



Forget
me
not

“Dwelling in the past, designing for the future”



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Chair: Dwelling
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Target group - Site: Dementia, Gillis van Ledenberchstraat-Zaagmolenstraat



“We remember their love when they can no longer remember.”

- A Caregiver -



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Preface

“When aging becomes a factor”

Description of the personal reasons for doing research about dementia and using this as input for a dwelling design project.





Age is nothing but a number. At least that's what they say and most of the times it's true. If you live a productive life with a strong social network it has a positive effect on your body and mind. Looking at my grandma who lost her husband at an fairly early age, she could have become socially isolated leaving her vulnerable. I'm fortunate enough to have a grandma who has a big social network and strong mindset on making the most of life. Because of her strong body and mind I never thought about the vulnerabilities people get when they grow older and how a disease as dementia can change life. This disease making even the strongest person turn into a person who needs guidance 24/7.

For my graduation project I have the assignment of designing a dwelling near the city center of Amsterdam, which is a densified solution for the year of 2040. I use this opportunity to research dementia and how architectural design can have a positive influence on the people that come in contact with this illness. With more than double the amount of people having dementia in 2040 compared to 2017 the relevance is undeniable, not only for me but probably for most people studying or working in the field of architecture.

With this research paper I have enriched my mind and I hope it does the same for you.

With kind regards,

ing. J.B. Blokker (Jeff)



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2.1 Busy street in Amsterdam city center



Amsterdam: the city in 2040

“How to live in a densified city center”

The brief for the research and design. This consist of a dwelling design where the relevance of the topic and site is explained. The important factors in this brief are the densification of Amsterdam and a housing solution relevant for the year 2040. In this chapter the main question is stated followed by the sub question.



Amsterdam: the city in 2040

The brief for this assignment is to create a dwelling design near the city center of Amsterdam for the year 2040. The proposal created with this research paper shouldn't just answer the immediate requirements but also the ones in the future. This can be answered with the questions; 'how do we want to live in the future?' and 'what do our cities need?'¹

Analyzing these questions resulted into three main topics; city living, high density, future oriented. These three main topics can be translated towards buildings and give them a function, target group and a method of densifying the city.

City living - Building provides for the neighborhood

Near the city center of Amsterdam 2040 it will be closely populated. Because of this dwelling solutions will be smaller and have more shared / communal space. Also the amount of green is limited and public buildings will be under pressure (amount of people using it). A building created in 2040 needs to be a building that also has a function which the neighborhood can profit from. In this way the pressure on public buildings will be less, existing green can stay and people living in smaller dwelling can get extra space right outside their home.

High density - Adding to the existing

There are several solutions to get a more densified city center. Buildings that are new can provide more dwellings per square meters by making higher buildings or smaller units. Beside new buildings Amsterdam is mostly a city of the existing which holds a lot of cultural value. Not all buildings are listed but they are still heritage and have a history. Trying to renew these buildings, there is a different method to create a higher density in the center, which is adding on the existing. By choosing this option the heritage and its history can be preserved while densifying the site.

Future oriented - Relevance target group

In 2040 the population is changed compared to 2017. Looking at the changes in population there will also be a different need in dwellings. With this assignment there will be a target group chosen that has its relevance for 2040. The target group chosen will not only have a relevance for Amsterdam but be also part of a broader context.

1. Kupers, T., Putt van der P. (2017). p. 2



This topic is answered by a main research question and sub questions.

The main research question is stated as below:

‘What architectural aspects can help people with dementia, to live safely with the possibility to be part of the society, in the center of Amsterdam in 2040?’

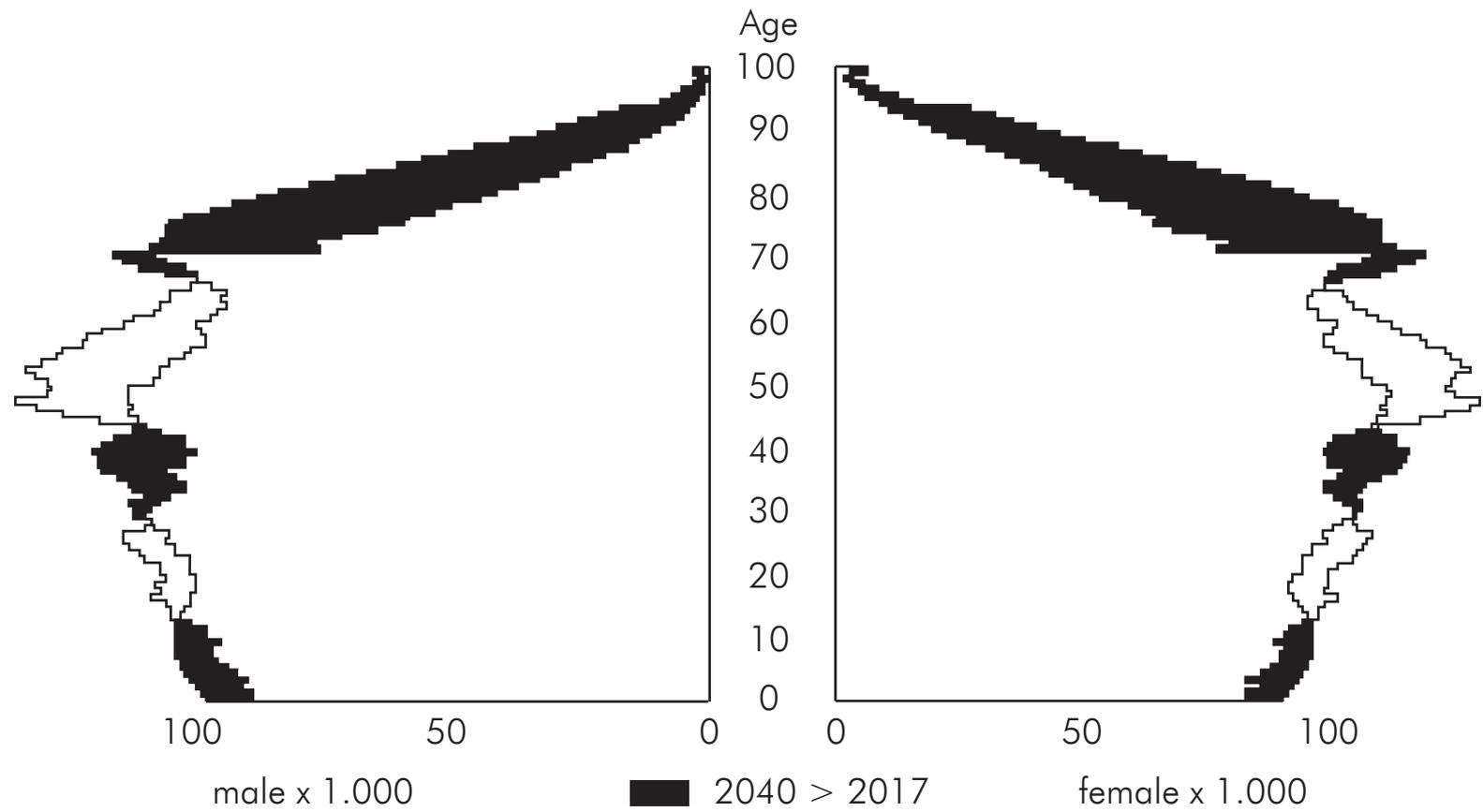
To answer the main research question a couple of sub question have to be answered. The sub questions are divided into two categories; the primary focus on dementia and the secondary focus on the site with its heritage.

Dementia:

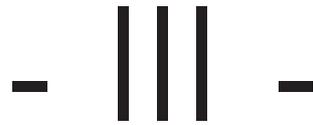
- Why is there a need for a dementia friendly design in 2040?
- What has a positive influence on a person with dementia?
- Which people are involved when it comes to a disease like dementia?
- Dementia is a process, can you divided dementia in stages and what are the characteristics of each stage?
- What is the GFA and outdoor space size for a co-housing schemes inhabited by people with dementia?
- What size are the individual rooms per person in co-housing schemes?
- How big are the shared spaces in co-housing schemes?
- How much space is used for hallways and corridors in co-housing schemes?
- What types of buildings are there for elderly and which can be used for people with dementia?
- What are typical architectural elements that people with dementia benefit from?

Site:

- What is the historic development of the site and how is this still visible today?
- What is the historic development of the building and how is this still visible today?
- How are the facades changed through time and what is still original?
- What type of construction has the building and can this be used to put extra levels on the building?
- What are the qualities of the surrounding area?
- How can the existing building fit a co-housing scheme?
- How will the existing building work with the added on volume?
- How can the added volume fit a co-housing scheme?
- What existing functions are in the neighborhood of the site that the urban design can benefit from?
- What is the vision of the municipality towards 2040 for the neighborhood; Fredrik Hendrikbuurt?



3.1 Population pyramide 2017 - 2040



Healthcare

"General principles"

General explanation about the changes and trends within the existing healthcare system.



Healthcare

3.1 Facts healthcare system

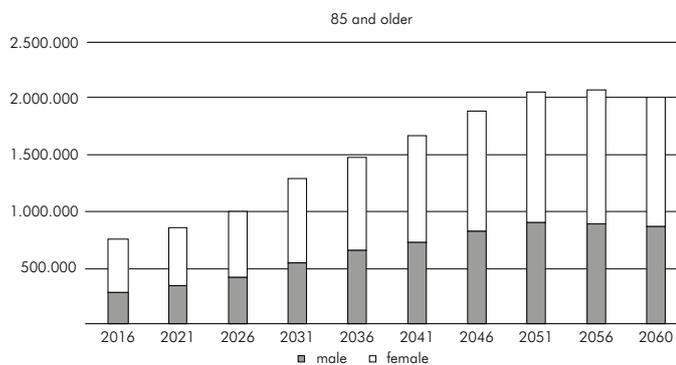
The healthcare system of the Netherlands is changing. This change is a result of a couple aspects. The most important aspects are the rising costs, staying longer at home and the amount of elderly (picture 3.1).

The rising cost will put pressure on the amount of care a person can get but also on the quality of the care. There will be less time available for the personal connection with the patient.

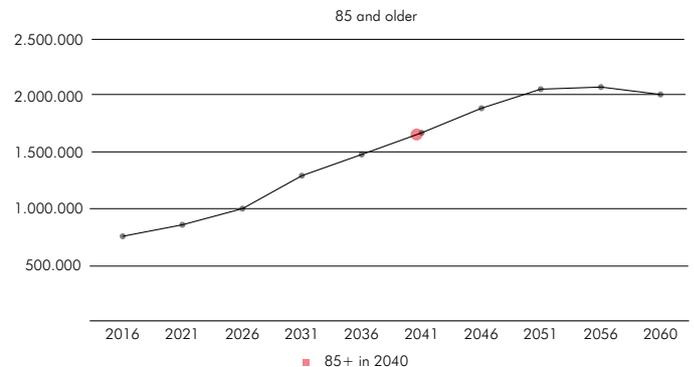
Staying longer at home will result in empty spots in retirement homes, adapting the existing home to make it life proof and it will make the flow of people less, resulting in shortage for other target groups.

But for the ones not able to stay at home it causes problems as well. People who have lived their whole life's together can get separated because of the regulations. One partner will need the care of the nursing home while the other is healthy enough to go without care but not able to take care of the partner without support. Several news articles show how the regulations mean that elderly living together get separated by the rules.^{2,3} There are also regulations to prevent the separation only in practices there are not enough rooms available for couples or the right care can't be provided.⁴

The elderly population will be rising cause of the baby boom (vergrijzing). Because the general healthcare is better than the past, the average age of people also rises. This will have the result that there will be a big increase of elderly above 85 years old (picture 3.2 – 3.3). Meaning a larger group that needs care.⁵



3.2 Elderly 85+ 2016 - 2040



3.3 Approximately 1.680.000 elderly 85+ in 2040

2. Sharifi, M. N., (2014).

3. Verwaaijen, M., (2018).

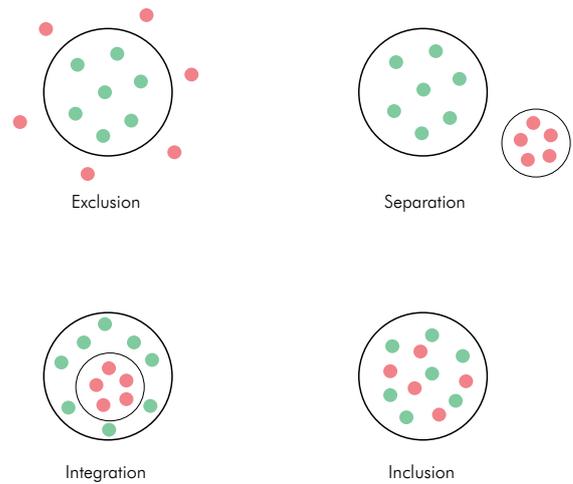
4. Willemse, H. (2014).

5. <https://www.kcwz.nl/thema/cijfers-en-trends/introductie>.

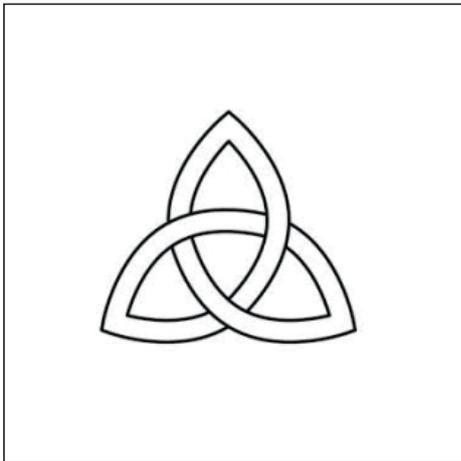


3.2 Changes and trends

There is also a change needed in how the society interacts with elderly and how housing is created. In the past the city wasn't for the elderly and there were solutions outside the city where the elderly could enjoy the piece and quiet in the form of the models exclusion and separation. Elderly don't want to be outside society but be a part of it within the city. This can be created by the models integration and inclusion. Integration would be a step in between where the end result will be inclusion, where the city, included with the elderly and their disability are created into the "inclusive city" (picture 3.4). At this point there are four trends in the health care to get in the future an inclusive city which are: combining care functions, redevelop with attention for environment, new collaboration & financing and energy friendly & sustainability (picture 3.5 to 3.8 inclusive).⁶



3.4 How elderly live in society



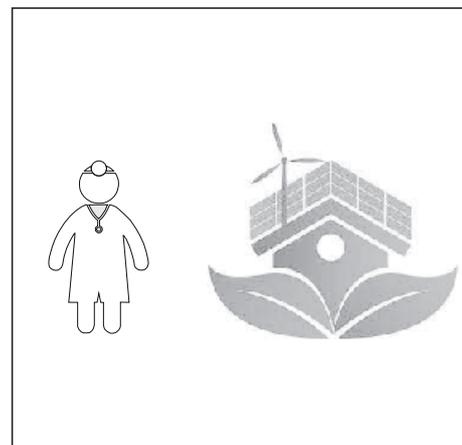
3.5 Combining care functions



3.6 Redevelop with attention for environment



3.7 New collaboration & financing

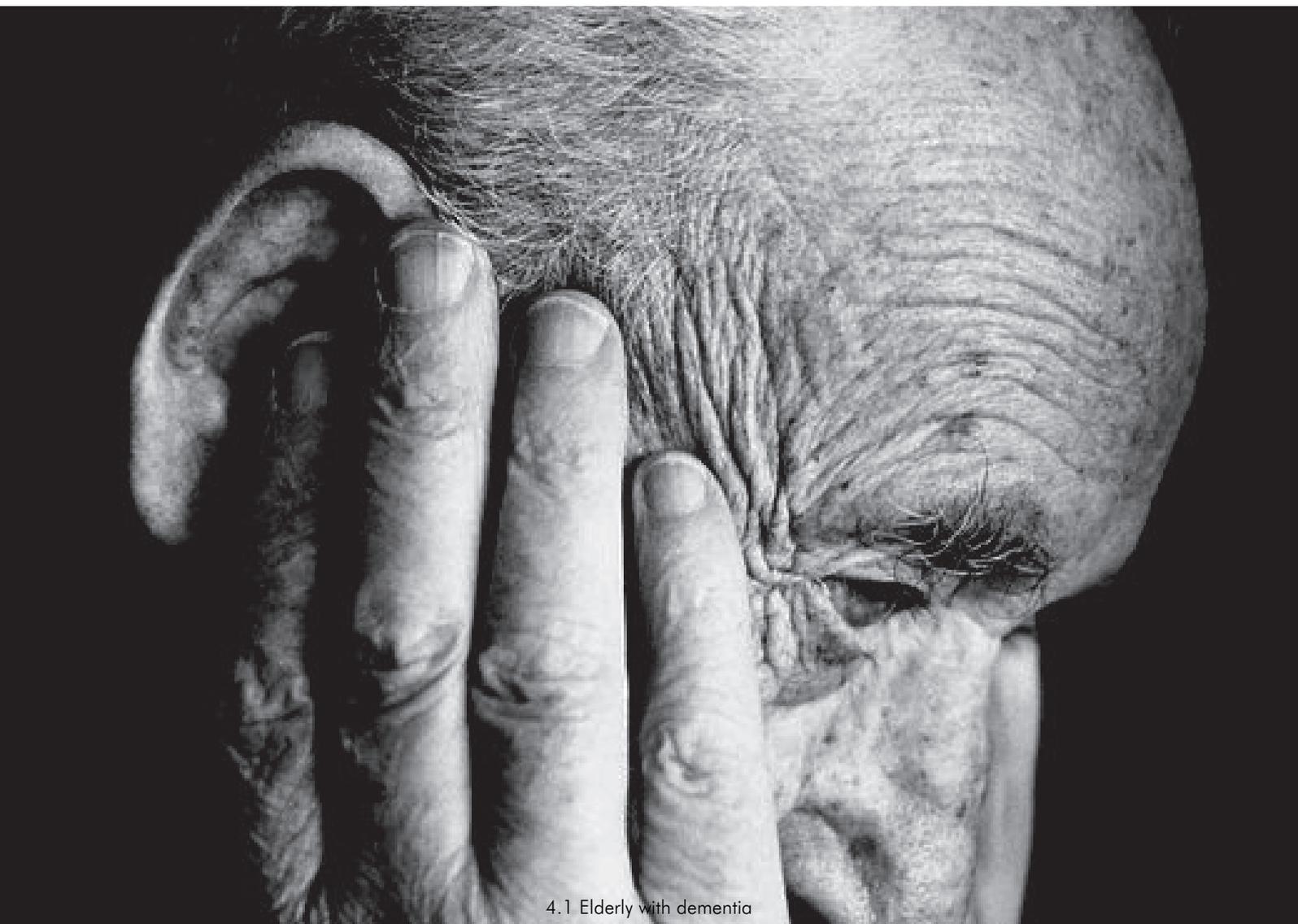


3.8 Energy friendly & sustainability

6. <https://www.kcwz.nl/doc/cijfers-en-trends/Impressie-Golden-years-in-the-city-juni-2017.pdf>.



- IV -



4.1 Elderly with dementia



- IV -

Dementia

"Raising an important issue"

The main topic of the research. This chapter describes the facts of dementia and its relevance towards the year 2040.

This chapter gives an answer to the sub question:

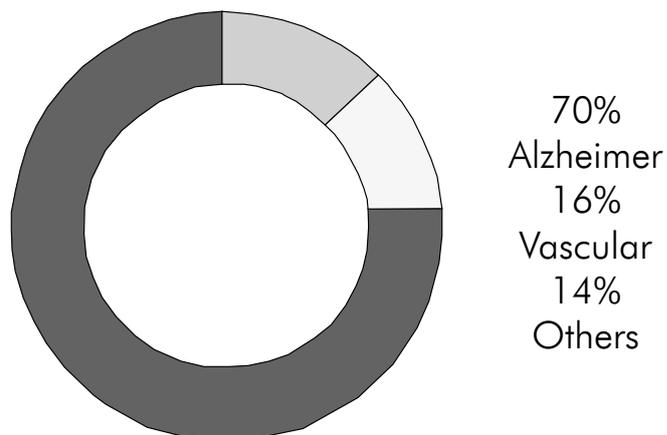
Why is there a need for a dementia friendly design in 2040?



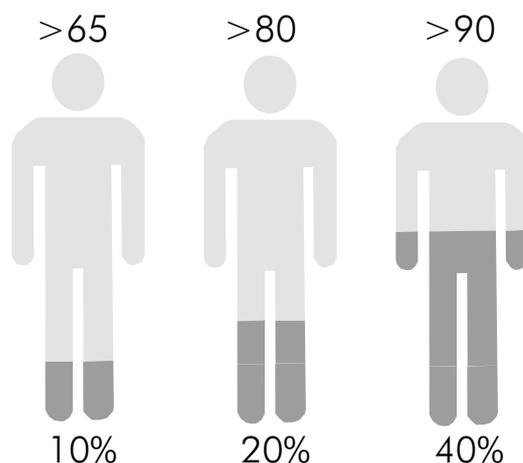
Dementia

4.1 Facts dementia

Dementia is the general term for the disease but can be split-up in different types (picture 4.2). The most common disease is Alzheimer's. The older a person gets the bigger the chance is this person gets Alzheimer disease (picture 4.3). Woman have a higher chance compared to men to get Alzheimer disease (picture 4.4).⁷



4.2 Most common type dementia



4.3 Chance of dementia age ratio



4.4 Men - Woman ratio

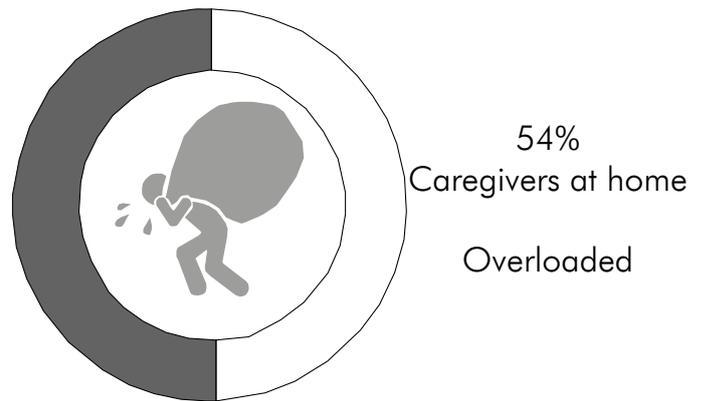
7. <https://www.alzheimer-nederland.nl/dementie/feiten-cijfers>.

Dementia



4.1 Facts dementia

People suffering from dementia get professional care or are cared for by a loved one, the spouse or family. The loved ones are most of the time the husband or wife taking care of their partner in their existing house. The caregiving is done on average 20 hours per week besides a job and or the household. Because of this pressure 54% of the caregivers feel the workload is too much or is getting to much (picture 4.5). Because people get dementia (mostly) on an elderly age the spouse is also older therefore on average the caregiver is 65 years old and female (picture 4.6 - 4.7).⁸



4.5 Caregivers overloaded

65

4.6 Average age caregiver



4.7 Gender caregiver

8. <https://www.alzheimer-nederland.nl/dementie/feiten-cijfers>.



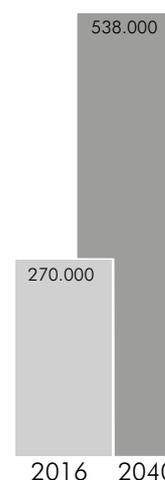
Dementia

4.1 Facts dementia

The professional caregiver is part of our social system. In 2016 the cost for professional care on dementia were 5% of the total care cost (picture 4.10). The yearly raise in cost as it states in 2017 is 2,9% (picture 4.9). If we would calculated the 2,9% annually raise from 2016 towards 2040 the cost would be doubled towards 10% of the total budget for care cost. This is if we keep the same amount of people with dementia and the same amount of care. But this is not realistic. ^{9 10}

The amount of people suffering from dementia will almost double towards the year 2040 making it 538.000 people with dementia in the Netherlands (picture 4.8). Because of the raise in people with dementia the care cost will raise as well. Not only by the amount of people having dementia but also by the workload on the caregivers. The pressure on loved ones is too much (picture 4.5) and also the professionals deal with a lot of pressure, which leave to arguing if the existing amount of money spend is enough to provide the quality needed let alone with the rise in pressure and patients. If we just look at recent newspaper articles from the NRC Handelsblad in 2015 and 2017 it shows that the amount of care provided in general to elderly is already lacking. The title say: "Meeste personeel ouderenzorg kampt met stress en schuldgevoel" (2017) (Most professional caregiver to elderly have stress and guilt) and "Ouderen krijgen thuis onvoldoende zorg" (2015) (Elderly get insufficient amount of care at home). ^{11 12}

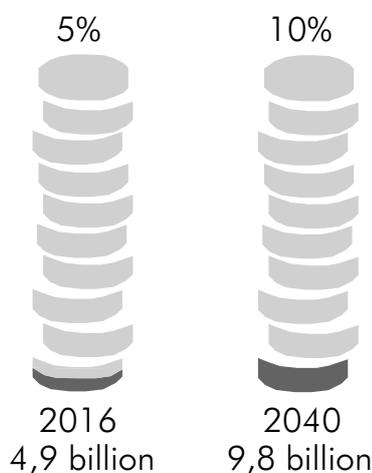
With all the arguments above you can doubt the existing system and maybe there should be more design solutions available.



4.8 Amount of people with dementia



4.9 Annually raise in care cost



4.10 Care cost comparison

9. Snel, H. (2014).
10. <https://www.alzheimer-nederland.nl/dementie/feiten-cijfers>.
11. Veen van der, C. (2015).
12. Pijker, J. (2017).



4.2 Characteristics dementia

Dementia is a disease that deteriorates the brain. You can divide the brain in four levels which all have a different function and complexity. At level 1 are the less complex basic reactions of a person and at four the complicated ones. With level four you use all parts of the brain therefore someone with dementia will lose these functions first. Eventually people with dementia will mostly react from the level 1 and 2 functions (pictures 4.11 – 4.12).¹³

The functions and their emotions are described below:

Level 1 Sensory perception: is what we can see, hear, smell, feel and taste;

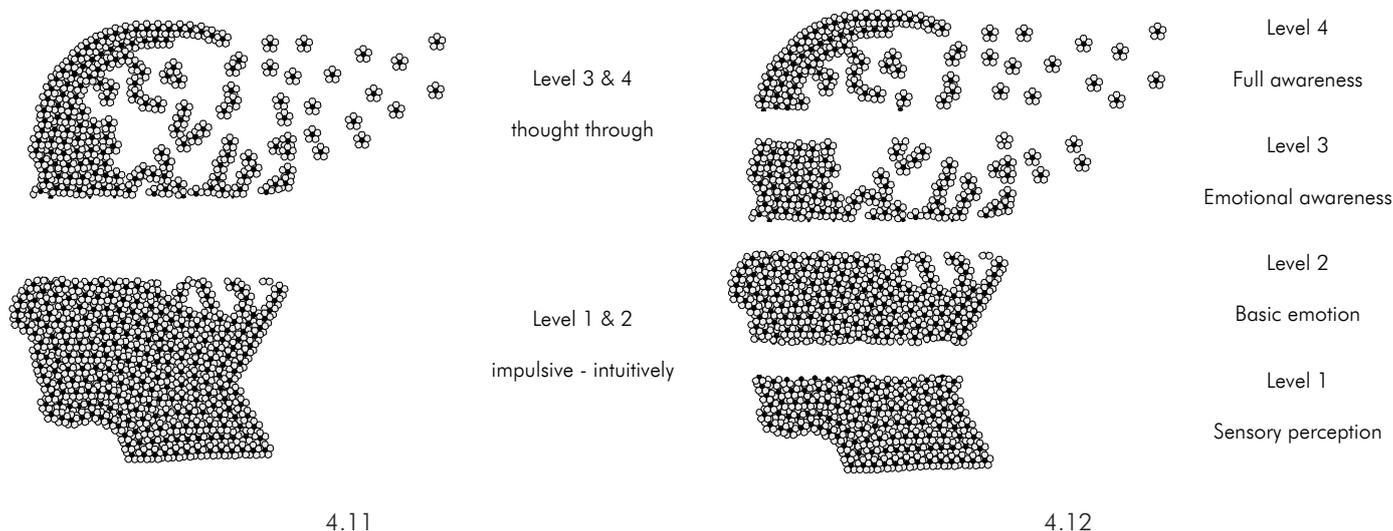
Level 2 Basic emotion: such as anger, anxious, happy and sad;

Level 3 Emotional awareness: we recognize the emotion and control it. We can show or hide our emotion;

Level 4 Full awareness: take responsibility, make choices, adjust to other emotions and knowledge time and date.

People with dementia have deteriorated brain functions which can be recognized by ten symptoms which are:

1. Forgetfulness: Someone will forget new information and important dates such as birthdays.
2. Unable to do tasks: Simple tasks get harder such as banking, structuring finances or hobby's.¹⁴



JANUARI 2011		week 2
ma	?? Birthday ??	7
di		8
wo	?? Birthday ??	9
do		10
vr	?? Birthday ??	11
za	?? Birthday ??	12
zo	?? Birthday ??	13

4.13 Forgetfulness



4.14 Unable to do tasks

13. Plaats van der, A., Verbrak, B. (n.d.) <http://www.vilans.nl/>.

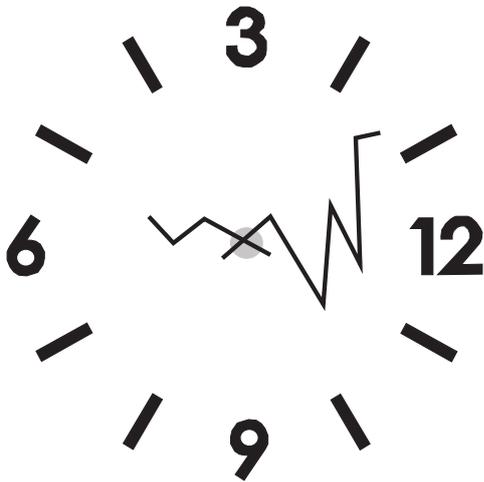
14. <https://www.alzheimer-nederland.nl/dementie/herkennen-symptomen/>.



Dementia

4.2 Characteristics dementia

- 3. Trouble with time & place: The person with dementia forgets the time frequently and doesn't recognize the places where he/she is.
- 4. Language problems: Following an conversation becomes harder with dementia. Also people will lose the memory of names and words and talk less fluently or repeat parts of their sentences.
- 5. Misplacing – losing possessions: Possessions get placed at strange places such as items that get stored in the fridge that don't belong there.
- 6. Reduced judgement: It's harder to judge a situation when having dementia. Someone can buy items not really needed because they look like a bargain. ¹⁵



4.15 Trouble with time & place

Landuade broPl...

4.16 Language problems



4.17 Misplacing - losing possessions



4.18 Reduced judgement

15. <https://www.alzheimer-nederland.nl/dementie/herkennen-symptomen/>.

