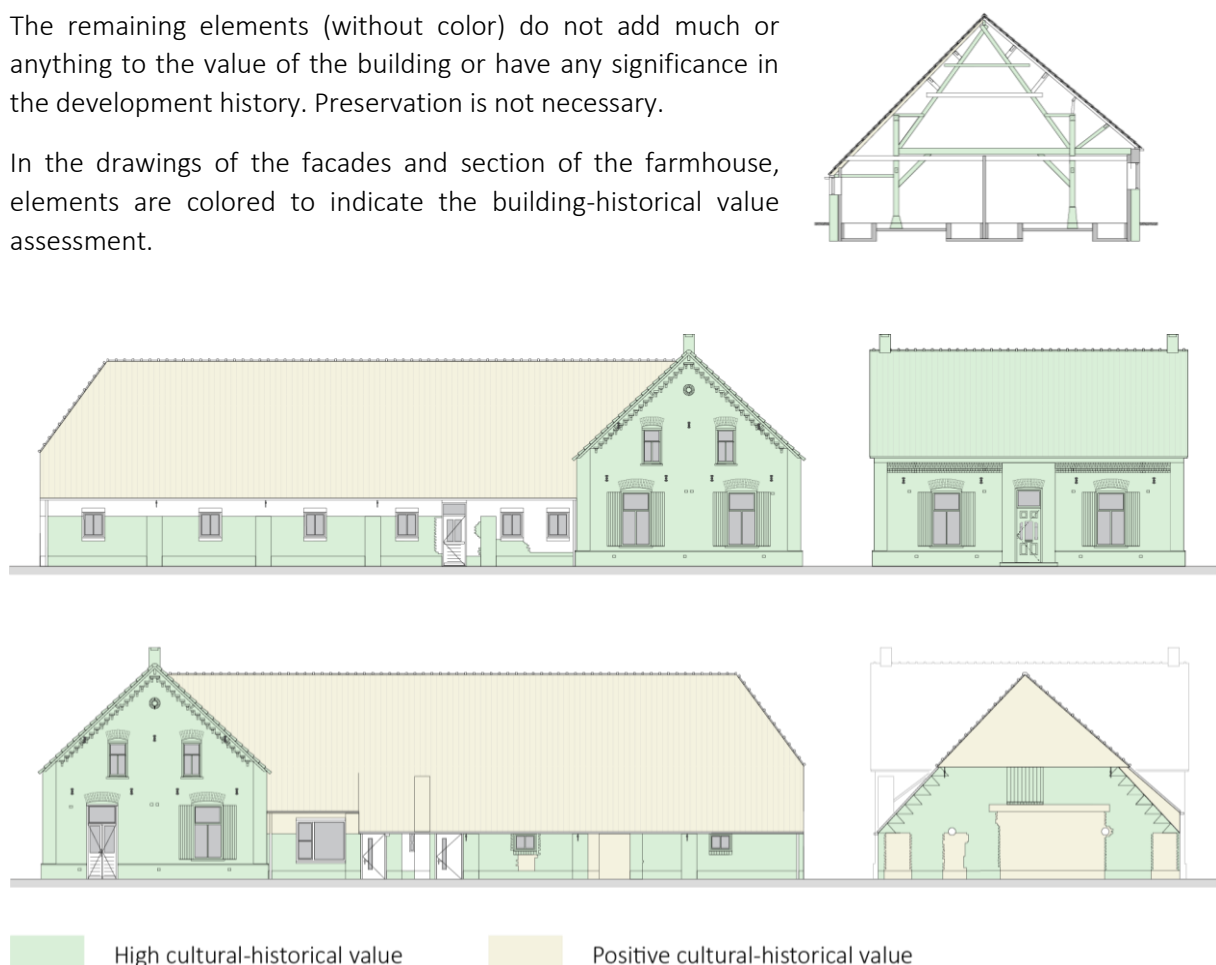


Figure 11.15 | Historical T-Farm cultural-historical value (Adapted from Schamp Bouwkundig advise, 2017)

The large barn (langsdeelschuur)

On the east side of the farmhouse is the langsdeelschuur situated. The langsdeelschuur is a tall and large barn, which was probably built at the same time as the farmhouse. The barn had a complete “kopbalkgebint”, which ensures high outer walls. The sides of the barn are high, allowing for sufficient height of the barn doors for a fully loaded horse-drawn wagon to enter. Later, extensions made of corrugated sheets were added to the barn for the storage of machinery. The barn is in a ruinous state. It has suffered greatly from weather and wind, causing all the timberwork of the structure to be in poor condition, which cannot be reused. The roof is almost completely gone, and the sides are also severely eroded. The only element that could be preserved in a reconstruction would be the western masonry wall, which would also need to be restored, re-pointed, and given a new foundation.



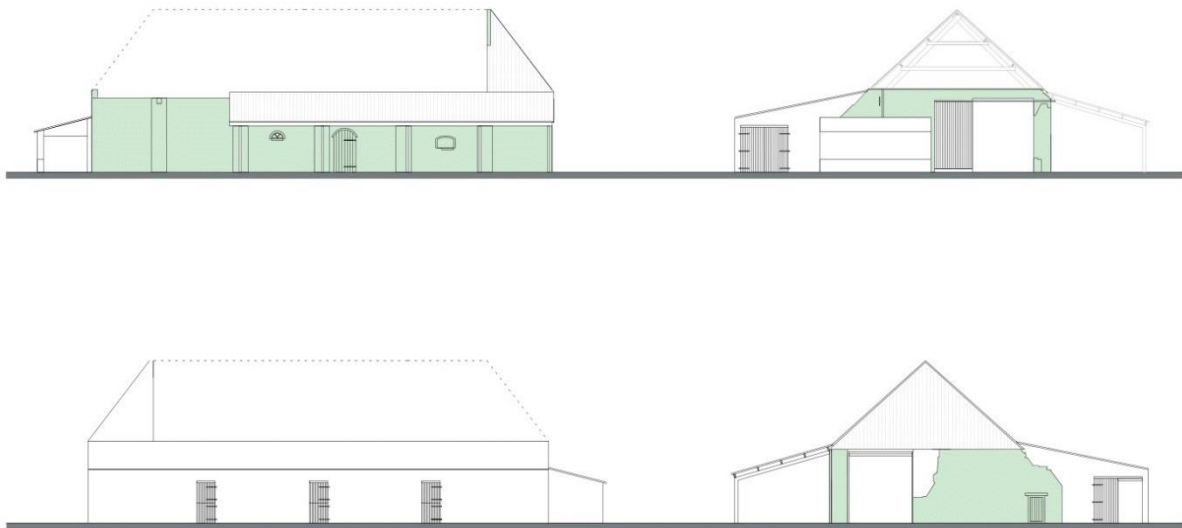
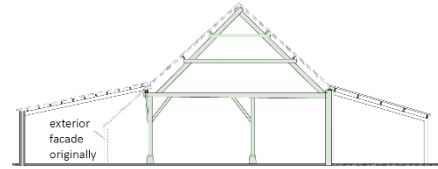
Figure 11.16 | Historical Large Barn Photos and Floorplan

High cultural-historical value:

- The original building mass
 - The beams and roof structure
 - The entire west façade with door, windows, and pilasters
 - The remnants of the north and south façade
- (Schamp Bouwkundig advise, 2017)

Positive cultural-historical value:

- The former east façade
 - The former roofing with roof tiles
- (Schamp Bouwkundig advise, 2017)



 High cultural-historical value

Figure 11.17 | Historical Large Barn cultural-historical value (Adapted from Schamp Bouwkundig advise, 2017)

11.3. Sub-Conclusion: Location Analysis

The purpose of this location analysis was to establish guidelines for the redevelopment of the agricultural property at the Graafsedijk 19 to a 24h care farm, with the historic buildings repurposed as day care facilities and respite care residence, and the redundant pigsties demolished to make way for greenery and four new homes accommodating 28 residents with dementia in total. The following guidelines are based on the location analysis and are aimed at ensuring that the design and development of the 24h care farm at Graafsedijk 19 promotes the quality of the outdoor area and meets the needs of the target group, including people with dementia, their families, and caregivers.

Demolition of surplus piggeries

Due to their unappealing appearance and lack of character, as well as the health risks posed by their asbestos roofs, these surplus piggeries are not suitable for reuse. As a result, demolishing them will create space for the construction of new homes and the planting of greenery.

Safe, accessible peaceful area

The location of the repurposed agricultural buildings into a 24h-care farm is not only aesthetically attractive, but also easily accessible and safe for residents. The location is situated in a peaceful rural area, surrounded by greenery and nature, creating a calm and serene environment that is well-suited for individuals with dementia. In addition, the location has a long driveway that keeps traffic from the public road far enough away from the residential buildings, which can contribute to the safety of the residents. The location is also easily accessible by car and public transport.

Preservation building masses historic farm and barn

It is vital to maintain the high cultural historic value of the T-farm's house area and stable area, as well as the large barn (langsdeelschuur). These three components complement one another, heightening the historic significance of the farm. The farmhouse and barns are an expression to the socio-economic and agricultural development that have occurred in this section of Beers. After the reclamation, the region flourished, which was reflected in the construction of a farmhouse's house area and stable area and a large barn (Schamp Bouwkundig Advies, 2017). Unfortunately, the only element of the large barn that is still in a reusable condition is the masonry western wall. However, it necessitates restoration work, including repairing the mortar joints, and masonry, as well as the construction of a new foundation. This also makes it possible to relocate the large barn if necessary. As the preservation of the building mass is essential, it can be fully reconstructed in a more efficient location as part of the new plan.

Preservation facades of the historic farm

The original facades of the farmhouse's house area are noteworthy for their period style. The decorative brickwork in the facade and the design of the front door are just a few examples. The symmetry of the house area, with its central risalit and corner risalits, gives the structure an attractive appearance. The original segments of the north, south, and east facades of the stable area have a high cultural heritage value and must remain visible. The pilasters, anchors, and Flemish bond brickwork in the facades must be preserved, according to Schamp Bouwkundig Advies (2017).

Preservation timber construction

The roofing and framing structure of the stable area of the farmhouse and the langsdeelschuur have a significant cultural historic value. The timber construction in the stable area is still intact and needs to be preserved. Unfortunately, the timber construction in the langsdeelschuur is in very poor shape and cannot be salvaged, necessitating its complete replacement.

Construction greenery

The incorporation of greenery in the project's design is crucial to its landscape integration, as it involves planting greenery around the homes. Not only will the redevelopment have no negative impact on the habitat of protected plant and animal species, but it will also generate new habitats through the installation of green belts, further enhancing species protection (Borgo Tuin-en Landschapsarchitectuur, 2018).



Figure 11.18| Demolition of Surplus Piggeries

12

FINAL DESIGN



Woonzorgboerderij Repelsvoort

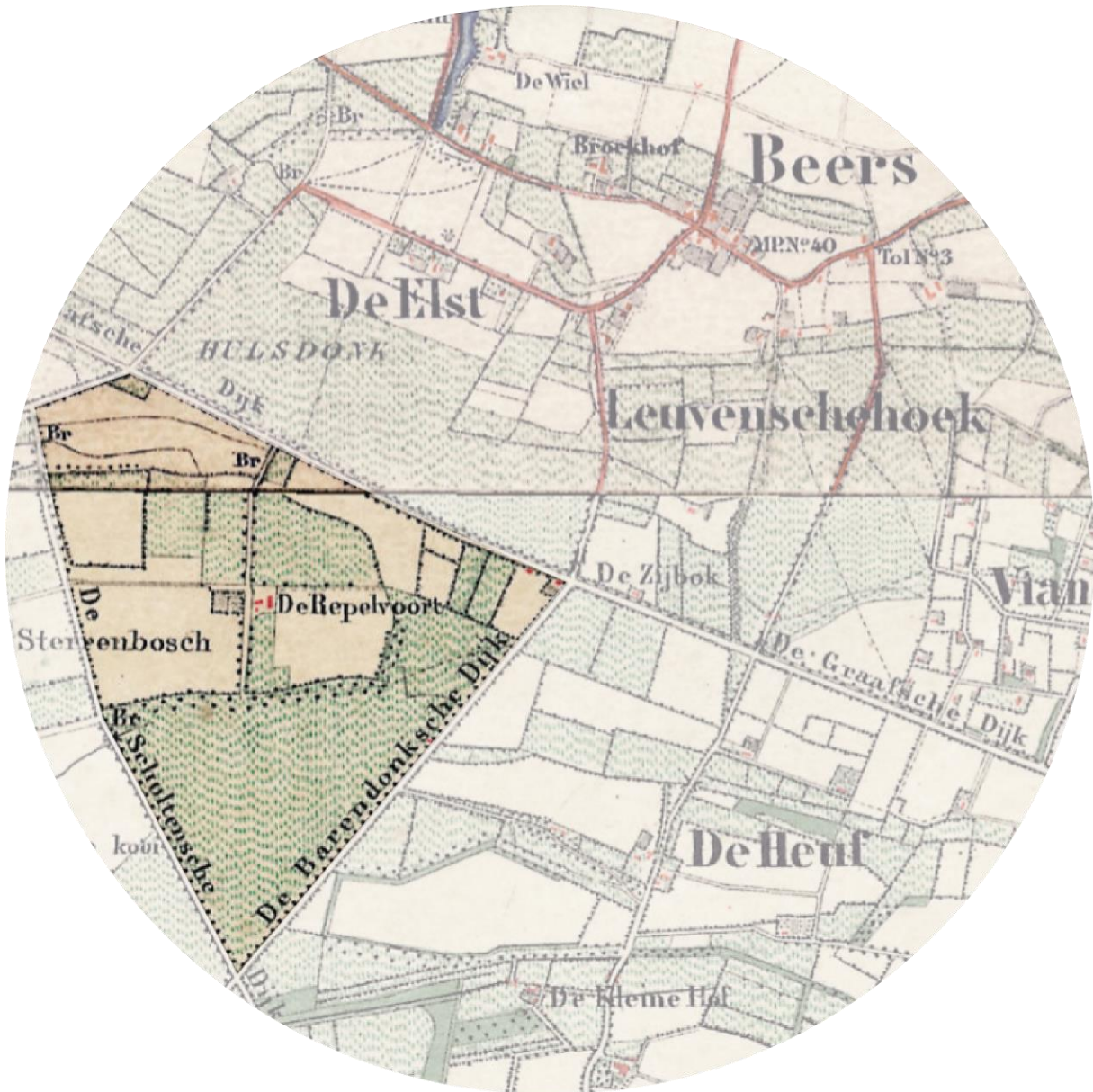


Figure 12.1 | Repelsvoort, Map 1867 (Adapted from Topotijdreis, n.d.) 149

Woonzorgboerderij Repelsvoort: Een plek waar mensen met dementie hun leven kunnen voortzetten, omringd door zorg, natuur en een betekenisvolle omgeving.



12.FINAL DESIGN

12.1. Program

The aim of the design is to create a 24h-care farm that promotes outdoor activities, connects people with dementia to nature, encourages exercise, and provides meaningful activities to enhance their quality of life. This includes designing outdoor spaces and residence with transition spaces based on specific guidelines examined in this research and insights from the case studies on 24h-care farms.

Woonzorgboerderij Repelsvoort as a holistic care facility

Woonzorgboerderij Repelsvoort operates as a holistic care facility, offering comprehensive support for individuals at all stages of dementia. It provides a range of services such as daycare, respite care through a dedicated respite home, and residences designed for permanent stays, offering 24-hour care. The facility provides specialized care for individuals of all ages, including those under 65, who are affected by various forms of dementia. There are a total of four residences, each accommodating seven residents with dementia, resulting in a total capacity of 28 residents. Additionally, the respite home can accommodate up to five temporary residents for stays ranging from 2 days to 3 weeks. Furthermore, the facility's day program benefits around 30 individuals with dementia who still live at home. The historical buildings will be repurposed to accommodate the daycare facility and respite home, while the residences will be newly built as standalone structures.

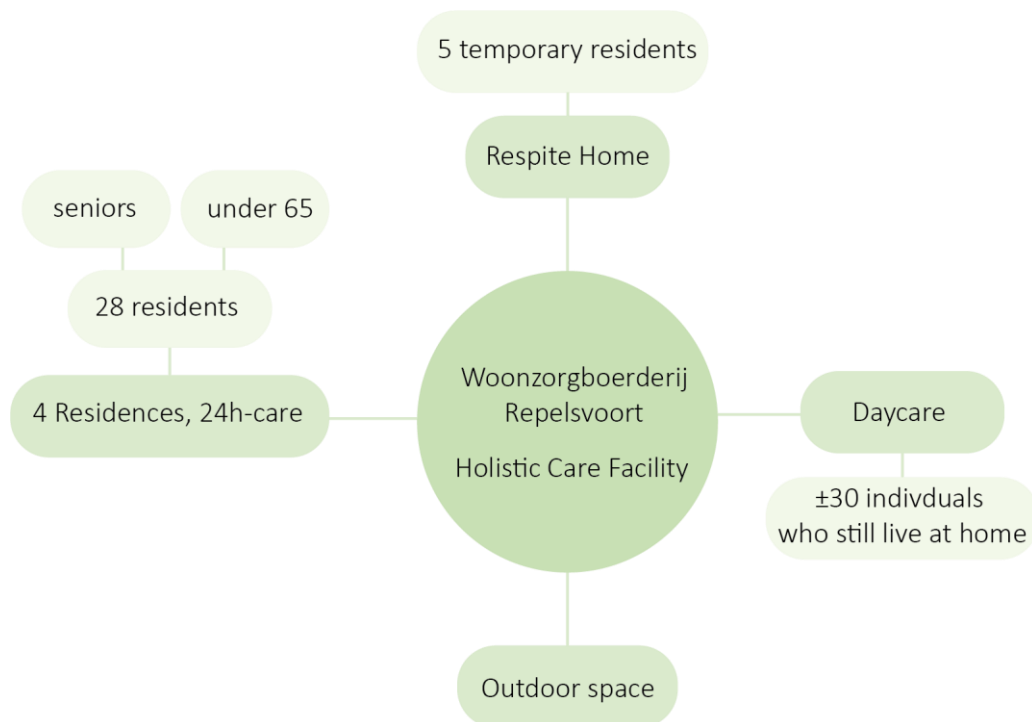


Figure 12.1.1|Program

These facilities, including residences, daycare building, respite home and the outdoor space will be further described and visualized in this Chapter.

