

# Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



## Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners ([Examencommissie-BK@tudelft.nl](mailto:Examencommissie-BK@tudelft.nl)), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Bob Marinus Johannes Nicolaas van der Veen
Student number	5927412

Studio		
Name / Theme	AR3AD110 Designing for Care in an Inclusive Environment	
Main mentor	Birgit Jürgehake	Architecture and the Built Environment, Housing and Public Building Design
Second mentor	Jasmina Campochiaro	Building technology
Third mentor	Leo Oorschot	
Argumentation of choice of the studio	About my passion for architecture and the passion for care that has developed during my part-time job in a nursing home. Furthermore, the interest to base a design on research and facts.	

Graduation project	
Title of the graduation project	Holistic design for dementia care
Goal	
Location:	Boelstraat, Tarwewijk, Rotterdam
The posed problem,	<p><b><i>Problem statement</i></b></p> <p>The aging population in the Netherlands is increasing, leading to a rise in both the number of elderly people and the average age of the population. Additionally, there is a phenomenon of double aging: the share of people aged 80 and older rose from 3.9% in 2010 to 15.5% in 2024 (Centraal Bureau voor de Statistiek, n.d.). According to Alzheimer Nederland (n.d.), more than 25% of people aged 80 and older have dementia, and with the double aging, this number is expected to grow. Currently, five people in the Netherlands are diagnosed with dementia every hour, amounting to 300,000 people, with a projected increase to 620,000 by 2050.</p> <p>At the same time, the healthcare sector is facing severe staff shortages. A shortage of 14,200 employees is expected in nursing homes by 2040, increasing to 51,900 in 2033 (Zuil,2023). This leads to long waiting lists, especially for care profiles 5 and 7 (Zorgverzekeraar Nederland, 2024). These</p>

developments place enormous pressure on informal care provided by family members and neighbors, which increases the burden on informal caregivers (Bremer et al., 2015).

Moreover, the current living conditions for people with dementia are often inadequate. According to Alzheimer Nederland (n.d.), 75% of healthcare professionals and informal caregivers believe that current housing options are unsuitable. The book 'Dimensie voor dementie' also highlights significant opportunities for improvement in the architecture of dementia care facilities: "The alienation begins with atriums, glass wall from floor to ceiling, and modern hard materials that generate a lot of noise" (Nillesen & Opitz, 2013, p.88). This statement underscores the need to carefully align interior design with the needs of people with dementia, as their living environment is crucial to their well-being and can contribute to stress, uncertainty, and confusion. Much more of our sense of well-being and familiarity is linked to our immediate surroundings (Ontwerpen Voor Dementie | Wat is Dementie, n.d.).

In summary, the following current issues are emphasized:

- Pressure on formal care, due to the aging and healthcare staff shortages.
- Pressure on informal care, due to increased reliance on family members and neighbors
- Lack of quality in current housing options for people with dementia.

### ***Relevance***

These national trends are mirrored in Rotterdam, where the population is expected to grow from 652,292 residents in 2022 to 733,012 by 2040. The proportion of people aged 65 and older will increase from 15.6% to 18.3% in the same period, with the number of elderly rising from 102,070 to 134,141 (Onderzoek 010, n.d.). Alzheimer Nederland (n.d.) predicts that one in five Dutch people will develop dementia, meaning approximately 156,602 residents of Rotterdam will be affected.

In neighborhoods surrounding Tarwewijk, such as Oud Charlois, Carnisse, Zuidplein, Bloemhof, and Katendrecht, there 6.725 residents aged 65 and older (Onderzoek 010, Bevolking (gebied/buurt) – Afrikaanderbuurt, n.d). The only dementia care facilities are located in Charlois and Zuidplein and are large-scale, while there is a lack of small-scale care (Google Maps, 2024). This is concerning, as a familiar