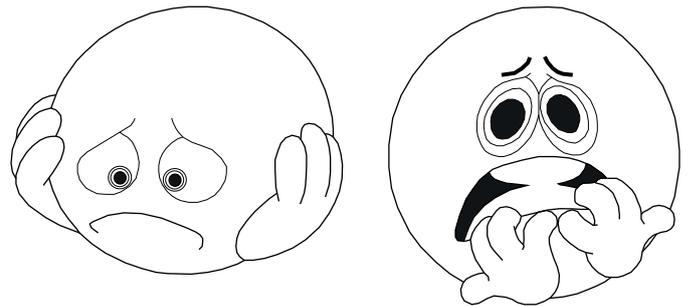


4.2 Characteristics dementia

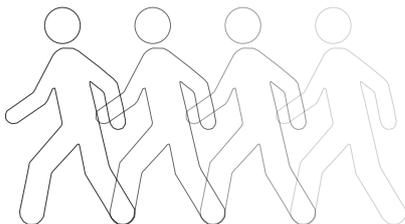
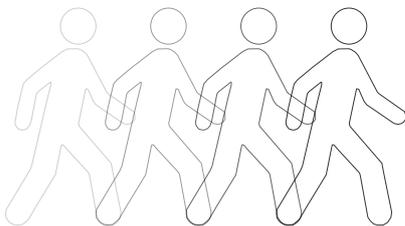
- 7. Withdraw from social activities: Hobby's and sports become harder and because of that people will withdraw from their activities or go out less than usual.
- 8. Anxious – depressed: It's possible that someone with dementia will show different behavior such as anxiety and depression. The person who has dementia realizes that he/she is changing resulting in these behavioral changes.
- 9. Restless: People can become restless and will walk impatiently and have trouble sleeping.
- 10. Visual problems: This results in several issues such as trouble with reading, distances, color and contrast. ¹⁶

JANUARI 2011		week 2
ma		7
di	— Bridge —	8
wo	— Lunch —	9
do		10
vr	— Bingo —	11
za	— Soccer match —	12
zo	— Dinner + Drinks —	13

4.19 Withdraw from social activities



4.20 Anxious - Depressed



4.21 Restless

Trouble Reading

Estimate distance

Recognize contrast

Recognize color

4.22 Visual Problems

¹⁶. <https://www.alzheimer-nederland.nl/dementie/herkennen-symptomen/>.



- V -



5.1 Documentary Alive inside "Henry feeling music"

"IT GIVES
THE ME
FEELING OF
LOVE
ROMANCE!"



Positive influences

“Reminiscence therapy & music”

There are aspects which have a positive influence during the illness such as reminiscence therapy, life circles and music. A short description about these subjects is giving, which can be used in the design process.

This chapter gives an answer to the sub question:

What has a positive influence on a person with dementia?



Positive influences

5.1 Reminiscence therapy

Therapy is used to make someone perform better in daily life and eventually cure from the disease. With dementia a cure is not possible but there are several therapeutic treatments that have been proven to let the person with dementia participate better in daily activities. Two are described in this chapter.

Reminiscence therapy:

The therapy is about the past and the memories the person with dementia has. The therapy can be done in several ways such as with a photo albums, conversations (if possible), music and memorabilia (furniture). The best memories are from the ages 10 – 30 and in between. The late teens and twenties seem to be the most prominent in the memory making. This period is called the reminiscence bump. The person will enjoy such conversation because it will recall positive memories which result in boosting self-esteem, less signs of depression and stimulating long-term and improving short-term memory. ¹⁷

It is not only the person with dementia who benefits from the therapy. Professional caregivers will gain knowledge about their personal life and spouses and family see their loved one happy making them feel better as well.

Not only the therapy benefits in people's happiness even larger elements such as buildings and the environment can provide. English research from Historic Heritage showed that 80% find heritage in their living area an improvement of the environment and 93% says that their local heritage has a positive impact on their life. ¹⁸

History and memories can't only be important for the person with dementia but also for the loved ones, professional caregivers and even the connection with the neighborhood.



5.2 Memories from the past

17. <https://www.unforgettable.org/blog/what-is-reminiscence-therapy/>.

18. <https://historicengland.org.uk/research/heritage-counts/2016-heritage-and-place-branding/heritage-and-society/>.

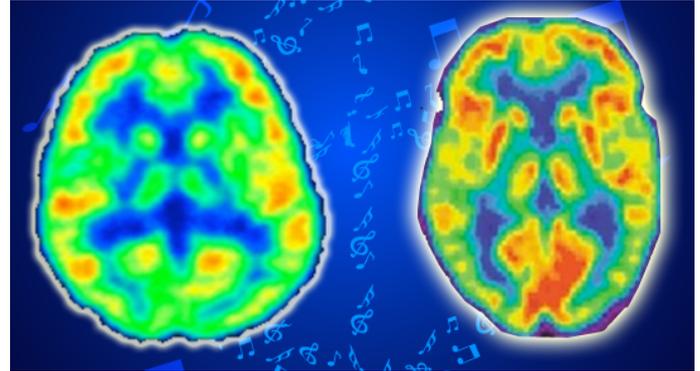
Positive influences



5.2 Music

Music therapy:

Music has the ability to stimulate the brain functions. When listening to music the brain gets activated (picture 5.3). It depends per person, the music and the combination of the two what the effect is. Some music will stimulate the left side of the brain, others the right. Depending at how a person is it can relax, increase creativity or help maintain focus while learning. For example classical (calm, gentle) music has been proven to calm the blood pressure. Music therapy also helps people with Parkinson's to improve movement speed and coordination while people with Alzheimer's benefit by remembering.¹⁹



5.3 Brain activity (at rest - music)

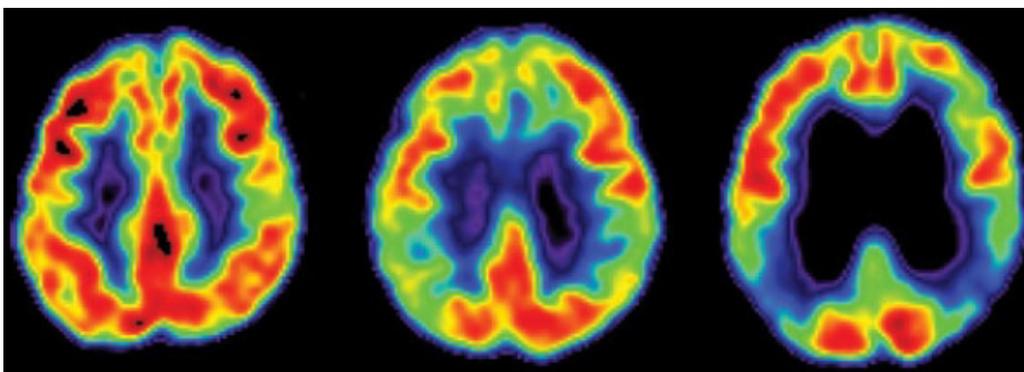
Research has shown five reasons why music therapy helps to stimulate the brain. It all has to do with keeping the people with dementia longer in contact with the world (caregiver / loved one). The five reasons are:

1. Music evokes emotions that bring memories;
2. Musical aptitude and appreciation are two of the last remaining abilities in dementia patients.;
3. Music can bring emotional and physical closeness;
4. Singing is engaging;
5. Music can shift mood, manage stress and stimulate positive interactions.²⁰

While the music therapy helps the person with dementia it also helps the people around them. For a professional caregiver it can be the way to keep a personal bond with the person who has dementia. For a loved one it can remind them of all the good memories they had. An example has given in the research of Mariko Hara who visited a community based organization called Singing for the Brain (SFTB) who helped couples at home with singing therapy. One observer wrote down:

"... Hannah and Simon responded directly to the singing of the tune (I'll be your sweetheart) by looking at each other, and Hannah was moved to tears. As Rosie notes, their life as a couple had changed due to the onset of Simon's Alzheimer's disease. It seems as if singing this familiar tune may have created an enjoyable moment that reminded them of their previous life and reconnected their relationship as a couple once again. ..."²¹

Music can be an important factor for the people with dementia and the people close to them.



5.4 Brain activity (normal - mild cognitive impairment - Alzheimer)

19. <https://drjockers.com/3-ways-music-improves-brain-function/>.

20. <https://www.alzheimers.net/2014-07-21/why-music-boosts-brain-activity-in-dementia-patients/>.

21. Hara, M. (2011). p. 50



- VI -



6.1 Elderly watching youth



- VI -

Target groups

“Stages of dementia, caregivers & the surrounding”

With dementia it is not only the person who has the disease that is affected by it. During this process several people come in contact with the disease such as the family or spouse (maybe as caregiver), professional caregivers and the people living in the neighborhood. All these people are influenced (small or big) and can benefit differently from the design.

This chapter gives an answer to the sub questions:

Which people are involved when it comes to a disease like dementia?

Dementia is a process, can you divided dementia in stages and what are the characteristics of each stage?

What is the walkability of an elderly person from the site Gillis van Ledenberchstraat – Zaagmolenstraat?



Target groups

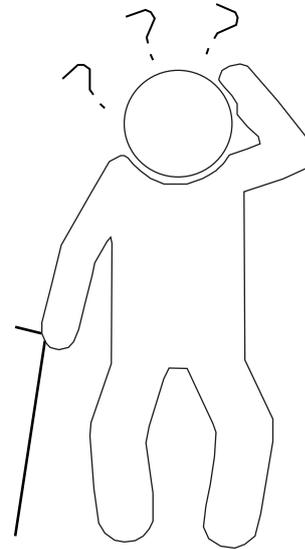


6.1 People involved

There are several people involved when designing a dwelling for people with dementia. The main target group is the person having dementia. This will result in design solution for the building but also the environment in order to make the building be part of the city. Besides the person with dementia there are three different target groups which are the loved ones, professional caregiver and the neighborhood.

Person with dementia:

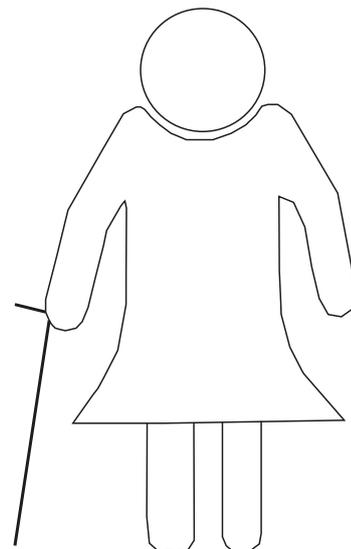
This is the main target group which to design for. The design needs to provide a home for the person with different stages of dementia. It not only needs to be a building but also an environment that can provide that. There needs to be the opportunity to participate in activities and the design needs to be a home with options for nursing not a nursing home that's "feels" like a home. If the design work well for people with dementia it will also work well for the other target groups within this design therefor making this the one with the most priority.



6.2 Person with dementia

Loved one:

Loved ones are the people that will visit the person with dementia but also people that provide care. The loved one that provides the care can be a family member or a good friend but is most of the times the spouse. Because of the need in change of our care system as explained in chapter III and IV, the design will provide a building where the spouse can live together with her / his loved one. This will provide a bigger system of care since people can share the care with each other and the professional. Beside the practical part they will also benefit socially since they life together with people with the same problem; a loved one suffering from dementia. It will also provide the necessary free time for a loved one to live their own life which is almost not possible since taking care of a person with dementia is 24/7.



6.3 Loved one (mostly spouse)

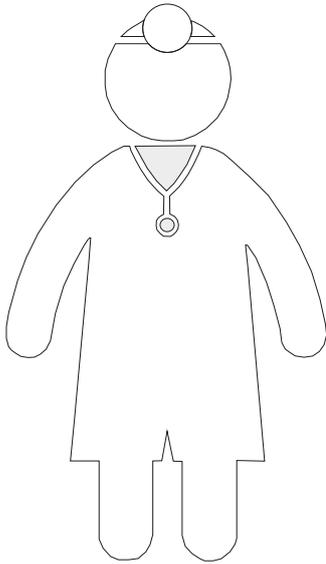


Target group

6.1 People involved

Professional caregiver:

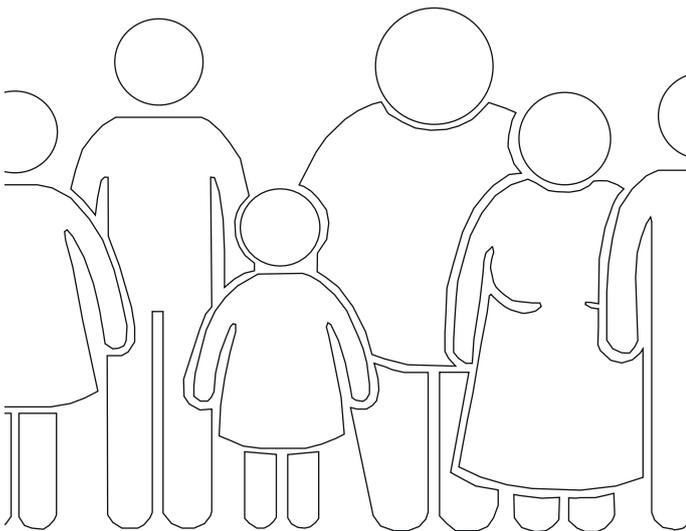
When dementia progresses there will be a need for a professional caregiver. This can be as support at home or when it's no longer possible for the loved one to provide the care, a nursing home. Within this design there is a combination made between the professional caregiver and the spouses. As will be explained in 6.2 Stages of dementia the existing amount of hours are not suitable enough, to provide enough quality and personal attention within the care system. By combining the care of spouses and professionals both will benefit in reduced stress but the professional will also have more time to provide personal care. For the design solution it has also benefits as described in chapter VII.



6.4 Professional caregiver

Neighborhood:

The design should create social interaction between the residents and neighborhood. Not only to prevent social exclusion with the elderly residents but also to inform the neighborhood about the resident and to make the design part of the environment. This can best be accomplished by integrating a function that provide a communal space.



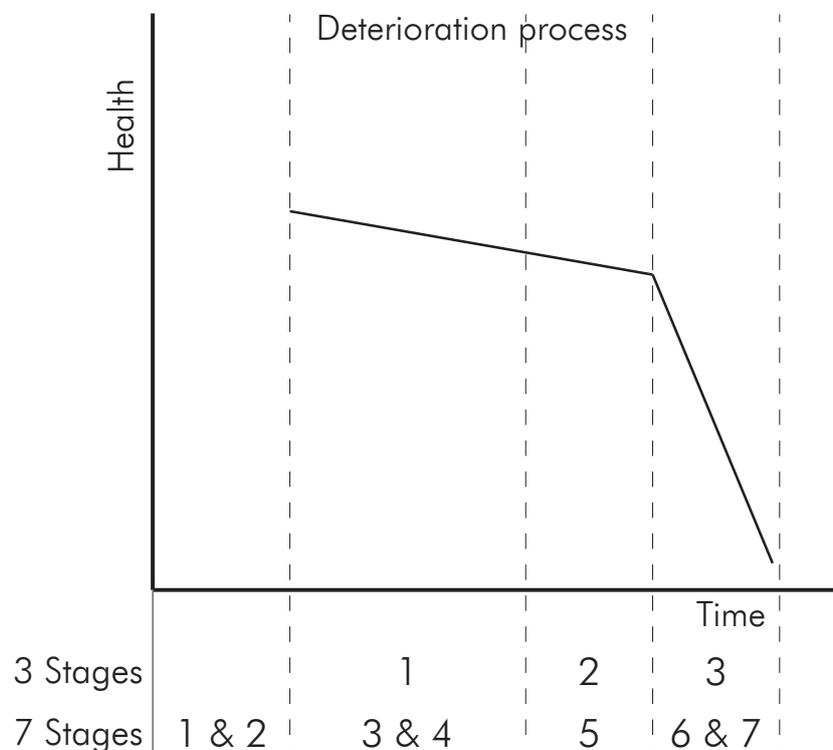
6.5 Neighborhood



6.2 Stages of dementia

Dementia has two models that describe the stages of dementia. One is divided in three stages and the other is divided in seven stages. The stages of the two models correspond differently which is shown in the picture 6.6. This picture also show the schematic deterioration progress of dementia. There is a fast decline in the last part of the illness (stage 3 or stage 6 & 7).

Every stage has different symptoms but the symptoms are rather similar in the two models described. The model of seven stages created by dr. Barry Reisberg from the academic medical center in New York is the most extended in describing Alzheimer disease. The seven stages and her symptoms are described at the next page.²²



6.6 Decay process with dementia

22. <https://www.alzheimers.net/stages-of-alzheimers-disease/>.



Target group

6.2 Stages of dementia

Stage 1: No Impairment

- Not detectable
- No memory problems

Stage 2: Very Mild Decline

- Unlikely to be detected
- Memory problems look old age
- Perform well on memory test

Stage 3: Mild Decline

- Friends and family notice memory and cognitive problems
- Physicians will be able to detect Alzheimer
- Patient difficulty in
 - o Planning organizing
 - o Remembering names of new acquaintances
 - o Finding the right words during conversation

Stage 4: Moderate Decline

- Poor short term memory
- Difficulty simple arithmetic
- Inability to manage finance and pay bills
- Forget details about life histories

Stage 5: Moderate Severe Decline

Patients begin to need help with many day to day activities

typically can still bath, toilet independently

know their family members, history childhood and youth

- Increased fear
- Social withdrawal
- Depression
- Significant confusion
- Difficulty dressing appropriately
- Inability to recall simple details about themselves such as their phone number

Stage 6: Severe Decline

Patients need constant supervision / require professional help

- Wandering
- Loss of bowel and bladder control
- Inability to remember most detail of personal history
- Major personality changes and potential behavior problems
- Confusion or unawareness of environment and surrounding
- Assistance daily living
- Inability to recognize faces except closest friends & relatives

Stage 7: Very Severe Decline

- Loose ability to respond
- Always need assistance
- Loose ability to swallow ^{23 24}

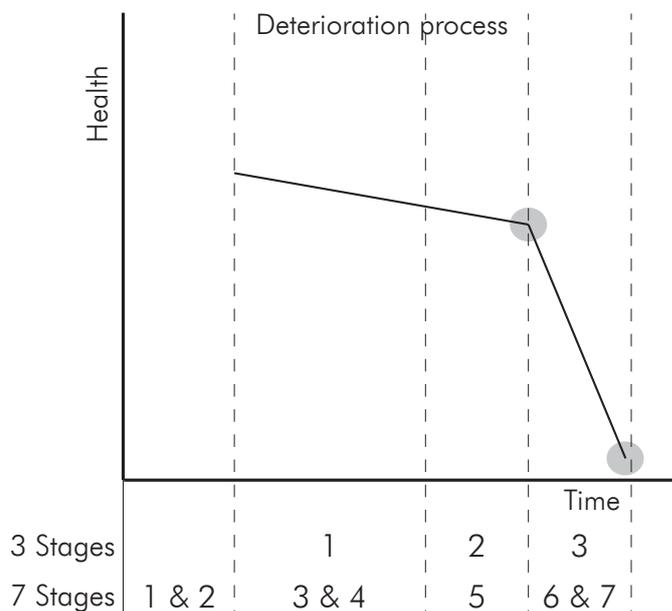
23. <https://www.alzheimers.net/stages-of-alzheimers-disease/>.

24. <https://www.alzheimer-nederland.nl/dementie/soorten-vormen/ziekte-van-alzheimer/fases>.

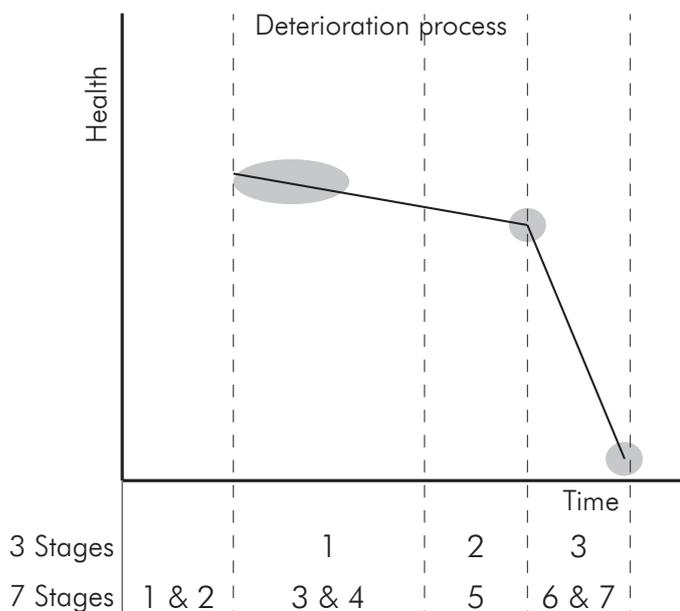


6.2 Stages of dementia

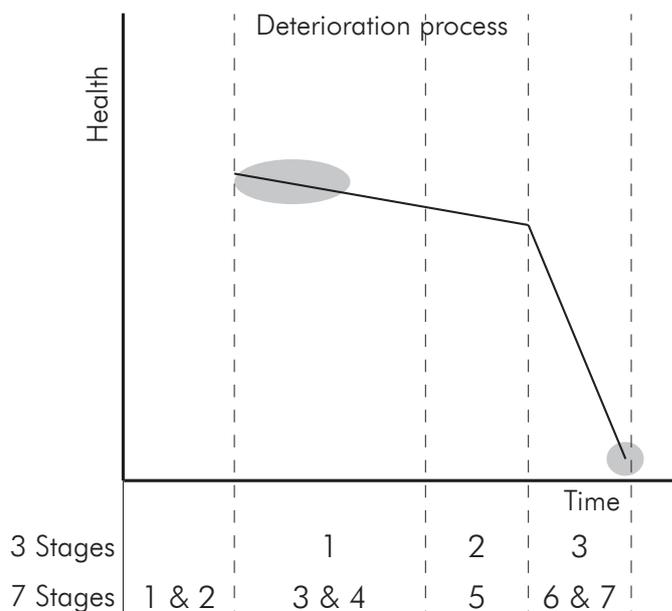
There are three types of moving schemes possible for someone with dementia. If the deterioration process is compared to the stages, it shows that the last part of the stage is the shortest and the disabilities a person with dementia feels have the biggest influence on the health. People stay longer at home which will result in the care of the spouse. Eventually this becomes too much or isn't save anymore for the person with dementia resulting in moving to a nursing home (picture 6.7). A type with also moving moments is the homogeneous type (picture 6.8). This model is similar as the stay at home model only people move to a nursing home the moment dementia is discovered which is not possible in the Netherlands due to regulation. Both option need moving which is not beneficial to the health of the person with dementia. A third model (picture 6.9) would be the heterogeneous model where people move in the moment dementia is discovered and live till they pass away. This reduces the moment of movement and provide the opportunity to create a safe environment from the start (At home, a dwelling needs to be made life-proof).



6.7 Stayed at home care



6.8 Homogeneous care



6.9 Heterogeneous care

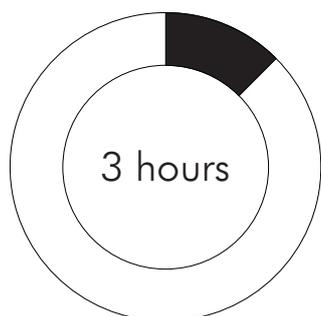


Target group

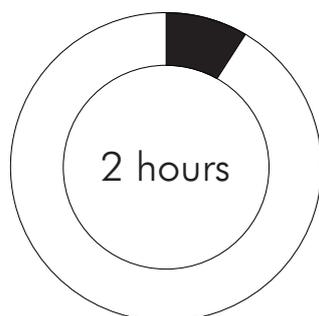
6.2 Stages of dementia

There are three types of care possible at this moment. One is by a loved one which at average provide for 20 hours per week the care of someone with dementia.²⁵ This would translate in approximately 3 hours per day (6.10). The other types are professional care with a difference in the amount of hours a person gets (picture 6.11 – 6.12). This is called “zorgzwaartepakket”.²⁶ If you would combine the amount of care from someone that stays at home with or without professional support it shows that the amount of hours is not enough (picture 6.13 – 6.14). At average elderly sleep 4 to 6 hours so calculating the care with a perfect 6 hours of sleep would still provide 13 – 15 hours unattended while a person with dementia need 24 hours of supervision. In a nursing home this is done by making groups resulting in a 24 hour supervision. Both situation have a flaws. At home there is not enough supervision resulting more stress for the loved one and dangerous situations for the person with dementia while in a nursing home fully supervised there is not enough personal care and people have to be in the same room or restrains are needed (closing doors) to provide the supervision which results in negative reactions of the person with dementia. The design will combine the groups of people with dementia with spouses and professional caregivers so it can raise the overall quality.

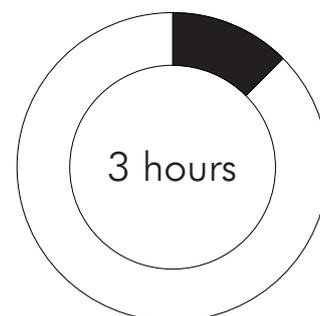
That the current situation doesn't provide enough individual care is stated by several researches from the Cultureel Plan Bureau (SCP) and EenVandaag. The research shows that 40% of the people in nursing homes think the amount of time of staff isn't sufficient to be personal or to undertake activities such as going outside while 75% of the people is depended from staff to undertake activities. Also the staff thinks there time isn't sufficient enough. 51% don't think they have enough time to provide the care they need and even 61% thinks they don't have time to provide personal care.²⁷ These numbers show that the existing care system is lacking.



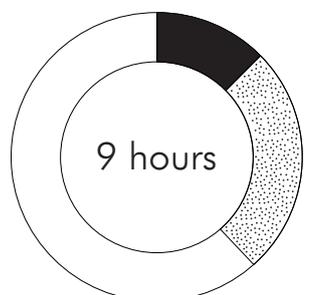
Care per person
6.10 Loved one care



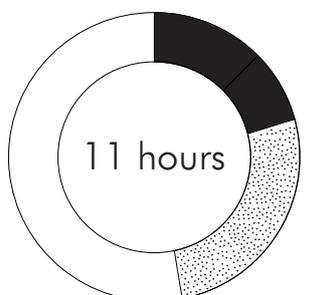
Care per person
6.11 ZZP 4 care



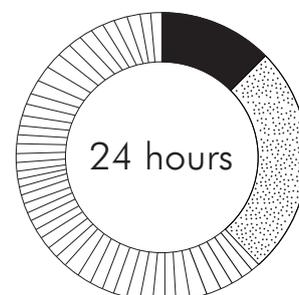
Care per person
6.12 ZZP 5 care



Care per person Supervision Sleeping
6.13 Supervision / care (1)



Care per person Supervision Sleeping
6.14 Supervision / care (2)



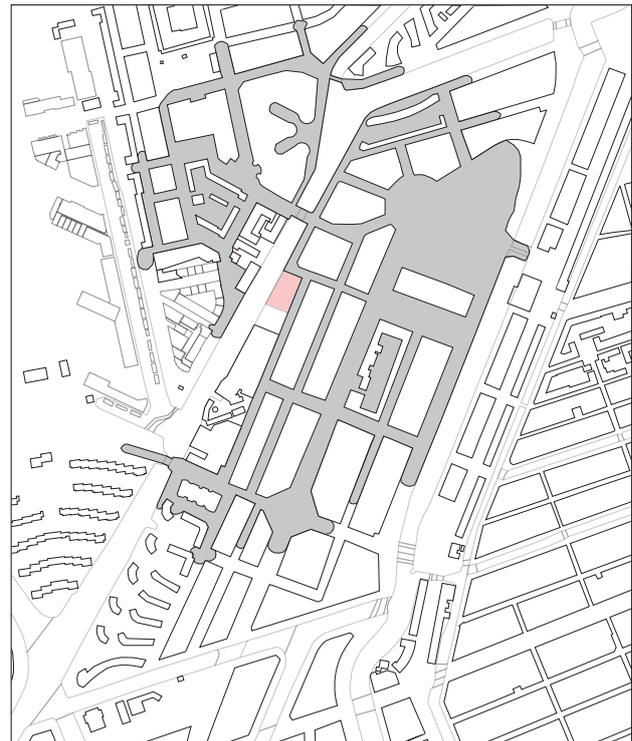
Care per person Supervision Sleeping
6.15 Supervision / care (3)

25. <https://www.alzheimer-nederland.nl/dementie/feiten-cijfers>.
26. <https://www.informatielangdurigezorg.nl/volwassenen/zzp-zorgprofiel>.
27. <https://www.ouderenfonds.nl/onze-organisatie/feiten-en-cijfers/>



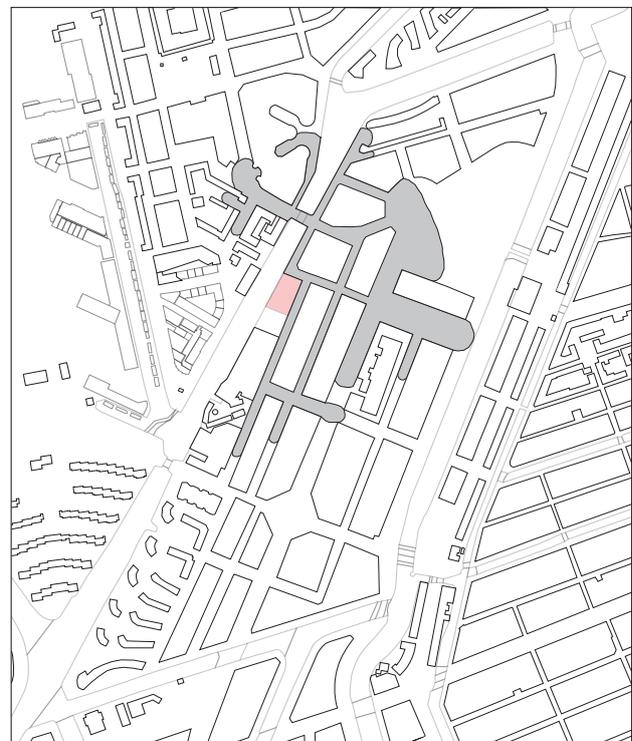
6.3 Walkability

Not only the personal contact of the professional caregiver is important for the social interaction, but also the contact with the neighborhood. It is therefore important that the environment is dementia friendly. The elements needed for a dementia friendly design will be discussed in chapter VII. Beside the people with dementia the environment is also important for the “healthy” spouse. It is their way for social interaction as well with or without their spouse with dementia. To determine what is needed within the design it is not only important to determine the functions in the neighborhood (chapter XI), but also the walkability of elderly. There are two important distances which are 300 and 500 meters.^{28 29} The 300 meters is with a walker and the 500 without. This determines what at average an elderly is willing or capable of walking to do for instance groceries. Some of the important functions that an elderly with or without dementia visit are supermarket, postal office, park or they walk without a reason.³⁰



6.16 Walkability elderly 500 m.

Beside this radius it is also important that an elderly can rest in between and that there dementia friendly elements.



6.17 Walkability elderly with walker 300 m.

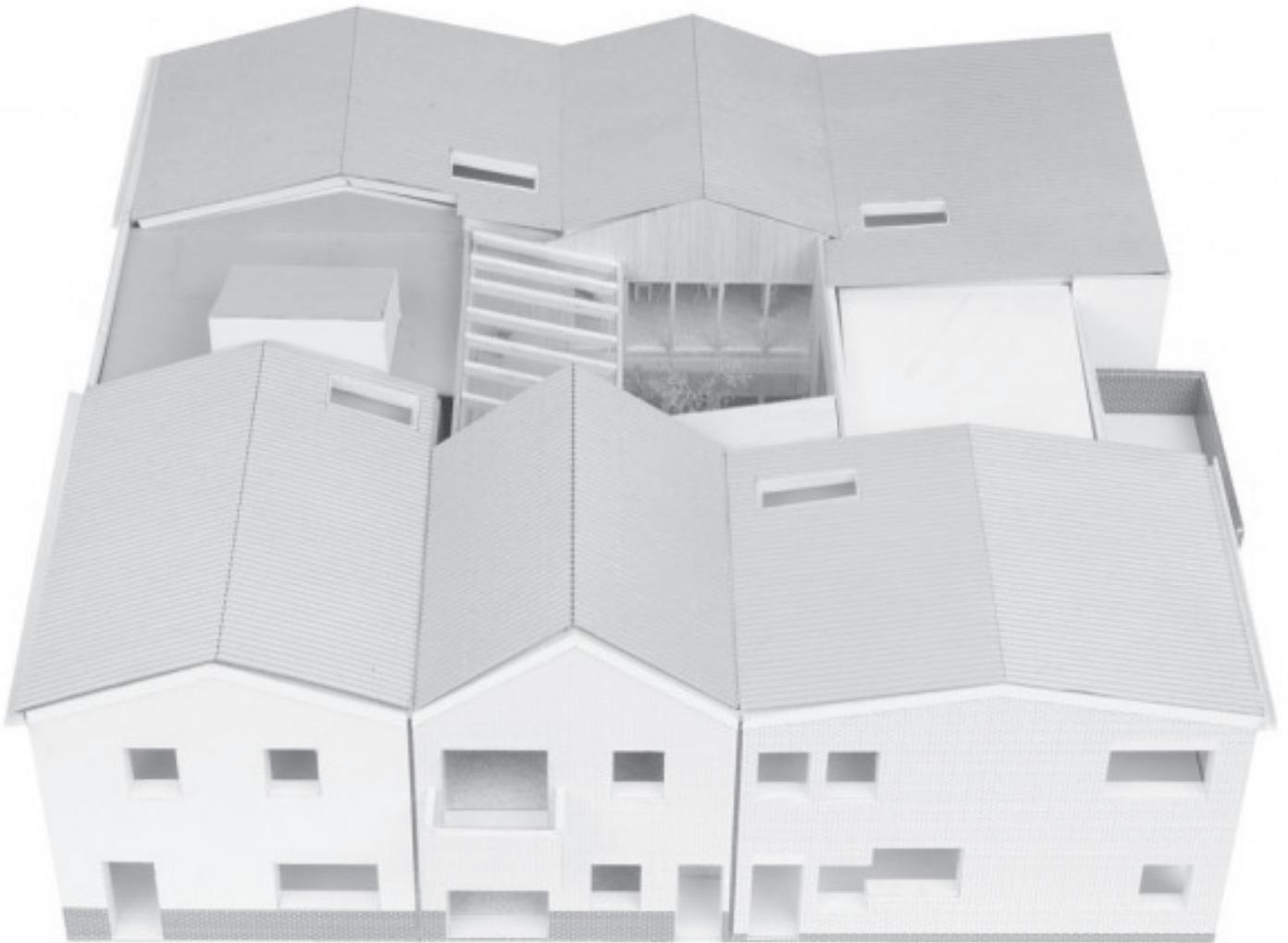
28. <https://www.eiffel.nl/over/artikelen/2017/rollatorcirkels-en-de-omgevingswet/>.