The theory discussed in this Chapter is derived from literature studies, case studies, the location analysis and the experiment. No new sources are added or mentioned in this Chapter, as they have already been addressed in the research part.

12.2. Mass Study

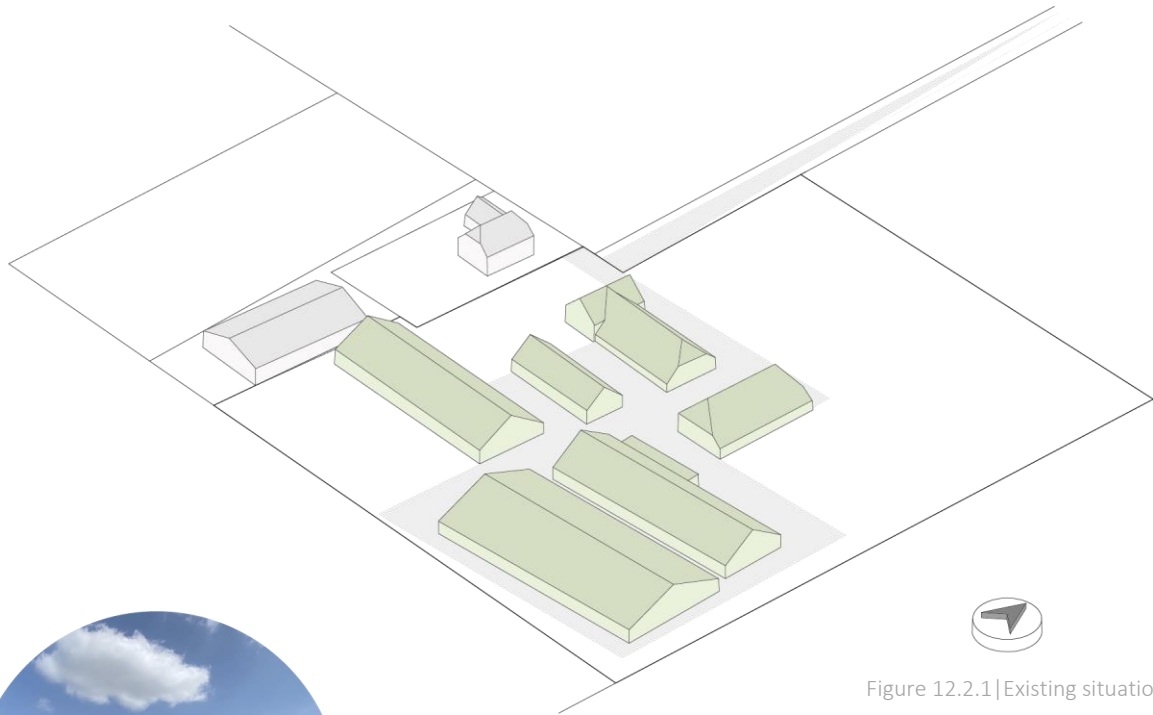


Figure 12.2.1 | Existing situation



Figure 12.2.2 | Existing Piggery

The surplus piggeries, which have asbestos roofs and are visually unappealing, will be demolished. Furthermore, the uneven concrete floor panels will be removed.

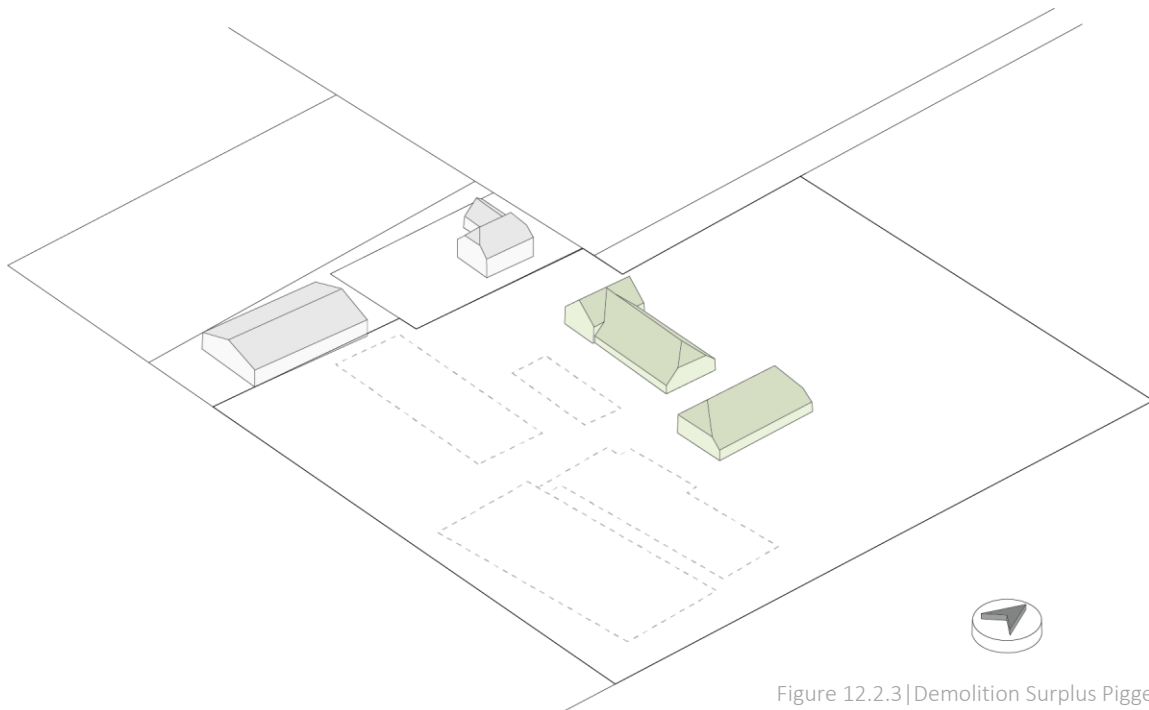


Figure 12.2.3 | Demolition Surplus Piggeries

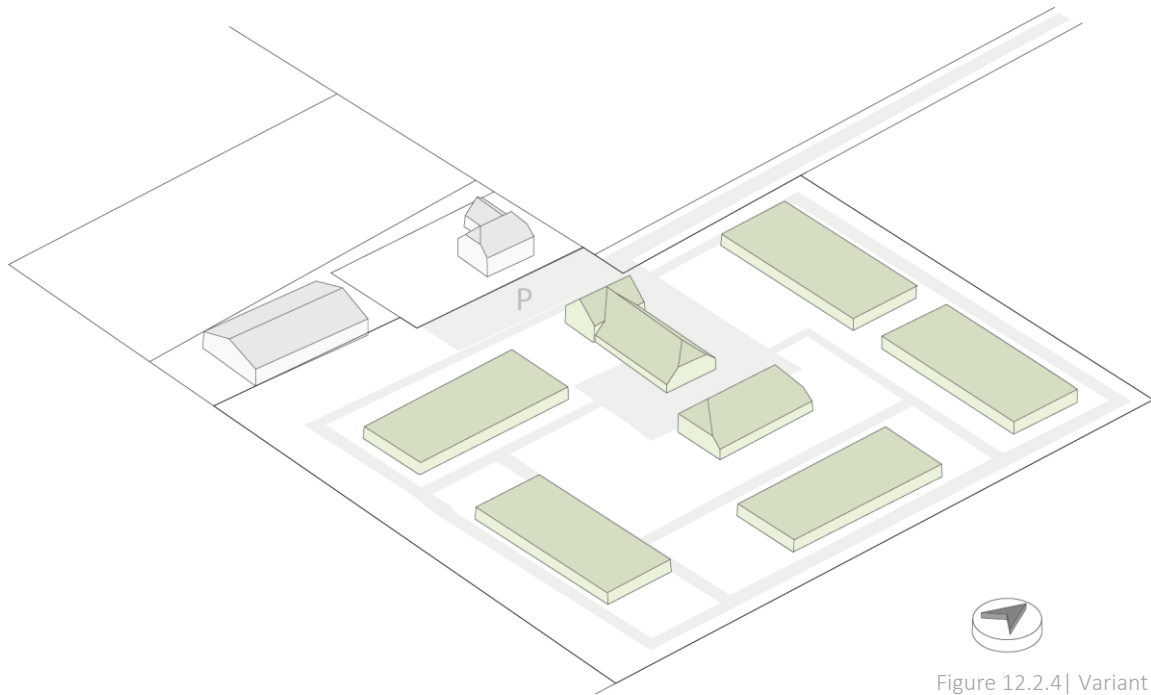


Figure 12.2.4 | Variant 1

Variant 1 entails the construction of 5 newly built standalone residences, incorporating repurposed historical buildings. In contrast, Variant 2 comprises 4 newly built standalone residences, accompanied by the relocation of the historical barn to a different location. This relocation is feasible because only the western wall remains salvageable, while the rest of the elements necessitate complete restoration, as indicated in the sub-conclusion of Chapter 11 (Location Analysis). Furthermore, Variant 2 offers a larger green space and a more expansive, open outdoor area, highlighted by a central courtyard that provides panoramic views.

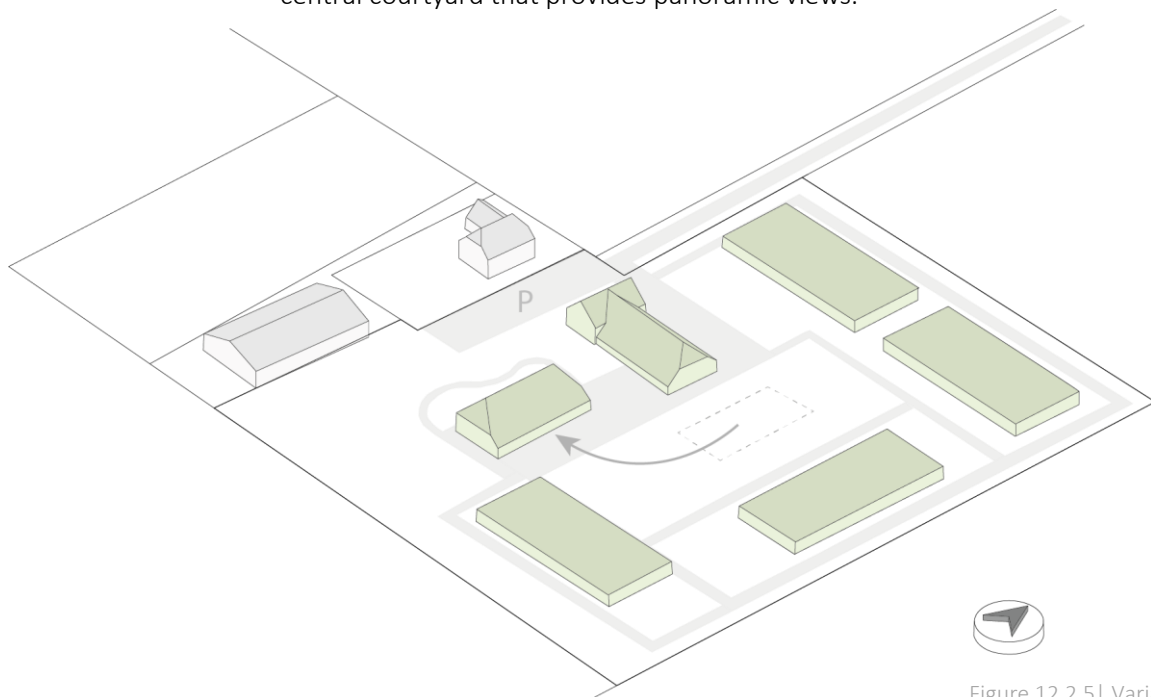


Figure 12.2.5 | Variant 2

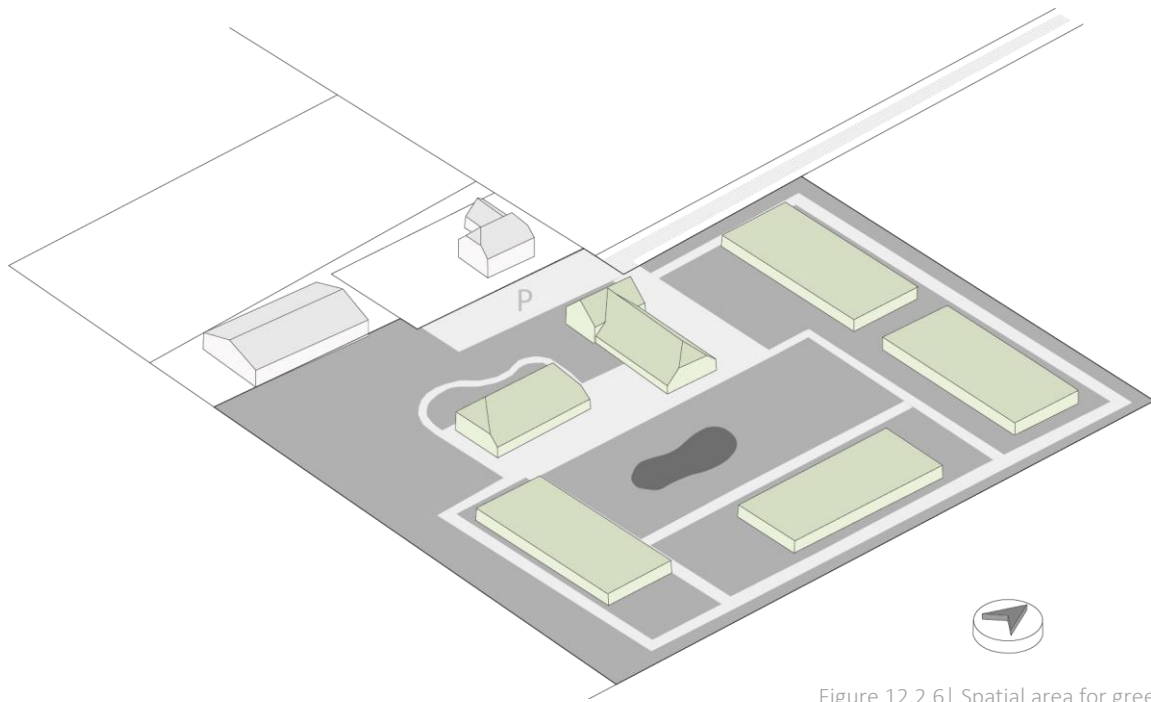


Figure 12.2.6| Spatial area for greenery

The design encompasses designated spatial areas for incorporating a pond, lawns, trees, a flower garden, animal pastures, an orchard, and natural boundaries.

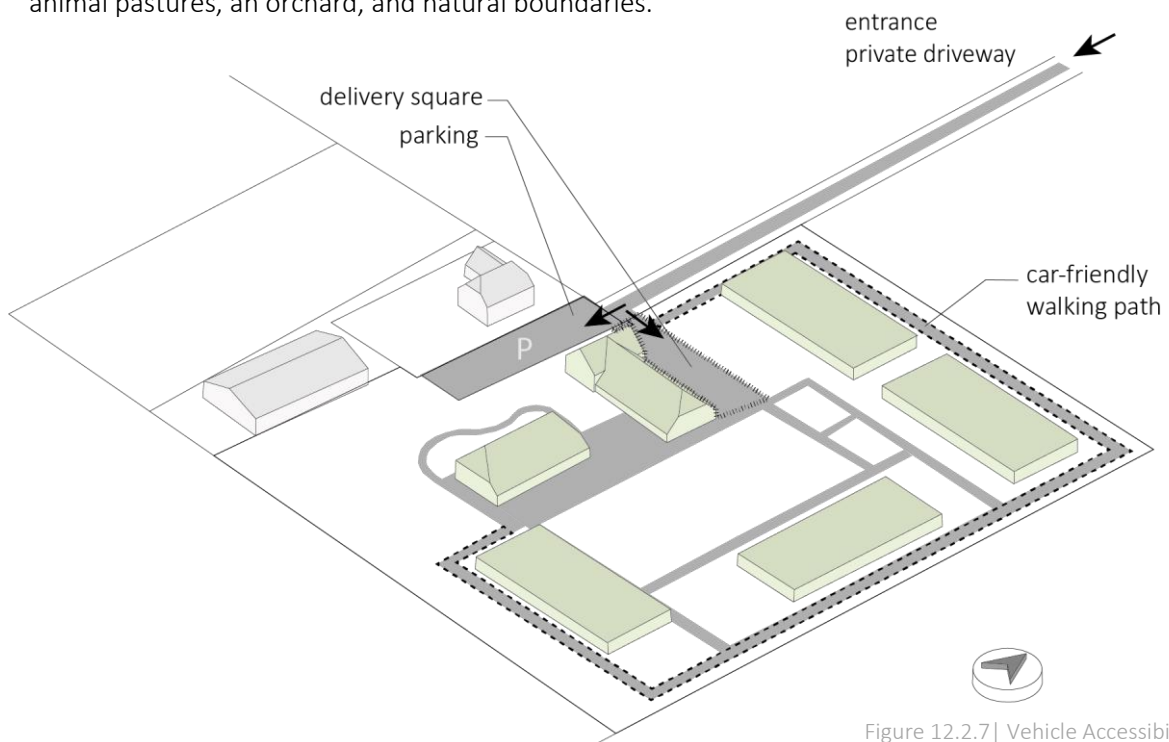


Figure 12.2.7| Vehicle Accessibility

The design includes dedicated paved walking paths and squares and a delivery pathway that is wide enough for cars around the residence, allowing for grocery shopping and ambulance access when needed. The parking area is situated directly adjacent to the private long driveway, along with a square by the gate for deliveries, where the waste containers are also located for pickup.