	<p>environment is crucial for the well-being of people with dementia (Ward et al., 2018).</p> <p>A new pedestrian and bicycle bridge will soon improve connectivity between Tarwewijk and Katendrecht (Houben et al., 2021), which also has an aging population and a shortage of dementia care. A new care facility in Tarwewijk could serve both neighborhoods.</p> <p>The poor accessibility of housing for the elderly, due to stairs and steps (Appendix 1), further emphasizes the need for adapted facilities. These are not only necessary to address the shortage of housing for people with dementia but also to enable them to stay in a familiar environment.</p> <p>Additionally, Tarwewijk is culturally diverse, with communities of Moroccan, Antillean, Surinamese, and Turkish origin (AlleCijfers, n.d.). In many cultures, it is common for children to care for their parents, often in shared households. This calls for housing suitable for multigenerational living (Alzheimer Europa &amp; NHS England, 2018). A new care facility in Tarwewijk could address these cultural and social needs while providing better support for the aging population.</p>
research questions and	<p><i>'How can insights from dementia-friendly architecture and Hogeweyk Care concept be used to develop a care and living environment for people with dementia in the Tarewijk?'</i></p> <ol style="list-style-type: none"> <li>1. What are the core principles of dementia-friendly architecture at the context level?</li> <li>2. What are the core principles of dementia-friendly architecture at the building level?</li> <li>3. What are the core principles of dementia-friendly architecture at the room level?</li> <li>4. What are the key care principles of the Hogeweyk Care Concept and how do they translate into design guidelines?</li> <li>5. What are the potential shortcomings of the Hogeweyk Care Concept, and how can these inform architectural design improvements?</li> <li>6. What are the specific needs of the residents of the Tarwewijk concerning care and housing for people with dementia in an urban context?</li> </ol>
design assignment in which these result.	<p>A care facility where various types of elderly care are implemented. To start, 24-hour apartments will be introduced with several communal features. Family participation will be given higher priority, which is why the building will integrate assisted living units and guest rooms. To meet the needs of Tarwewijk, the facility will also include kangaroo housing,</p>

	allowing families to live close to their loved ones who require care.
<b>Process</b>	
<b>Method description</b>	
<i>Literature</i> The literature study is based on existing literature from both care and architectural perspectives. For the architectural perspective, the focus is on five domains (see figure 3), which is addressed at three different scales. Literature (J. Nielsen et al., KAW et al., 2024) and previous studies (Marquardt, Bueter, & Motzek, 2014; Mitchell & Burton, 2006; Isaacson & Barkay, 2020) are used to generate new insights. The perspective analyzes sources to understand and critically evaluate the 'Hogeweyk Care Concept' by domain (Grabowski, 2020, p.62, p.42; Godwin, B., 2015; Røhnebæk, Engen, & Bast, 2023; Niedderrer et al., 2024). Scholar is used to find reliable and recent sources. For the care perspective, selected sources are no older than 15 years, as the Hogeweyk Care Concept was established in 2009. For the architectural perspective, sources are no older than 20 years. Search terms (see figure 7) may be adjusted as the study progresses and new insights emerge.	
<i>Casestudies</i> The dementia village Boswijk and the care home Randerode serve as case studies to test theories in practice. In Boswijk, which applies the 'Be-Advice Paradigm' based on the Hogeweyk Care Concept, both care and architectural perspectives are examined. In Randerode, only dementia-friendly architecture, based on evidence-based design, is evaluated. Insights from both locations will be applied across the different architectural scales. The care-related insights from Boswijk will contribute to answering research questions 4 and 5.	
<i>Fieldwork</i> Fieldwork will take place at two locations: Boswijk and Randerode. Both locations house people with dementia who require 24-hour care. In Boswijk, four days of observation will be conducted, while in Randerode, three days of observation are planned. This allows for a comparison, particularly because the locations differ significantly in age: Randerode is 40 years old, whereas Boswijk was opened in 2013. The methods used collectively during the fieldwork aim to answer the main research question by integrating care, architectural and contextual perspectives into dementia care design.	
<i>Observations</i> The observations aim to provide insight into the daily lives of people with dementia who can no longer live independently. These observations are conducted from both care and architectural perspectives, taking into account relevant domains. The focus is on the building and its users (residents, care staff, family members), ensuring that practical insights can be integrated into existing literature and contribute to answering the main research question.	
<i>Interviews</i>	

During fieldwork, interviews will be conducted with residents, care staff, and family members. The questions, included in Appendices 2 and 3, are designed to gather insights from various perspectives and will be incorporated into the research questions.

### ***Workshop***

As part of the fieldwork, residents will visualize their ideal concept for a dementia care facility. Using images organized by theme (see Appendix 4), they will select their preferences and provide justification, resulting in a visual representation of their wishes. The result will be used to refine architectural guidelines and align them with user preferences.