29. <https://www.allesoversport.nl/artikel/bewegen-in-de-openbare-ruimte-met-deze-sociale-maatregelen-gaan-ouderen-er-op-uit/>.

30. Burton, E., Mitchell, L. (2006). p. 33-47



- VII -



Menos Genk by Osar Architects



- VII -

Case studies

“Typologies dwelling elderly, global comparison, dementia friendly design & co-housing schemes”

There are fourteen different types of elderly housing schemes described and this chapter explains which ones could be suitable for a design made for people with dementia. The studies focus on several aspects of the co-housing schemes. Starting with a comparison on an international level between the Netherlands, United Kingdom, Australia and the United States. This result into some main conclusions on a bigger scale which will be followed by several case studies on individual projects. These projects will be analyzed in depth on size and configuration of the floor plans. Also main architectural elements needed for a well working dementia scheme are explained.

This chapter gives an answer to the sub question:

What is the GFA and outdoor space size for a co-housing schemes inhabited by people with dementia?

What size are the individual rooms per person in co-housing schemes?

How big are the shared spaces in co-housing schemes?

How much space is used for corridors in co-housing schemes?

What types of buildings are there for elderly and which can be used for people with dementia?

What are typical architectural elements that people with dementia benefit from?



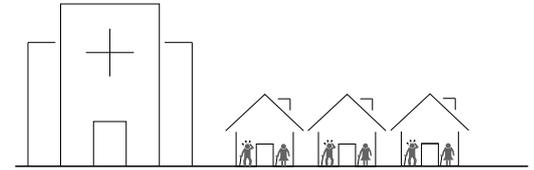
Case studies

7.1 Typologies elderly housing

In the Netherlands there is a center of knowledge on living and care called Aedes-Actiz. This center describe fourteen types of living where there is a combination of care and living. The types variate between the amount of care and housing scheme such as attached living and cohousing. Comparing all the types will result in some scheme that are suitable for people with dementia. ³¹

1. Individual supported home (aanleunwoning):

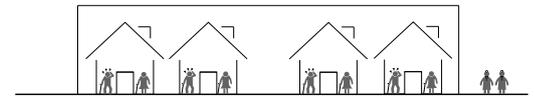
People live in their individual home next or attached to the care center. They can use the facilities of the care center but live individually.



7.2 Individual supported home

2. Care complex:

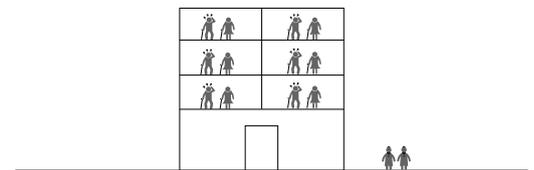
A complex with individually living which provide a safe and sheltered environment with a communal area and care system.



7.3 Care complex

3. Service flat:

A flat with mostly owner-occupied apartments that can use the services offered such as a communal space, food service, guest room and a handy man.



7.4 Service flat

4. Life-proof home:

This is an individual dwelling that is made "life-proof" which means that the dwelling already provides with future shortcomings of becoming older.



7.5 Life-proof home

5. Attached housing (kangoeroe woning):

It are two individual dwellings with are connected by a internal passage. The caregiver and care taker live individually.



7.6 Attached housing

6. Informal care home (mantelzorger woning):

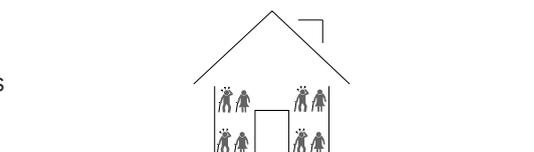
It's a moveable temporary home that's gets placed (in the backyard) of the care taker. In this way the relative who needs care is nearby.



7.7 Informal care home

7. Co-housing same age:

People live together without a family bond. They have individual homes with the communal space for living and kitchen. They do activities together.

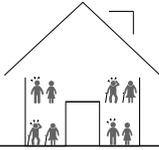


7.8 Co-housing same age

31. <https://www.kcwz.nl/thema/woonvariaties/woonvormen>.



7.1 Typologies elderly housing



7.9 Co-housing different age

8. Co-housing different age:

Same as the previous one but here the residents have a different age such as students.



7.10 Small co-housing (thuishuis)

9. Small co-housing (thuishuis):

It's a small co-housing scheme where single elderly live together with the help of volunteers.



7.11 Small co-housing scheme

10. Small co-housing scheme:

Same as the previous one only with the need of an intensive care system.



7.12 Courtyard (hofje)

11. Courtyard (hofje):

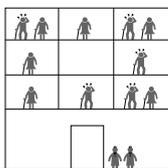
These are individual dwelling surrounding an inside outdoor space where all the entrances meet. Most of these courtyard are for single woman (different ages) but it can also be single men.



7.13 Private ownership option

12. Private ownership option:

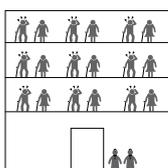
This is a group of people that buy a house together and live for example as a group in a life-proof home. It can be all different kind of solutions.



7.14 Individual with communal area

13. Individual with communal area (gestippelde woning):

These are individual dwelling where there is a possibility to do communal activities. Also people are a "goede buur" which means that they help each other with small activities.



7.15 Clustered complex

14. Clustered complex (harmonica woning):

People of a dwelling facility live clustered within the building. ³²

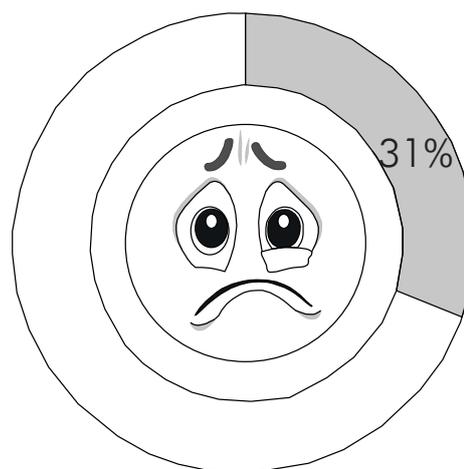
32. <https://www.kcwz.nl/thema/woonvariaties/woonvormen>.



Case studies

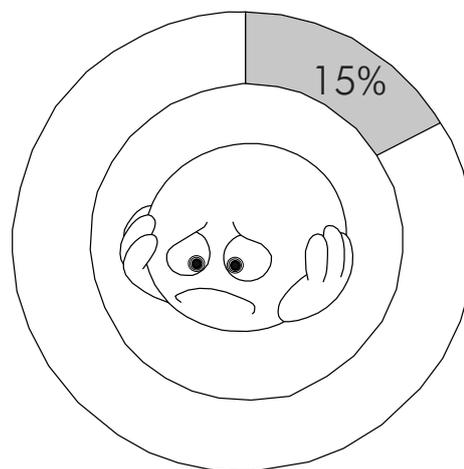
7.1 Typologies elderly housing

Within these fourteen types there are a couple innovative solutions. As described in chapter III & IV about the general health care system is that it becomes too expensive and the workload for the (professional) caregivers becomes too much. Beside the stress on the financial and work side there is also the problem of loneliness with elderly. Because elderly get older and have to stay at home longer there is an increase of loneliness. As of 2017 there are 2.9 million people above 65 of which 0.9 million feel lonely which is 31% (picture 7.16). Within the category of above 85 elderly are 15% depressed (picture 7.17). A research done by Professor Cacioppo of the Chicago University stated in The Journal of Psychology in 2012 that lonely elderly have a higher change of dying (14%) because of depression, higher blood pressure and increased stress levels (picture 7.18).³³



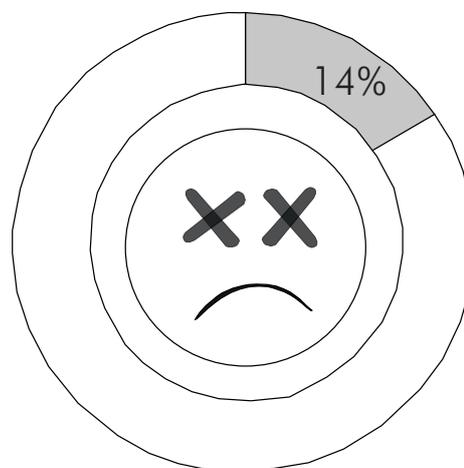
7.16 Age 65+ feeling loneliness

Several researches also show that social contact and group activities are important for people with dementia. Jane Williams and John Rees made a method called "Dementia Mind Mapping" which they use to find out about what the patient thought are of the care received. The study shows that social interaction is important and that more time with the patient is needed not only by the nursing staff but it should be a mix in roles and skills (not only nursing). It also shows that the current professional caregiver feel there is not enough time to do their job properly and that morale is low within staff.³⁴



7.17 Age 85+ feeling depressed

A same result came from a research by Susan B Gee and Matthew Croucher which interviewed several people with dementia and asked them how the rebuild of Christchurch New Zealand should be in order to provide a good environment for people with dementia. The people interviewed would like to take part in social activities but need more help with them to execute the tasks. Because of this help not being there or ashamed to ask they feel more socially isolated than they would like to be.³⁵



7.18 Lonely elderly higher chance of death

33. <https://www.ouderenfonds.nl/onze-organisatie/feiten-en-cijfers/>.

34. Rees, J., Williams, J. (1996). p. 320-322

35. Gee, S. B., Croucher, M., (2016). p. 6-12



7.1 Typologies elderly housing

Because of these problems existing nursing homes and facility managers are looking for innovative solutions. These solution variate in scale and how they make a change within the existing home. There are two different examples shown of how this can be done.

Co-housing scheme different age:

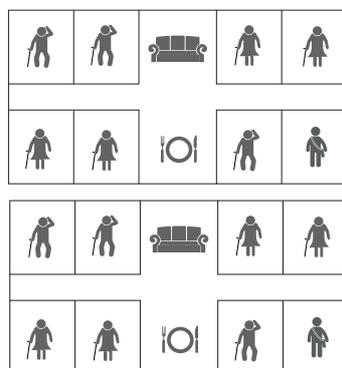
There are samples of nursing homes where they integrate students into the nursing homes. Within the elderly home the students live for a cheaper rent and have a contract to be a “good neighbor” (“goede buur”) to the elderly, helping with simple tasks or grab a cup of coffee for example. With Keizerslanden Deventer from Humanitas and De Molenhof Zwolle from Habion it are student that not have a special background and variate in what they do for a study. In Judson Manor Cleveland it are students with a specific study in music and provide in the communal area performances when they need to practice.^{36 37 38}

Co-housing scheme with communal shared space:

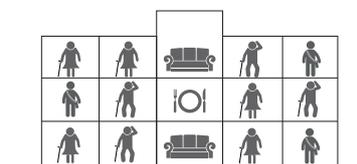
In the case of the Saffier Utrecht from Socius students also live in a nursing home but it is completely separate from the elderly and they only share the communal spaces such as the hairdresser, restaurant and garden.³⁹ Mount Providence St. Vincent in Seattle uses the communal space of the elderly home to do shared activities. Here they combine the activities of a daycare with elderly so they can participate and have social interaction.⁴⁰

If we translate these innovative ideas into schemes we get four configurations.

1. A mixture of elderly and students where the students are integrated in the nursing home. They live separately between the elderly and participate in the daily life and make use of the communal areas as well. The students have no restrictions and have different backgrounds or are specifically chosen because of their studies with the exception of caretaking related studies (pictures 7.19 - 7.20) .



7.19 Floor plan



7.20 Section plan

36. <http://www.humanitasdeventer.nl/wonen/humanitas-woonstudenten>.

37. <http://www.habion.nl/pdf/Friesch%20Dagblad%20wonen%20in%20de%20Molenhof%2031%20december.PDF>.

38. <https://www.youtube.com/watch?v=hW2KNGgRNX8>.

39. <http://www.de-saffier.nl/woonruimten.html>.

40. <https://www.youtube.com/watch?v=i9BfAgRa2ul>.



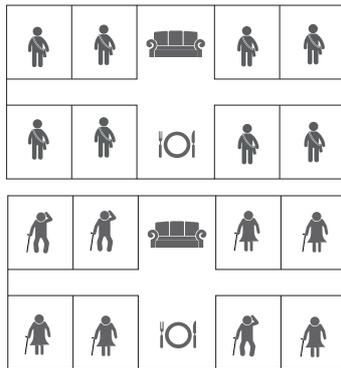
Case studies

7.1 Typologies elderly housing

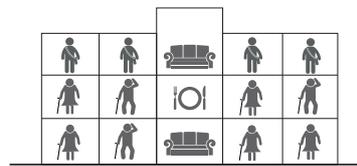
2. A mixture of elderly and students where the students are integrated in the nursing home. They live together on one floor but participate in daily life and make use of the communal areas as well. The students have no restrictions and have different backgrounds (pictures 7.21 - 7.22).

3. Separate living of students and elderly within the building only connected by the use of their communal space. The student don't need to interact with the elderly if they don't want to and will only the elderly within the communal areas (pictures 7.23 - 7.24).

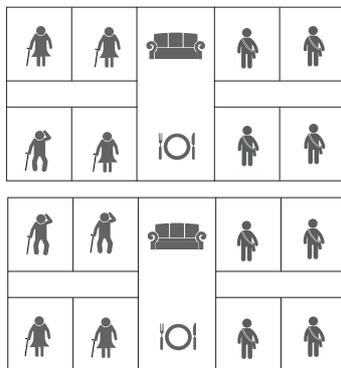
4. Living is only for the elderly. They share their communal space for social interaction and activities with a different target group in this case a daycare (pictures 7.15 - 7.26).



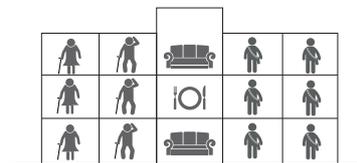
7.21 Floor plan



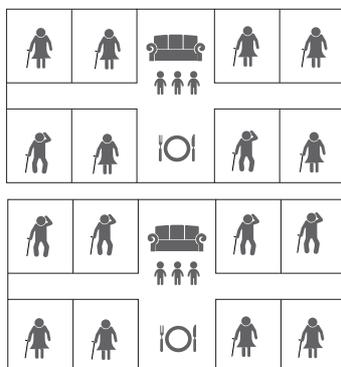
7.22 Section plan



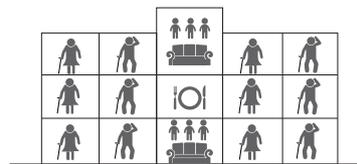
7.23 Floor plan



7.24 Section plan



7.25 Floor plan



7.26 Section plan



7.2 Global comparison

The book “design for aging. International case studies of building and program” describes several projects designed for people with dementia. From that project the countries Australia, Netherlands, United Kingdom and the United States are analyzed (pictures 7.27 – 7.28). Of each country three projects are analyzed on the following categories; GFA project, overall size outdoor space, amount of people, GFA per person and outdoor space per person.

With the analysis the overall score from the Netherlands is compared to each individual country.



7.27 Projects in the Netherlands



7.28 United States, United Kingdom & Australia

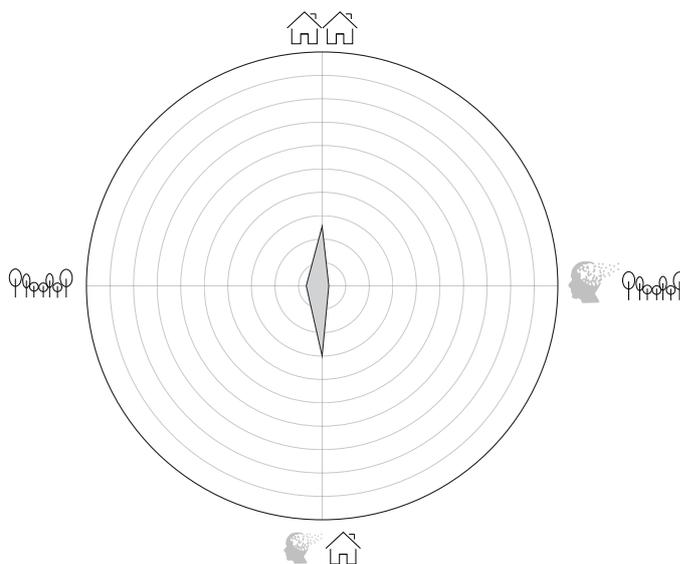


Case Studies

7.2 Global comparison

The three projects from the Netherlands have the largest amount of residents at average. The amount of outdoor space will probably be the lowest since it is a small country with a high density. Therefore design solutions need to be made that provide shared outdoor space and a public environment that is user friendly towards elderly and especially elderly with dementia. ⁴¹

The project Hogeweyk has the scale of a neighborhood with a dementia friendly urban environment. This will provide more outdoor space but also causes an separated solution. By making the urban environment dementia friendly the same results can be accomplished only it will be an inclusive solution creating the possibility for social interaction with the neighborhood.



7.29 Average

Project:
Wiekslag Krabbelaan

Architect:
Jorissen Simonetti Architecten

Occupied since:
2010

Average age:
87,0

7.31 Project information

Project:
De Hogeweyk

Architect:
Molenaar & Bol & VanDillen

Occupied since:
2009

Average age:
81,6

7.32 Project information

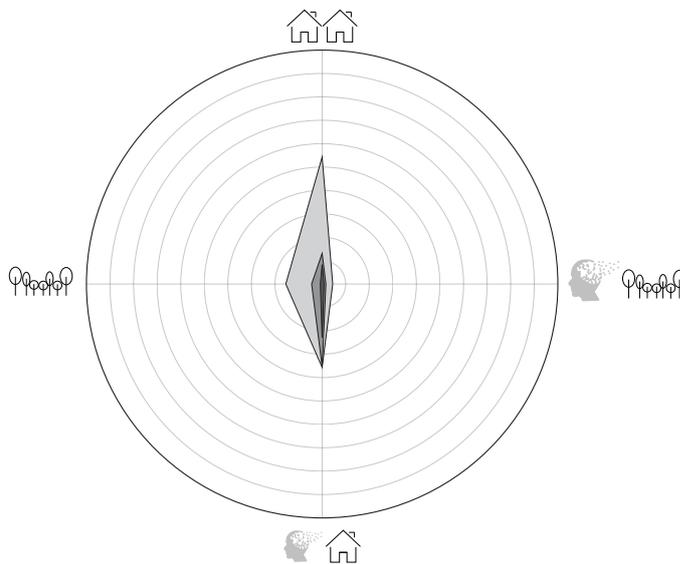
Project:
Wiekslag Boerenstreek

Architect:
Oomen architecten

Occupied since:
2006

Average age:
81,0

7.33 Project information



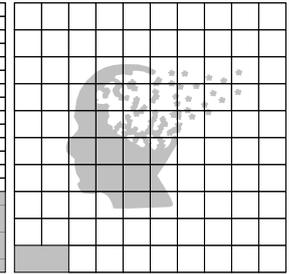
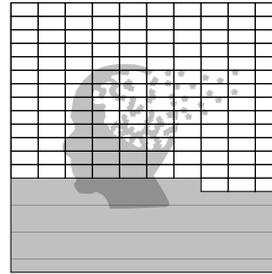
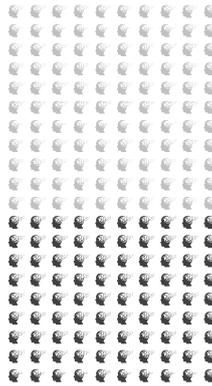
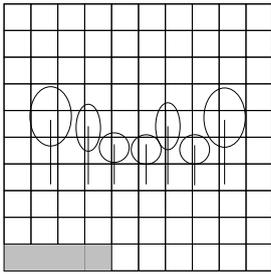
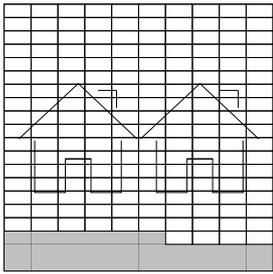
7.30 Comparison Projects

41. Anderzhon, J. W., et al. (2012). p. 125-166

Case Studies



7.2 Global comparison



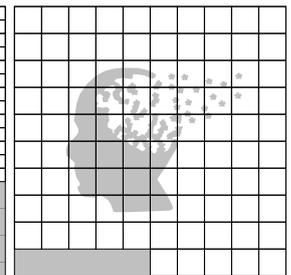
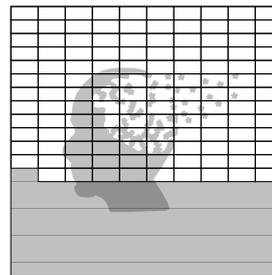
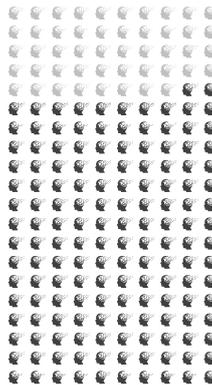
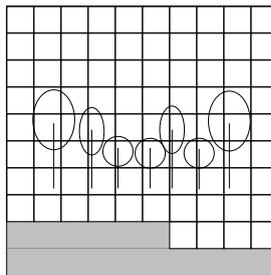
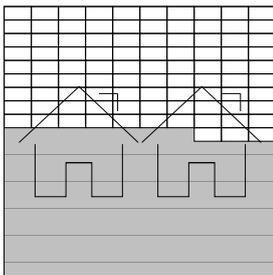
7.34 GFA 2.6 m² (x 1000)

7.35 Outdoor 3.6 m² (x 500)

7.36 People 90

7.37 GFA p.p. 67 m²

7.38 Outdoor p.p. 2.0 m² (x 10)



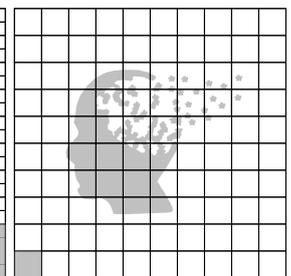
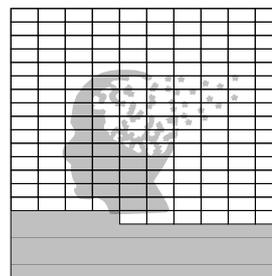
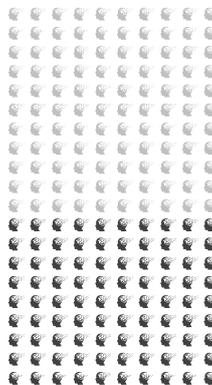
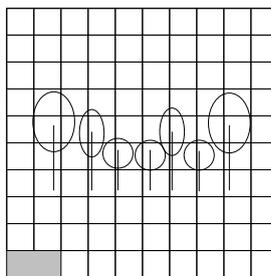
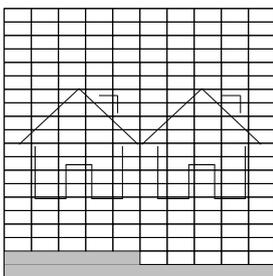
7.39 GFA 10.7 m² (x 1000)

7.40 Outdoor 15.4 m² (x 500)

7.41 People 152

7.42 GFA p.p. 71 m²

7.43 Outdoor p.p. 5.1 m² (x 10)



7.44 GFA 1.5 m² (x 1000)

7.45 Outdoor 2.0 m² (x 500)

7.46 People 90

7.47 GFA p.p. 44 m²

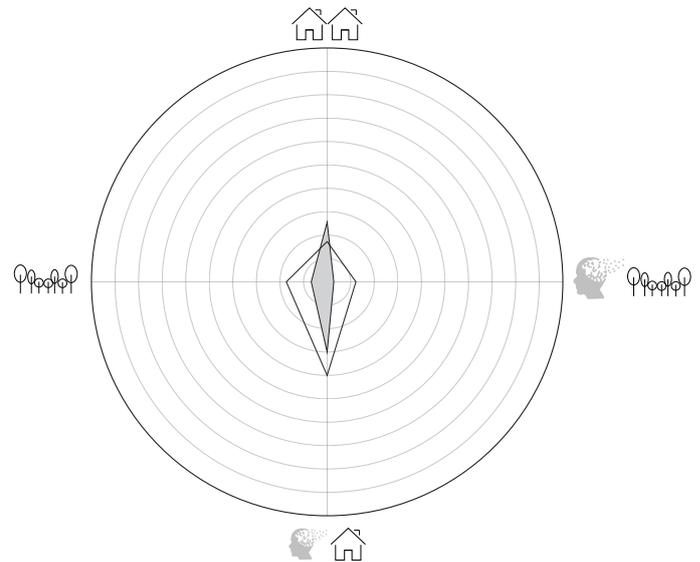
7.48 Outdoor p.p. 1.1 m² (x 10)



Case Studies

7.2 Global comparison

Comparing the overall schemes of Australia and the Netherlands people with dementia have more indoor and outdoor space but the overall projects are smaller in size (picture 7.49). If we look at the individual case studies it shows that the density of the projects from the Netherlands is higher therefor making the GFA per person less (picture 7.50).⁴²



7.49 Comparison Average

Project:
Southwood Nursing Home

Architect:
Allen, Jack & Cottier Architects

Occupied since:
2007

Average age:
84,5

7.51 Project information

Project:
Wintringham Port Melbourne

Architect:
Allen Kong Architect Pty Ltd

Occupied since:
1996

Average age:
69,0

7.52 Project information

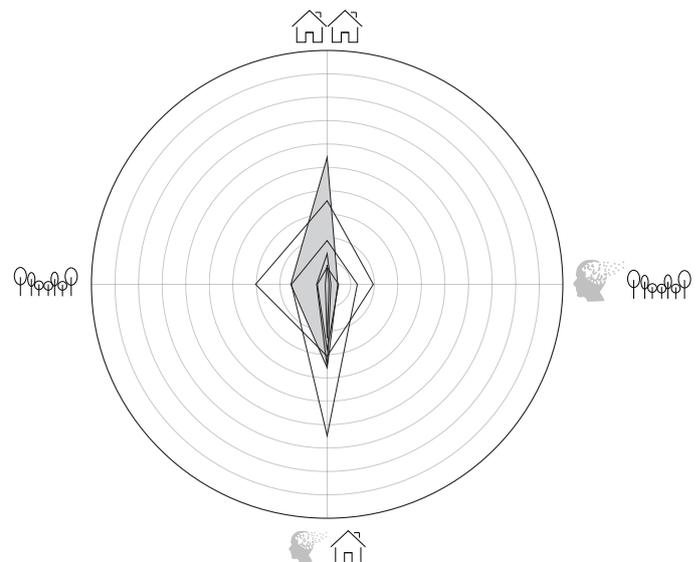
Project:
Brightwater Onslow Gardens

Architect:
Kidd and Povey Pty Ltd

Occupied since:
2001

Average age:
72,0

7.53 Project information



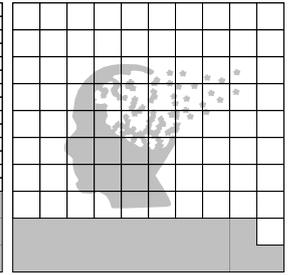
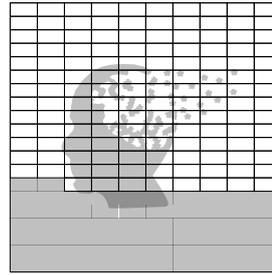
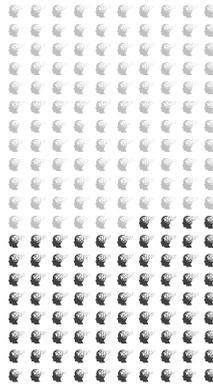
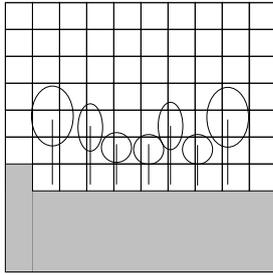
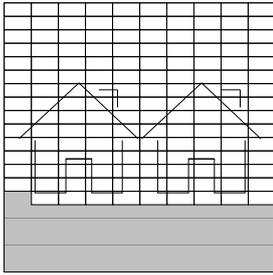
7.50 Comparison Projects

42. Anderzhon, J. W., et al. (2012). p. 1-54

Case Studies



7.2 Global comparison

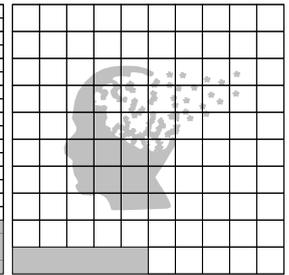
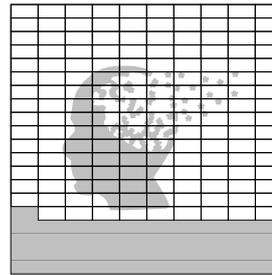
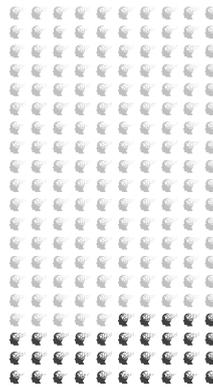
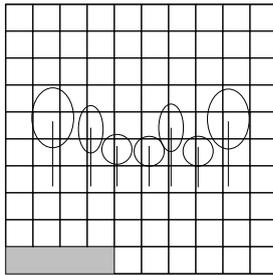
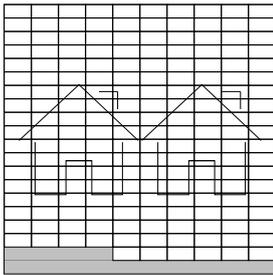