12.3. Residence

12.3.1. Design goals and applied principles

This Chapter will explore the design goals and principles implemented in the residence for individuals with dementia.

Dwelling type: Bungalow



Required interior rooms

Communal living room & kitchen
 7x Private room / bedroom
 7x Private bathroom
 Laundry room
 Office
 Lobby with toilet
 Storage / Technical room

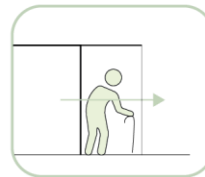


wheelchair-accessible
 and recognizable
 environment with
 homely atmosphere

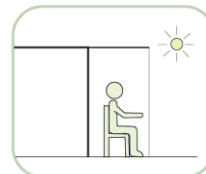
Main goal:

Stimulating people with dementia to get outdoors and
 connect with nature, exercise and do meaningful activities

Providing a comfortable
 transition between the
 indoors and outdoors



Providing a comfortable
 stay within transition
 spaces



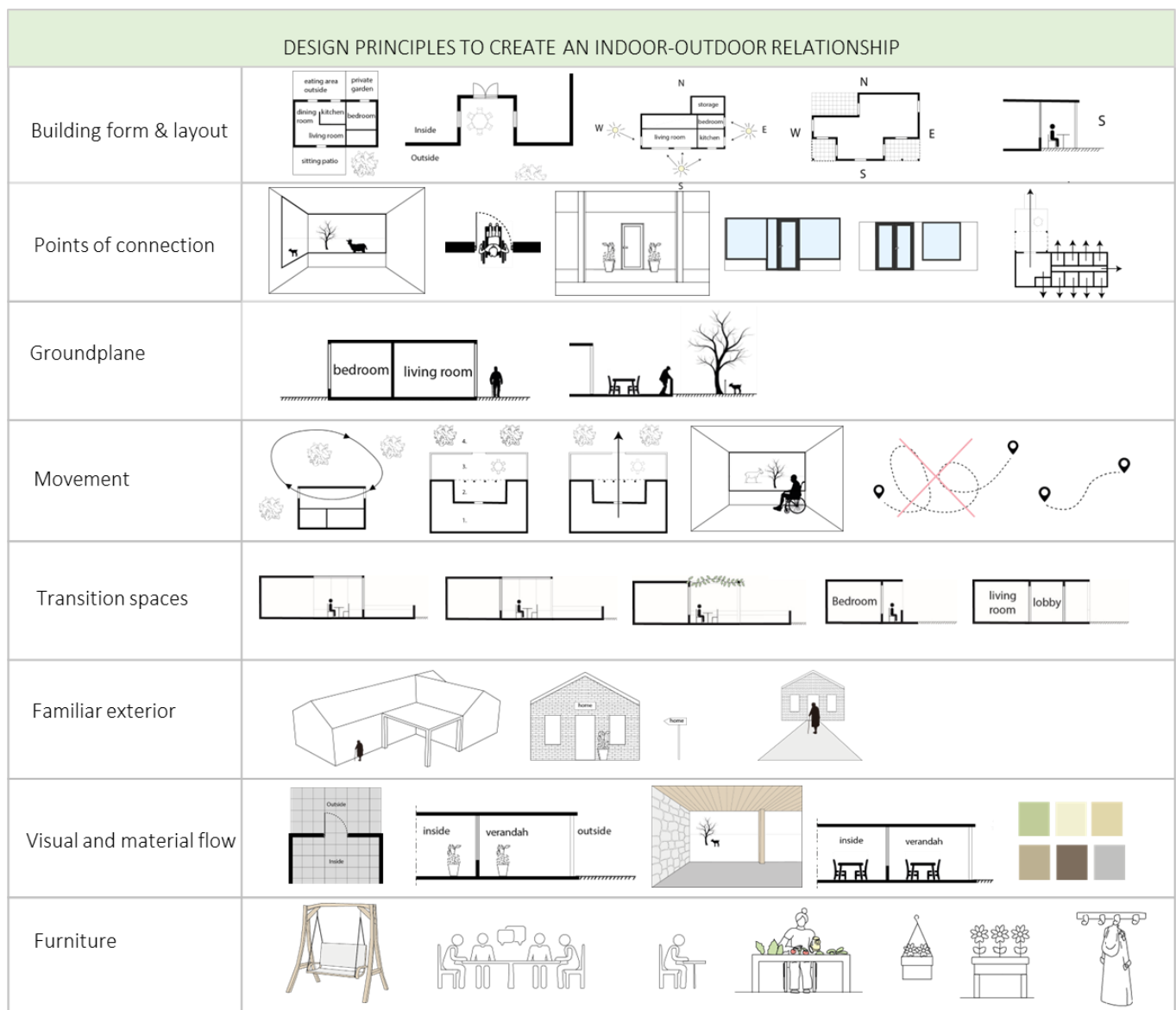
Providing opportunities
 for meaningful activities
 (sense of purpose)





Figure 12.3.2 | 3D view Residence 156

The following overview presents a revised compilation of the design principles derived from the literature study, as previously discussed in Chapter 9: "Designing an Indoor / Outdoor Relationship with Transition Spaces." This comprehensive overview also encompasses the findings from the experiment conducted on the design of transition spaces involving individuals with dementia, as outlined in Chapter 10: "Experiment: Transition Spaces." In this Chapter, a detailed description will be provided for each category, outlining how these principles are specifically adjusted in the final design. By incorporating these principles, an indoor-outdoor relationship is established, ensuring a pleasant transition and stay between the indoors and outdoors with the presence of transition spaces.



(Brawley, 2007; Cochrane, 2010; George, 2009; Marcus, 2007; Mitchell et al., 2003; Pollock & Marshall, 2012; Sparke et al., 2018; Singh & Tiwari, 2020)

Figure 12.3.3 | Design Principles to create an indoor / outdoor relationship

Building Form & Layout

Layout and sun orientation

The orientation of spaces plays an important role in the design of the residences. Three out of four residences are positioned on the west-east axis, offering a large sun-facing site.

The living room faces south to make the most of the afternoon sunlight. The kitchen faces the south-east to make the most of the morning and afternoon sunlight.

The lobby and storage are placed on the non-sun facing side.

Maximizing sun access at all times of the day

A wrapped-around transition space is strategically positioned to optimize sun exposure throughout the day, providing residents with a range of sunlight and shade options

The south-east facing conservatory is an ideal space for hobbies or dining, as it receives ample morning and early afternoon sun without overheating. A pergola with vegetation on the west side maximizes late afternoon and evening sun. The veranda, with a glass roof, captures sunlight from the south during the afternoon. The open terrace, with low walls, gets sunlight for most of the day. Private terraces attached to bedrooms are covered but still receive ample sunlight. The north east side covered terrace offers a cooler area during hot summer days.

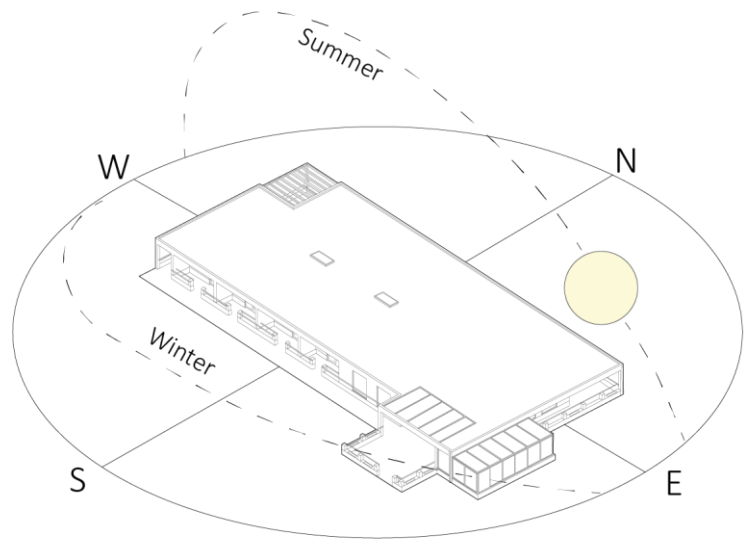


Figure 12.3.4| sun orientation

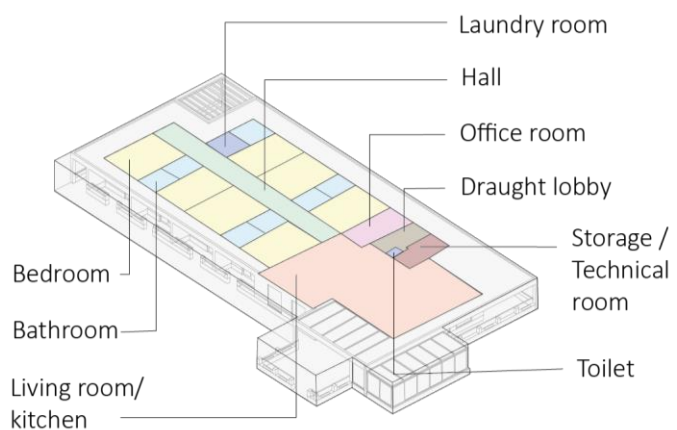


Figure 12.3.5| Layout

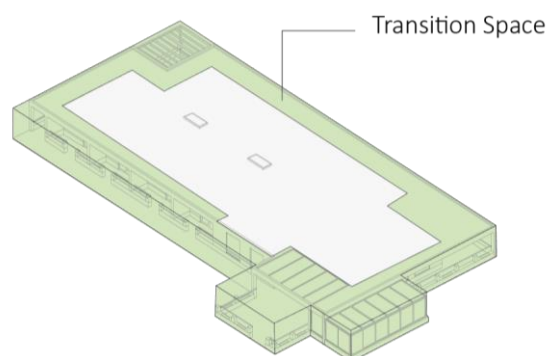


Figure 12.3.6| Wrapped-around Transition Space

Homely and Open layout

The small-scale residence creates a homely environment with familiar furnishings and decorations. The layout is thoughtfully arranged to facilitate easy movement and orientation, achieved through an open layout and the absence of long corridors. Each resident has a private bedroom and bathroom, which are designed to ensure their privacy and independence. Additionally, there are shared spaces like the kitchen and living room, encouraging social interaction and fostering a sense of community among the residents.

- Kitchen / living room
- Entrance / hallway
- Toilet
- Storage / technical room
- Bedroom
- Bathroom
- Office
- Laundry room



Figure 12.3.7 | Floorplan

Similar and complementary spaces placed next to each other

For enhanced functionality and comfort, indoor and outdoor spaces with similar purposes are closely positioned. Private terraces near the bedrooms offer tranquil spaces for relaxation and contemplation, while outdoor eating areas are conveniently located near the kitchen.

Architectural inclusions

The transition spaces, resembling architectural inclusions such as courtyards, are enclosed by two or three walls with one or two sides left open. This design provides both privacy and a scenic view of the outdoor space.

Ground plane

Indoor and outdoor spaces on the same level

The indoor and outdoor spaces of the design are aligned on the ground floor, promoting visual continuity and facilitates a seamless access between indoors and outdoors.

Terracing

Terracing is provided all around the residence, offering an enjoyable place to stay and comfortable place for movement. The low walls with railings create areas where users can pause, observe and choose to explore further.

Points of connection

Multiple access points creating short routes to the outdoors

By providing short routes and easy access to the outdoors, residents can easily find their way outside and are encouraged to spend more time there. The layout of the home is designed to be easy to navigate, with clear sightlines and minimal obstructions to help residents feel confident and independent in their surroundings.

Visual connection

Windows and glass doorways are strategically positioned to create open sight lines, fostering a vital connection with the natural environment.

Secondary and Primary Entrances

The design features a primary entrance accessed via the main route, with two paths leading directly to the entrance. The secondary route is more private and provides multiple entrance / exit points for residents. This design allows for additional entrances without confusing residents, who can easily find their way inside using the primary route.

Emphasizing Courtyard Views

The key living spaces, such as the living room, kitchen, conservatory, and four bedrooms with private terraces, provide open views to the vibrant courtyard. Additionally, the communal open terrace and veranda with glass and a barbecue area are strategically positioned towards the courtyard.

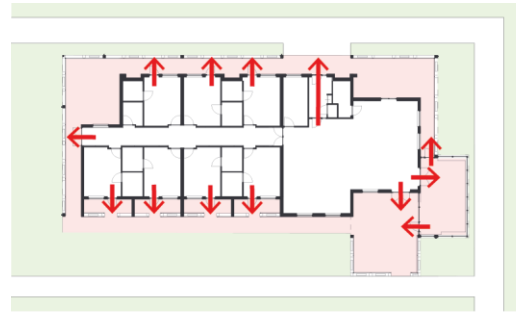


Figure 12.3.8| Physical access



Figure 12.3.9| Visual connection

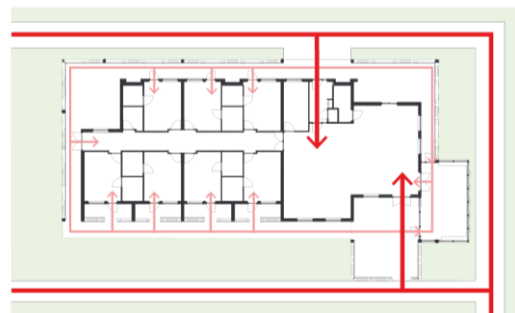


Figure 12.3.10| Secondary and Primary Entrances



Figure 12.3.11| Courtyard Views

Movement

Continuous Loop (indoor / outdoor walking route)

The transition spaces are arranged in a continuous loop, allowing residents to walk and sit all around the building, to enjoy the outdoors, different views and experiences, while staying protected from the elements, such as rain or excessive direct sunlight.

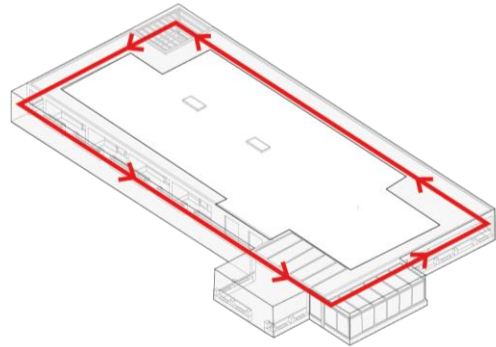


Figure 12.3.12 | Continuous Loop

Familiar exterior

Simple, small, domestic style - home

The bungalow offers a welcoming and cozy living environment. Its familiar façade features masonry walls and windows, complemented by a low wall design acting as a balustrade. This design avoids the use of fully glazed walls or modern sliding doors, contributing to its overall sense of familiarity and comfort.

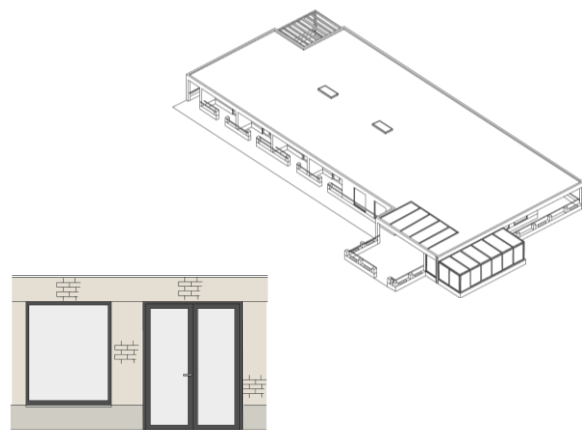


Figure 12.3.13 | Domestic-style home

Visual cues and signage

Attention is directed towards the doorways, which facilitate seamless movement between spaces. This is achieved through details, including the presence of flower-filled planters, clear numbering, a door mats, and well-defined guiding paths. Additionally, visual cues such as a magnificent tree, animals, a serene pond, vibrant flowers, or an inviting pergola, further attract attention to the outdoor surroundings.



Figure 12.3.14 | Visual cues and signage

Transition spaces

The transition spaces exhibit variations in size, degree of enclosure, materials, transparency, vegetation, **furniture** and seating options, resulting in diverse experiences and levels of sensory stimulation for individuals.

Pergola with vegetation

Residents have a unique experience as they sit beneath the pergola adorned with lush vines and vibrant flowers. Here, individuals with dementia can gather around a cozy round table, engaging in card games while enjoying the soothing warmth of the late afternoon and evening sun.



Figure 12.3.15 | Pergola with vegetation

Veranda with glass roof

The veranda is a cozy and enclosed space, flooded with natural light and offering delightful outdoor views. It provides a comfortable seating option to enjoy the outdoors, protected from rain and wind. With a table for eight, it's perfect for lunches and barbecues, accompanied by an outdoor kitchen block featuring a sink and integrated BBQ for convenient meal preparation.



Figure 12.3.16 | Veranda with glass roof

Open terrace

The open terrace is bathed in ample direct sunlight throughout the day, from the early morning rays to the captivating glow of the evening sun. The low wall that encloses the space adds intimacy, further enhanced by the integration of beautiful flowers. Residents can delight in a cup of coffee while leisurely basking in the sun's warmth, all while enjoying expansive views of the vibrant courtyard.