### ***Mapping***

To better understand the Tarwewijk, maps will be created that focus on care-related aspects such as green spaces and local facilities. These maps will support implementation of the research in the neighborhood and address research question 6. of the research in the neighborhood.

### ***Interviews Tarwewijk***

Interviews with residents of the Tarwewijk will map their needs and any shortcomings in the neighborhood (see Appendix 5). These insights will complement the general literature and ensure better implementation at the project location.

This research will result in guidelines informed by multiple perspectives: literature from care and architectural viewpoints, observations, and interviews. The guidelines will be categorized into the previously mentioned care and architectural domains and organized at three levels of scale: context, building level, and room level. The importance of each guideline will be determined by confirmation from these varied perspectives.

## Literature and general practical references

### Problemstatement:

- *Centraal Bureau voor de Statistiek. (z.d.). Ouderen. Centraal Bureau Voor de Statistiek. <https://www.cbs.nl/nl-nl/visualisaties/dashboard-bevolking/leeftijd/ouderen>*
- *Feiten en cijfers over dementie/ Alzheimer Nederland. (n.d.). Alzheimer Nederland. <https://www.alzheimer-nederland.nl/dementie/feiten-en-cijfers-over-dementie>*
- *Ontwerpen voor dementia. (n.d.) Retrieved on 22 december 2024, from <https://www.ontwerpenvoordementie.nl/maat-en-schaal/>*
- *Zorgverzekeraars Nederland (2024). Landelijke rapportage wachtlijsten verpleegzorg (Wlz).*
- *Zuil, W. (20230, 21 december). Personeelstekort zorg groeit naar maar liefst 190.000 medewerkers in 2023 – Skipr. <https://www.skipr.nl/nieuws/personeelstekort-groeit-naar-maar-liefst-190-000-zorgmedewerkers-in-2023/#:~:text=Gevolgen%20beleidsmaatregelen&text=Volgend%20jaar%20stijgt%20het%20tekort,bij%20ouderen%20thuis%20te%20verlenen.>*

### Relevance:

- *AlleCijfers, (n.d.). Buurt Tarwewijk, Rotterdam. Retrieved on 24-12-2024, from <https://allecijfers.nl/buurt/tarwewijk-rotterdam/>*
- *Alzheimer Europe & NHS England. (n.d.). Intercultural dementia care: A guide for health and care workers. Retrieved on 24-12-2024 from <https://www.england.nhs.uk/publication/intercultural-dementia-care-guide/>*
- *Google. (2024). [Verpleeghuizen Tarwewijk.] Google Maps. Retrieved on 09 oktober 2024, [https://www.google.nl/maps/search/3m1!1e3?entry=tту&g\\_ep=EgoyMDI1MDExNS4wIKXMDSOASAFQAw%3D%3D](https://www.google.nl/maps/search/3m1!1e3?entry=tту&g_ep=EgoyMDI1MDExNS4wIKXMDSOASAFQAw%3D%3D)*
- *Houben, F., Van den Boomen, G., Flink, J., Karakus, H., Unck, M., Molenaar, M., Koorten, R., Pastors, M., Vrijland, W., Schrijer, D., Bormans, R., De Baedts, B. (2021). Manifest Rotterdam Zuid.*
- *Onderzoek010 – Bevolking – Rotterdam. (n.d.). <https://onderzoek010.nl/dashboard/onderzoek010/bevolking>*
- *Ward, R., Clark, A., Campbell, S., Graham, B., Kullberg, A., Manji, K., Rummery, K., & Keady, J. (2018). The lived neighbourhood: understanding how people with dementia engage with their local environment. *International Psychogeriatrics*, 30(6), 867-880..*

### 'Dementia-friendly architecture'

- *Nillesen, J., & Opitz, S. (2013). Dimensie voor dementie: Kleinschalige woonvormen voor dementerende ouderen. Wiegerinck. ISBN: 978-90-820173-0-4.*
- *KAW, Alzheimer Nederland, Aedes, ActiZ, de Deel academy TU Eindhoven (2024). Toolkit dementievriendelijk woongebouw. Woonzorg Nederland.*
- *Marquardt, G., Bueter, K. & Motzek, T. (2014). Impact of the design of the built environment on people with dementia: an evidence-based review. *Health Environments Research & Design Journal*, 8 (1, 127-157. <https://doi.org/10.1177/193758671400800111>*