7.54 GFA 5.1 m² (x 1000) 7.55 Outdoor 31.4 m² (x 500)

7.56 People 84

7.57 GFA p.p. 61 m²

7.58 Outdoor p.p. 18.7 m² (x10)

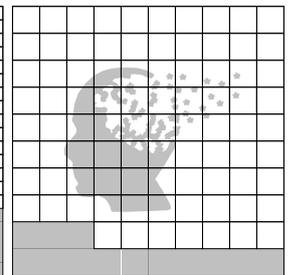
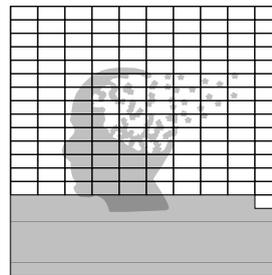
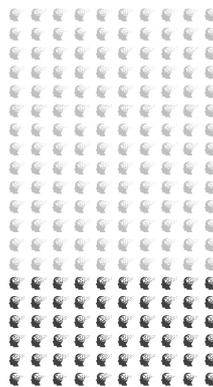
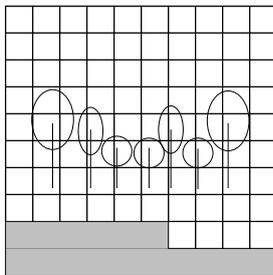
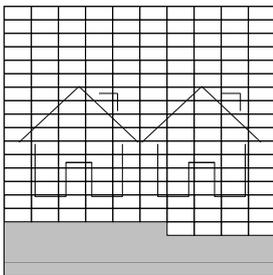


7.59 GFA 1.4 m² (x 1000) 7.60 Outdoor 3.8 m² (x 500)

7.61 People 35

7.62 GFA p.p. 41 m²

7.63 Outdoor p.p. 5.3 m² (x10)



7.64 GFA 3.5 m² (x 1000) 7.65 Outdoor 15.4 m² (x 500)

7.66 People 60

7.67 GFA p.p. 59 m²

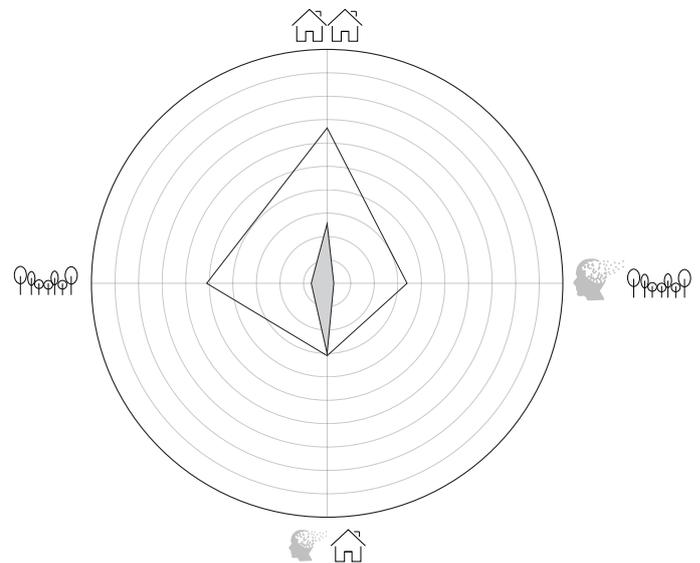
7.68 Outdoor p.p. 12.8 m² (x10)



Case Studies

7.2 Global comparison

Comparing the overall schemes of the United Kingdom and the Netherlands the projects have a higher GFA and amount of outdoor space (picture 7.69). But looking at the GFA per person two projects are similar making the projects in the Netherlands providing just as much indoor space (picture 7.70).⁴³



7.69 Comparison Average

Project:
Belong Atherton

Architect:
Pozzoni LLP

Occupied since:
2011

Average age:
80,0

7.71 Project information

Project:
Sandford Station

Architect:
KWL Architects

Occupied since:
2010

Average age:
min. 60,0

7.72 Project information

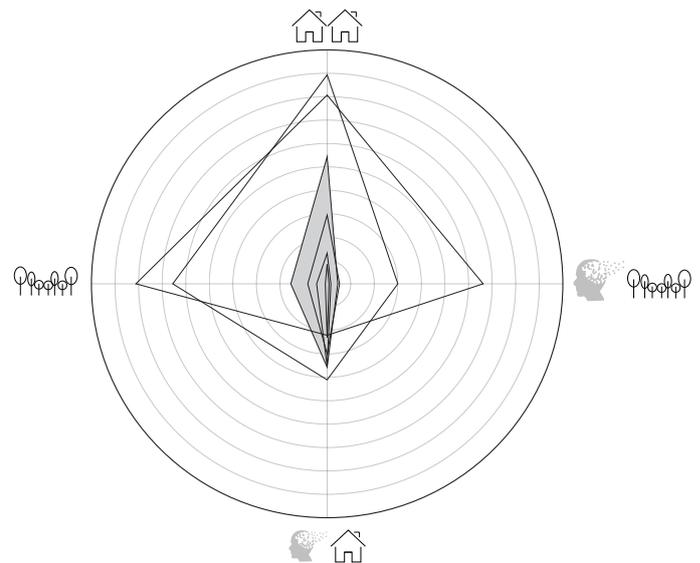
Project:
The Brooke Coleraine

Architect:
ASI Architects Ltd

Occupied since:
2007

Average age:
50,0 - 90,0

7.73 Project information



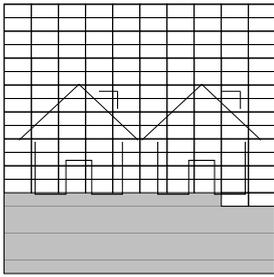
7.70 Comparison Projects

43. Anderzhon, J. W., et al. (2012). p. 167-210

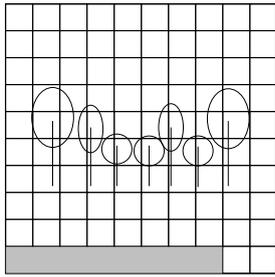
Case Studies



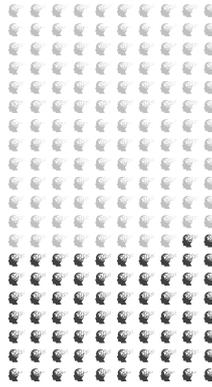
7.2 Global comparison



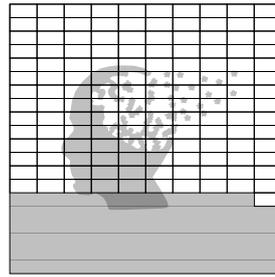
7.74 GFA 5.8 m² (x 1000)



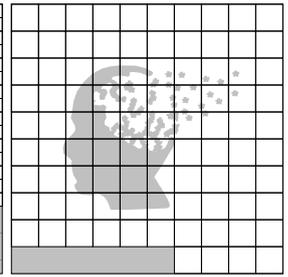
7.75 Outdoor 8.2 m² (x 500)



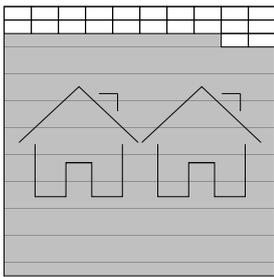
7.76 People 72



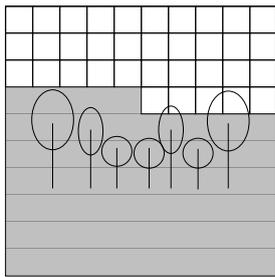
7.77 GFA p.p. 59 m²



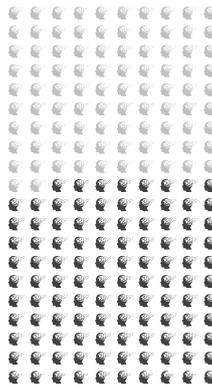
7.78 Outdoor p.p. 5.7 m² (x 10)



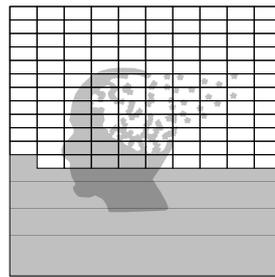
7.79 GFA 17.8 m² (x 1000)



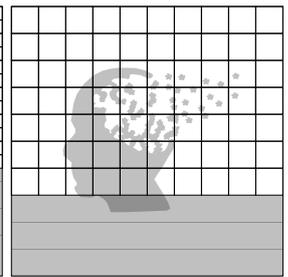
7.80 Outdoor 64.6 m² (x 500)



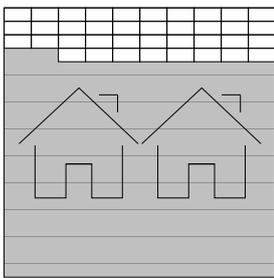
7.81 People 108



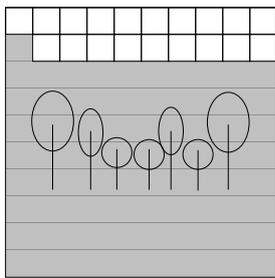
7.82 GFA p.p. 81 m²



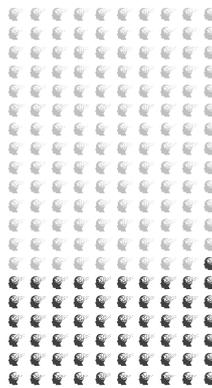
7.83 Outdoor p.p. 29.9 m² (x 10)



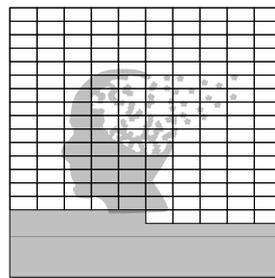
7.84 GFA 16.2 m² (x 1000)



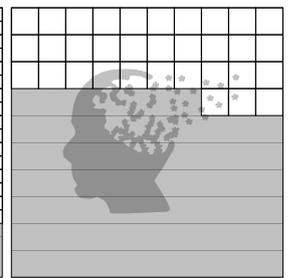
7.85 Outdoor 81.2 m² (x 500)



7.86 People 61



7.87 GFA p.p. 45 m²



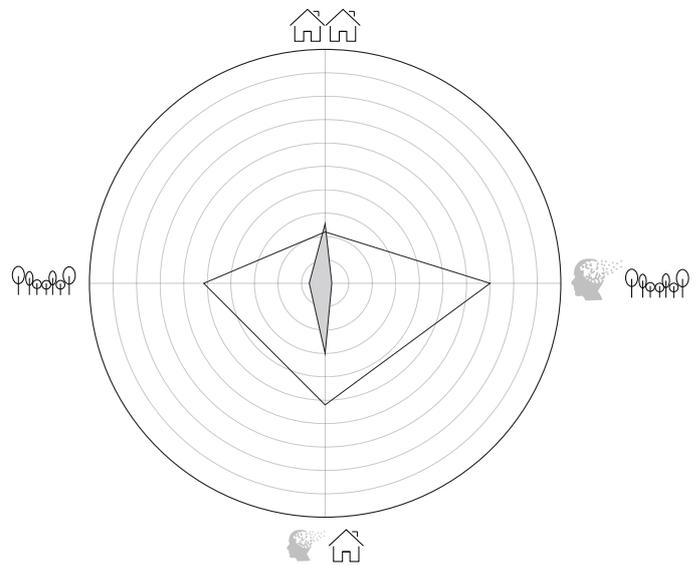
7.88 Outdoor p.p. 66.6 m² (x 10)



Case Studies

7.2 Global comparison

Comparing the overall schemes of the United States and the Netherlands the projects have a higher amount of outdoor space while the overall GFA is the almost the same (picture 7.89). But looking at the GFA per person two projects are similar making the projects in the Netherlands providing just as much indoor space (picture 7.90).⁴⁴



7.89 Comparison Average

Project:
Deupree Cottages

Architect:
SFCS, Inc

Occupied since:
2009

Average age:
85,0

7.91 Project information

Project:
Park Homes at Park Side

Architect:
Crepidoma Consulting, LLC

Occupied since:
2007

Average age:
85,0

7.92 Project information

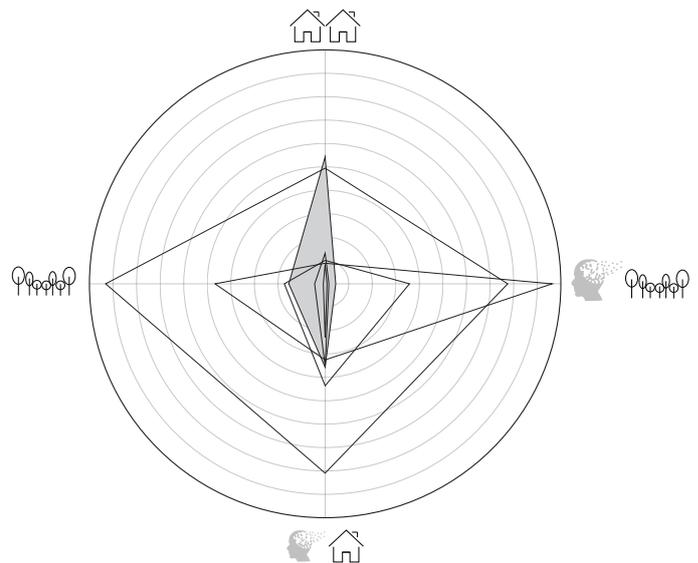
Project:
Childers Place

Architect:
Perkins Eastman

Occupied since:
2007

Average age:
85,0

7.93 Project information



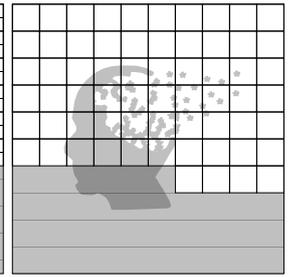
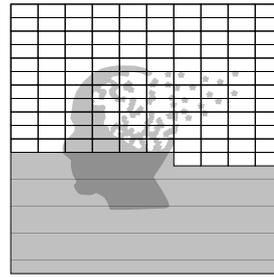
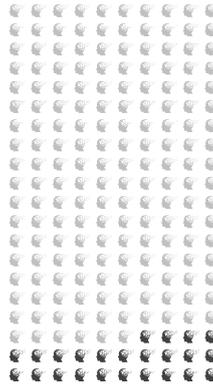
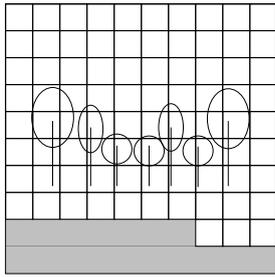
7.90 Comparison Projects

44. Anderzhon, J. W., et al. (2012). p. 211-272

Case Studies



7.2 Global comparison



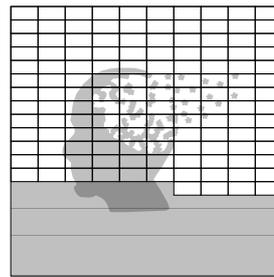
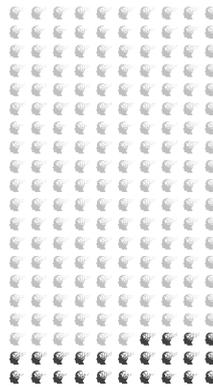
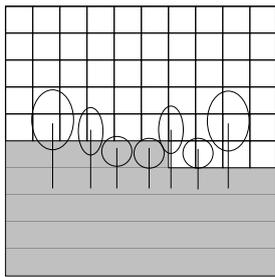
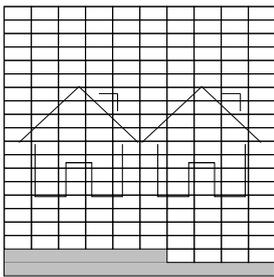
7.94 GFA 2.0 m² (x 1000)

7.95 Outdoor 17.4 m² (x 500)

7.96 People 24

7.97 GFA p.p. 86 m²

7.98 Outdoor p.p. 5.7 m² (x 10)



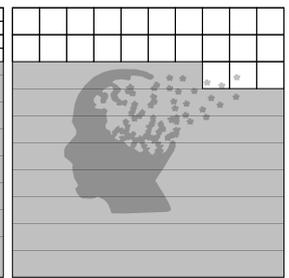
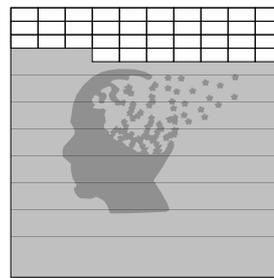
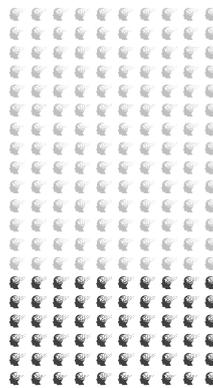
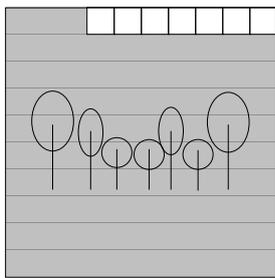
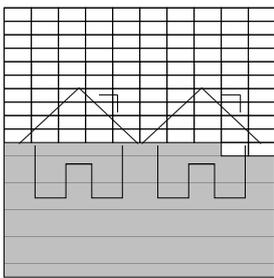
7.99 GFA 1.6 m² (x 1000)

7.100 Outdoor 46.0 m² (x 500)

7.101 People 24

7.102 GFA p.p. 66 m²

7.103 Outdoor p.p. 95.8 m² (x 10)



7.104 GFA 9.8 m² (x 1000)

7.105 Outdoor 93.0 m² (x 500)

7.106 People 60

7.107 GFA p.p. 163 m²

7.108 Outdoor p.p. 77.4 m² (x 10)



Case Studies

7.3 Dementia friendly design

A building and environment for people with dementia comes with special attention to certain parts of the design. These key principles needed for a dementia friendly design will not only provide a good environment and building for them but also for the spouses, caregivers, visiting loved ones and the neighborhood. In the book “Environmental design resources” by Bennett and Fleming there are ten key design principles described.⁴⁵

Some of these key principles seem so logical that you would expect that every design has these qualities. In practice this isn't true. A key element in designing is a sufficient amount of daylight. A Dutch research in nursing homes showed that of all the measurements taking in communal areas, 55% of the horizontal illuminance and 65% of the vertical illuminance fell below the threshold of 750 lux. While when getting older lighting conditions become more important because elderly need more light than younger people for doing the same tasks, visual field declines, the effect of glare is stronger, adapting to the dark becomes harder and color discrimination decreases.⁴⁶

A design should besides the key principles of Bennett and Fleming also provide in an environment that is rich with natural daylight.

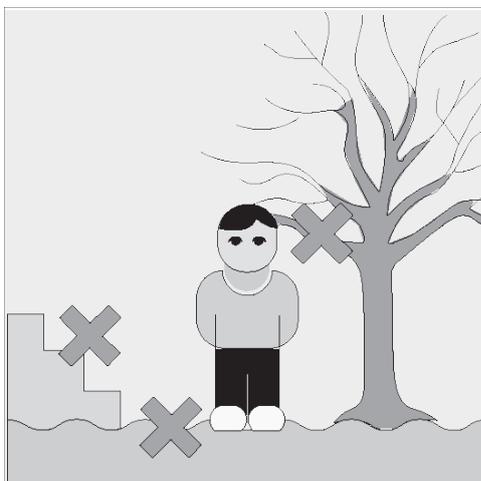
These key design principles are:

1. Unobtrusively reduce risks:

A safe building and environment needs to be provided for people with dementia. This means for example avoiding steps. Obvious safety measures such as a fence or locked door can lead to frustration and anger and need to be avoided as much as possible.

2. Provide a human scale:

This can be achieved with three factors; number of people they encounter, overall size of the building and size of the individual components (doors, rooms and corridors). Too much choices and interactions will be intimidating and result in a negative experience.



7.109 Unobtrusively reduce risks



7.110 Provide a human scale

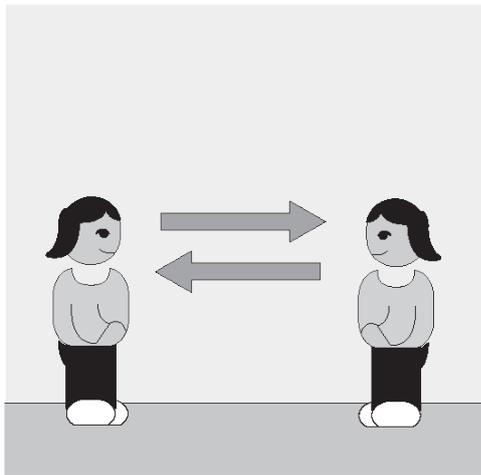
45. Bennett, K. A., Fleming, R. (2017). p. 49-52

46. Sinoo, M. M., et al. (2011). p. 1-11

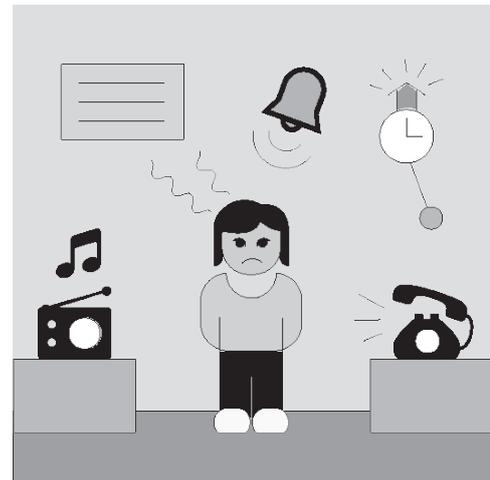


7.3 Dementia friendly design

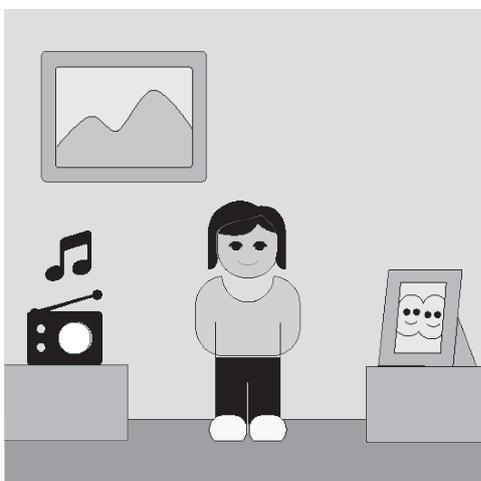
3. Allow people to see and be seen:
People with dementia benefit from a building with good visual access. This means that the environment is easily understood and that they can see where they are, came from and can go to. It will help them exploring the floor plan and boost confidence. For the caregiver it also provide visual control causing less anxiety.
4. Reduce unhelpful stimulation:
Stimulating a person with dementia is only helpful if it's controlled and not too much at once. Competing stimulations like different noises at once or too much singing such as posters should be avoided.
5. Optimize helpful stimulation:
Cues to help a person understand the environment can be done by own furniture in their bedroom, music bringing back memories from the past or a nice smell from the kitchen just before dinner.
6. Support movement and engagement:
Creating a pathway without obstacles and a clear view provide purposeful movement which keeps a person with dementia healthy. This need to be created internal and external which can lead in more participation in activities and improved social interaction. ⁴⁷



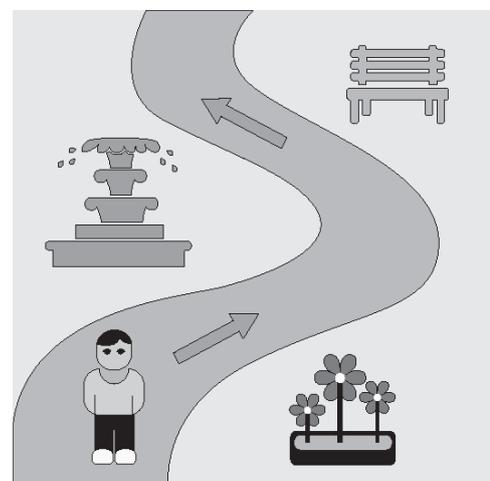
7.111 Allow people to see and be seen



7.112 Reduce unhelpful stimulation



7.113 Optimise helpful stimulation



7.114 Support movement and engagement

47. Bennett, K. A., Fleming, R. (2017). p. 49-52



Case Studies

7.3 Dementia friendly design

7. Create a familiar place:

A person with dementia enjoys places and objects better if they are recognizable. This can be accomplished by placing own furniture or using fittings, colors and objects from the past.

8. Alone or with others building level:

A floor plan needs to provide a person with dementia the option to interact or to be alone. Rooms should be designed for group activities such as cooking and dining but also to read a book or to stare out of the window.

9. Alone or with others environment level:

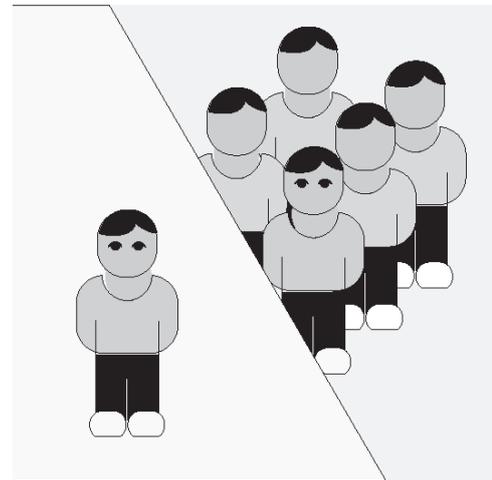
A building should be part of the neighborhood offering the possibility for social interaction with the community. Visiting family and friend help maintain the identity of the person with dementia.

10. Design in response to vision:

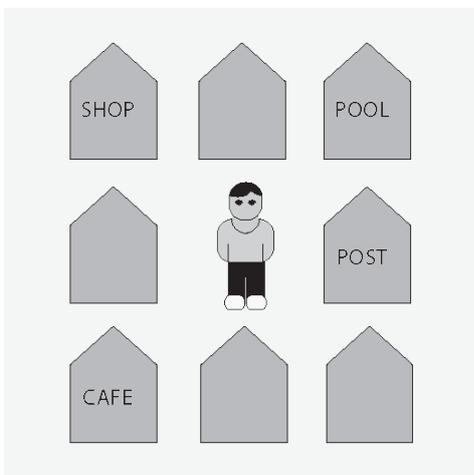
A building should be the embodiment of the philosophy of care providing the residents and caregivers with the tools needed for a meaningful life. ⁴⁸



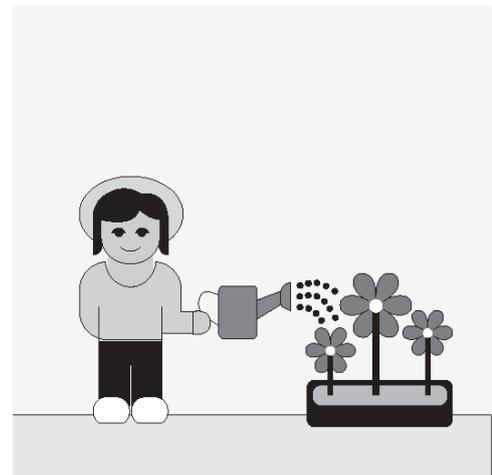
7.115 Create a familiar place



7.116 Alone or with others building level



7.117 Alone or with others environment level



7.118 Design in response to vision

48. Bennett, K. A., Fleming, R. (2017). p. 49-52

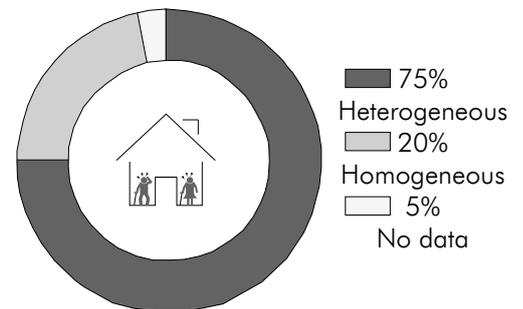


7.4 Co-housing schemes

People with dementia live in co-housing dwellings because the professional caregivers can provide the care and supervision at the same time. Within these co-housing schemes there are a variety of group composition, sizes and types. The Belgium book of Erik Stroobants and Patrick Verhaest called "Architectonica Een thuis voor mensen met dementie" has twenty case studies which can be analyzed on co-housing schemes.⁴⁹

Group composition:

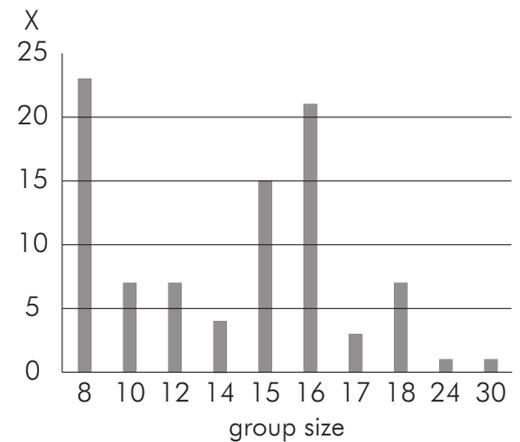
Out of twenty case studies 75% percent had a heterogeneous composition (picture 7.119). In the Netherlands with the current system this isn't possible, because to get into a nursing home you need to be severely ill and with the heterogeneous group you will live in the nursing home when you get diagnosed with dementia. The design however will be a heterogeneous group because it will improve the quality for the person with dementia. In the design it can be arranged because it is a combination of professional caregiver and loved one.



7.119 Group composition

Group size:

The most groups are a multiplication of 8, with 8 and 16 being the most common group sizes. The case studies are described as nursing homes that should feel like home. This is best completed through a smaller scale, with 8 being the smallest, due the professional caregiver costs (chapter 6.2). Studies have also shown that residents in smaller groups show less decline in daily activity, have more sustained interest in the environment and need smaller doses of drugs. But not only the person with dementia benefits, for the professional caregiver it is easier to work as a group and they showed to be more enthusiastic about their work.⁵⁰

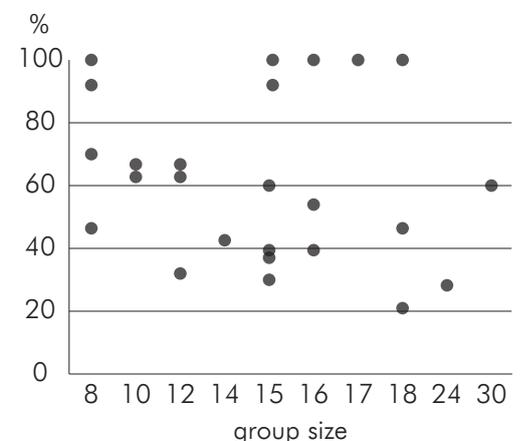


7.120 Group size

Small groups have better results with the shared facilities such as the dinner room. People with dementia caused less chain reactions of disruptive behavior and conversation with staff was improved.⁵¹

Not only a smaller group size had positive results but also the scale of the building is important. Providing this human scale is important because of three factors which are; the scale of the building, the number of people encounters and the size of individual components (doors). Keeping this in balance and at a smaller scale, provide a clear view for the people with dementia and causes less negative behavior. Mixing the people with dementia with "normal" elderly gives them more respect for the overall quality of living.⁵²

By keeping the design at a small scale (building and co-housing scheme) it will provide the necessary qualities needed for a person with dementia. In the design the co-housing dwellings will also provide space for the spouses improving the social interaction and creating the mixture with "normal" elderly.