Figure 12.3.17 | Open terrace

Conservatory

In the conservatory, residents can enjoy natural light and outdoor views regardless of the weather. With its glass walls and roof, this versatile space allows for meals, coffee breaks, and engaging in horticultural activities such as growing herbs and planting seeds in raised beds. The presence of a sink and accompanying equipment facilitates flower arrangements and other gardening tasks.



Figure 12.3.18| Conservatory

Private Terrace

Private terraces, located next to the bedrooms on the courtyard side, offer a serene retreat. These inviting spaces provide privacy, tranquility, and shelter from rain. Residents have the freedom to furnish their private terraces to their liking, and can begin their day by having a cup of coffee, taking in the lively views of the courtyard, creating a harmonious start to the morning.



Figure 12.3.19| Private Terrace

Veranda

The veranda on the north-east side benefits from the early morning sun. During the hot summer months, it provides a cool area to sit. Residents can enjoy the serene outdoor view, which is quieter compared to the vibrant courtyard on the other side. The veranda is equipped with an outdoor kitchen block with sliding windows, ensuring convenience for both staff and residents. It offers seating for two as well as additional seating for larger groups.



Figure 12.3.20| Veranda

Main Entrance

The design includes a covered main entrance that feels familiar and welcoming. It features a mailbox, doormat, planters with flowers, and a visible house number. Additionally, a seating area is built into the wall, creating a friendly and inviting atmosphere.



Figure 12.3.21 | Main Entrance

Lobby

The design includes a welcoming lobby, which conveniently provides access to essential amenities such as the restroom, coat rack, umbrella stand, and shoe rack. This layout, reminiscent of common household setups, offers a sense of familiarity and convenience.



Figure 12.3.22 | Lobby

Private entrances north side

The covered walkway offers private entrances to the bedrooms and incorporates private seating areas, allowing residents to retreat and enjoy serene views of the outdoors. The presence of a low wall with a railing ensures support and stability for individuals as they move around the wrapped-around transition space.



Figure 12.3.23 | Private Entrances North Side

Furniture

Integrating supportive elements in the architectural design enhances the overall experience by prioritizing a human-centric approach. These elements provide physical support, safety, and aesthetic appeal while promoting accessibility, and well-being. The result is an inviting and user-friendly space that seamlessly combines form and function.

Integrated seating in the wall

The integrated seating offers places to sit and offers solitude and privacy



Figure 12.3.24 | Floorplan

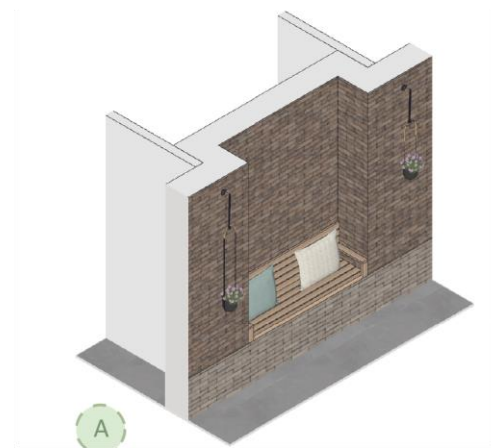


Figure 12.3.25 | Integrated seating in the wall

Outside kitchenette

The indoor kitchen is mirrored to the outside with a sink and sliding window. This allows residents and staff to enjoy drinks outside without having to go inside, providing convenience and accessibility.

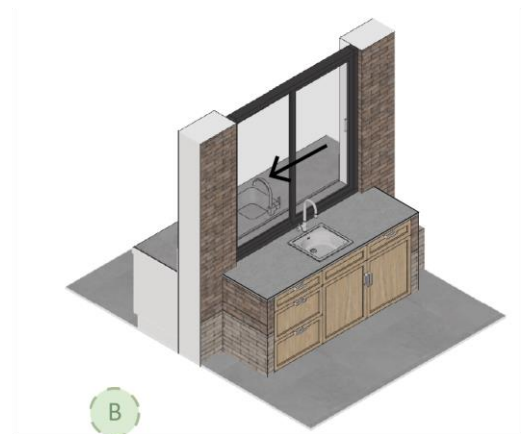


Figure 12.3.26 | Outside Kitchenette

Integrated flower beds and railing

The design features a low wall to create a sense of enclosure and privacy around the walkways and terraces. An aluminum round railing is attached to the wall blocks to provide support for residents as they walk. Additionally, the low wall includes an integrated flowerbed.

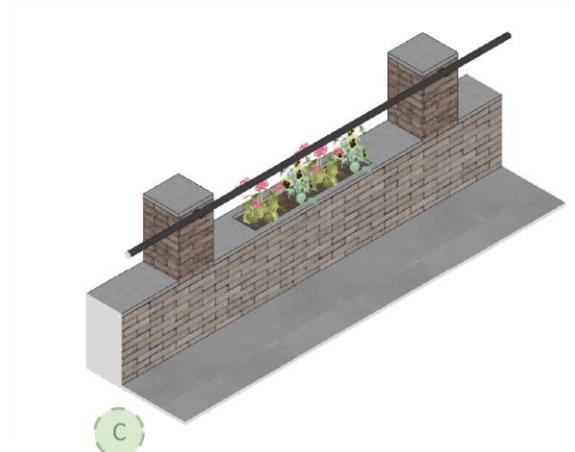


Figure 12.3.27 | Integrated flower beds and railing

Interior

Private room / Bedroom

The spacious bedroom features a bed, a cozy sitting area and a kitchenette equipped with a refrigerator and coffee maker. The room offers views of the lively outdoor surroundings.

The residents have the freedom to personalize their living space by furnishing it with their preferred decorations. Additionally, the residents benefit from the privacy of a personal bathroom and an outdoor private terrace adorned with comfortable seating.

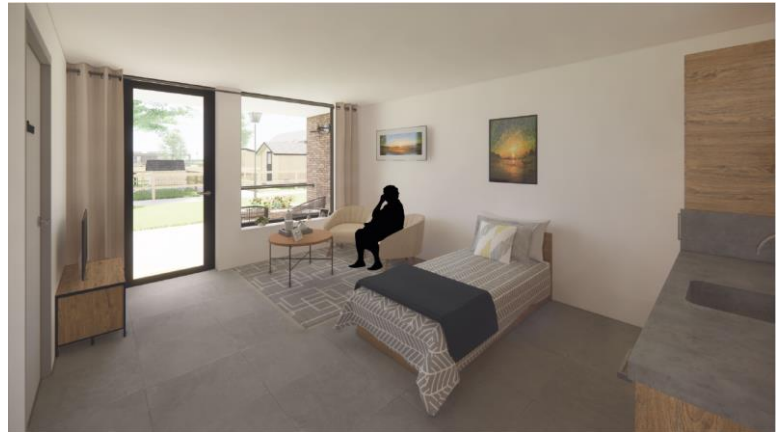


Figure 12.3.28 | Private room / bedroom



Visible toilet seat
in bathroom



Signage

Figure 12.3.29 | Visible toilet and signage

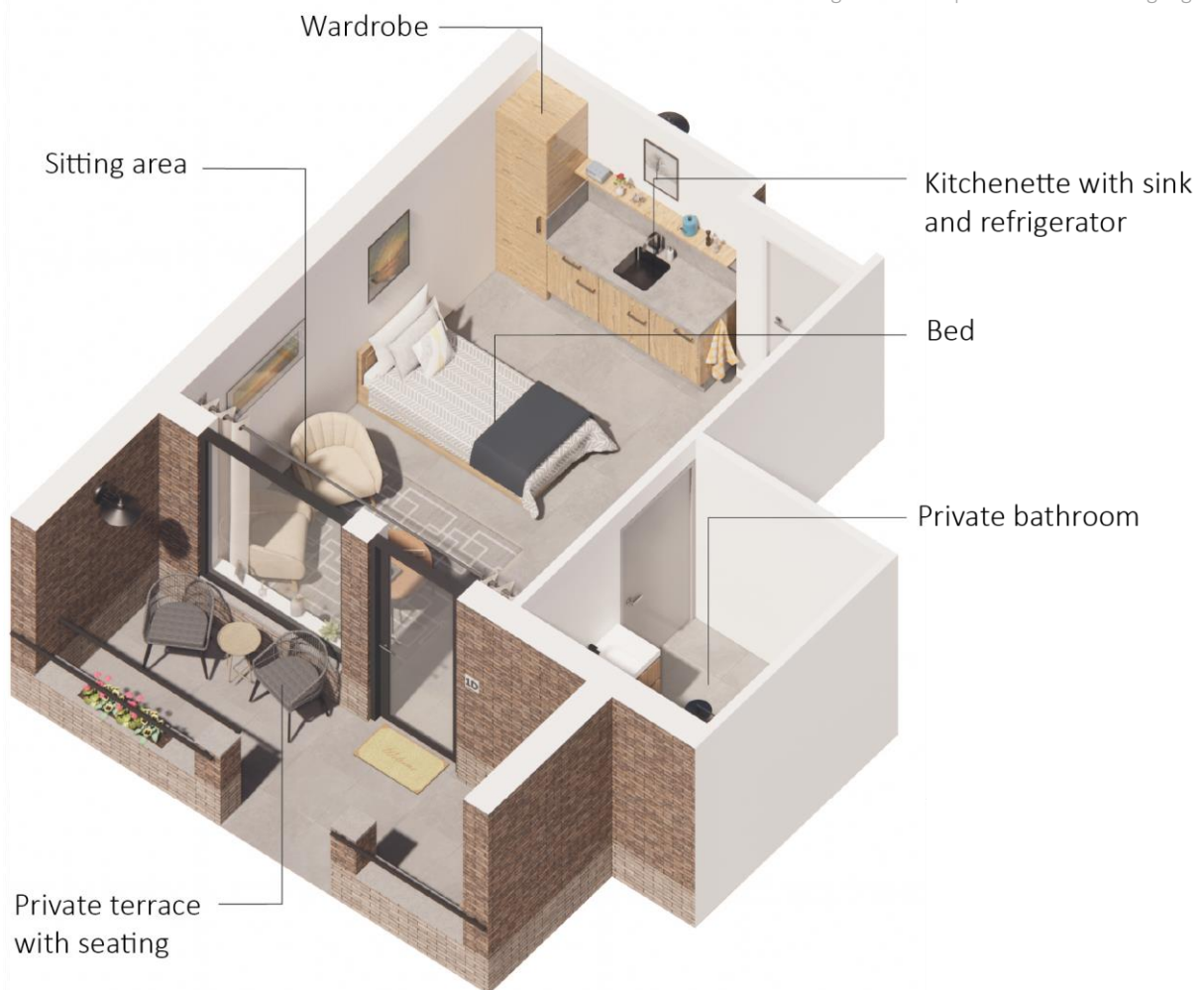


Figure 12.3.30 | Private Room with Private Terrace and Private Bathroom

Kitchen

The kitchen offers scenic views of the outdoor space and benefits from ample morning and afternoon light. It provides easy access to the conservatory and veranda. The spacious layout accommodates wheelchair users comfortably. With its cozy decor, well-equipped kitchen block, and inviting seating area, it creates homelike ambiance.



Figure 12.3.31| Kitchen

Living room

The spacious living room provides a variety of seating options, including a more secluded area near the window for enjoying outdoor views and a comfortable spot near the TV for socializing. With its strategic positioning, the living room provides views of the vibrant courtyard and receives ample afternoon sunlight from the south.



Figure 12.3.32| Living room

Hallway

The hallway features skylights providing natural light, and each door is distinctively designed with visible house numbers, making it easier to identify their room. With a supportive railing along the walls, the hallway ensures stability while walking, while its spacious 2-meter width allows for easy accessibility for wheelchair users. The overall atmosphere of the hallway resembles an gallery that leads towards apartments.



Figure 12.3.33| Hallway

Meaningful activities Indoors and in the Transition Spaces



Figure 12.3.34 | Meaningful Activities Indoors and in the Transition Spaces

Floorplans

Residence type A

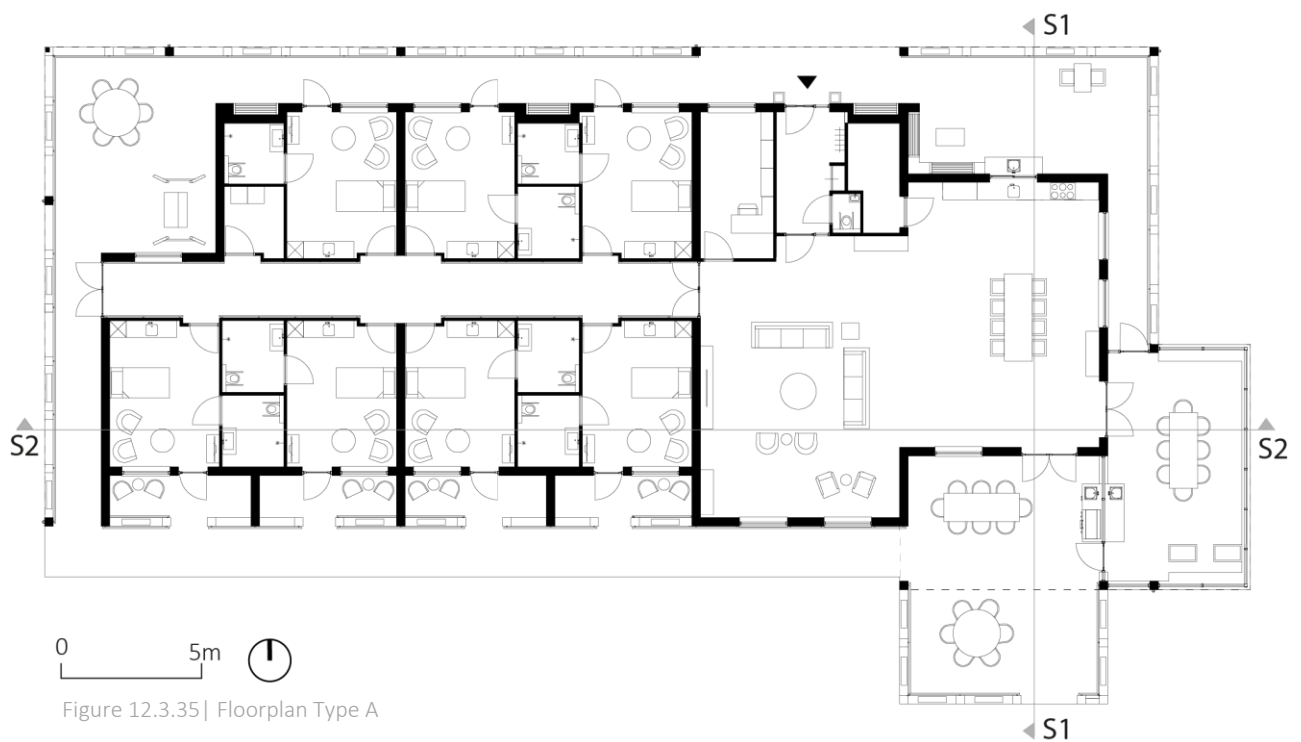


Figure 12.3.35 | Floorplan Type A

Residence type B

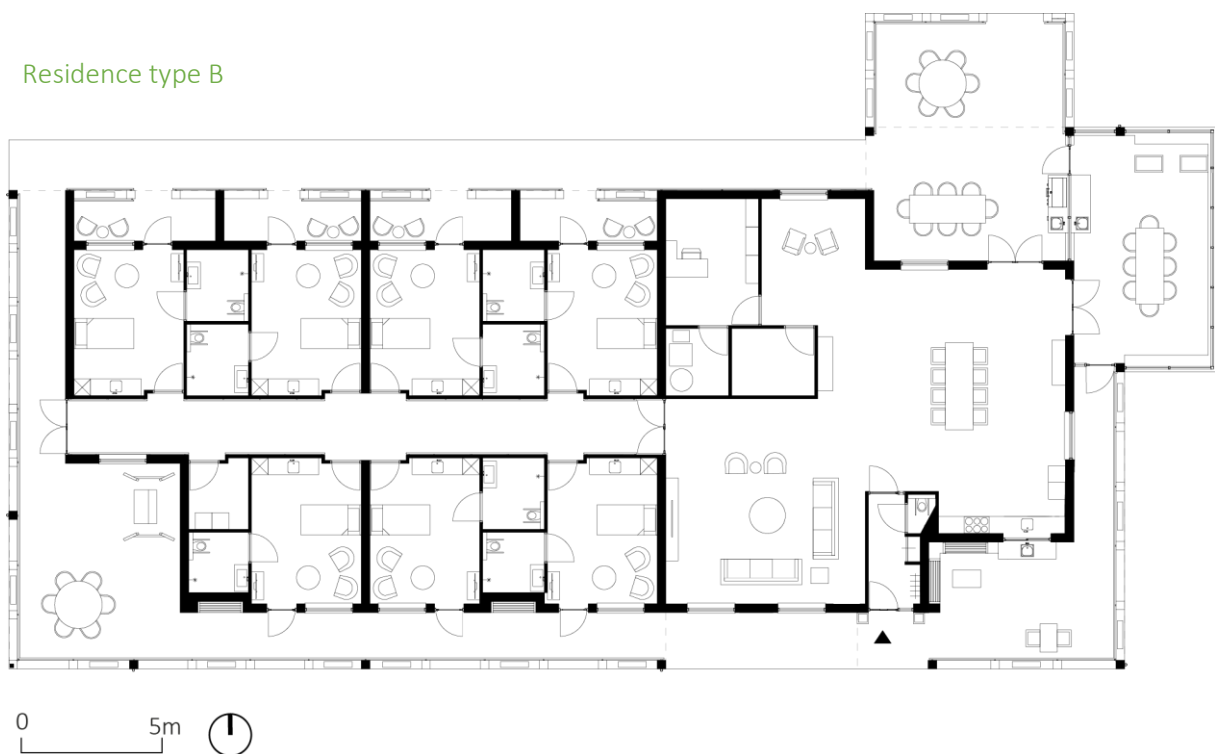


Figure 12.3.36 | Floorplan Type B

The floorplans exhibit both similarities and differences due to their sun orientation. While sharing the same design goals, the spaces are strategically arranged in different ways to optimize sunlight access and highlight the panoramic views of the courtyard. Additionally, the interior of each home showcases distinct variations in color schemes and decorations.