- Marquardt, G., & Schmieg, P. (2009). Dementia-friendly architecture; Environments that facilitate wayfinding in nursing homes. *American Journal of Alzheimer's Disease & Other Dementias*, 24(4), 330-340. <https://doi.org/10.1177/1533317509334959>
- Mitchell, L., & Burton, E. (2006). Neighborhoods for life: Designing dementia-friendly outdoor environments. *Quality in Ageing: Policy, Practice and Research*, 7(1), 26-33. <https://doi.org/10.1108/14717794200600005>
- Isaacson, M., & Barkay, D. (2020). Mobility scooter in urban environments: A research agenda. *Journal of Transport & Health*, 18, 100917. <https://doi.org/10.1016/j.jth.2020.100917>
- Chalfont, G. (2009). *Design for nature in dementia care*. London, England: Jessica Kingsley publishers
- Fillée, A. (2022). *Het welzijn van mensen met dementie, in het kader van kleinschalige woonvormen*. (Master's thesis). Retrieved from <https://documentserver.uhasselt.be/handle/1942/38589>
- Altona, C. & Wiegelman, S. (2023). *Evaluating Wayfinding Infrastructures for People Living with Dementia*. Sage Journals. <https://journals.sagepub.com/doi/full/10.1177/0739456X221113796>
- Liao, M., Ou, S., Hsieh, C. H., Li, Z., & Ko, C.C. (2018). Effect of garden visits on people with dementia: A pilot study. *Dementia*, 19 (6), 1009-1028
- Øderud, T., Landmark, B., Eriksen, S. H., Fossberg, A. B., Aketun, S., Omland, M., Hem, K., Østensen, E., & Aasen, D. (2015). Persons with dementia and their caregivers using GPS. *Studies in Health Technology and Informatics*, 2017, 212-221. <https://pubmed.ncbi.nlm.nih.gov/26294475/>
- *Ontwerpen voor dementie*. (n.d.) Retrieved on 22 december 2024, from <https://www.ontwerpenvoordementie.nl/maat-en-schaal/>

### **'Hogeweyk Care Concept'**

- Godwin, B. (2015). Hogeweyk: a 'home from home' in the Netherlands. *The Journal of Dementia Care*, 23(3), 28-31.
- ABC News. (2012, 10 april). *Alzheimer's Disease: Dutch Village Doubles as Nursing Home*. <https://abcnews.go.com/Health/AlzheimersCommunity/alzheimers-disease-dutch-village-dubbed-truman-show-dementia/story?id=16103780>
- Glass, A.P., (2014). *Innovative Seniors Housing and Care Models: What We Can Learn from the Netherlands*. (Report Seniors Housing and Care Journal Vol. 22 Num. 1).
- Grabowski, K. (2020). *Redefining Residence: An Alternative Memory Care Environment for single, childless persons with Alzheimer's disease* [Master's practicum, University of Manitoba].
- Niedderer, K.M., Ludden, G., Denning, T., & Holthoff-Detto, V. (Eds.). (2024). *Design for dementia, mental health and wellbeing: Co-design, interventions and policy*. Routledge <https://doi.org/10.4324/9781003318262>
- Røhnebæk, M. T., Engen, M., & Bast, A. (2023). Co-designing a dementia village: Transforming dementia care through service design. In M. A. Pfannstiel (ed.), *Human-centered Service Design for Healthcare Transformation*:



## **Reflection**

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

### ***Relation to the studio***

One area of care focuses on supporting the elderly, particularly those with dementia. It brings together both health and care. By improving well-being, the quality of life for people with dementia can be enhanced. At the same time, practical interventions can help ensure the health of older adults with dementia.

### ***Relation to the master track***

An important aspect of architecture is designing care facilities, including for elderly care. Research shows that appropriate design can have a positive impact on the well-being of people with dementia.

### ***Relation to the master programme***

At a broader level, a location can contribute positively to its surroundings. This could involve incorporating features that are valuable at neighborhood level.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

Research shows that well-integrated architecture can contribute to the well-being of people with dementia, while also positively affecting the efficiency of dementia care. This approach addresses the high pressure in the healthcare sector caused by staff shortages and the growing number of people with dementia. Furthermore, the quality of current dementia facilities is often lacking. Considering location-specific aspects, family participation is highly valued, which can be addressed by designing a care facility that integrates various types of elderly housing.