7.121 Percentage dementia groups

49. Stroobants, E., Verhaest, P. (2012). p. 19-230

50. Fleming, R., Purandare, N. (2010).

51. Bennett, K. A., Fleming, R. (2017). p. 14-18

52. Bennett, K. A., Fleming, R. (2017). p. 14-18



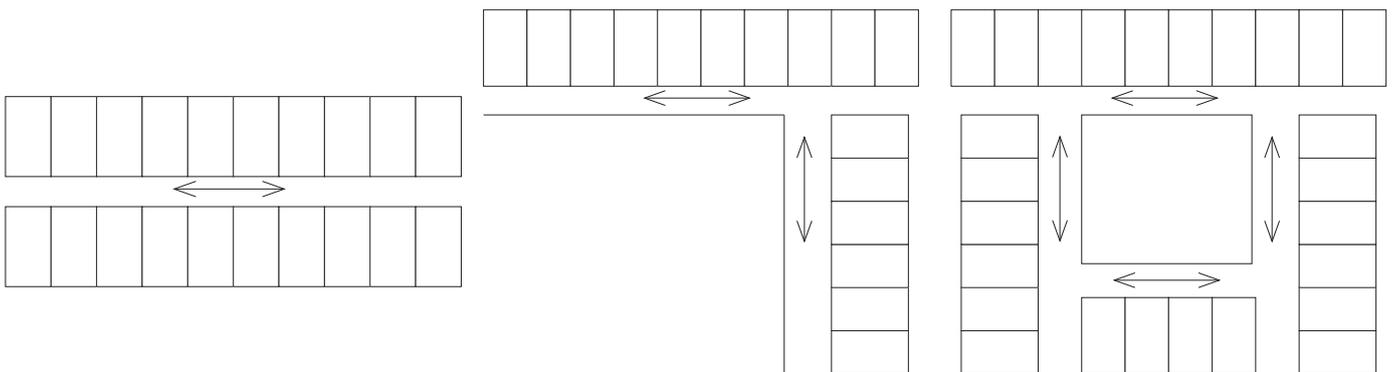
Case Studies

7.4 Co-housing schemes

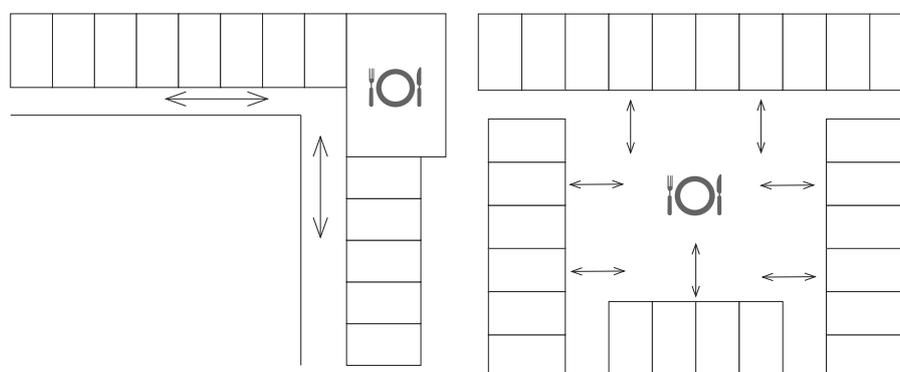
Nursing homes made adjustment through time providing a smaller scale of co-housing and created more the feeling of “home”. Not only the scale is a factor in the “home” feeling but also the circulation of the floor plan. Wayfinding is important for the independence as well as the self-esteem of the person with dementia. The architectural design doesn’t only help with the wayfinding but also with other symptoms such as agitation, aggression and temporal disorientation. By reducing these symptoms the overall wellbeing of the person with dementia improves, showing less of the deterioration.⁵³

There are two levels of wayfinding that help a person with dementia which are; the circulation of the floor plan and environmental cues such as signage, furnishing, lighting, color, etc. However the environmental cues can never compensate for the circulation therefor making the circulation the more important aspect for the independence in wayfinding. Within in the floor plan the following aspects have proven beneficial; small scale, direct visual access to relevant places, simple decision points, places with function and meaning and spatial proximity of communal spaces. Negative effects were created by; long corridors, changes of direction in circulation system and repetitive elements. The nursing homes investigated can be explained with three models; Corridor, L-shape and Courtyard (picture 7.122). The corridor gave the best results of wayfinding since there were no changes in direction. Although the corridor works best for wayfinding it has negative effects if they are too long, have repetitive elements and if there is nothing to do (only circulation). Another positive effect for orientation was a eat-in kitchen as central communal space. It provide a reference point with the floor plan.⁵⁴

The L-shape and Courtyard could be altered into designs that have less circulation and provide better reference points, avoiding the long corridor. The L-shape could have the kitchen and dinner area at the corner as a reference point. The courtyard could be the central spot, resulting in no corridors at all (picture 7.23 – 7.124).



7.122 Circulation systems nursing homes



7.123 L-shape improvement

7.124 Courtyard improvement

53. Marquardt, G. (2011). p. 22-25

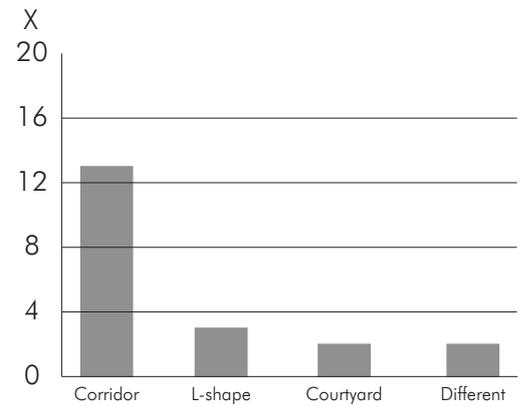
54. Marquardt, G. (2011). p. 26-41



7.4 Co-housing schemes

The twenty case studies are analyzed for circulation and the corridor is the most used method (picture 7.116). The corridor provides the best solution for wayfinding as research showed although it has many negative aspects as well. Within the 13 corridor solutions, 4 tried to solve these negative aspects by making small size groups (human scale). All case studies made use of signage but as described this can't provide enough compensation for the qualities the circulation of the floor plan offers.⁵⁵

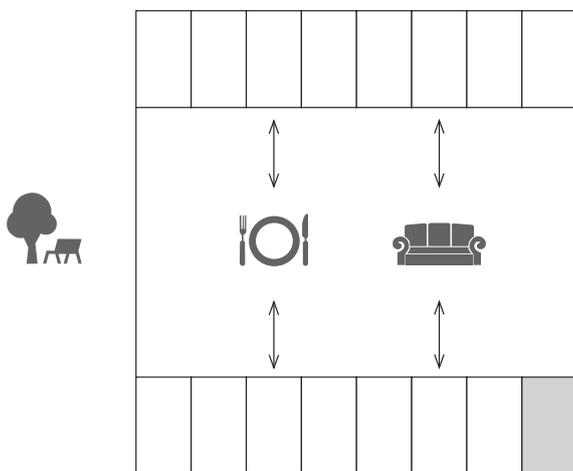
There are also two solutions which show a different approach. These are schemes without or with minimal space dedicated to the circulation. By minimizing or leaving out circulation wayfinding is improved, more space can be used for individual or communal space and financing can be spent elsewhere.



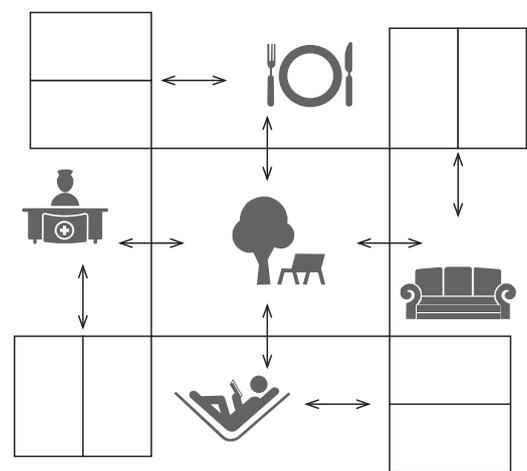
7.125 Circulation types

The first scheme is with a group size of 15, providing a direct connection from the individual rooms to the combined living room and kitchen. The entrance door is hidden and made with frosted glass making it unattractive for the people with dementia. The caregivers find the door an downside because it also makes it impossible for them to talk to colleagues. Because the rooms are placed at the north and south side surrounding the communal spaces there are only dwellings possible with a single orientation. While a dwelling is only single orientated with the communal space also belonging partly to the dwelling it provides a space with multiple orientations (picture 7.126).⁵⁶

The second scheme has a more human scale providing a floor plan with 8 dwellings. Two dwellings are connected to a communal space and the communal spaces are connected by an winter garden and outdoor space in the core of the scheme. This plan provides the opportunity to withdraw from the group as well to do group activities. Because the plan is open and transparent in the middle there is enough supervision possible on several rooms at once. The space dedicated to circulation is 8% less than the "standard" scheme making the floor plan more efficient in use. The corner dwellings have a double orientation providing multiple dwelling solutions in one scheme (picture 7.127).^{57 58}



7.126 Circulation group size 15



7.127 Circulation group size 8

55. Stroobants, E., Verhaest, P. (2012). p. 19-230

56. Stroobants, E., Verhaest, P. (2012). p. 90-97

57. https://www.slideshare.net/osar_architecture/menos-presentatie-091113.

58. Stroobants, E., Verhaest, P. (2012). p. 212-227



Case Studies

7.4 Co-housing schemes

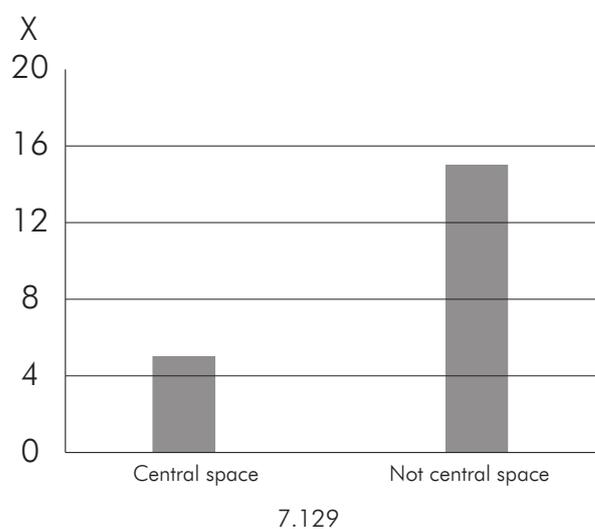
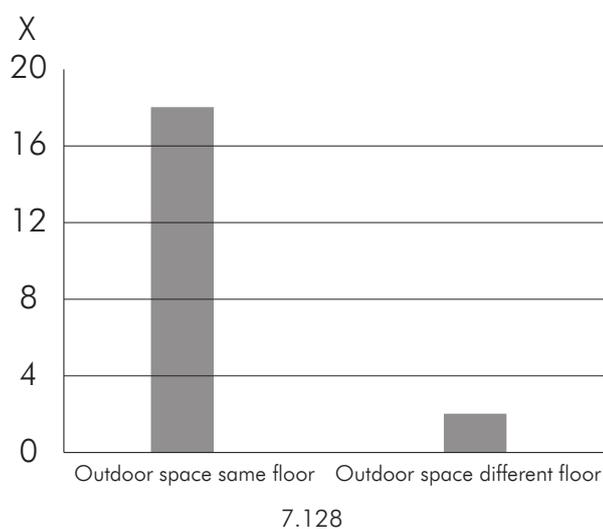
Picture 7.127 shows a scheme where the core of the plan is the (semi) outdoor space. Research showed that a garden or (semi) outdoor space helps a person with dementia in improving their mental and physical functions. People with access to the garden showed less aggression while the amount of incidents increased in facilities without a garden. ⁵⁹

Outdoor spaces are also needed because the people with dementia (and people in general) spend not enough amount of time outside missing out on sunlight exposure and fresh air. An outdoor space is therefore not only beneficial for the people with dementia but also for their caregivers. Besides exposure to the elements of nature, the outdoor space should also protect them from too much sunlight and wind. ⁶⁰

The designed outdoor environment should also provide possibilities to do numerous activities. An outdoor space which is safe and sheltered from the elements of nature, which still creates an easy access, activities, visible connection and exposure to sunlight and air will have the best results in keeping a person with dementia (and without) as healthy as possible. ⁶¹

Of the twenty case studies 18 had a (semi) outdoor space on the same floor (picture 7.128). If an (semi) outdoor space is harder to reach such as the case with placing it on a different floor it will mean in practice that is never or barely used. The caregiver needs to move the whole group providing help with moving and keeping supervision. Beside creating a (semi) outdoor space on the same floor usage is also improved if the placement is central in the scheme (picture 7.129). This provide visual access for the people with dementia and caregivers meaning that the people with dementia get attracted to the (semi) outdoor space while the caregivers can keep control. Another option is to increase the amount of caregivers so the moving of people or the use of (semi) outdoor space can be shared. ⁶²

Out of the 20 case studies some schemes are explained showing possibilities to create a well working (semi) outdoor space.



59. Willemse, H. (2014).

60. Brawley, E.C., (2008). p. 267-280

61. Brawley, E.C., (2008). p. 267-280

62. Brawley, E.C., (2008). p. 267-280



7.4 Co-housing schemes

In the scheme of Ter Kerselaere the outdoor space is a garden which is the central point of the scheme. There is a strong visual access possible from the communal spaces at the left and right side of the scheme. The garden is enclosed providing comfort for the caregiver when it is used alone by the residents. The garden design is easy to oversee, has good visual access and is not only accessible through the communal spaces but has also two extra access point in the middle of the scheme. The garden is well designed and also to use for activities but misses an semi outdoor space making it only usable during good weather conditions. The garden also creates other less beneficial parts for the design such as the courtyard shape making it harder to find the way for a person with dementia (wayfinding p. 60 – 61).



7.130 Ter Kerselaere



Case Studies

7.4 Co-housing schemes

De Weister has a garden central located and attached to the communal space (picture 7.131). There is also a strong visual connection from the communal space for resident and caregivers. The outside space is divided in a covered terrace and a garden. This provided several outdoor space suitable for different weather conditions. The garden is a wide and open space making it possible to use for activities. The outdoor has no semi outdoor space which would have increased the usability and could have improved the wayfinding of the scheme since it could have made an indoor connection between the left and right wing.



7.131 De Weister



7.4 Co-housing schemes

Perrekes has the same qualities of outdoor space as De Weister meaning, an outdoor space connected the communal are with a terrace and garden (picture 7.132). The outdoor space also has no semi outdoor, making it less usable due weather conditions. It is also not the central of the scheme but since the group size is small and it is easily accessible from the communal area it has enough qualities for an active program.



7.132 Perrekes



Case Studies

7.4 Co-housing schemes

Menos is a small group size scheme with a central patio and a semi outdoor space. Both are in in the scheme not only connecting the rooms but also providing strong visual connection and supporting an active outside program. Because there is also an semi outdoor space the usability is not dependent on the weather conditions. While creating both a semi and fully outdoor area they become both small in size. Making the choose for only a semi outdoor which is larger could have provided the same qualities while making the room more spatial.



7.133 Menos



7.4 Co-housing schemes

A well designed (semi) outdoor space and an active program can create social interaction and increase wellbeing of people with dementia. In the pictures 7.134, 7.135 and 7.136 three examples are shown all providing the right qualities for an active program outdoors.

Menos (picture 7.134) provides the semi outdoor space which can be used throughout the whole year. Also because it is a room with a high percentages in daylight / sunlight which is connected to the other communal space the whole scheme is rich in daylight.

De Weister provides an outdoor space which has several zones (picture 7.135). This increases the activity outside since it can adjust to the needs of the residents such as sitting in the sun or shade. With a garden that is easily overseen and a wide space it provides enough room for group activities. The downside of this open space, that it is mostly grass making it a bit dull missing the opportunity to provide helpful stimulation.

The outside from the Berchmantehuis is the one with the most helpful stimulation (picture 7.136). The garden has benches to rest, places in the sun and shade, change in scenery with plants and activities such as feeding the bird and chickens. The downside is that there is no semi outdoor space making it not possible to use the space throughout the whole year.



7.134 Semi outdoor space Menos



7.135 Easy to oversee outdoor space De Weister



7.136 Interactive outdoor space Berchmantehuis



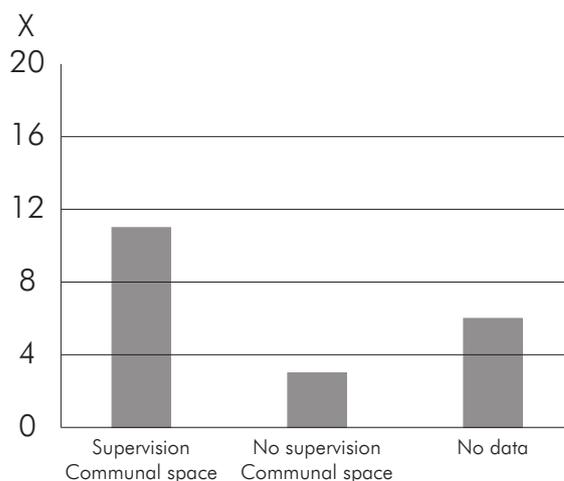
Case Studies

7.4 Co-housing schemes

Sight is not only for the person with dementia important but also for the caregiver. While a person with dementia needs the sightlines to oversee the rooms and use these sight lines to guide them from one room to the other, it is for the caregiver important to oversee the rooms to keep control. Making a design with sight lines that see through rooms a caregiver is more at ease since they can keep an eye at several people while letting them do activities individually if they want to. ⁶³

The study cases provide mostly good sight lines from the nursing station at the communal area where the activities are for the residents but this limits the changes for individuality which is only possible at their rooms, controlled with warning technology (picture 7.137). The study cases that don't provide sightlines from the nursing station keep control by locating the nursing station next to the exit (picture 7.138). The positive element is that the nursing station is quiet and isolated, needed for documenting but this also means there is no possibility to keep control resulting in feelings of unease while documented files.

Other options are a half open nursing station (picture 7.139) or no nursing station at all (picture 7.140). The half open nursing station provides visual control but lacks a private room for staff meetings and documenting. The documenting can still be done at the nursing station meaning that the caregiver is always available if needed by a person with dementia. The plan from Menos has no nursing station but provides great visual control. The communal areas are connected which means several rooms can be seen in one view and individual activity is possible while providing supervision.



7.137

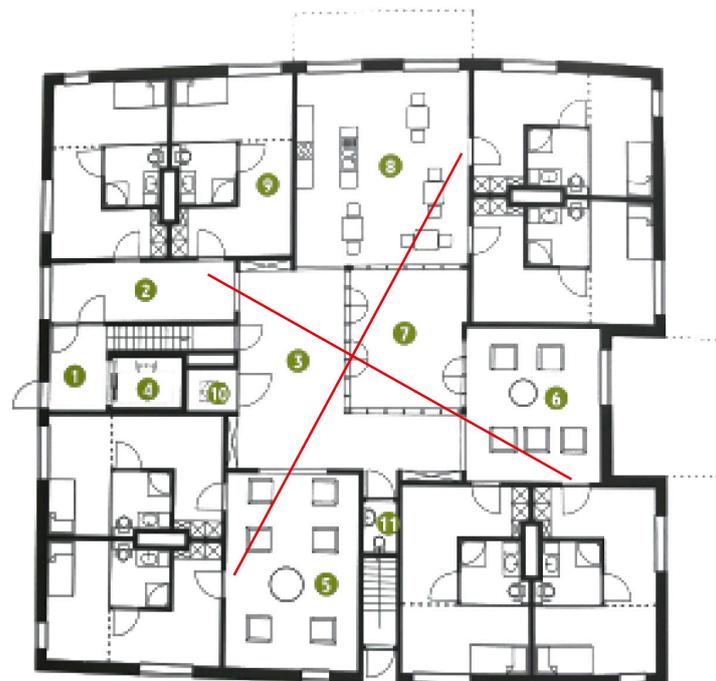


7.138 Joostens

63. Fleming, R., Purandare, N. (2010).



7.139 Sint Anna



7.140 Menos



Case Studies

7.5 Urban design

For a person with dementia and elderly in general it is important that the urban environment is user friendly. Providing a user friendly environment will mean that an elderly person or person with dementia is more likely to go outside and get social interaction preventing loneliness and also keeping a better physical shape. A unfriendly neighborhood increases the times staying indoor making elderly and people with dementia more isolated. ⁶⁴

Improving the public space can be done in several ways but keeping it at a proper level is also important. Unsafe walk paths, unclear high placed signage and benches that aren't really for resting should be avoided. Elderly and mostly people with dementia have their view downwards meaning placing clear signage high in a pole is not preferable. Most times they are scanning the ground looking if the walk path is safe. Combining this with clear signage improves the walk path. ⁶⁵

In the Netherlands some improvements for the public space have been introduced by the stimulation fund (Stimuleringsfonds). The stimulation fund had a design contest where they ask for interventions within the public space to improve the usage for people with dementia. The contest had five proposals that were evaluated and tested (picture 7.144 – 7.149). At the site some of these elements can be incorporated in the urban design to improve the neighborhood making it dementia friendly. ⁶⁶

“Praatpaal” (Ask for guidance):

This is an old Dutch system for asking for guidance when you had troubles with your car. The system was expired therefore the “Praatpalen” could be used for a new lifecycle. It is a recognizable device therefore making it useful as a supportsystem.

“Geworteld” (Engraved signage):

Tiles around the nursing facility are increased like roots. They become more intense engraved near the nursing home guiding the person with dementia.

Smartphone support:

Persons with dementia use building and other elements to guide them in walking. The smartphone app helps by a personal recorded message and street view pictures of recognizable elements.



7.141 Unsafe walk path



7.142 Unclear high placed signage



7.143 Bench?

64. Burton, E., Mitchell, L. (2006). *Inclusive urban. design Streets for life*. p. 33-128

65. Burton, E., Mitchell, L. (2006). *Inclusive urban. design Streets for life*. p. 33-128

66. http://stimuleringsfonds.nl/nl/zorg/terugblik_dementie_in_de_openbare_ruimte/.

Case Studies

7.5 Urban design



Guidance and friendly neighborhood:

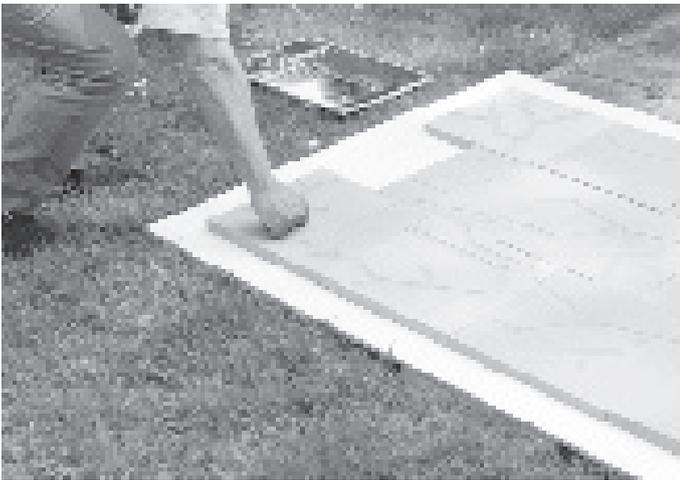
The surrounding of a nursing home is tested by walking around looking for unsafe situations. Afterwards the area is supported by street signage placed in the ground tiles.

Forget me not:

The forget me not flower is used at places for safe crossing. This is not only to help the person with dementia but also informing the neighborhood.



7.144 "Praatpaal" (Ask for guidance)



7.145 "Geworteld" (Engraved signage)



7.146 Smartphone support



7.147 Guidance and friendly neighborhood



7.148 Forget me not walk path



- VIII -



8.1 Windmill De Otter 1631



- VIII -

Warehouses & Windmills

“History of the plot & building”

A chapter about the history of the site and the building. Describing the origin.

This chapter gives an answer to the sub question:

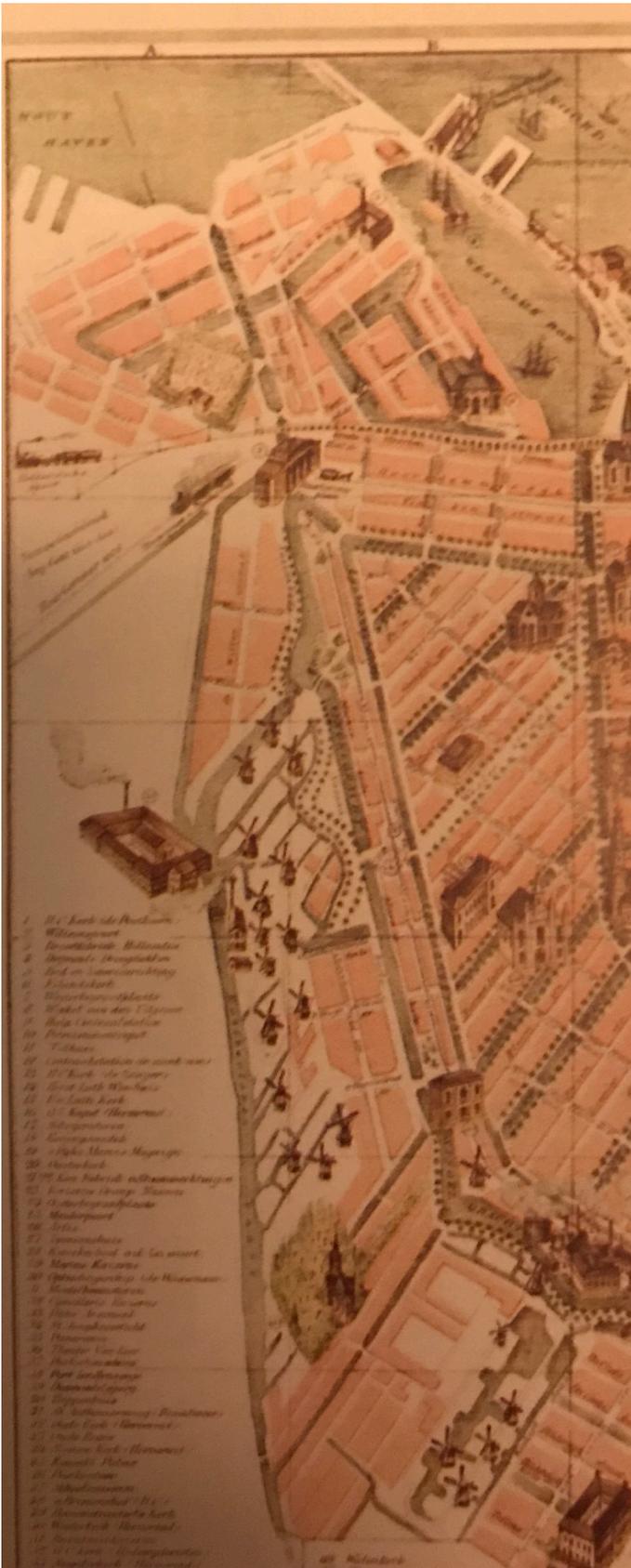
What is the historic development of the site and how is this still visible today?

What is the historic development of the building and how is this still visible today?

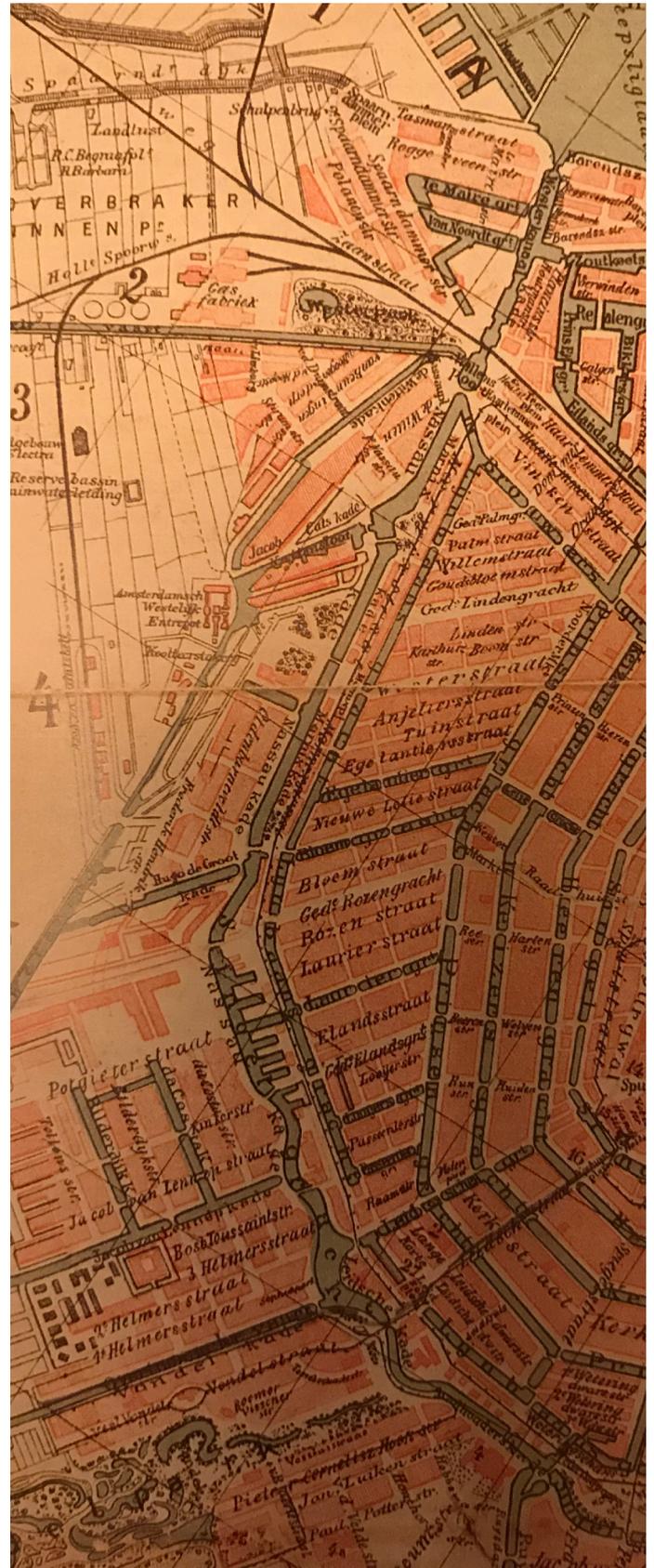


Warehouses & Windmills

8.1 History of the site



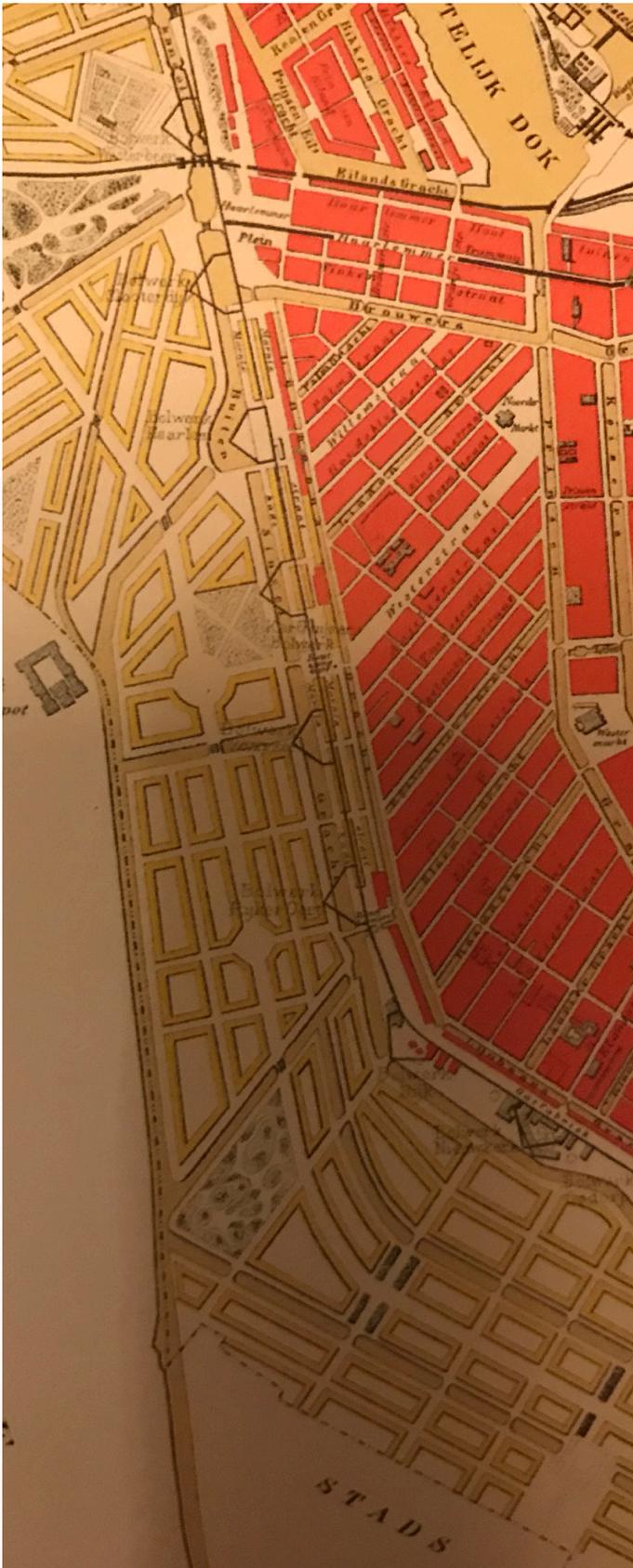
8.2 Illustrations of location with windmills and factories



8.3 Frederik Hendriksbuurt slowly developed with dwelling

Warehouses & Windmills

8.1 History of the site



8.3 One of many plans for dwelling in Frederik Hendriksbuurt



8.4 Map from 1929 showing the industrial strip intact

68. Hameleers, M. (2003). p. 109-209



Warehouses & Windmills

8.2 History of the building

The exact date of completion from the building wasn't found but drawings and building style suggest it is around 1920. The first drawing is from 1922 for an change in the inside of the building. The applicant for the permit was the builder of the original building Meester's Gewapend Betonbouw. This was an firm from Amsterdam specialized in building with reinforced concrete which was a relatively new technique for the time. A small firm yet involved in some big innovative projects such as the Nirwana flat in The Hague (first flat in the Netherlands and listed Dutch Heritage), Sanatorium Zonnestraal in Hilversum (listed for UNESCO World Heritage) and the Derde Ambachtsschool in Scheveningen (listed Dutch Heritage).⁶⁹

The building in Amsterdam is not listed but is still a well preserved example of reinforced concrete done by the Amsterdam firm Meester's Gewapend Betonbouw. The building was called De Magister (picture 8.6). The reasoning for the name for the building wasn't found in any documents but Magister is originally from Latin meaning master or leader.