Figure 12.3.37 | Site plan, Residence types

Residence type C

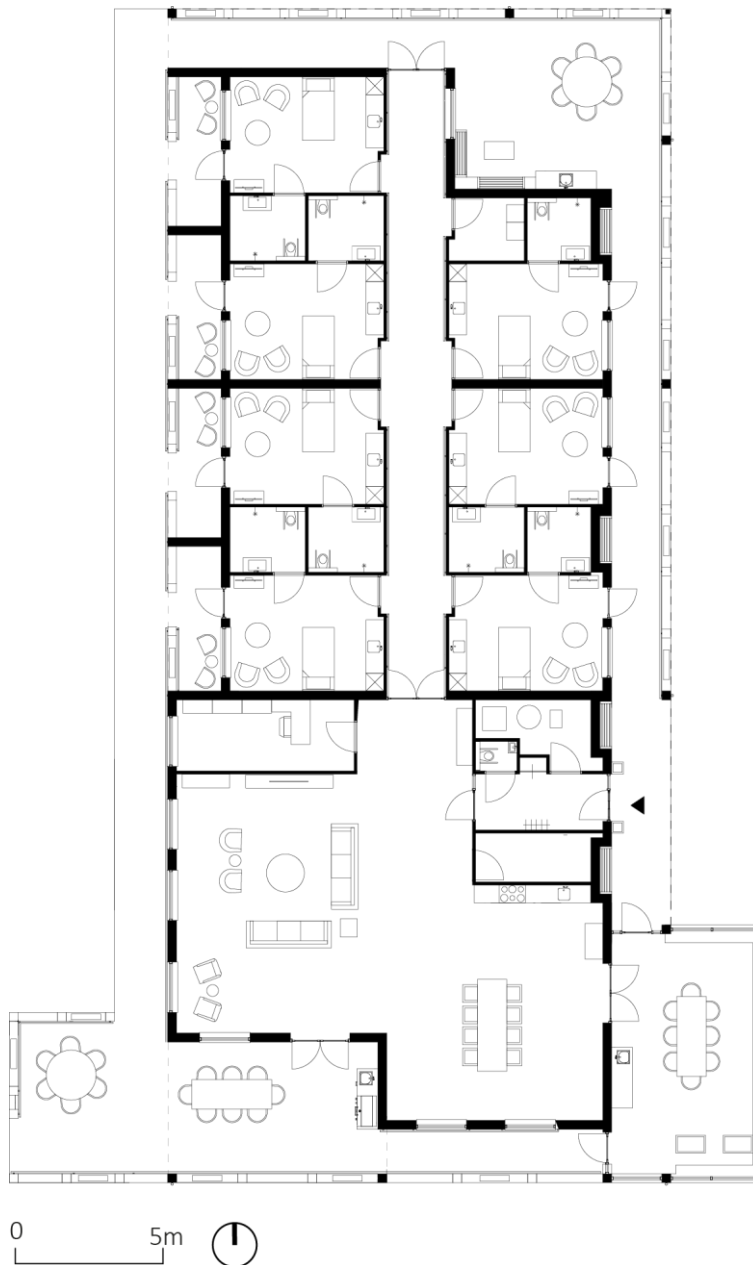
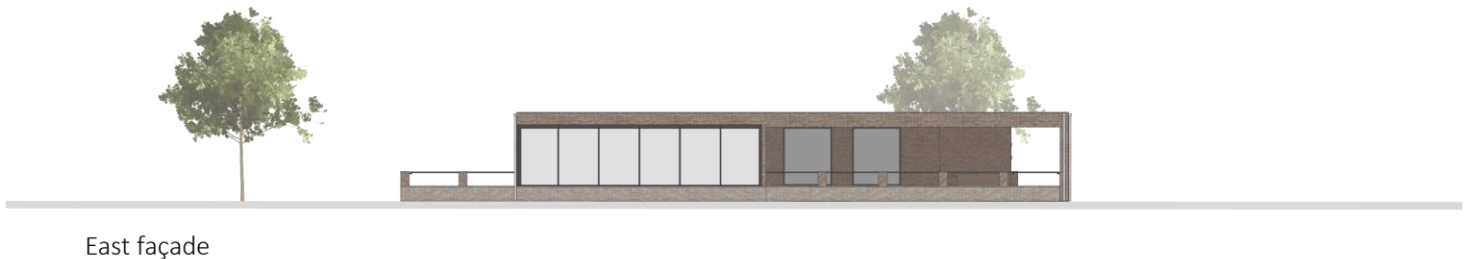
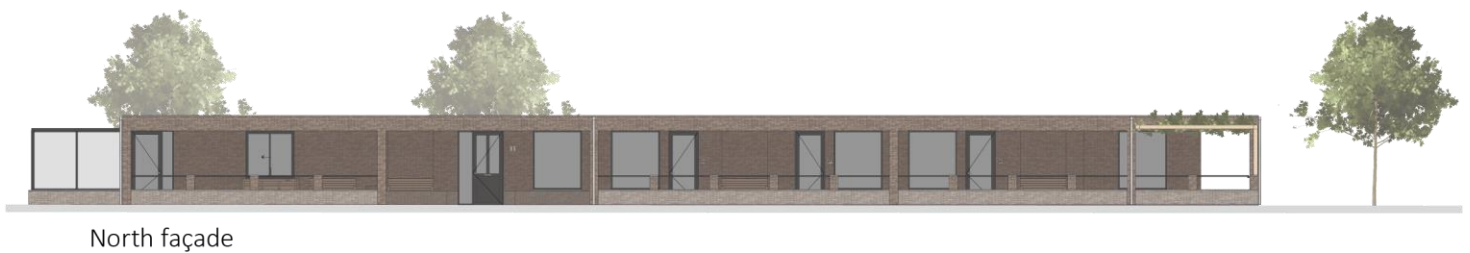
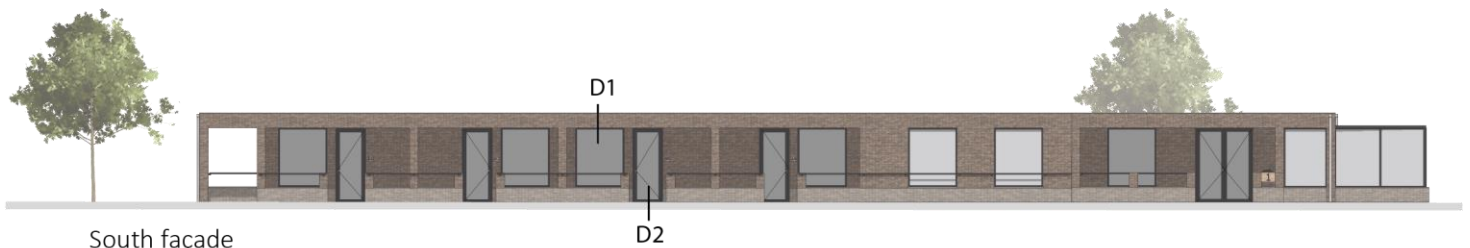


Figure 12.3.38 | Floorplan Type C

Section



Facades



Visual and material flow

Consistent materials in ground coverings and ceiling

The interior and transition spaces feature a seamless transition, due to the use of consistent materials and height for the ceiling and flooring. Both the ceiling and floor are finished with white plaster and ceramic tiles, correspondingly, creating a comfortable transition between indoor and outdoor spaces.

Details

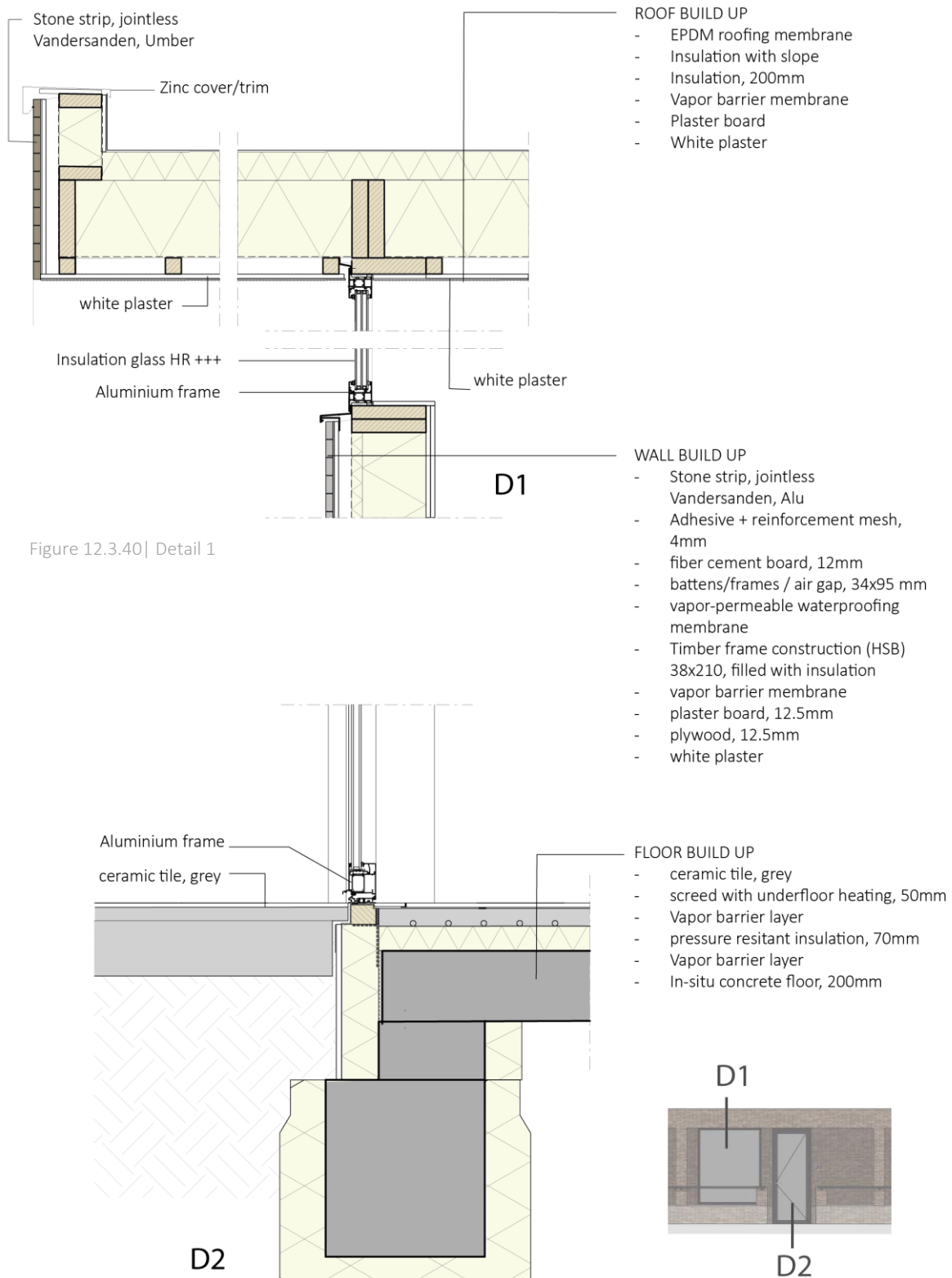


Figure 12.3.40 | Detail 1

Figure 12.3.41 | Detail 2

Materialization

Using landscape color schemes

Outdoor-inspired colors are used for the materialization to enhance the connection to the surrounding landscape.

Using natural materials

Natural materials such as stone, wood and plants are incorporated in the design to establish a stronger connection with the outdoors.

Façade
Stone strips, jointless,
brown



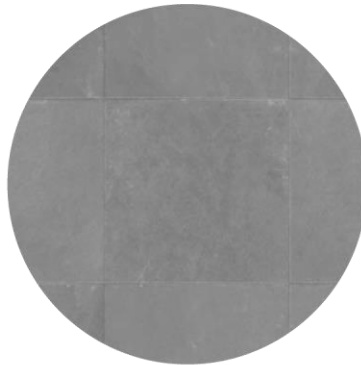
Façade plinth +500
Stone strips, jointless,
light brown/grey



Ceiling and interior walls
White plaster



Flooring
Ceramic tiles, grey



Vegetation



Pergola and furniture
Wood



Sustainability

Wadi

The utilization of the centrally located pond as a wadi in the 24h-care farm offers several benefits. It serves as a temporary storage and retention area for rainwater, preventing direct discharge into the sewage system. This helps reduce waterlogging during heavy rainfall and contributes to improved water management in the area. Additionally, the captured rainwater can be utilized to nourish the soil and enhance the water table, promoting a sustainable and environmentally-friendly approach to water management on the 24h-care farm. The rainwater drainage pipes from the residences, farm house, and large barn are connected to underground pipes that lead towards the wadi.

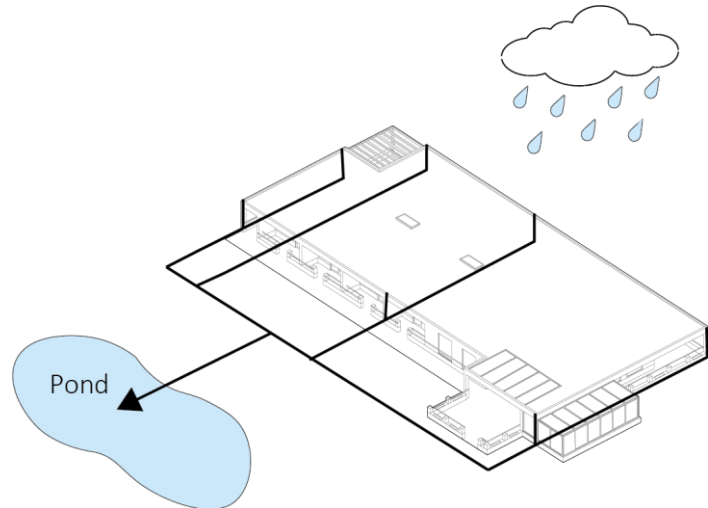


Figure 12.3.43 | Pond / Wadi

Energy Neutral

The residences, daycare building and respite home achieve energy neutrality through the implementation of various sustainable technologies, including solar panels, a heat pump, boiler, and the use of underfloor heating and induction cooktops. The flat roof of the residence is covered with solar panels, discreetly hidden from view, providing a more homely and familiar ambiance for individuals with dementia. Additionally, the houses are well-insulated and equipped with a ventilation system and heat recovery unit (WTW) to ensure proper airflow. The installation, such as the heat pump, is located in the storage room/technical room.

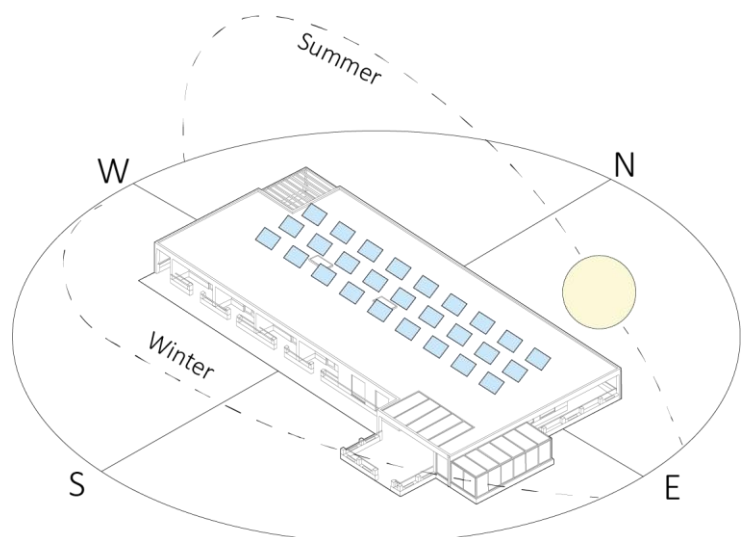


Figure 12.3.44 | Solar Panels

Timber Frame Construction

The residences are built using timber frame construction, incorporating timber frames in all the exterior and interior walls and roof. In addition, the exterior walls feature a combination of stone strips and timber frame construction, replacing traditional stone walls. This choice emphasizes the sustainable aspects of using wood as a renewable resource. The timber used is sourced from responsibly managed forests certified by the Forest Stewardship Council (FSC), ensuring environmental and social responsibility.

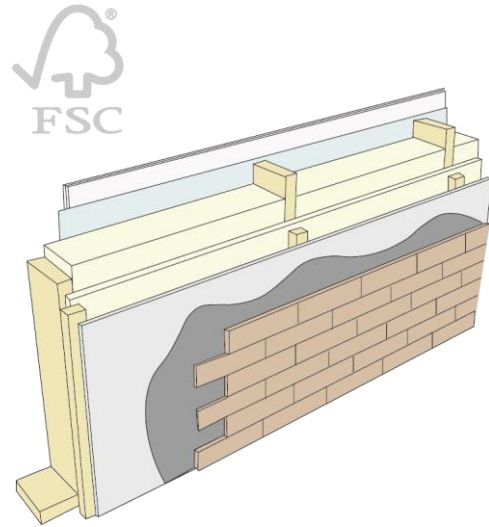


Figure 12.3.45 | Timber frame construction, Exterior wall
(Adapted from BouwTotaal, 2023)

Preventing overheating in the residences

To prevent overheating, the conservatory is strategically positioned in the south-east direction. However, additional measures such as proper ventilation, closed doors, and effective sun screening should be implemented to ensure complete prevention of overheating. However, the veranda with a glass roof is situated in the south, which poses a risk of overheating. To address this, sun protection measures, such as pleated sunscreen, are integrated, allowing for the temporary closure of the veranda and conservatory's glass roof.