8.6 Advertisement Meester's Gewapend Betonbouw De Magister

69. http://www.architectuur.org/bouwwerk/193/Nirwana_Flat.html

Warehouses & Windmills



8.2 History of the building

The building started out as a garage and shop for cars at the ground floor and the yard with the upper floors being used as a warehouse (picture 8.6). From the users after the original owners is not much photographic material or history available only drawings of permits.

The building had a printing shop on the second floor around 1922 (picture 8.7). At that point Meester's Gewapend Betonbouw was still the applicant of the permits so also probably the owner of the building. In 1930 ownership changed or at least the building was owned by Hille en Zoon who produced biscuits with the brand name The White Elephant (De Witte Olifant) (picture 8.8). After 1930 there were no permits for a long time. Hille en Zoon existed till 1959 but the first permit showed that a dentist took office at the ground floor.⁷⁰



8.7 Printing shop as in 1922



8.8 Hille en Zoon biscuits The White Elephant

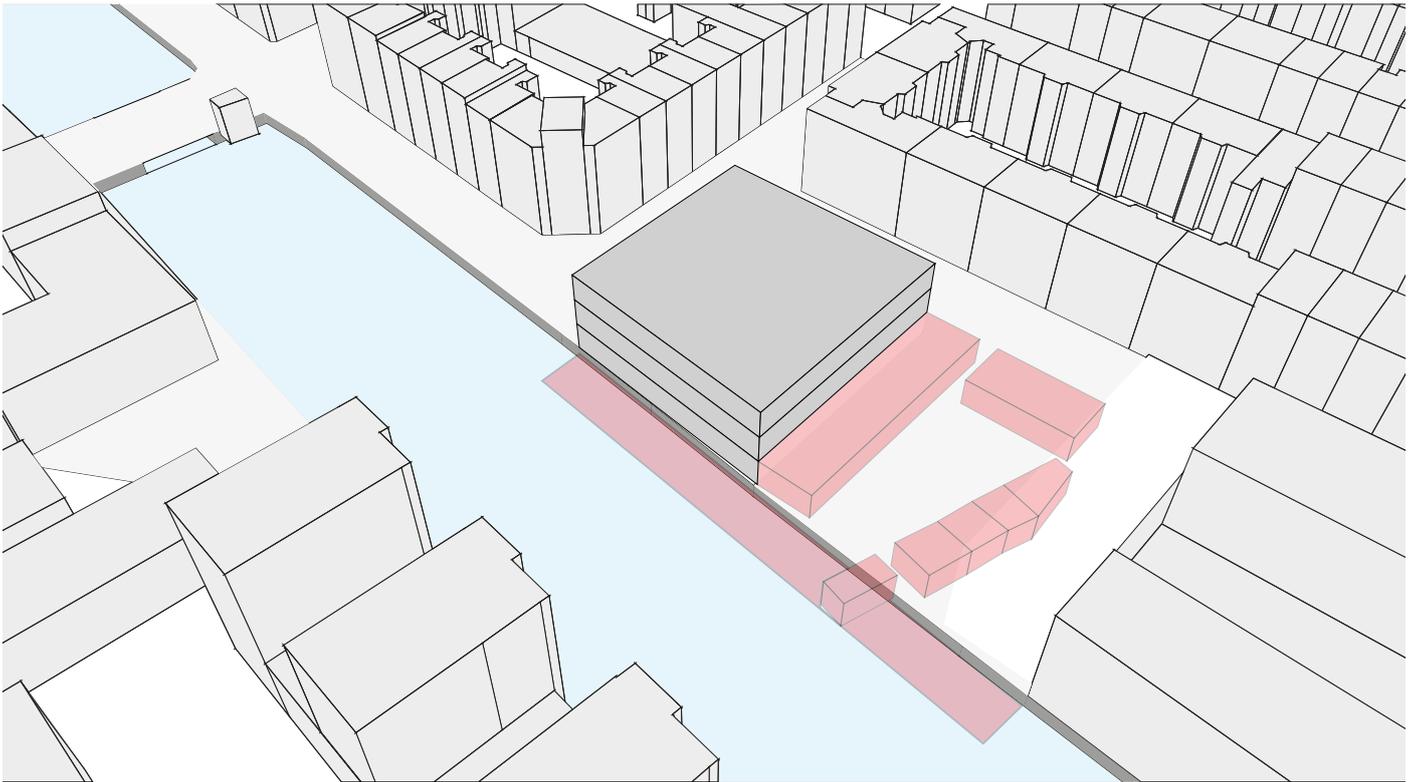
70. <http://www.zaanwiki.nl/encyclopedie/doku.php?id=beschuitfabrieken>.



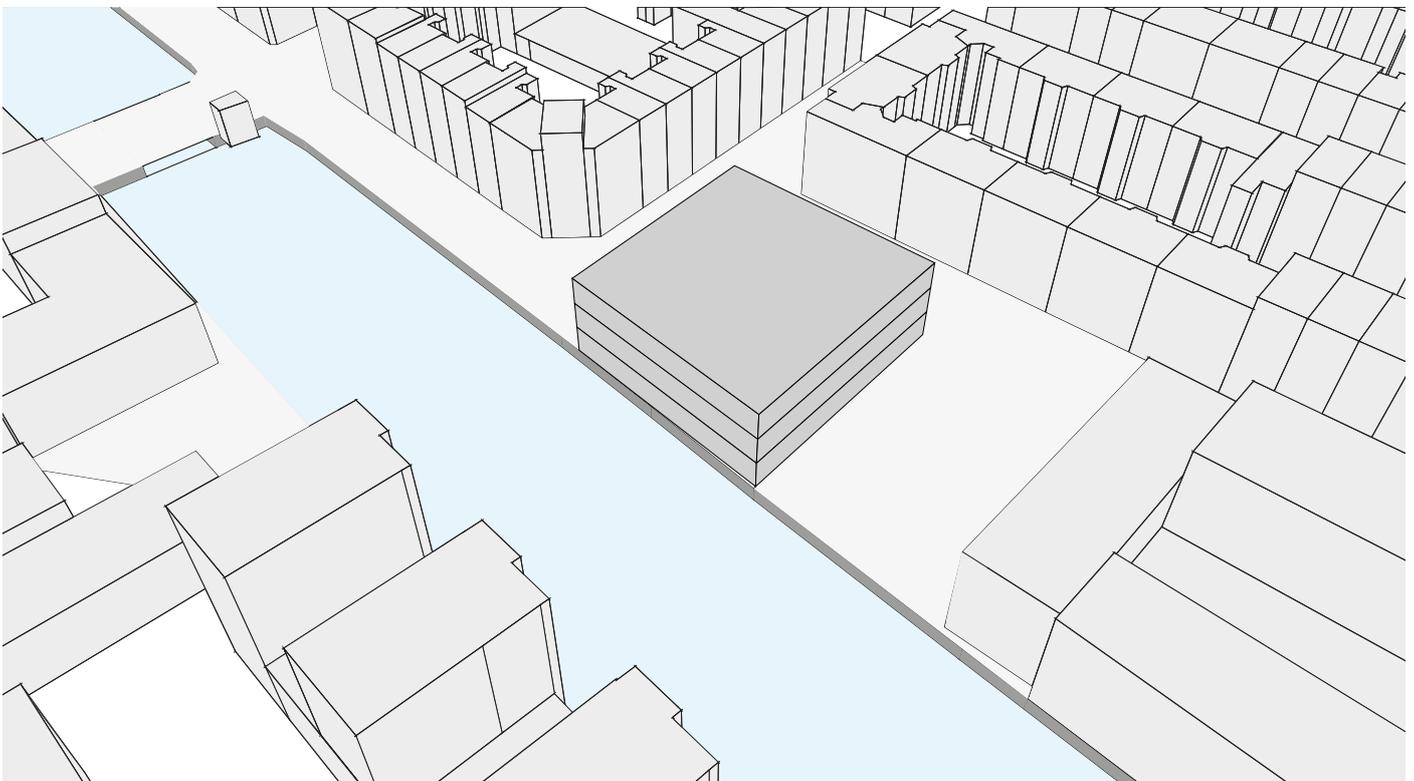
Warehouses & Windmills

8.2 History of the building

All these changes have resulted in an change in exterior and interior where the inside with the column structure remained the same (some non-load bearing partition walls added through time). The facades are discussed in chapter IX showing the transition through time. The plot isn't well documented except for a drawing from 1922 (picture 8.9 – 8.10). The plot had a deck for entering from the waterside. The south façade facing what's now a playground was the backyard with a small expansion connected to the main building. The rest of the yard was filled with some smaller buildings probably for storage.



8.9 Surrounding Gillis van Ledenberchstraat - Zaagmolenstraat 1922



8.10 Surrounding Gillis van Ledenberchstraat - Zaagmolenstraat 2018



- IX -



9.1 De Magister



- IX -

Heritage as a cornerstone

“Change through time & construction”

A description of the changes the facades of the building made through time. Also the main construction is calculated to prove that the building can get extra levels on top making the heritage building a densification project.

This chapter gives an answer to the sub question:

How are the facades changed through time and what is still original?

What type of construction has the building and can this be used to put extra levels on the building?



Heritage as a cornerstone

9.1 Changing facades



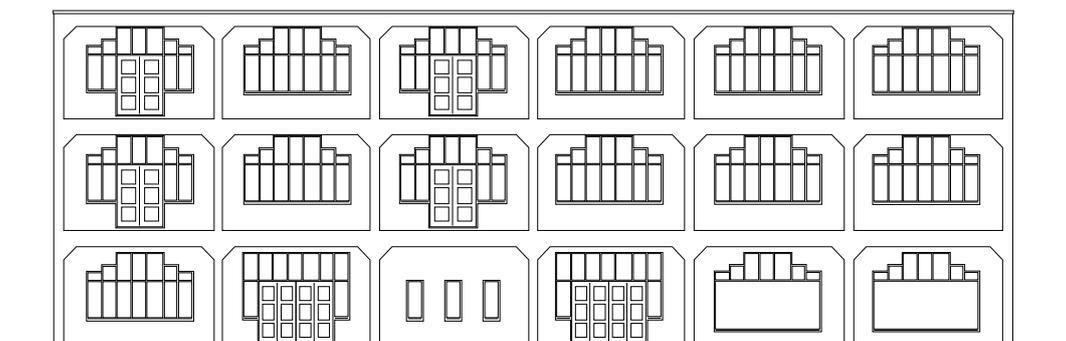
9.2 Facade Gillis van Ledenberchstraat 2017

Heritage as a cornerstone



9.1 Changing facades

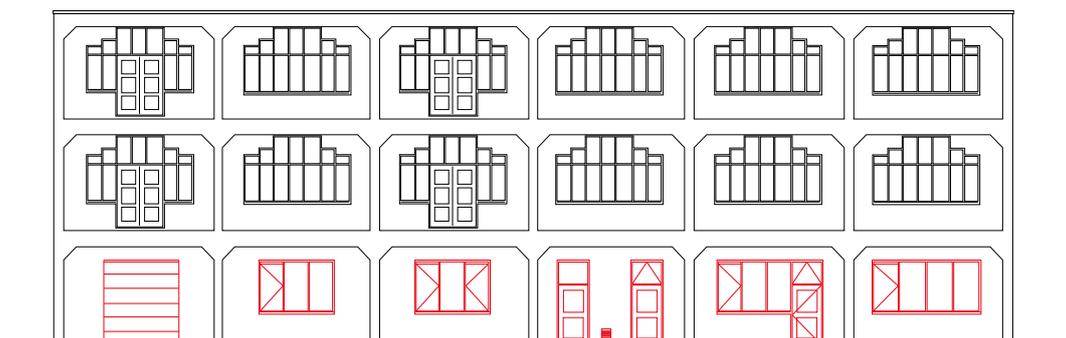
The façade facing the Gillis van Ledenberchstraat is well documented when it was built because it was showed at a flyer for advertisement and on building drawings from 1922 (picture 9.3). In 1979 there was a dentistry located at the ground floor and another set of drawings where made showing the façade in the current and new state of 1979 (picture 9.4). With the existing photographs made at 2017 the changes in the façade are made visible in red (picture 9.5). It shows that the façade is almost original in form at the first and second floor while being completely changed at the ground.



Gillis van Ledenberchstraat

Around 1922 - First drawing archive

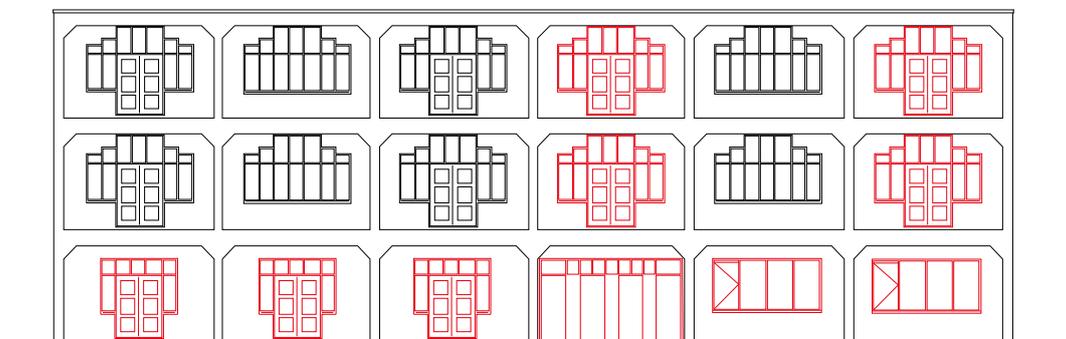
9.3 Facade Gillis van Ledenberchstraat 1922



Gillis van Ledenberchstraat

1979 - Dentistry

9.4 Facade Gillis van Ledenberchstraat 1979



Gillis van Ledenberchstraat

2017 - Current state

9.5 Facade Gillis van Ledenberchstraat 2017



Heritage as a cornerstone

9.1 Changing facades

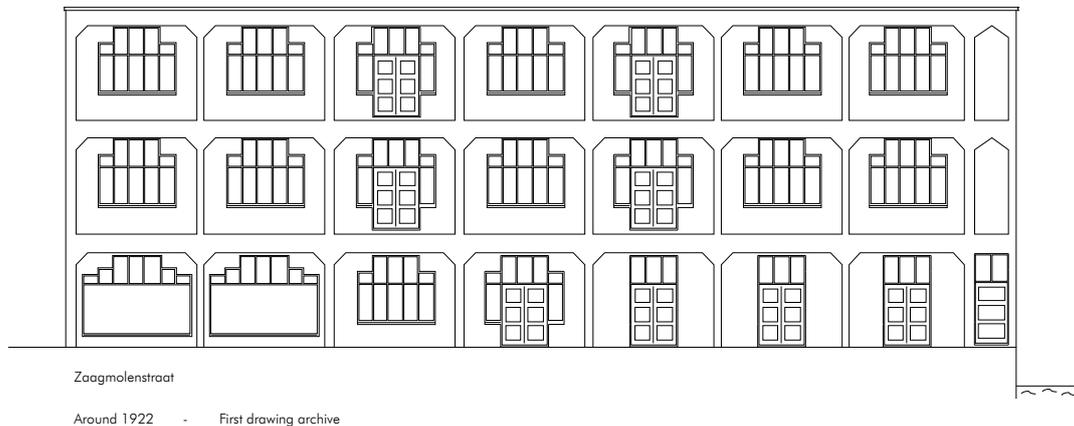


9.6 Facade Zaagmolenstraat 2017

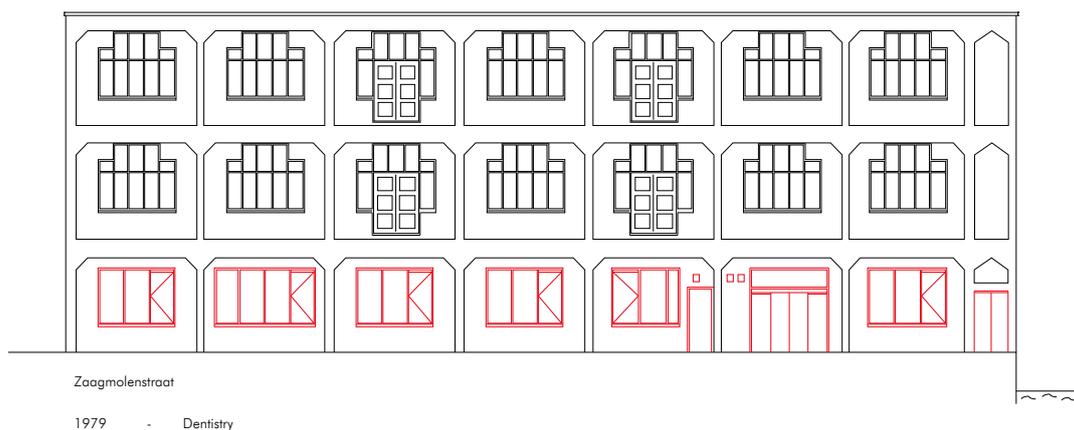


9.1 Changing facades

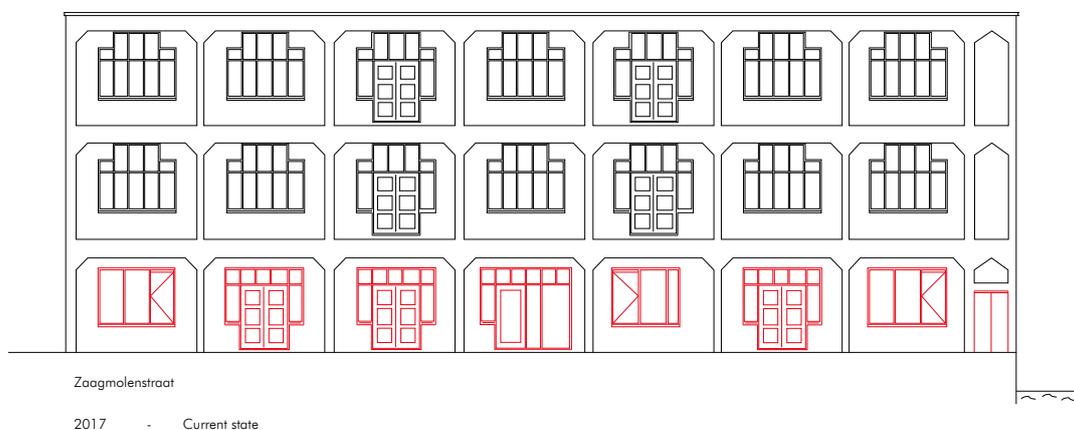
The façade facing the Zaagmolenstraat is well documented when it was built because it was showed at a flyer for advertisement and on building drawings from 1922 (picture 9.7). In 1979 there was a dentistry located at the ground floor and another set of drawings where made showing the façade in the current and new state of 1979 (picture 9.8). With the existing photographs made at 2017 the changes in the façade are made visible in red (picture 9.9). It shows that the façade is original in form at the first and second floor while being completely changed at the ground.



9.7 Facade Zaagmolenstraat 1922



9.8 Facade Zaagmolenstraat 1979



9.9 Facade Zaagmolenstraat 2017



Heritage as a cornerstone

9.1 Changing facades

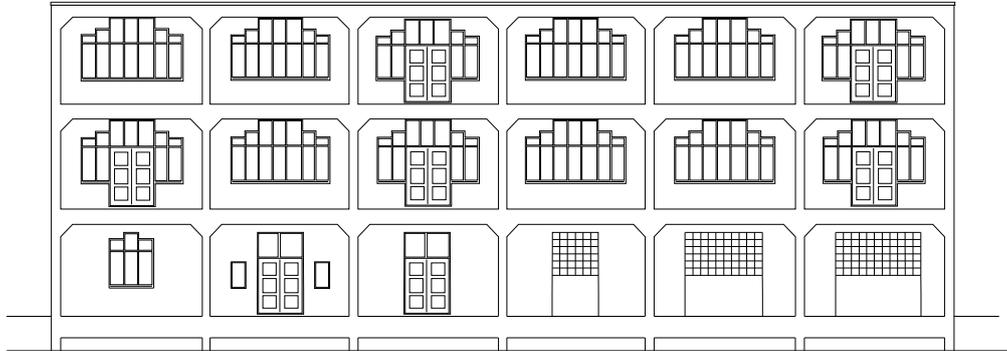


Heritage as a cornerstone



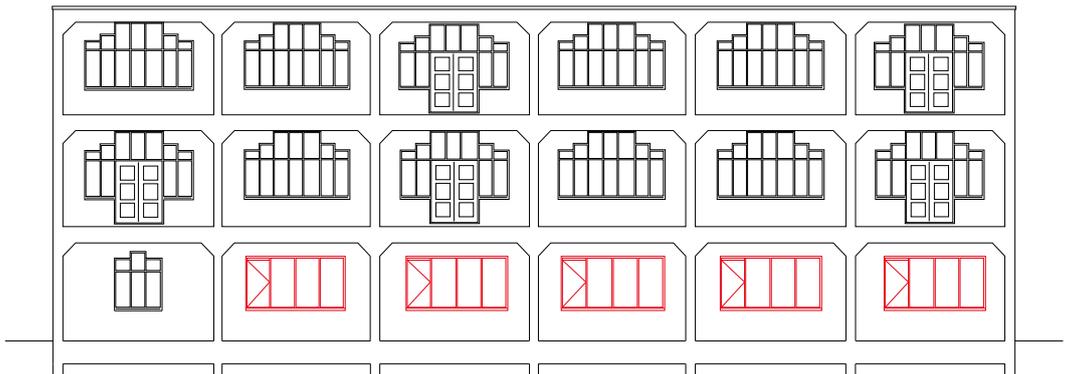
9.1 Changing facades

The façade facing the Kostverlorenvaart is not documented in 1922 leaving it impossible to exactly know how the original façade looked. In 1979 there was a dentistry located at the ground floor and another set of drawings where made showing the façade in the current and new state of 1979 (picture 9.11 - 9.12). With the existing photo's made at 2017 the changes in the façade are made visible in red (picture 9.13). It shows that the façade at the ground floor is completely changed. The first and second floor are at several places altered but give a uniform expression. Without drawings or photographs of 1922 it is impossible to state if they are original in form.



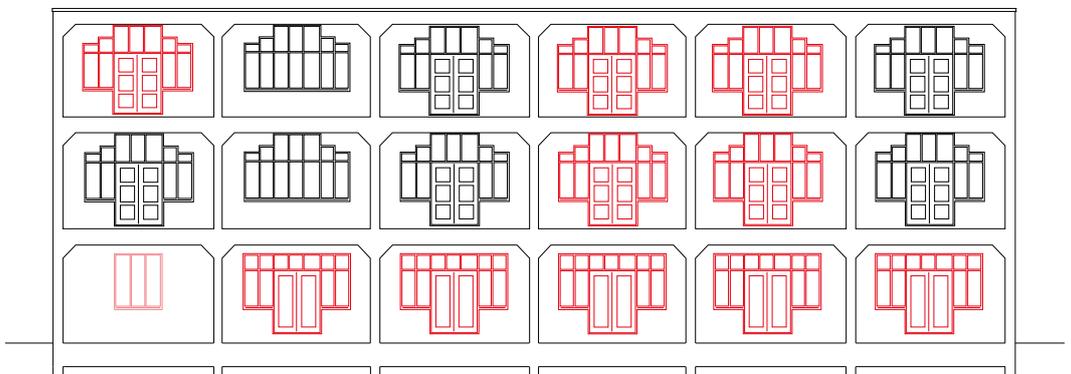
Kostverlorenvaart
Before - 1979

9.11 Facade Kostverlorenvaart before 1979



Kostverlorenvaart
1979 - Dentistry

9.12 Facade Kostverlorenvaart 1979



Kostverlorenvaart
2017 - Current state

9.13 Facade Kostverlorenvaart 2017



Heritage as a cornerstone

9.1 Changing facades

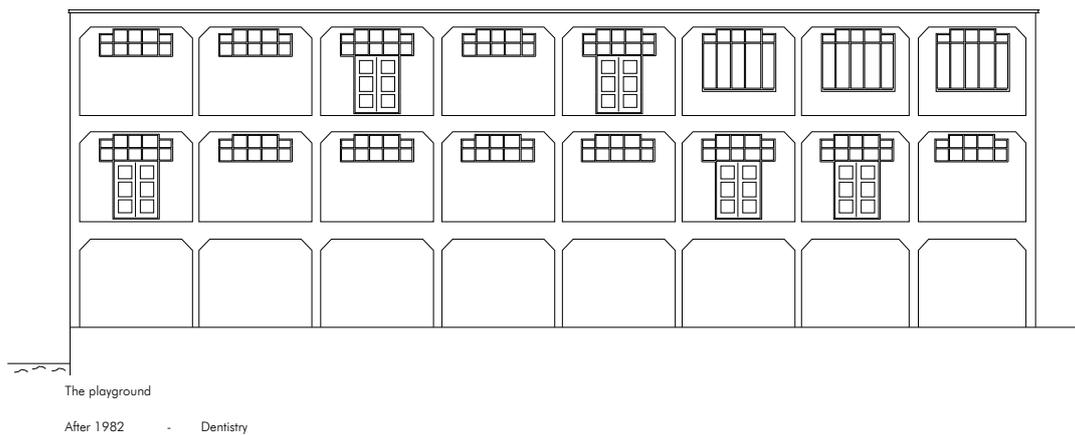


Heritage as a cornerstone

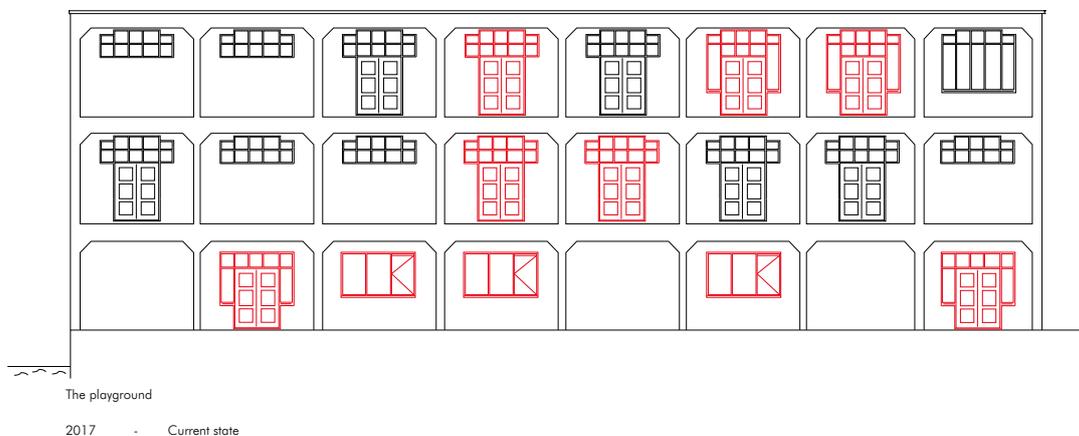


9.1 Changing facades

The façade facing the playground is not documented in 1922 leaving it impossible to exactly know how the original façade looked. With the floorplan from 1922 can be shown that the ground floor was originally completely closed with brick. The first and second floor are also altered since 1922. This is researched with photographs. Because there are differences in window configurations it is likely that there are made changes in the facades since 1922 making this side of the building less original than the Zaagmolenstraat and Gillis van Ledenberchstraat façade.



9.15 Facade Playground after 1982



9.16 Facade Playground 2017



Heritage as a cornerstone

9.2 Construction

The existing construction is made out of reinforced concrete (approximately 1920). The strength of the concrete will be less than the concrete used today, nonetheless the structure is well proportioned making it suitable for adding levels on top of the building.

As described in chapter VIII the original function was a warehouse, an industrial function which was already calculated for a heavier load on the construction than dwellings. In a later stage (approximately 1922) the second floor was used by a printing company which in that time had a lot of heavy equipment, suggesting the existing construction can hold a substantial amount of weight.

The existing structure is made out of concrete consisting of columns (320 x 320 mm) and beams (300 x 500 mm).

To determine if the construction could potentially uphold extra added floors a calculation needs to be made. Before such a calculation can be made the new added material should be chosen.

There are three types of construction possible; solid structure (A), two load bearing walls (B), column structure (C) (picture 9.17).⁷¹ A column structure would be most suitable for the design providing freedom in both directions which is needed to connect communal space to each other and to the dwellings. Also with the existing structure being a column structure the dividing of the weight could cause problems if chosen a load bearing wall structure.

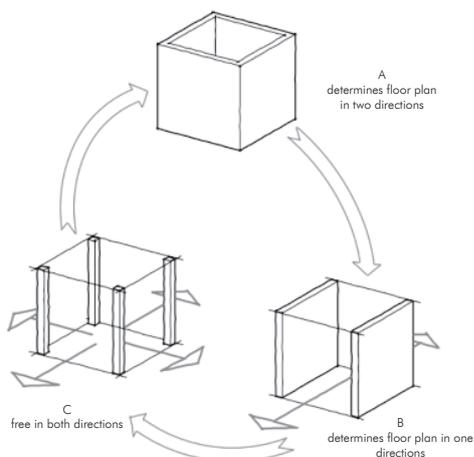
For the column structure there are three materials suitable which are concrete, steel and wood. Out of the three, wood has the best qualification being the least in weight, natural resource (healthy material) and good acoustic and thermal qualities.⁷²

The calculation can be done with a rule of thumb and more explicit with a calculation to control the assumption. With the rule of thumb the first calculation is done for the building assuming it will be a building of six layers with a concrete column structure calculating the concrete column size at the ground floor. If this is less than the existing of 320 x 320 mm the assumption that three floors can be added can be done (picture 9.18).⁷³

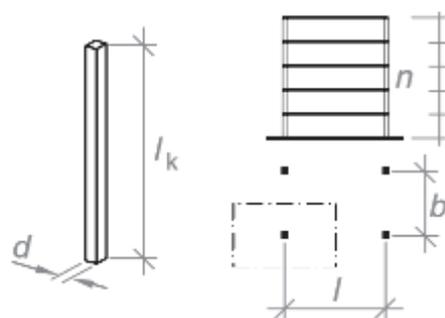
The calculation is as followed: $d = 1/35 * \sqrt{6} * 4 = 0,280 \text{ m} = 280 \text{ mm}$

The assumed size is 40 mm less than the actual concrete column. The existing column is of less quality nonetheless, the top three floor structures will be made out of wood instead of concrete and the dwelling function is of less weight as the previous industrial functions.