Figure 12.3.46 | Pleated Sunscreen for temporary closure in the veranda, to prevent overheating and providing shade

12.3.2. Sub-Conclusion: Residence

In conclusion, the design of the residence for individuals with dementia prioritizes a familiar and homely environment, offering person-centered care, promoting outdoor engagement, facilitating meaningful activities, and supporting autonomy. A notable feature of the design is the inclusion of transition spaces, seamlessly connecting indoor and outdoor areas and providing a comfortable and inviting place to stay.

By meeting the specific needs of individuals with dementia, the residence creates a supportive environment that enhances their quality of life and overall well-being.

12.4. Daycare Building and Respite Home

12.4.1. Design goals and applied principles

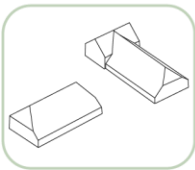
This Chapter will explore the design goals and principles implemented in the respite home and daycare facilities for individuals with dementia.

Main goal

With a focus on preserving the rich historical context of the T-Farm and Large Barn, the goal is to design a welcoming Respite Home and Daycare building that provides essential services and fosters a sense of purpose for individuals with dementia, with a particular emphasis on stimulating outdoor engagement.

Key principles

Preservation and Restoration of Cultural Historical Value



The aim is to uphold or restore the existing cultural historical value as outlined in Chapter 11 (Location Analysis).

Homely Respite Home



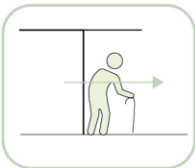
The goal is to create a welcoming respite home for up to 5 temporary residents with dementia, accommodating stays ranging from 2 days to a maximum of 3 weeks.

Meaningful Activities for Residents and Daycare Users



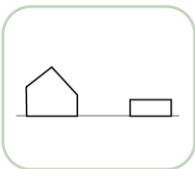
The design should provide purposeful activities for both residents and users of the daycare who still live at home.

Transition Spaces



The design should include transition spaces that facilitate smooth and comfortable movement between the two buildings, as well as between indoor and outdoor spaces.

Additional Indoor Environment for Residents



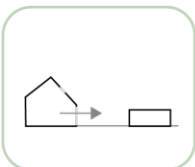
In addition to their residences, the design should offer residents an alternative indoor environment where they can have a different experience.

Dementia-Friendly Spaces on the Ground Floor



The ground floor should accommodate spaces specifically designed for users with dementia, while the first floor may primarily serve as staff areas or storage.

Courtyard Integration and Neighbor Consideration



The design should have an open orientation towards the courtyard while being more closed off towards the Graafsedijk 21 to minimize potential disturbances.

Figure 12.4.1| Design Goals



Figure 12.4.2| 3D view Daycare facilities and Respite home 178

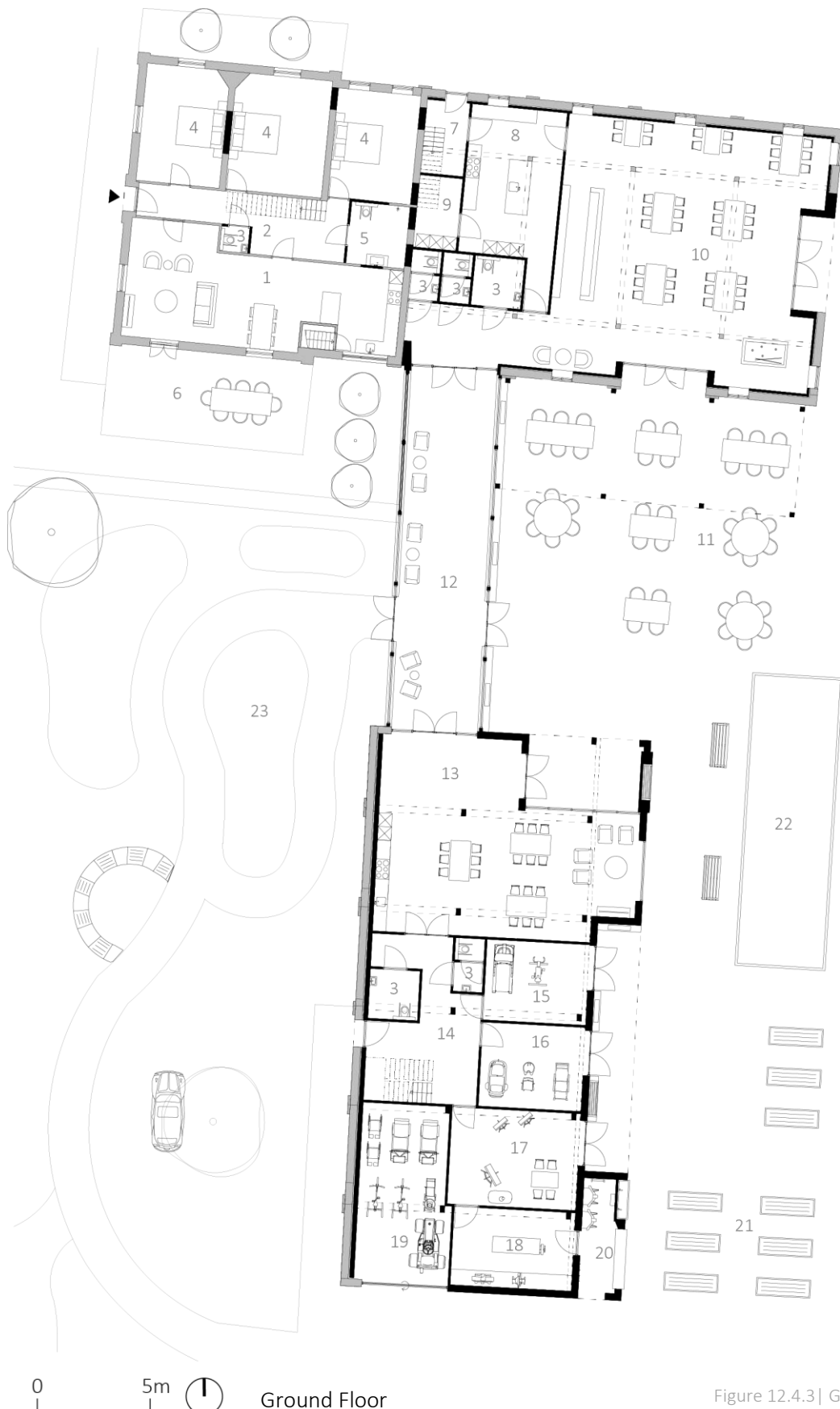
Respite Home

1. Livingroom / kitchen
2. Entrance Respite
3. Toilet
4. Bedroom
5. Bathroom
6. Private terrace

Daycare

7. Hallway
8. Kitchen
9. Storage
10. Café Repelsvoort
11. Terrace
12. Enclosed Walkway
13. Ontmoetingsplek
14. Hallway Daycare
15. Gym
16. Hairdresser & Beautician
17. Atelier
18. Workspace

19. Garage
20. Garden shed
21. Vegetable Garden
22. Jeu De Boules
23. Experience Garden



Ground Floor

Respite Home

1. Bedroom
2. Hallway
3. Laundry room
4. Bathroom
5. Attic
6. Storage

Daycare

7. Bedroom for daycare users to rest during the day
8. Bedroom for staff or family members who live far away
9. Bathroom
10. Office for staff
11. Conference room for staff
12. Kitchen for staff
13. Hallway



0 5m



First Floor

Figure 12.4.4 | First Floor

Café Repelsvoort

Café Repelsvoort is open on weekends, offering various activities. On Fridays, movie enthusiasts can enjoy cinema nights, while Saturdays are reserved for residents to dine in the café, with delicious meals from the kitchen. Throughout the day, residents, daycare visitors, family members, and other guests can relax and enjoy drinks inside or on the terrace or engage in a game of pool. The café is also available for hosting events like birthdays.



Figure 12.4.5 | Café Repelsvoort

Ontmoetingsplek

The 'Ontmoetingsplek' primarily caters to visitors of the daycare who still reside at home. It serves as a gathering spot where they can meet, have lunch, prepare soup, bake cakes, engage in crafting, play games, take a coffee break, or watch TV. The meeting place, along with the daycare activities for individuals with dementia who live at home, operates from 11:00 AM to 5:00 PM.



Figure 12.4.6 | Ontmoetingsplek

The Vegetable garden

The vegetable garden is a shared space accessible to both residents and visitors of the daycare, as well as dedicated volunteers responsible for its maintenance. Conveniently situated near the integrated shed, the garden provides easy access to essential gardening equipment and a convenient sink for handwashing and watering the plants.



Figure 12.4.7 | The Vegetable Garden

Transition spaces

Covered inclusion with signage

The covered inclusion area serves multiple purposes by providing clear signage and visual cues for the facilities. It creates a welcoming space for seating and offers a viewpoint to overlook the courtyard.



Figure 12.4.8| Covered Inclusion with Signage

Enclosed walking area

The enclosed walking area connects the two buildings, offering a comfortable transition and providing a sheltered space for users to sit and enjoy the outdoors.



Figure 12.4.9| Enclosed Walking area, view outdoors

Enclosed walking area

Integrated glass bird boxes are strategically placed at different heights, offering a delightful view from the inside as birds swoop in to enjoy some food. The enclosed wall surrounding the bird boxes ensures privacy due to its proximity to the adjacent respite home.



Figure 12.4.10| Enclosed Walking area, Glass bird boxes

Terrace with veranda and parasols

The terrace at Café Repelsvoort offers a pleasant environment for visitors to relax and socialize. With its timber veranda, glass roof, and parasols, it offers a cozy and sheltered atmosphere. From here, guests can enjoy scenic views of the lively courtyard, including animals, children playing in the playground, trees, and people playing jeu de boules. Additionally, the terrace serves as a central area, connecting entry points to both buildings and the covered walkway.



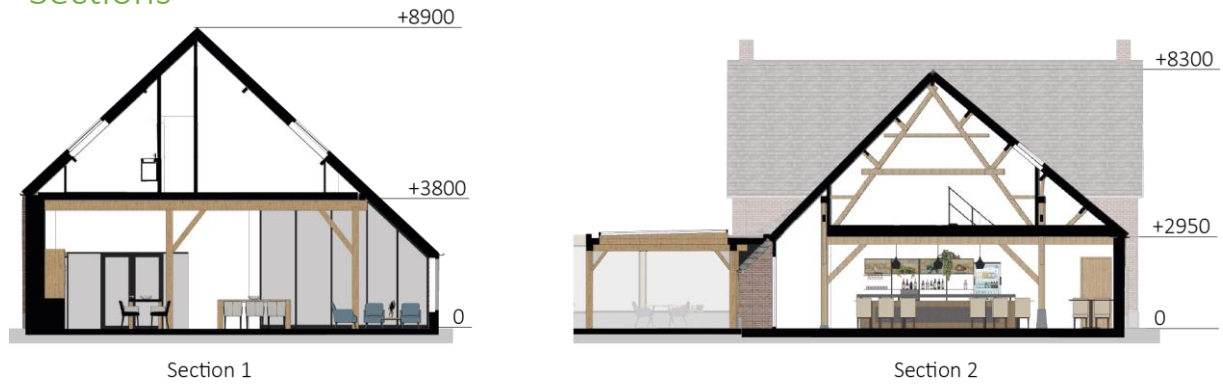
Figure 12.4.11| Terrace with veranda and parasols

Meaningful activities

At the daycare building



Sections



Facades



West Facade



East Facade



North Facade



South Facade



South Facade



North Facade

12.4.2. Sub-Conclusion: Daycare Building & Respite Home

In conclusion, the final design successfully preserves and restores the historical context of the T-farm and large barn. The house area of the T-farm creates a welcoming and homely respite home, while the stable area and the Large barn offer essential services and a sense of purpose for the residents and individuals with dementia who still live at home. The inclusion of transition spaces stimulates an engaging outdoor environment.

Moreover, the entire daycare complex provides a range of meaningful activities, and the dynamic spaces of the daycare are visible from the residences, further enhancing the overall experience.

12.5. Outdoor space

12.5.1. Design goals and applied principles

This Chapter will explore the design goals and principles implemented in the final design of the outdoor space suitable for individuals with dementia.

Main goal

Designing an outdoor space that addresses the specific needs and challenges of individuals with dementia, aiming to maximize utilization and harness the therapeutic benefits derived from being outdoors.

Key principles

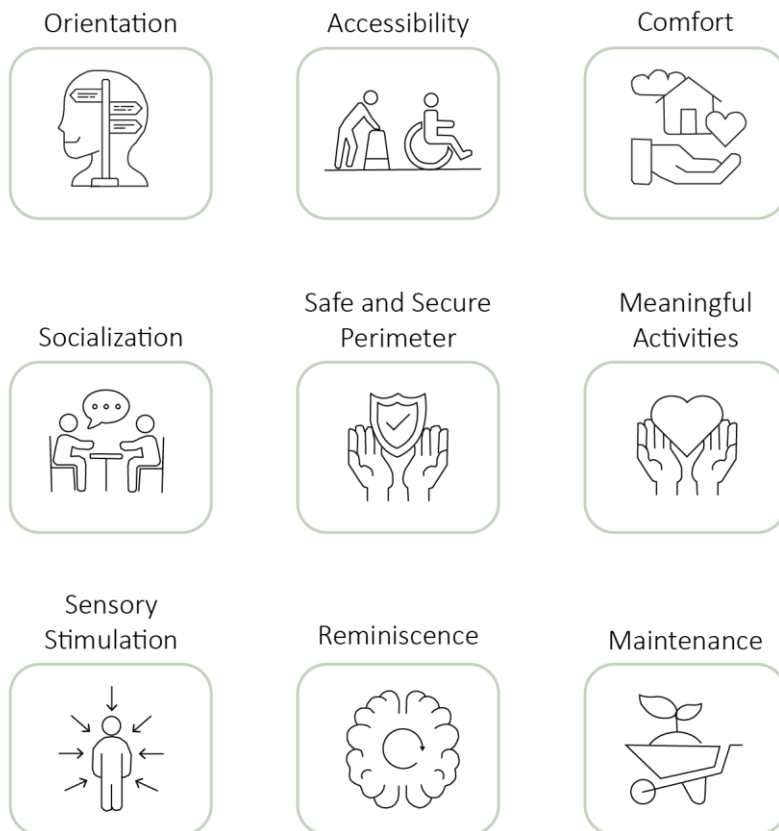


Figure 12.5.1 | Key Design Principles

Site plan

- | | | |
|-----------------------------|-----------------------------|----------------------|
| 1. Residence (7 persons) | 8. Pergola | 15. Bicycle shed |
| 2. Respite home (5 persons) | 9. Animal pasture | 16. Bus shelter |
| 3. Café | 10. Orchard | 17. Mailbox PostNL |
| 4. Daycare | 11. Pond / Wadi | 18. Aviary |
| 5. Terrace | 12. Playground for children | 19. Shed |
| 6. Experience garden | 13. Canopy | 20. Vegetable garden |
| 7. Parking | 14. Waste containers | 21. Jeu De Boules |



Figure 12.5.2 | Site Plan



Orientation

Legibility:

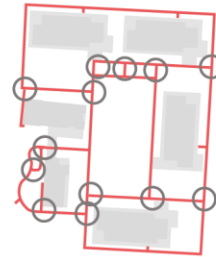
Simplified Layout



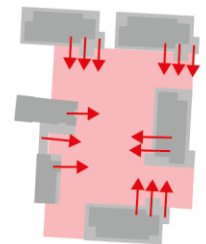
Simple, easy-to-follow pathsystem



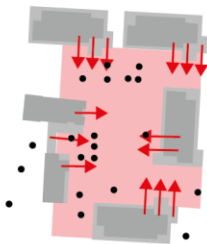
No dead ends and minimize puzzling options



Visible outdoor space (from main living spaces)



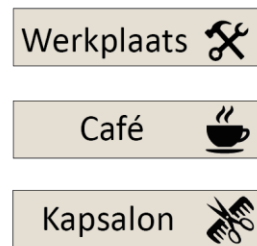
Visible destination points



Visible entrance/exit



Clear signage



Providing Cues

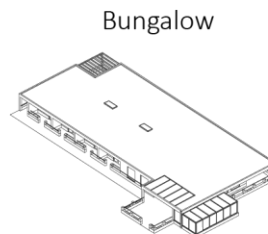


Familiarity

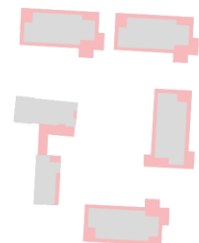
Familiar, simple Domestic elements



Simple domestic-style homes



Transition space





Accessibility

Physical connection

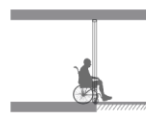
Highly visible, glass doors



Providing multiple easily accessible, unlocked doors

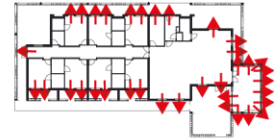


Thresholds should be level



Visual connection

Visual access to the outdoor space



Seating near windows

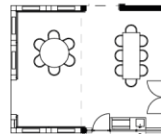


Paved areas

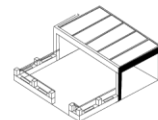
Avoid large paved areas directly outside bedrooms



suitable for tables chairs and wheelchair users



shelter from elements



Walking Path

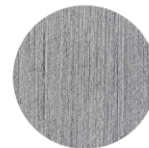
Walking path leading to destination points



handrails or waist-height structures for support

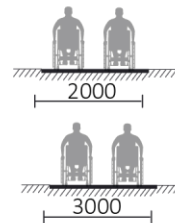


Smooth, even surface non-slipping material. Tinted to minimize glare



tinted brushed cast-in-place concrete

easy passable for wheelchair users



avoid steps or steep inclines

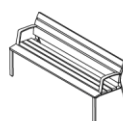


Outdoor furniture

variety of seating options



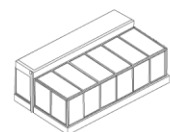
Robust benches with arms



Tables / raised beds appropriate for wheelchair users



Year-round accessibility conservatory

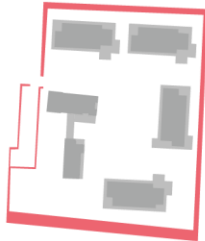




Safe & Secure Perimeter

Fencing

Natural boundaries



Timber fencing,
animal pasture

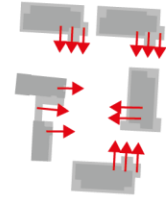


Low entrance
gate



Constant supervision

Visible outdoor space
to the staff



No walking paths near
tree with falling fruit
or leaves



Avoid Poisonous
and thorny plants

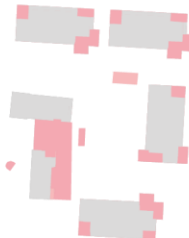


Figure 12.5.5| Applied Design Principles: Safe & Secure Perimeter



Socialization

space for social
gathering



space that offers
solitude and privacy



Playground for
children



Figure 12.5.6| Applied Design Principles: Socialization



Comfort

Transition spaces



Free standing overhead structure



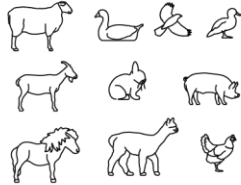
- Circular tree seating
- Canopy
- Parasol
- Pergola with vegetation

Figure 12.5.7| Applied Design Principles: Comfort 190



Sensory Stimulation

observing or petting Animals



Viewing the Pond



raised beds and hanging pots allowing for touch, smell, or taste it.



Planting
Different tree sizes



Grass / lawn areas



Plants that announce the seasons: spring, summer flowers and autumn color:

Maple, Magnolia, Cherry Blossom, Linden



Trees and plants attract birds and wildlife:

Coneflower, Butterfly bush, Lavender, Fruit trees



Edible plants: fruit trees, herbs and vegetables



Plants that may trigger memories by their type or perfume:

mint
thyme
jasmine
lavender
rosemary



Evergreen Plant/
Plant to touch:
Conifer



Appropriate tree with bench: Maple tree



Warm colored flowers, which seniors' eyes can more easily discern

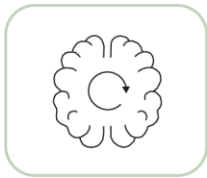


1. Large Maple tree
2. Medium Maple tree
3. Small Tree (azijnboom / knotwilg)
4. Grass / Lawn
5. Linden
6. Magnolia
7. Walnut Tree
8. Cherry Blossom
9. Apple trees
10. Mint, Basil, rosemary, Thyme, Tomatos, Strawberries, Cucumber, Lettuce
11. Tulips, Hortensias, Lavender, Butterfly bush, Coneflower, Conifer, Sunflowers, Rosemary, Iris
12. Hornbeam hedging
13. Green belt, various bushes
14. Pond

0 10m

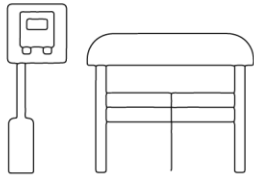
Meaningful Activities Outdoors



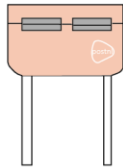


Reminiscece objects

Bus shelter



Mailbox PostNL



Old car



Old wheelbarrow

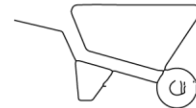
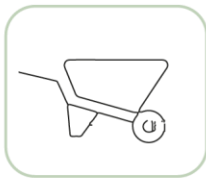


Figure 12.5.10| Applied Design Principles: Reminiscence Objects



Maintenance

Maintaing the garden

Weekly Gardening group
Volunteers

- Garage, lawn mower
- Garden tools

Caring for Animals

(with the assistance of the staff)

- Residence group 1: Rabbits, and Birds in aviary
- Residence group 2: Chickens and Pig
- Residence group 3: Goats
- Residence group 4: Sheep
- Daycare group 5: Shetland Ponies, Alpacas, Goat

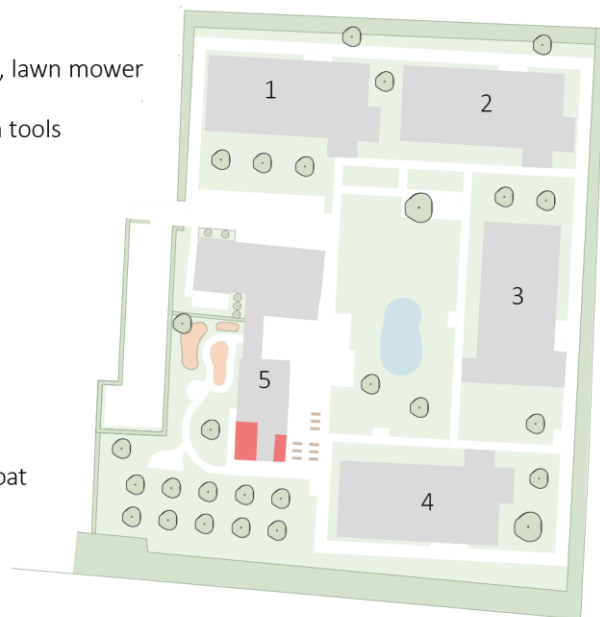


Figure 12.5.11| Applied Design Principles: Maintenance

Impressions

Experience Garden

The Experience Garden provides a serene setting adorned with ornamental flowers, and unique reminiscence objects like an old car, creating a nostalgic atmosphere. It offers comfortable seating for socializing and provides a perfect opportunity to take a leisurely stroll and immerse themselves in the beauty of nature.



Figure 12.5.12 | Experience Garden

Freestanding Pergola

The seating area beneath the pergola, adorned by lush vegetation, creates a tranquil and secluded ambiance. From this spot, visitors can enjoy views of the orchard, with its apple and cherry trees and grazing sheep, adding to the overall beauty of the setting.



Figure 12.5.13 | Freestanding Pergola

Re-used Entrance Gate

The existing gate from the Repelsvoort farm complex is reused as the main entrance gate for the plot. This low and open gate creates a welcoming atmosphere. Residents have the freedom to open the gate and leave the premises. As residents enter the driveway, staff members are alerted due to their GPS-equipped shoes, ensuring their safety. Staff can then accompany residents on walks along the driveway before returning for a relaxing cup of coffee.



Figure 12.5.14 | Re-used Entrance Gate

Animal pastures

Residents can enjoy in the presence of animals by leaning against the friendly pasture fencing while walking, allowing them to observe and interact with the animals in a safe and enjoyable manner.



Figure 12.5.15 | Animal Pastures

Section



Figure 12.5.16 | Section

Connecting with Nature and Time

Individuals with dementia are immersed in a sensory journey through the seasons. Specially selected trees, each representing a different season, create a living calendar, providing a tangible perception of time. As residents explore, they witness the blossoms of spring, the warmth of summer, the vibrant colors of autumn, and the stillness of winter, fostering a deeper connection to the rhythm of nature and a greater sense of orientation in time.

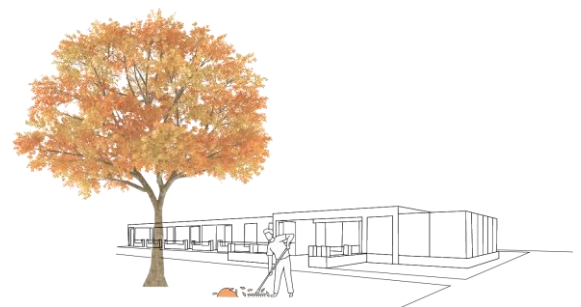


Figure 12.5.17 | A living Calendar

12.5.2. Sub-Conclusion: Outdoor space

In conclusion, the outdoor space in the final design is thoughtfully designed to effectively meet the specific needs and challenges of individuals with dementia. It carefully incorporates key elements such as accessibility, orientation, comfort, socialization, safety, meaningful activities, sensory stimulation, reminiscence, and easy maintenance to maximize utilization.

Overall, The outdoor space in the final design aims to create a supportive and enriching environment that maximizes the utilization and harnesses the therapeutic benefits of being outdoors for individuals with dementia.

12.6. Sub-Conclusion: Therapeutic Elements

The 24h-Care farm Repelsvoort serves as an effective therapeutic environment for people with dementia. The following explanation highlights how the therapeutic elements are incorporated in the final design, promoting the well-being of individuals with dementia:



Person-centered care:

The final design promotes person-centered care by catering to the specific needs and preferences of each resident. With a limited number of 7 residents per home, personalized attention and care can be provided, promoting a sense of belonging and enhancing their quality of life. This approach ensures that each resident's individuality is honored, fostering meaningful and fulfilling experiences within the therapeutic environment.



Recognizable environment with homely atmosphere:

The final design of the residences creates a familiar and welcoming environment, evoking a sense of home. It achieves this by incorporating cozy and inviting spaces, personalized decorations, familiar furniture arrangements, private areas, and communal spaces that encourage socialization and a sense of belonging. This homely atmosphere promotes a feeling of security and comfort for individuals with dementia, reducing anxiety and enhancing overall well-being.



Personal space

Private living spaces indoors and outdoors are essential in the design, offering residents a private bedroom, bathroom, sitting area, kitchen block, and a private terrace with an individual entrance. This privacy promotes autonomy, personalization, ownership, and a sense of control. Residents can maintain familiar routines and enjoy a space for relaxation and solitude. By prioritizing privacy, the design significantly enhances the well-being and overall quality of life for individuals with dementia.



Transition spaces

The final design integrates transition spaces that seamlessly connect the indoor and outdoor areas, creating a comfortable and inviting environment for residents to enjoy the outdoors while ensuring their protection and comfort. These transition spaces play a crucial role in promoting the well-being, engagement, and connection with nature for individuals with dementia, including those with limited mobility and severe cognitive impairment.



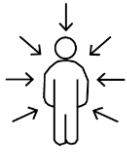
Meaningful activities:

The final design provides a variety of meaningful activities indoors and outdoors, fostering purpose, a daily routine, social interaction, physical exercise and a connection with nature. These activities include domestic tasks, horticulture, walking, animal care, and relaxation, promoting a sense of accomplishment.



Independent outdoor access:

A crucial therapeutic element in the final design is facilitating independent outdoor access for individuals with dementia. Providing a safe environment that allows them to go outdoors independently promotes their sense of autonomy, empowerment, and connection with nature.



Multi-sensory experiences:

The final design offers a rich multi-sensory environment, with sights, sounds, smells, and tactile experiences that stimulate the senses. The diversity of natural elements, such as flowers, trees, animals, and the changing seasons, offers a range of sensory stimuli that can help individuals with dementia engage and connect with their surroundings.



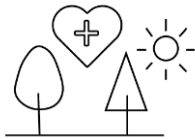
Social interactions:

The final design fosters social interactions and a sense of community by facilitating opportunities for individuals with dementia to interact with staff, volunteers, other residents, and animals. These interactions promote socialization and help reduce feelings of isolation. The presence of group activities, communal meals, and shared spaces further encourages social engagement among the residents.



Nature Immersion:

The final design is nestled in the middle of a vast agricultural area, surrounded by greenery and nature. This tranquil rural setting provides a calm and peaceful environment that is ideally suited for individuals with dementia. It allows them to immerse themselves in nature, which has proven therapeutic benefits such as reducing stress, improving mood, and enhancing overall well-being.



Therapeutic landscapes:

The outdoor space in the final design embraces therapeutic landscapes, featuring walking paths, a vegetable garden, and an experience garden. These carefully designed areas offer individuals with dementia opportunities for gentle exercise, exposure to natural light for Vitamin D absorption, outdoor enjoyment, and sensory stimulation.



Animal-assisted therapy:

The final design includes a variety of animals such as goats, rabbits, sheep, dogs, cats, Shetland ponies, alpacas, chickens, a pig, ducks, and birds in an aviary. Interacting with these animals provides therapeutic benefits, including emotional well-being, anxiety reduction, and social connections. Petting and engaging with the animals brings joy, comfort, and companionship, enhancing the overall well-being of individuals with dementia.



Connection to agricultural rhythms:

Residents in the final design embrace the natural rhythms of agricultural life, including activities like planting, harvesting, and tending to animals. This connection to the cyclical patterns of nature can help individuals with dementia establish routines, provide a sense of stability, and enhance their overall sense of time and purpose. By aligning with the natural flow of agricultural life, residents can find a greater sense of harmony and meaning in their daily experiences.

Through the integration of these therapeutic elements, the final design of the 24h-Care farm creates a holistic and therapeutic environment for people with dementia, promoting well-being, engagement, and quality of life for individuals living with dementia.

13

DISCUSSION



13. DISCUSSION

The user-centered and research-based approach adopted in this thesis provided a solid framework for exploring the target group, their needs, challenges, existing solutions, and translating these insights into design principles and guidelines. The initial stages of the project, particularly the exploration phase, the workshops and the in-depth understanding of individuals with dementia, were crucial and highly valuable for this research.

The primary focus of this thesis was to explore the design of outdoor spaces and their connection to interior space, using transition spaces within a 24h-care farm designed specifically created to address the unique needs and challenges of individuals with dementia.

A significant aspect of this research was the guided tours with interviews conducted at four different 24h-care farms, which greatly enriched the understanding of designing outdoor spaces and small-scale residences within the context of 24h-care farms. The visits and interviews provided valuable information that enriched the study's knowledge base.

Another essential and valuable element of this research was the experiment involving individuals with dementia and a healthcare worker, which provided valuable insights into their preferences and individual needs, shaping the design approach of this study. One limitation of this study was the small sample size of participants. Initially, the plan was to involve four residents from nursing home Castella and six residents from a 24h-care farm in the Netherlands, along with a larger number of healthcare workers. However, due to unforeseen circumstances, the participation of additional residents and healthcare workers was not possible. Despite this limitation, given the time constraints of the graduation project, the sample size was considered sufficient and appropriate. The insights gained from the available participants still provided valuable information.

Furthermore, future research could focus on validating specific elements of the final design, such as the continuous loop in the wrapped-around transition space, to gain further insights into their effectiveness and impact on the well-being of individuals with dementia.

Overall, this research is comprehensive and offers valuable insights. The study benefited from extensive exploration and visits to various care farms, as well as the experiment, contributing to a well-informed understanding of designing 24h-care farms that effectively stimulate individuals with dementia to engage in outdoor activities, connect with nature, participate in meaningful activities, and exercise, thereby enhancing their overall quality of life.

14

CONCLUSION



“How can the design of a 24h-care farm stimulate people with dementia to get outdoors, connect with nature, do meaningful activities and exercise, to improve the quality of life?”

14. CONCLUSION

This thesis addressed the research question of how the design of a 24h-care farm can effectively stimulate people with dementia to engage in outdoor activities, connect with nature, participate in meaningful activities, and exercise, ultimately improving their quality of life.

This study used a user-centered and research-based approach to develop design principles for a therapeutic environment tailored to individuals with dementia. It highlighted the need for nursing homes that prioritize the well-being of individuals with dementia, addressing their psychological needs and the importance of suitable outdoor spaces, a factor frequently neglected in traditional settings. The research emphasized the vital role of outdoor spaces in improving the overall well-being of individuals with dementia and highlighted the therapeutic benefits of outdoor experiences. It also identified the specific challenges and needs experienced by individuals with dementia when getting or being outdoors. Therefore, designing outdoor spaces that cater to their specific requirements is essential to maximize these benefits.

Although 24h-care farms in the Netherlands have shown promise in promoting outdoor activities and nature connection, their availability remains limited, and there is room for improvement in the design of both interior and outdoor spaces to make them more dementia-friendly and integrated. Therefore, this research aimed to investigate and enhance the design of 24h-care farms to maximize their therapeutic benefits. To achieve this goal, a comprehensive methodology was employed, encompassing extensive literature review, site visits, case studies, and comparative analysis. These research methods provided valuable insights into the physical environment and care practices of 24h-care farms.

Based on the findings from the exploration phase, the research formulated design guidelines that focused on creating therapeutic outdoor spaces and seamless transitions between indoors and outdoors. It underscored the importance of well-designed transition spaces that fostered a smooth connection between the interior and exterior environments. Transition spaces were identified to offer numerous benefits, including opportunities for movement, engagement in outdoor activities and nature, and a sense of comfort and security. Transition spaces are crucial for residents with limited mobility, as it is a common challenge among individuals with dementia and seniors in general.

The testing of design concepts with individuals with dementia and healthcare workers validated the effectiveness of transition spaces designed according to the guidelines identified in the exploration and translation phases. Valuable insights were gained from the participants' feedback, leading to the development of additional design guidelines that align with their specific needs and preferences.

Additionally, the thesis included a location analysis for the redevelopment of an agricultural property into a 24h-care farm. This analysis established guidelines to ensure the quality of the historical complex, the outdoor area and meet the specific needs of the target group.