The existing size of 320 x 320 mm will be used in the calculations.



9.17 Types of load bearing structure



$$\text{Formula} = 1/35 * \sqrt{n} * l = d$$

9.18 Global calculation concrete

71. Amerongen van, R. PH., Millekamp, H., Spierings, T.G.M. (2004). p. 3-13

72. Amerongen van, R. PH., Millekamp, H., Spierings, T.G.M. (2004). p. 3-13

73. Amerongen van, R. PH., Millekamp, H., Spierings, T.G.M. (2004). p. 127-137



9.2 Construction

For the wooden construction a rule of thumb would be sufficient enough. The beam will be calculated to carry the weight of three floors (picture 9.19).

The calculation is as followed:

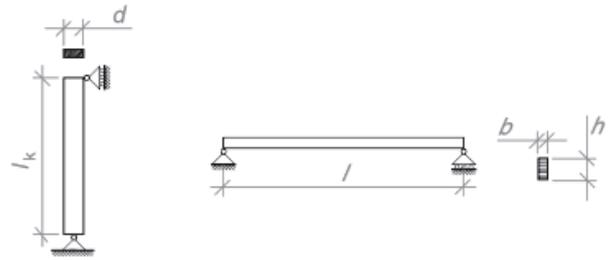
Column

$$d = 1/20 * 4 = 0,200 \text{ m} = 200 \text{ mm}$$

Beam

$$h = 1/20 * 5,6 = 0,280 \text{ m} = 280 \text{ mm}$$

$$d = 1/17 * 0,6 = 0,040 \text{ m} = 40 \text{ mm}$$



$$\text{Formula} = 1/20 * l = d$$

$$\begin{aligned} \text{Formula} &= 1/20 * l = h \\ &= 1/17 * a = d \end{aligned}$$

The column size is 200 x 200 mm. The laminated beam is bigger than calculated due to the fabric size. The beam size is 56 x 315 mm (7 laminated layers).⁷⁴

9.19 Global calculation wood

For the calculation there are factors for safety on permanent and variable load. For the new dwelling the safety factor is class 3; 1,2 permanent and 1,5 variable.

Permanent load structure:

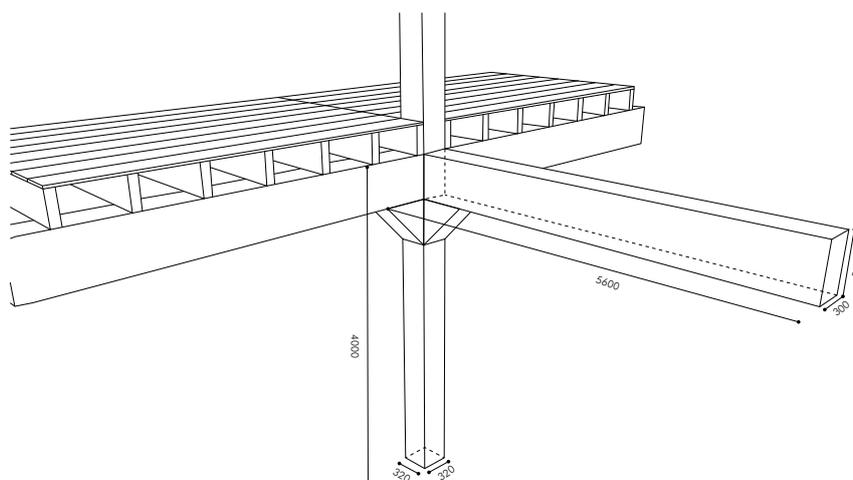
The load of the structure: wooden columns (3), wooden beams (3 x 4 x 0,5), concrete columns (2), concrete beams (3 x 4 x 0,5).

Calculated with the formulas below:

Permanent load column = surface column (m²) * length column (m) * weight material (kg/m³)

Permanent load beam = surface column (m²) * length beam (m) * weight material (kg/m³)

There are three floors with wooden beams and columns and three with concrete. Each column holds four beams but the weight is divided over two columns.^{75 76}



9.20 Calculation weight concrete column

74. Amerongen van, R. PH., Millekamp, H., Spierings, T.G.M. (2004). p. 173-180

75. Kamerling, J. W., Kamerling, M. W. (2004). p. 81 - 91

76. Gerrits, J.M., Hogeslag, A.J., Kamerling W.M. (2008). p. 109-124



Heritage as a cornerstone

9.2 Construction

Permanent weight columns and beams:

$$\begin{aligned}\text{Concrete column} &= 0,102 \text{ m}^2 * 4 \text{ m} * 2400 \text{ kg/m}^3 = 9,83 \text{ kN. (x 2)} \\ \text{Concrete beam} &= 0,150 \text{ m}^2 * 5,6 \text{ m} * 2400 \text{ kg/m}^3 = 20,16 \text{ kN. (x 6)} \\ \text{Wooden column} &= 0,040 \text{ m}^2 * 4 \text{ m} * 940 \text{ kg/m}^3 = 1,50 \text{ kN. (x 3)} \\ \text{Wooden beam} &= 0,018 \text{ m}^2 * 5,6 \text{ m} * 940 \text{ kg/m}^3 = 0,93 \text{ kN. (x 6)}\end{aligned}$$

Total permanent weight of the structure:

Concrete column	=	18,76 kN.
Concrete beam	=	120,96 kN.
Wooden column	=	4,50 kN.
Wooden beam	=	5,58 kN.
Total	=	149,80 kN.

Permanent load secondary structure and fittings:

63 column in total that cover an area of approximately 1.156 m². If the calculation is made for one column it will hold an percentage of the total area in weight. The area per column is around 18,35 m².

Plywood floor boarding with wooden floor beams (x 5):	0,30 kN per m ²
Roof with insulation (x 1):	0,30 kN per m ²
Pipes heating - cooling (x 6):	0,20 kN per m ²
Lighting (x 6):	0,05 kN per m ²
Light separated walls (x 3):	0,50 kN per m ²
Total:	4,80 kN per m ²

$$\text{Permanent load secondary structure and fittings: } 4,80 \text{ kN /m}^2 * 18,35 \text{ m}^2 = 88,08 \text{ kN.}$$

Variable load:

The variable load consist of rain and snow on the roof and the people occupying the dwellings.

Dwelling function (x 5) 2,5 * 0,5:	1,25 kN per m ²
Roof (x 1):	1,00 kN per m ²
Total:	7,25 kN per m ²

$$\text{Permanent load variable: } 7,25 \text{ kN /m}^2 * 18,35 \text{ m}^2 = 133,04 \text{ kN.}$$

The total load can be calculated by adding the safety factors.

Permanent load structure:	1,2 * 149,80 kN =	179,76 kN.
Permanent load secondary structure and fittings:	1,2 * 88,08 kN =	105,70 kN.
Permanent load variable:	1,5 * 133,04 kN =	199,56 kN.

$$\text{Total permanent load: } 676,56 \text{ kN. } ^{77} \text{ } ^{78}$$

77. Kamerling, J. W., Kamerling, M. W. (2004). p. 81 - 91

78. Gerrits, J.M., Hogeslag, A.J., Kamerling W.M. (2008). p. 109-124



9.2 Construction

With the total permanent load several calculation can be made to proof the strength of the construction.

Compressive stress column:

(For the calculation the lowest strength class is used of concrete since the concrete used will be of less quality than nowadays.)

Quadratic surface moment $I = (1/12) * 320 * 320^3 = 819.000.000$

Internal radius $i = \sqrt{819.000.000 / 102.400} = 89,44$

Slimness $\lambda = 4.000 / 89,44 = 44,72$

Reduction factor $w = 0,74$ (from a diagram confirmed by slimness)

Strength concrete C 12/15 = 15 (most used C 20/25)

$F / A = w * f_{c,d} = 676.560 / 102.400 = 0,74 * 15$
 $6,61 = 18,5$ is within the limit.

Buckling column:

Euler buckling force $F_e = 3,14^2 * 15.000 * 819.000.000 / 4000^2 = 7.570.324$

Permanent load $F_d = 676.560$

Buckling safety value $n = 7.570.324 / 676.560 = 11,19$
 $11,19 > 10$ is within the limit.

Eccentricity column:

Strength concrete C 12/15 = 15 (most used C 20/25)

Load on 1 floor $F = (4,5 \text{ kN} * 18,35 / 5) * 1,5 = 24773$

Moment eccentricity $M_e = 24773 * 3/4 * 320 = 5.945.520$

Moment of resistance $W = 1/6 * 320 * 320^2 = 5.461.333$

Eccentricity column = $5.945.520 / 5.461.333 < 15$
 $1,09 < 15$ is within the limit.

Strength column:

Compressive stress = 6,61

$f_{c,d} * w = 18,5$

$f_{c,d} = 15$

Eccentricity = 1,09

Buckling column $n = 11,19$

Strength of column = $(6,61 / 18,5) + (1,09 / 15) * (11,19 / (11,19 - 1)) < 1$

$0,47 < 1$ is within the limit. ^{79 80}

The existing structure can uphold the three added floors if the construction chosen is wood.

$$\sigma = F / A < w * f_{c,d}$$

σ = compressive stress
 F = permanent load
 A = column surface
 w = reduction factor
 $f_{c,d}$ = strength concrete

$$\lambda = L / i$$

λ = slimness
 L = buckling column

$$i = \sqrt{I / A}$$

i = inertial radius
 A = column surface

$$I = 1/12 * b * h^3$$

I = quadratic surface moment
 B = column size
 H = column size

9.21 Compressive stress

$$n = F_e / F_d > 10,0$$

n = buckling safety value
 F_d = permanent load

$$n < 5,0$$

$$n > 5,0$$

$$n > 10,0$$

= unsafe

= more research

= safe

$$F_e = 2 * E * I / L^2$$

F_e = Euler buckling force
 E = modulus of elasticity
 I = quadratic surface moment
 L = buckling column

9.22 Buckling

$$\sigma = M_e / W < f_{c,d}$$

σ = eccentricity
 $f_{c,d}$ = strength concrete

$$W = 1/6 * b * h^2$$

W = moment of resistance
 b = size column

$$M_e = F (1 \text{ floor}) * 3/4 h$$

M_e = moment eccentricity
 F = load of one floor
 h = size column

$$(\sigma_c / (f_{c,d} * w)) + (\sigma_m / f_{c,d}) * (n / (n-1)) < 1$$

σ_c = compressive stress
 σ_m = eccentricity

9.23 Eccentricity column & strength column

79. Kamerling, J. W., Kamerling, M. W. (2004). p. 81 - 91

80. Gerrits, J.M., Hogeslag, A.J., Kamerling W.M. (2008). p. 109-124



- X -



10.1 Gillis van Ledenberchstraat - Zaagmolenstraat



- X -

Site analysis

“Dwelling types & mass model studies”

This chapter will analyze the site and building on his qualities and shortcoming for the design. The existing surrounding provide certain element important for the design such as sightlines, view and day - and sunlight. Beside the surrounding qualities the existing building needs to be tested on how to fit a co-housing scheme. Not only the existing but also the new added volume needs be tested as well as how they react on each other.

This chapter gives an answer to the sub question:

What are the qualities of the surrounding area?

How can the existing building fit a co-housing scheme?

How will the existing building work with the added on volume?

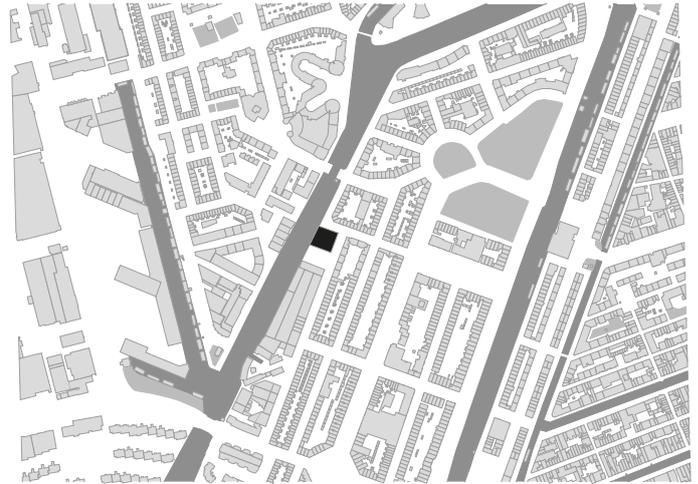
How can the added volume fit a co-housing scheme?



Site analysis

10.1 Qualities surrounding

The design is located at the cross section of the Gillis van Ledenberchstraat and Zaagmolenstraat in the Frederik Hendrikbuurt in Amsterdam (pictures 10.3 - 10.4). The existing building is maintained and combined with the surrounding, this will bring some elements which can be incorporated into the design.



10.2 Gillis van Ledenberchstraat - Zaagmolenstraat



10.3 Frederik Hendrikbuurt Amsterdam



10.1 Qualities surrounding

1. west – south orientation:

Two sides of the building are orientated towards the midday and evening sun. These sides of the building can provide outdoor or communal spaces for all the residents and their social activities.

2. water view - connection water:

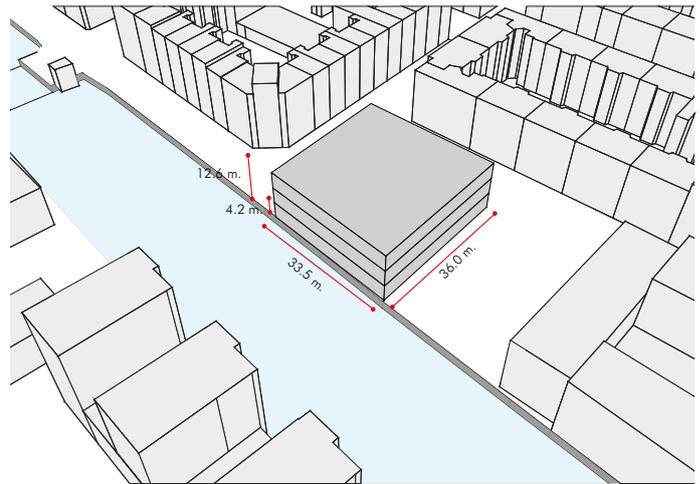
The west façade is connected to the water and the north and south side provide a vision on the water.

3. connection to square:

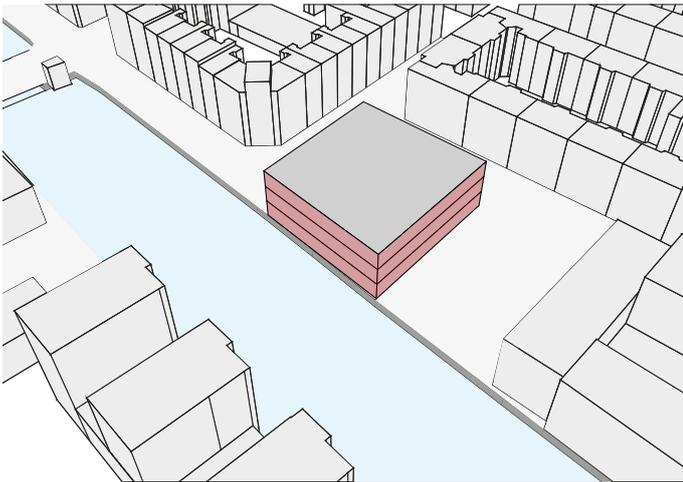
The south side is connected to a square which with a the new function can result in social interaction and benefits for the neighborhood.

4. Free standing:

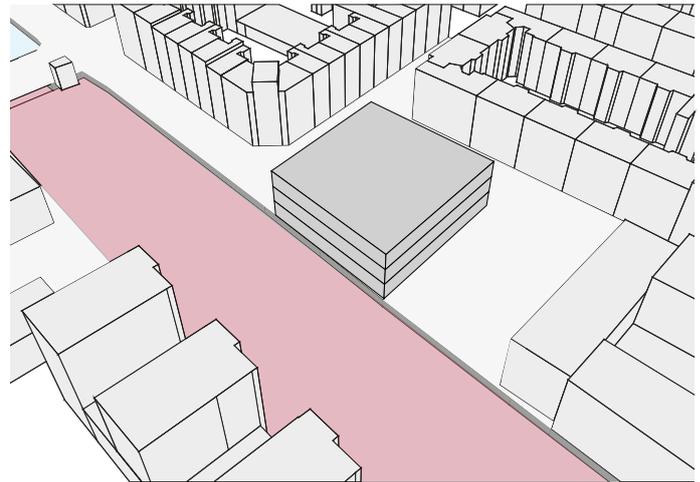
The existing building is free standing making it stand out in comparison to the other buildings in the neighborhood. The shape of the building stands out making it more recognizable.



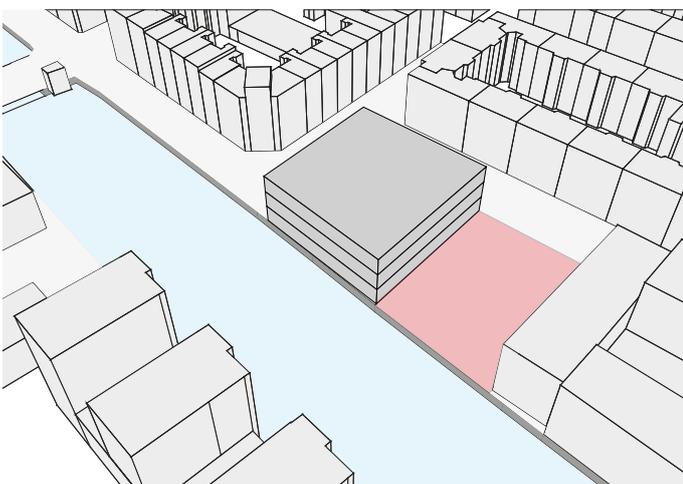
10.3 Measurements



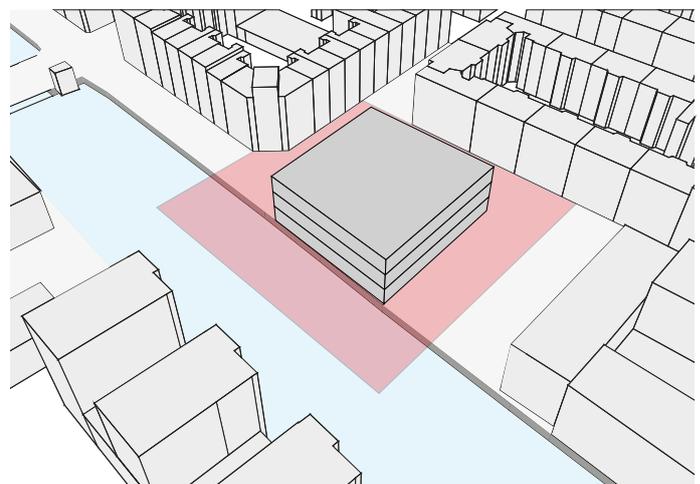
10.4 West - South orientation



10.5 Water view - Connection water



10.6 Connection to square



10.7 Free standing building



Site analysis

10.2 Building mass model

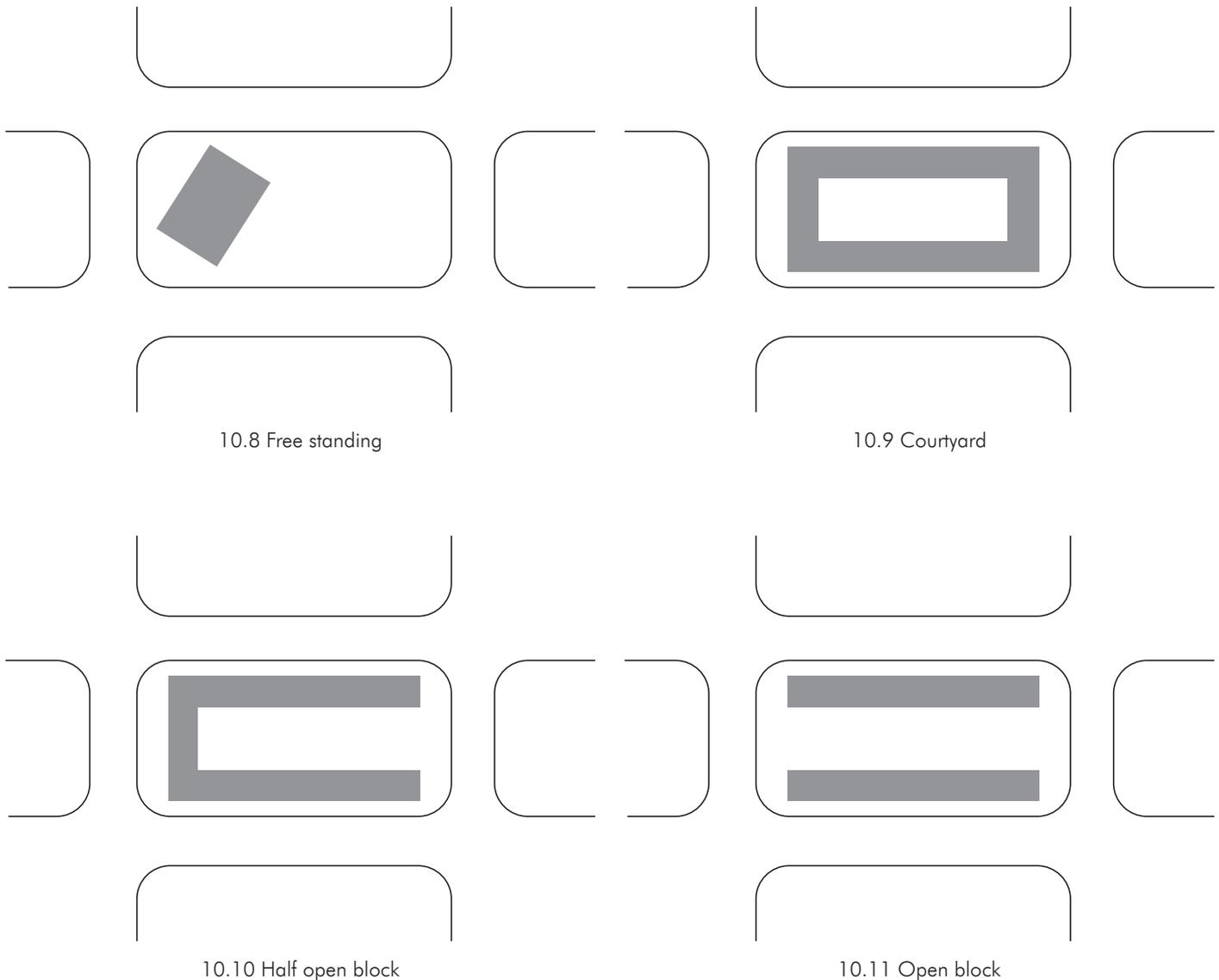
In the book of Leupen and Mooij called "Het ontwerpen van woningen" are nine typologies described for the urban environment. If the site is analyzed four of those nine would be suitable.

1. Free standing (picture 10.8 & 10.12):

A free standing object leaves on the ground floor space free which can be used for public functions in the neighborhood. The building, depending of the dimensions used provide good daylight in the dwelling and can create a high density by building higher than normally done. 81

2. Courtyard (picture 10.9 & 10.13):

The courtyard is a closed of building block with an inner yard for private use. The problems exist with the corner dwellings which lack good sun orientation, private outside space and connection to the inner yard. Several solutions where introduced such as making the inner yard public space creating the possibility for double sided entrances. Using the corners as circulation space while enhancing the size of corner dwellings resulted in bigger apartments with more qualities than the existing. With the solutions the relation between private and public changed creating new possibilities. 82



81. Leupen, B., Mooij, H. (2011). p. 216-219
82. Leupen, B., Mooij, H. (2011). p. 230-231



10.2 Building mass model

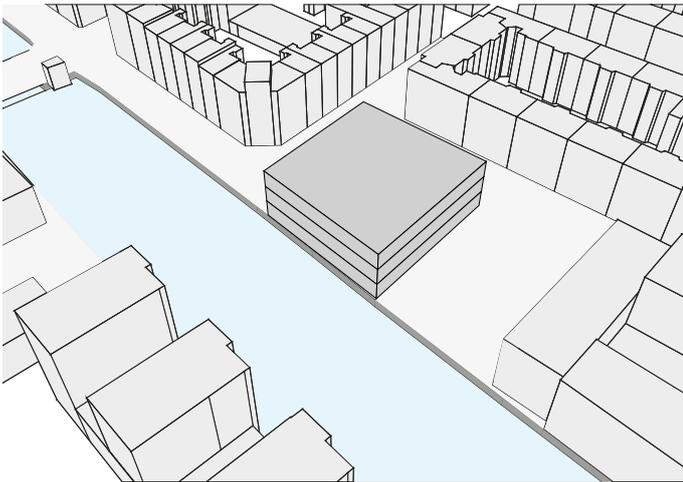
3. Half open block (picture 10.10 & 10.14):

It is the same as the courtyard but opened at one side of the building block. There is a loss of privacy in the inner yard but there is a gain on entering sunlight and the view from inside is increased. The side that is opened now provides a new type with three orientation possibilities, instead of the difficult to solve corner dwelling. 83

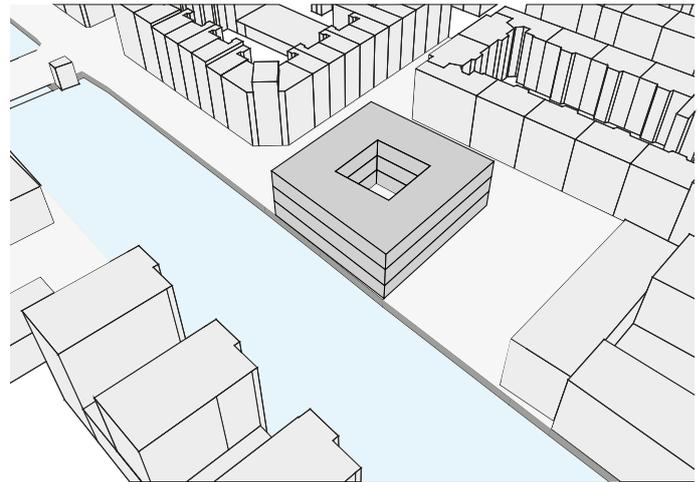
4. Open block (picture 10.11 & 10.15):

The open block provides two rows of dwelling which can be orientated well and have therefor gardens and indoor spaces rich with sunlight. Comparing to the courtyard and half open block the corner dwelling do not exist which had problems with daylight and sunlight. The backsides form an informal street while the front side of the building defining the public space at the street side. 84

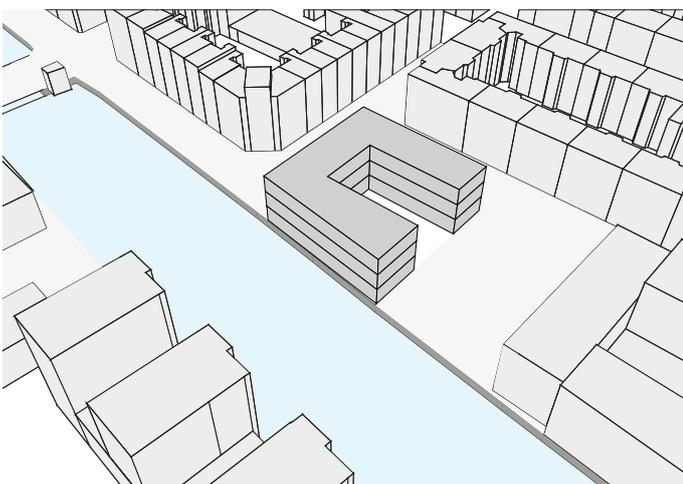
Because the site is an existing building not every urban typology is possible. The existing building is three layers of the urban typology free standing. The only other typology which keeps the appearance of form and façade the same is with a courtyard.



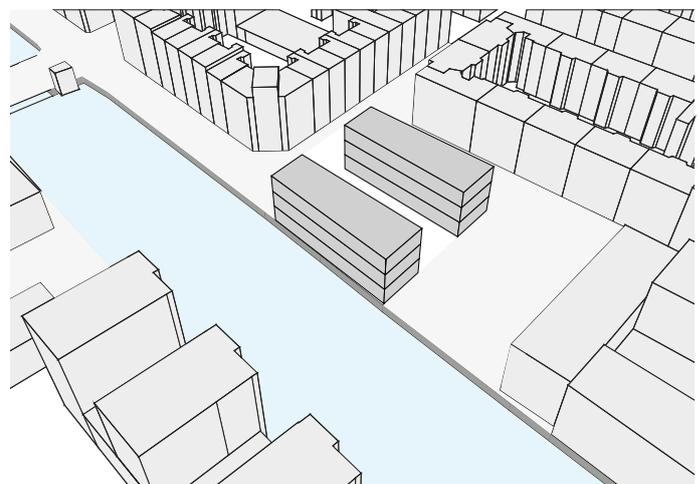
10.12 Free standing (existing)



10.13 Existing as courtyard



10.14 Existing as half open block



10.15 Existing as open block

83. Leupen, B., Mooij, H. (2011). p. 220-223

84. Leupen, B., Mooij, H. (2011). p. 224-226



Site analysis

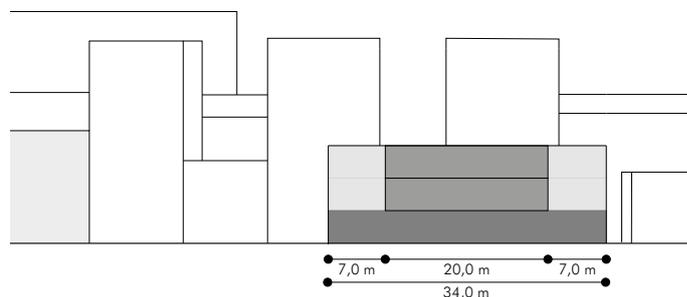
10.2 Building mass model

Without a courtyard the building will only have daylight from the outside façade and at the top level from the roof. The outside facades will bring daylight into the building 7 meters deep leaving a space of 20 by 20 in the middle without daylight (picture 10.18).⁸⁵

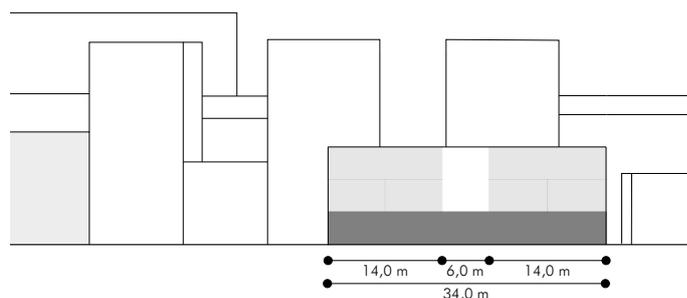
To provide daylight in the whole building two sided can be the solution, which results in a courtyard typology. In this way there is a double orientation possible. The minimum size needed for the site is 6 meters (picture 10.19). This size is only measured for providing the sufficient amount of daylight. The size also needs to fit with the measurements of the floor plan, existing structure and semi outdoor space. In the design the courtyard will be bigger than 6 by 6 meters since there are also layers added on top of the existing volume limiting the amount of light entering from above.

There is also a maximum size for the courtyard. This is based on a minimum size needed for a dwelling. For the design a minimum size can variate between 5,4 and 7,0 meters. This depends on the zones in the dwelling. The dwelling can be one zone in depth (5,4 m) and two in width or two in depth (7, 0 m) and one in width (picture 10.20).⁸⁶

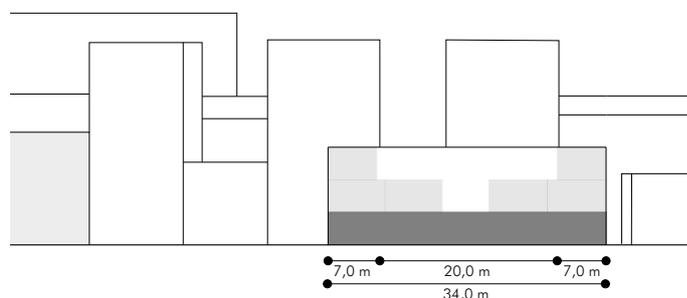
With a depth of 7,0 m this would result in an open space on the inside of 20 by 20 meters (picture 10.21).