The culmination of this research is the final design, which aims to create a 24h-care farm that enhances the well-being of individuals with dementia. The program includes carefully designed outdoor spaces, daycare facilities, a respite home and residences with transition spaces, fostering a familiar and homely environment.

The design incorporates therapeutic elements such as person-centered care, a recognizable atmosphere, personal space, transition spaces, meaningful activities, independent outdoor access, multi-sensory experiences, social interactions, nature immersion, therapeutic landscapes, animal-

assisted therapy and connection to agricultural rhythms. In its entirety, the program offers a holistic and therapeutic environment that promotes the overall quality of life for individuals living with dementia.

In conclusion, this research provides valuable insights into the design of 24h-care farms that effectively stimulate individuals with dementia to engage in outdoor activities, connect with nature, participate in meaningful activities, and exercise. The developed design principles, based on a user-centered and research-based approach, significantly contribute to improving the quality of life for people with dementia and addressing their psychological needs. By integrating the developed design principles, the 24h-care farm can harness the therapeutic power of nature, promoting health and well-being in people with dementia.

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All other figures were created by the author

APPENDIX



APPENDIX

The Appendix includes blank data collection forms used during the experiment to provide an impression of how information was gathered in a thorough manner. These forms are presented in Dutch.

Appendix 1

An example of testing 2 out of the 9 design options with individuals with dementia is presented. Although a data collection form was created for 9 design options, it has been condensed to 2 design options to offer an overview. This form was filled out by the researcher during the experiment.

Appendix 2

Similarly, for the data collection form used when testing the design with the healthcare worker, the file containing 9 design options has been reduced to 1 design option to provide an impression, along with the final sheet displaying the top 3 results. This form was filled out by the researcher during the experiment.

Appendix 3

Additionally, a form has been completed by the healthcare worker to describe the participants' dementia profiles.

INVULBLAD EXPERIMENT

Deelnemer:

Datum:

Tijd:

Test scenario's:

VOORBEREIDING;

Ik ga het gesprek opnemen, zodat ik het later nog terug kan luisteren.

Inleiding

Ik studeer architectuur en ik heb meerdere ontwerpen gemaakt van een woning. Ik wil graag samen met u wat filmpjes kijken over iemand die van de woonkamer naar buiten loopt en dan ga ik wat vragen stellen. Ik wil uw mening weten en hoe u zich voelt. Er is geen goed of fout antwoord, het gaat om uw gevoel.

SCENARIO A1

Taak 1: Scenario A1

Hier ziet u het filmpje. Hij staat nu op pauze. U bevindt zich hier BINNEN in de woonkamer. Kunt u mij de deur naar BUITEN aanwijzen op het scherm?

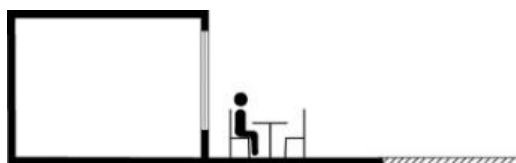
met een kruis aangeven waar ze naar wijzen.



Taak 2: Variant A1

U gaat nu het filmpje bekijken. Ik zou graag willen dat op het moment dat u zich buiten voelt, u hand wil opsteken. Er is geen goed of fout antwoord. Ik wil gewoon weten wanneer u zich buiten voelt. Dus kunt u op het moment dat u zich buiten voelt u hand opsteken?

Aangeven op tekening wanneer deelnemer hand opsteekt:



Taak 3: Scenario A1

Ik zet nu het filmpje hier op pauze. Kunt u mij iets aanwijzen wat u prettig vindt om naar te kijken?

Kunt u mij vertellen waarom u dat een prettig vindt om te ervaren?

Is er iets in deze ruimte wat u niet of minder prettig vindt om te ervaren?

met een kruis aangeven waar ze naar wijzen.



Taak 4: Scenario A1

Kunt u hier de weg naar buiten, naar de tuin, aanwijzen?

met een kruis aangeven waar ze naar wijzen.



SCENARIO A2

Taak 5: Scenario A2

Nu bekijken we het filmpje van iemand die van buiten naar binnen loopt.

Vraag: kunt u mij de deur naar binnen aanwijzen, de weg naar binnen aanwijzen.

Aangeven op tekening:

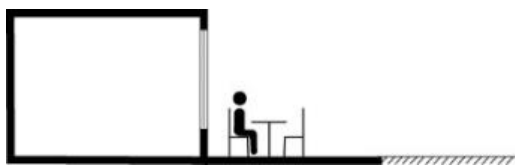


Taak 6: Scenario A2

U gaat nog een keer het filmpje bekijken.

Vraag: kunt u uw hand opsteken wanneer u zich BINNEN voelt, BINNEN bent?

Aangeven op tekening wanneer deelnemer hand opsteekt:



Taak 7: Scenario A2

Ik zet nu het filmpje hier op pauze. Kunt u mij iets aanwijzen wat u prettig vindt om naar te kijken?

Kunt u mij vertellen waarom u dat een prettig vindt om te ervaren?

Is er iets in deze ruimte wat u niet of minder prettig vindt om te ervaren?

Screenshot video, met een kruis aangeven waar ze naar wijzen.



Opmerking overig:

Scenario G1

Taak 1: Scenario G1

Hier ziet u het filmpje. Hij staat nu op pauze. U bevindt zich hier BINNEN in de woonkamer. Kunt u mij de deur naar BUITEN aanwijzen op het scherm?

met een kruis aangeven waar ze naar wijzen.



Kunt u hier de deur naar buiten aanwijzen?

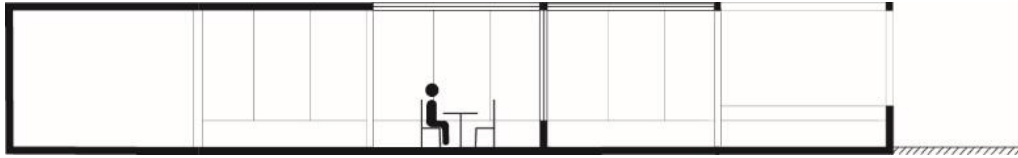
met een kruis aangeven waar ze naar wijzen.



Taak 2: Scenario G1

U gaat nu het filmpje bekijken. Ik zou graag willen dat op het moment dat u zich buiten voelt, u hand wil opsteken. Er is geen goed of fout antwoord. Ik wil gewoon weten wanneer u zich buiten voelt. Dus kunt u op het moment dat u zich buiten voelt u hand opsteken?

Aangeven op tekening wanneer deelnemer hand opsteekt:



Taak 3: Scenario G1

Ik zet nu het filmpje hier op pauze. Kunt u mij iets aanwijzen wat u prettig vindt om naar te kijken?

Kunt u mij vertellen waarom u dat een prettig vindt om te ervaren?

Is er iets in deze ruimte wat u niet of minder prettig vindt om te ervaren?

met een kruis aangeven waar ze naar wijzen.



Ik zet nu het filmpje hier op pauze. Kunt u mij iets aanwijzen wat u prettig vindt om naar te kijken?

Kunt u mij vertellen waarom u dat een prettig vindt om te ervaren?

Is er iets in deze ruimte wat u niet of minder prettig vindt om te ervaren?

met een kruis aangeven waar ze naar wijzen.



Taak 4: Scenario G1

Kunt u hier de weg naar buiten, naar de tuin, aanwijzen?

met een kruis aangeven waar ze naar wijzen.



Ik zet nu het filmpje hier op pauze. Kunt u mij iets aanwijzen wat u prettig vindt om naar te kijken?

Kunt u mij vertellen waarom u dat een prettig vindt om te ervaren?

Is er iets in deze ruimte wat u niet of minder prettig vindt om te ervaren?

met een kruis aangeven waar ze naar wijzen.



Kunt u hier de weg naar buiten, naar de tuin, aanwijzen?

met een kruis aangeven waar ze naar wijzen.



Scenario G2

Taak 5: Scenario G2

Nu bekijken we het filmpje van iemand die van buiten naar binnen loopt.

Vraag: kunt u mij de deur naar binnen aanwijzen, de weg naar binnen aanwijzen.

Aangeven op tekening:

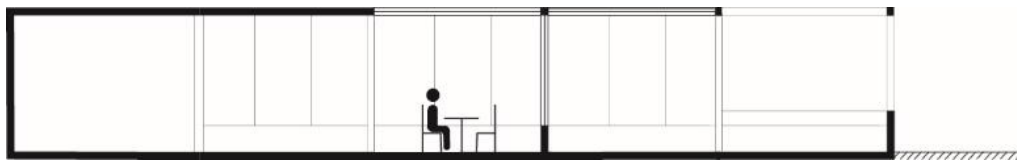


Taak 6: Scenario G2

U gaat nog een keer het filmpje bekijken.

Vraag: kunt u uw hand opsteken wanneer u zich BINNEN voelt, BINNEN bent?

Aangeven op tekening wanneer deelnemer hand opsteekt:



Taak 7: Scenario G2

Ik zet nu het filmpje hier op pauze. Kunt u mij iets aanwijzen wat u prettig vindt om naar te kijken?

Kunt u mij vertellen waarom u dat een prettig vindt om te ervaren?

Is er iets in deze ruimte wat u niet of minder prettig vindt om te ervaren?

Screenshot video, met een kruis aangeven waar ze naar wijzen.



Vraag: kunt u mij de weg naar de woonkamer wijzen?



QUESTIONNAIRE ZORGMEDEWERKERS

± 40 minuten

Mag ik het interview opnemen?

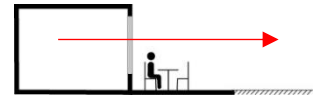
ALGEMENE VRAGEN

Hoelang werkt u al in de zorg met mensen met dementie?

Wat is uw ervaring met het werken met mensen met dementie in overgangsruidten tussen binnen en buiten?

ONTWERP VARIANT A :

DIRECTE OVERGANG VAN BINNEN NAAR BUITEN



Op een schaal van 1 tot 10, hoe gemakkelijk vinden mensen met dementie hun weg naar buiten?

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7 8 9 10

complex om te navigeren

gemakkelijk te navigeren

Op een schaal van 1 – 10, hoe comfortabel is de overgang van binnen naar buiten? (Kunnen de bewoners wennen aan het buitenleven voordat ze volledig naar buiten gaan)

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 6 7 8 9 10

oncomfortabele overgang

comfortabele overgang

Op een schaal van 1 – 10, hoe lang is de lengte van de overgang tussen binnen en buiten (rekening houdend met factoren zoals hoe lang het duurt voordat het individu zich buiten voelt en of hij/zij tijdens de overgang gedesoriënteerd of verward raakt)

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

1 2 3 4 5 5 4 3 2 1

te kort

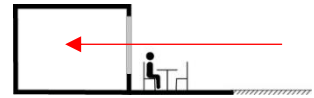
te lang

Welk ontwerp elementen moeten worden vermeden? (Welke ontwerpelementen kunnen oncomfortabel, uitdagend zijn en desoriëntatie, verwarring en angst veroorzaken?)

welke ontwerp elementen zijn prettig, (vertrouwd en bekend) en comfortabel om te ervaren en gewenst? Welke ontwerp elementen kan de interesse versterken van het individu met dementie om naar buiten te gaan?

ONTWERP VARIANT A :

DIRECTE OVERGANG VAN BUITEN NAAR BINNEN



Op een schaal van 1 tot 10, hoe gemakkelijk vinden mensen met dementie hun weg naar binnen?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	8	9	10
complex om te navigeren					gemakkelijk te navigeren				

Op een schaal van 1 – 10, hoe comfortabel is de overgang van buiten naar binnen? (Kunnen de bewoners wennen aan het binnenleven voordat ze volledig naar binnen gaan)

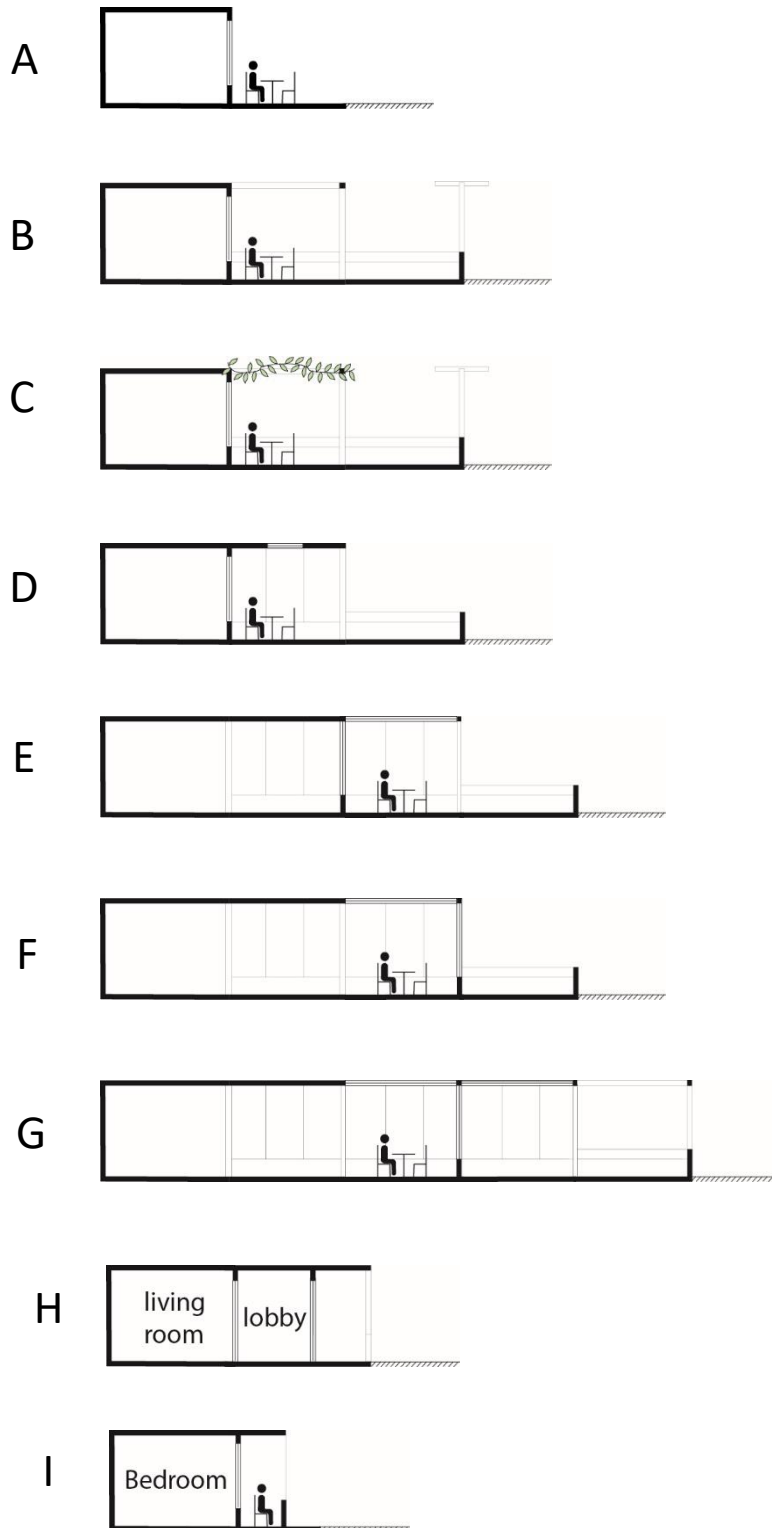
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	6	7	8	9	10
oncomfortabele overgang					comfortabele overgang				

Op een schaal van 1 – 10, hoe lang is de lengte van de overgang tussen buiten en binnen (rekening houdend met factoren zoals hoe lang het duurt voordat het individu zich binnen voelt en of hij/zij tijdens de overgang gedesoriënteerd of verward raakt)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5	5	4	3	2	1
te kort					te lang				

Opmerking

Zou u een top 3 kunnen geven die het meest passend is voor mensen met dementie, waarbij de overgang tussen binnen en buiten comfortabel is en de bewoners zich kunnen oriënteren in de ruimte en de weg naar buiten makkelijk vinden?



CASTELLA ZORGCENTRA CUIJK
PG-AFDELING

DEELNEMERS MET DEMENTIE

Deelnemer 1:

Vorm van dementie:

- ☐ Alzheimer
- ☐ Vasculaire dementie
- ☐ Frontotemporale dementie
- ☐ Lewy body-dementie

Symptomen:

- ☐ Geheugenverlies
- ☐ desoriëntatie in tijd en ruimte
- ☐ taalproblemen
- ☐ moeite met dagelijkse activiteiten
- ☐ veranderingen in gedrag of emoties

Fase van dementie

- ☐ milde fase waarin symptomen nog subtiel zijn
- ☐ matige fase waarin symptomen ernstiger worden en hulp nodig heeft bij dagelijkse activiteiten
- ☐ ernstige fase waarin de persoon volledig afhankelijk is van anderen voor zorg.

Scenario's experiment:

- | | | |
|-------------------------|-------------------------|-------------------------|
| <input type="radio"/> A | <input type="radio"/> D | <input type="radio"/> G |
| <input type="radio"/> B | <input type="radio"/> E | <input type="radio"/> H |
| <input type="radio"/> C | <input type="radio"/> F | <input type="radio"/> I |

Deelnemer 2:

Vorm van dementie:

- ☐ Alzheimer
- ☐ Vasculaire dementie
- ☐ Frontotemporale dementie
- ☐ Lewy body-dementie

Symptomen:

- ☐ Geheugenverlies
- ☐ desoriëntatie in tijd en ruimte
- ☐ taalproblemen
- ☐ moeite met dagelijkse activiteiten
- ☐ veranderingen in gedrag of emoties

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