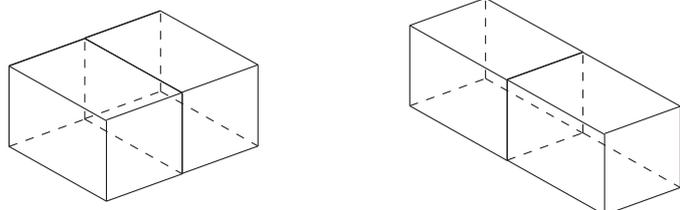
10.18 Section free standing maximum daylight



10.19 Section courtyard minimum needed for daylight



10.21 Section courtyard maximum opening



10.20 Depth and width of zones

85. Dobbelsteen van den, A., Huijbers, K., Yanovshtchinsky, V. (2012).

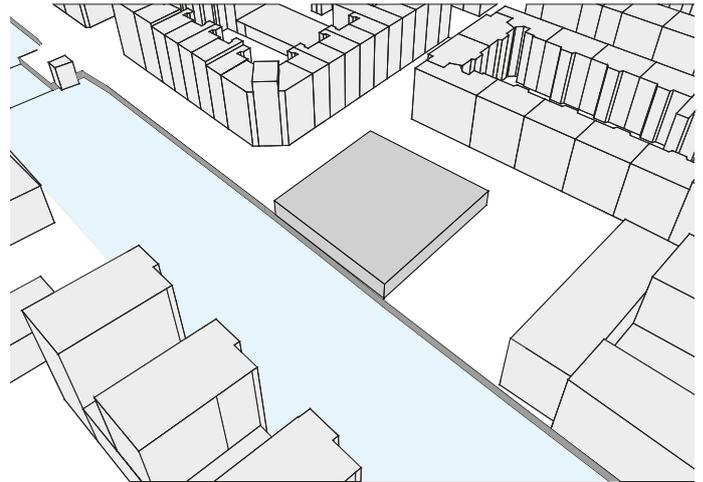
86. Leupen, B., Mooij, H. (2011). p. 93-95



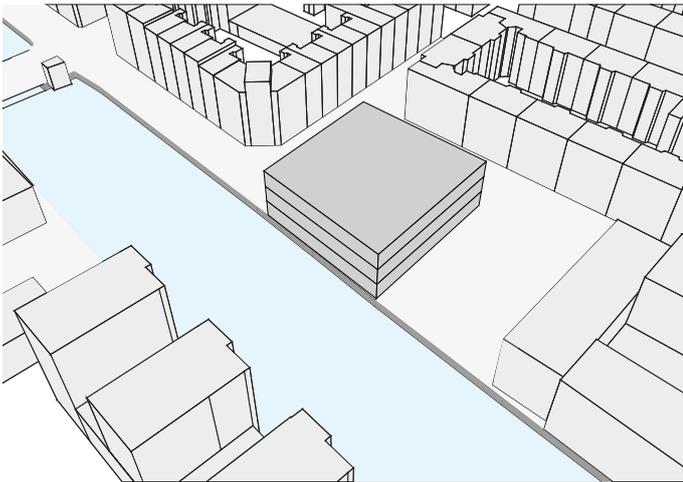
10.2 Building mass model

The free standing and courtyard typology can be projected at the site. The ground floor will be free standing since it has the square as outdoor space and the water side can be improved with a deck (picture 10.22).

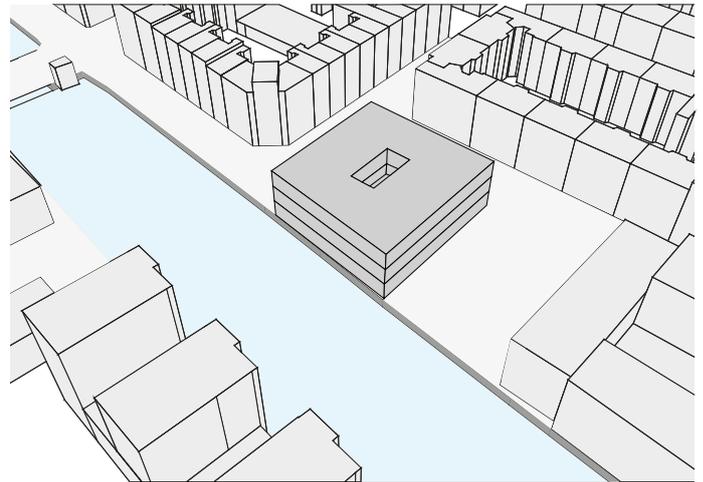
This will leave four options; free standing block, courtyard minimum, courtyard maximum and courtyard layered (pictures 10.23 – 10.26). With the free standing there is insufficient daylight, while the minimum courtyard provides not enough quality for the courtyard and the maximum courtyard will leave limited options for the floor plan. Chosen a layered version will provide a mixture. The second floor will provide enough space for a group scheme will the upper floor can be for single rooms leaving enough space for the light to enter (picture 10.26).



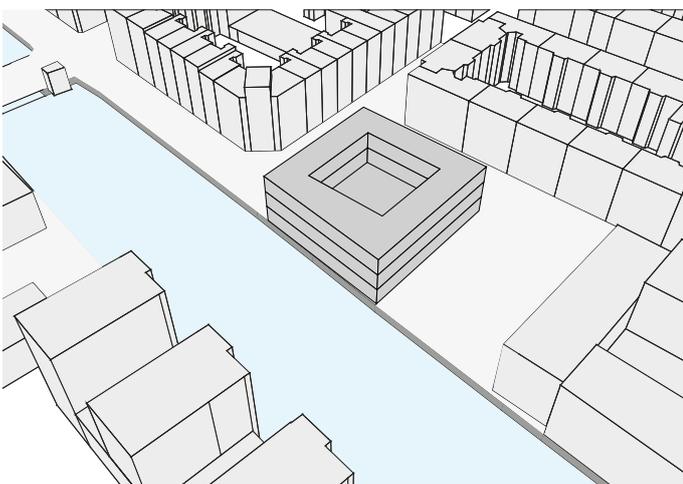
10.22 Ground floor free standing



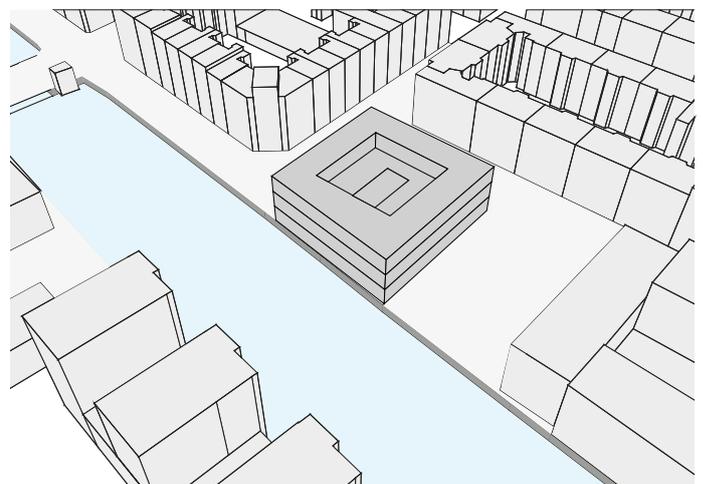
10.23 Existing building



10.24 Courtyard minimum



10.25 Courtyard maximum



10.26 Courtyard layered



Site analysis

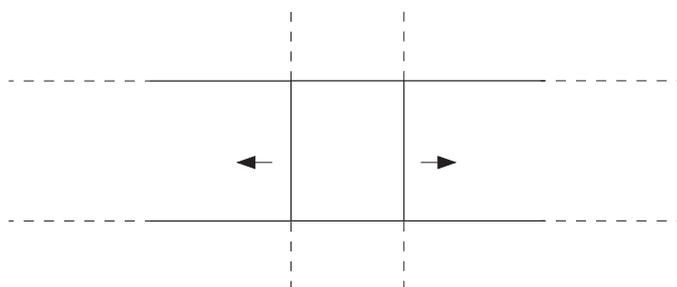
10.2 Building mass model

There are three possibilities for the existing structure when analyzing the type of circulation which are; corridor, gallery and elevator (pictures 10.27 – 10.29).

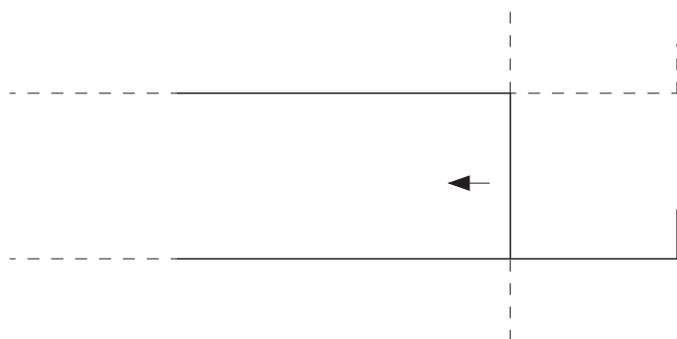
The existing building will not be free standing but a courtyard (qualities for; form, daylight, overall scheme) ruling out the option of the corridor. Besides that the corridor doesn't work for the form of the building, it would also result in a dark entrance zone and increased difficulty for people with dementia in wayfinding.⁸⁷

The gallery circulation is not preferable for people with dementia but for the widowers and students which will live on a floor with single dwelling unites it can provide the circulation space. The negative side of a gallery circulation can be the lack of privacy. People passing by can look into the dwelling but this negative is for this design scheme a positive because it leads to social control. Preventing isolation and loneliness are of higher priority in this design resulting in less privacy. This can mean that people that prefer to be left alone are not fit for this design scheme.⁸⁸

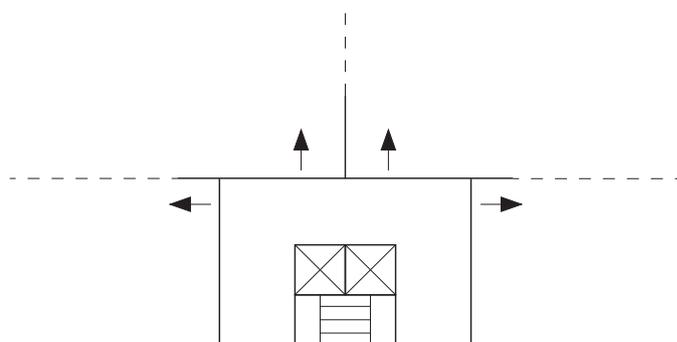
The elevator circulation fits the needs of the design scheme the best. People with dementia have the most benefits of a room when it is easy to oversee and corridors are avoided. With the elevator circulation the amount of space spent on circulation can be limited, providing schemes that are easy to oversee resulting in the most space being the communal areas where the social interaction occurs.⁸⁹



10.27 Corridor



10.28 Gallery



10.29 Elevator

87. Leupen, B., Mooij, H. (2011). p. 194-201

88. Leupen, B., Mooij, H. (2011). p. 186-193

89. Leupen, B., Mooij, H. (2011). p. 184-185

Site analysis

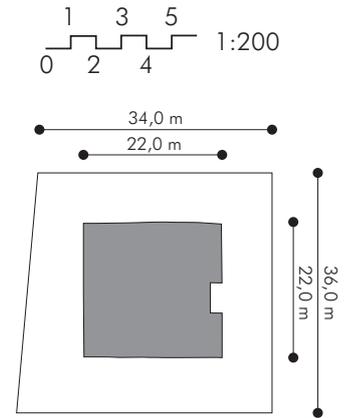


10.2 Building mass model

With the ground floor fully used for functions that benefit the residents and neighborhood the first floor will be where the dwelling starts. To test the site with the existing building a floor plan is copied onto the site to analyze the group size and building qualities such as daylight, floor plan and circulation (picture 10.30 – 10.31).

The projected plan is for individuals with in total a group of 8. The site is slightly more than double the size but in contrary to the projected plan a design made for couples. The design scheme should therefore provide the qualities for a co-housing scheme that is for larger groups of couples being for at least more than 8 couples on the second floor.

- A = Sleeping room
- B = Bathroom
- C = Entrance room
- D = Wintergarden
- E = Patio
- F = Kitchen - dinnerroom
- G = Living room
- H = Sitting - relaxing area
- I = Toilet caregivers
- J = Medical supply storage



10.30 Measurements Menos and Building



10.31 Projection of Menos on the site



Site analysis

10.2 Building mass model

The plan Menos is projected because it has many qualities for people with dementia living in co-housing schemes as described in chapter VII.

When the plan is analyzed and projected onto the site it will uphold most of these qualities which can be integrated into the design, while the site provide opportunities that are not available in the plan of Menos.

Three qualities in the plan of Menos:

Dual orientation dwelling unit corners (picture 10.32):

The corner units in the plan Menos are dual orientated resulting in more daylight in the dwelling and two sightlines towards outside.

Communal spaces at multiple sides of the building (picture 10.34):

While only half of the dwellings are dual orientated the communal spaces are all facing one side of the building providing sight. Not all the rooms have the same qualities but there is a four sided orientation.

Possibilities for increased daylight (picture 10.36):

With a semi outdoor and outdoor space in the center of the plan and a setback in the façade there are possibilities for bringing in more daylight into the scheme.

There are also three negative point in the plan of Menos which can be avoided in the design increasing the quality of a co-housing scheme:

Connected to entry (picture 10.33):

Two rooms are connected to the entry. The plan is explained as all rooms are connected to a communal space. The entrance being a communal space is providing nothing but circulation. In the design a connection to the circulation space is avoided. The entrance should be slightly hidden away not attracting the attention because this increases moment of uneasy and feelings of being locked up.

One elevator (picture 10.35):

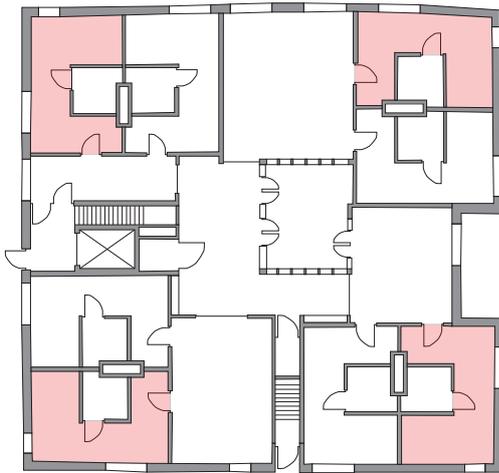
Because the design is at a bigger plot the group sizes and levels increase meaning one elevator is not enough. For the design a minimum of two is required.

Direct contact with communal space (picture 10.36):

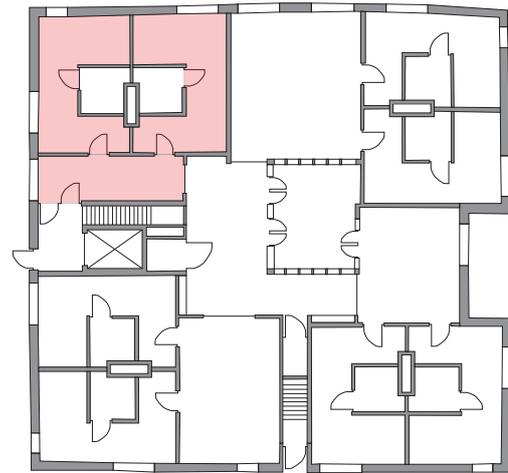
The circulation space is minimized and the communal spaces are increased in the plan of Menos but the direct contact with the dwellings would be described as a negative. Providing a small entrances zone results in a space where it can be personalized for the person with dementia. This increases the recognition of the own dwelling, without interfering with the furniture and design of the communal area. The direct doors on the communal area also attract attention of the person with dementia. This will increase the curiosity which is normally good but since the door is from a private space meaning that it is not available for the rest of the people with dementia it becomes a negative stimulation creating unease and negative behavior.



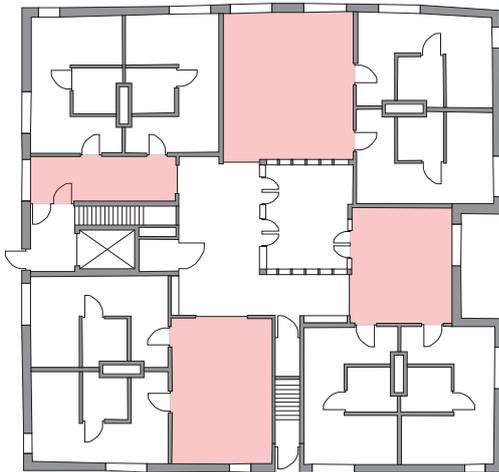
10.2 Building mass model



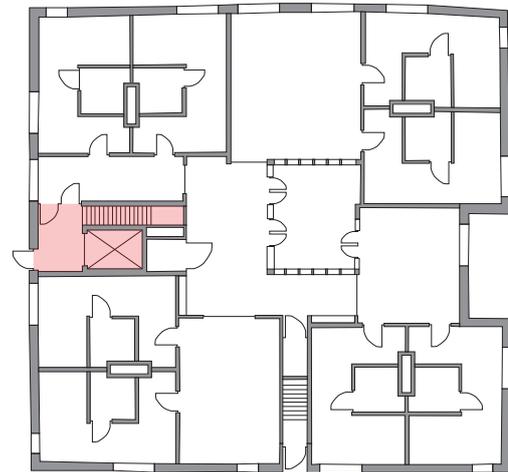
10.32 Dual orientation



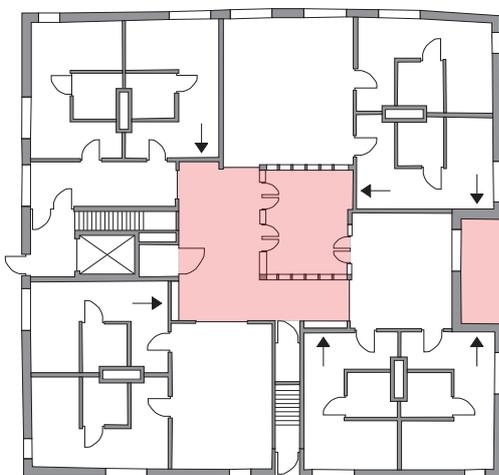
10.33 Connected to entry



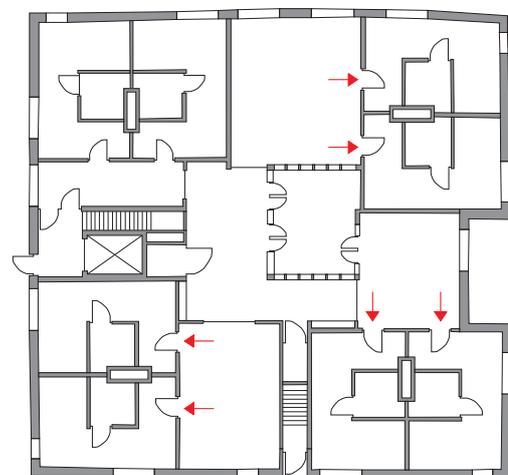
10.34 Communal spaces on multiple sides of building



10.35 One elevator



10.36 Possibilities for increased daylight



10.37 Direct contact with communal space

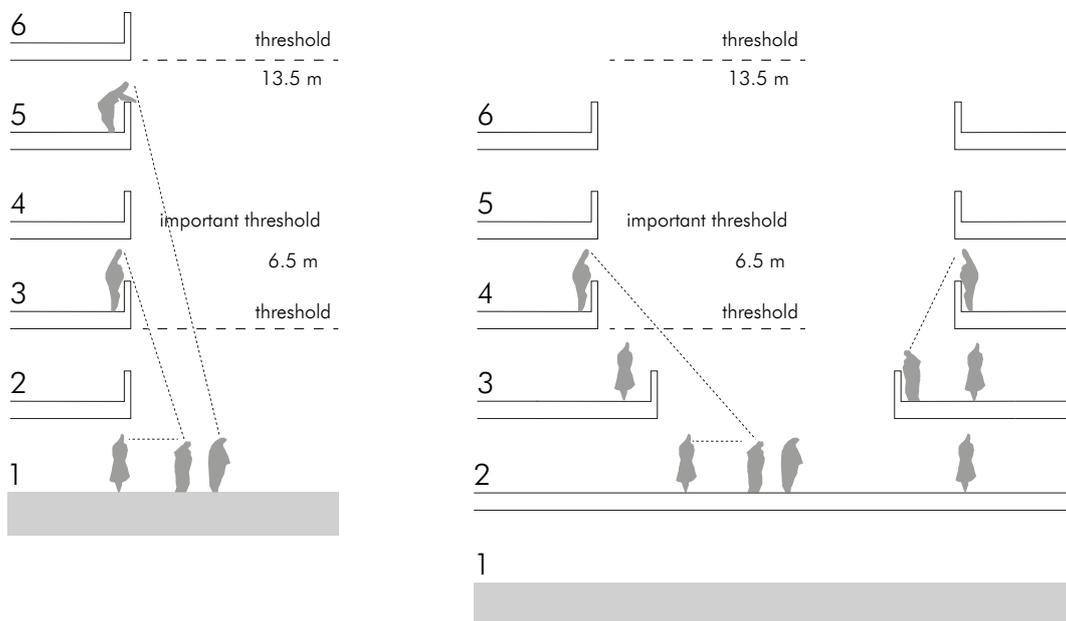


Site analysis

10.2 Building mass model

Important for the design is the social interaction in the project which should not only be between people living on one level but also within the building. Important for this is the sharing in facilities but also that there is a human scale present. Jan Gehl shows the human scale in a building with a diagram of a section (picture 10. 38 left). Communicating and interaction between levels only happens within a certain distance. An important threshold is between the ground floor (1) and third level (3). Above the second level there is only a visual connection to the fourth floor (5) but communicating in practice will not happen.⁹⁰

In the design the ground floor is fully used for neighborhood functions as a floor on its own connected with the outdoor space. This create the option for a courtyard from the first level up. The second level can be used for a co-housing scheme on the whole floor while the floors above provide single units and smaller co-housing schemes. From the second level towards the fourth level communication is possible therefor if the floors are connected social interaction can be stimulated (picture 10.38 right). Because the courtyard at the first level needs to provide sufficient daylight a setback is used throughout the third and fourth level. The fourth level will provide the least amount of square meters therefor locating the single units for people without dementia (such as the widowers and conservatory students) as a good fit. The third level will provide in small co-housing schemes for people with dementia and partner.



10.38 Human scale Jan Gehl - Human scale Site plan

90. Gehl, J. (2010). p. 36-45



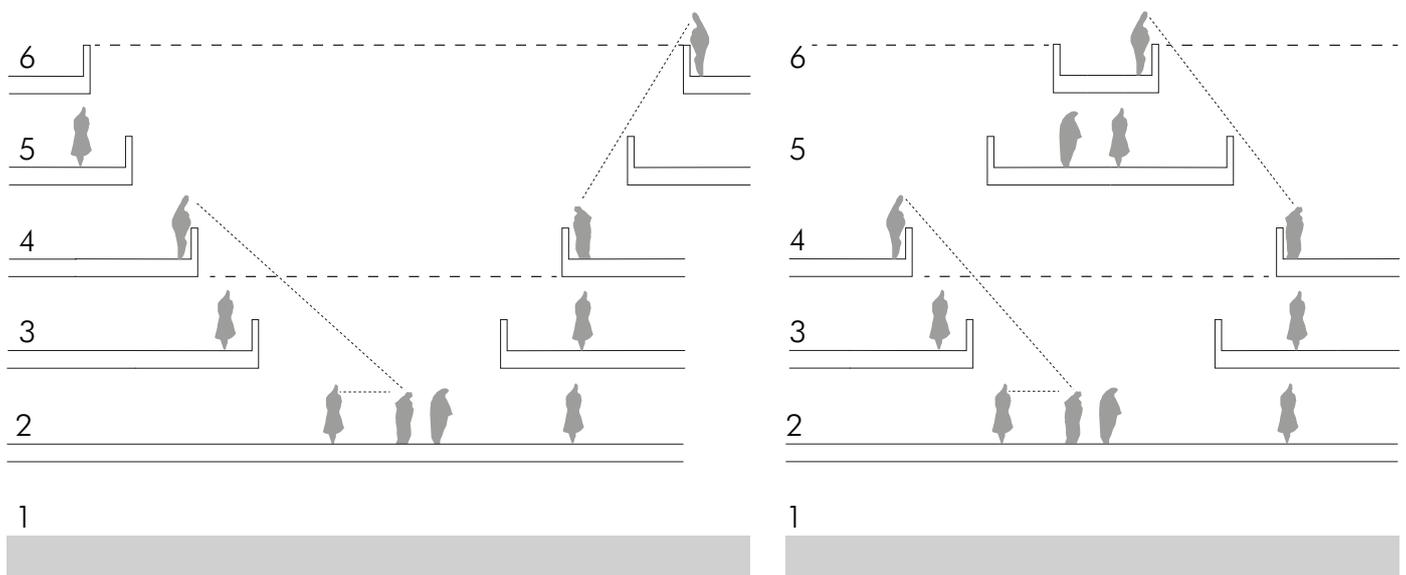
10.2 Building mass model

The brief being a densification within the city center is realized by adding floors on the existing building. The fourth (first added level) is in connection with the second and third floor making these three floor with increased social interaction. The fifth and sixth level will not interact with the with the second and third floor since the distance is too far. The fourth level could be used as a floor to connect and provide social interaction by creating setbacks (picture 10.39 left) or by moving the fifth and sixth level to the core (picture 10.39 right).

In the design working with setbacks all the way to the sixth level will results in a scheme that won't be suitable for co-housing due to the amount of floor space left per level or it will create a courtyard at the second level that is too small making it not useable and providing a minimal amount of daylight.

The inverted version can result in co-housing scheme that provide a spatial floor plan but result in limiting the amount of daylight that enters in the courtyard.

Within the design the floors will be separated. In practice social interaction within the whole building is not realistic therefore separating some layers. This means that the fifth and sixth level can be seen individually from the second, third and fourth floor in term of direct social interaction.



10.39 Human scale layered - Human scale inverted



Site analysis

10.2 Building mass model

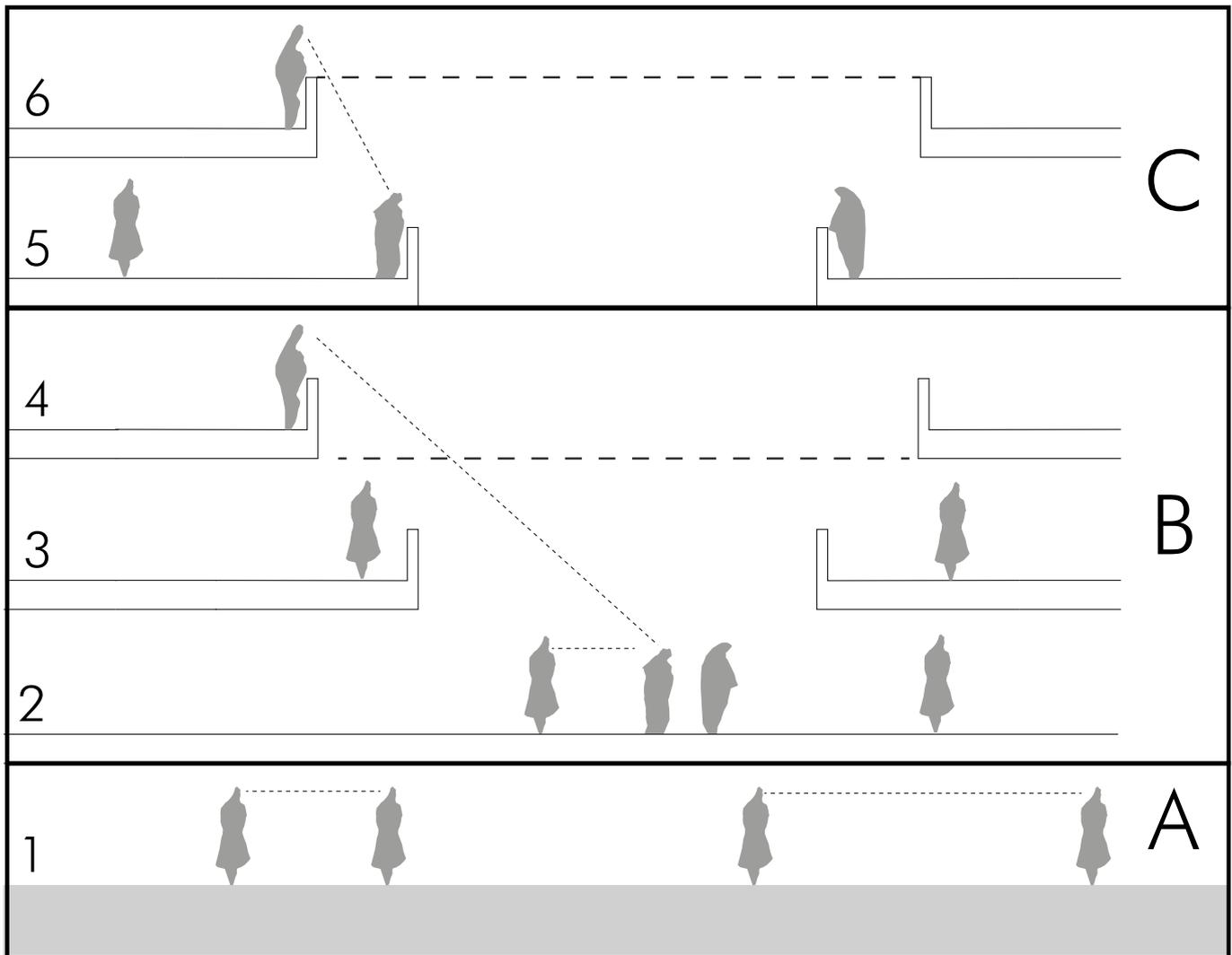
In the design there are three levels of social interaction (picture 10.40).

(A) The ground floor (indoor and outdoor space) which is used in combination with the neighborhood.

(B) The second, third and fourth level. A courtyard type three levels with the second and third floor being co-housing schemes for couples of which one person has dementia. These floor plans provide shared space in living, dinner and kitchen, relaxation and semi outdoor space. Semi outdoor meaning that the courtyard is a space that can provide fresh air and a sufficient amount of sunlight and daylight. The fourth level is for individuals starting with a couple of conservatory students and the widowers of who the spouse with dementia has passed on. These single dwellings have some shared space on the floor plan to increase social interaction and prevent loneliness.

(C) The fifth and sixth level are designed for couples of which the spouse has dementia in smaller co-housing schemes.

The design focusses on a person with dementia and the spouse but if through time there is no need for such dwellings it can be seen as a variation in co-housing and a floor of single units.

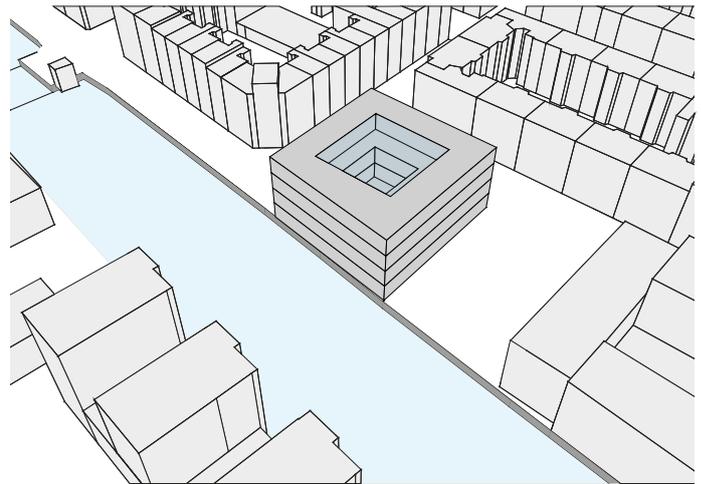


10.40 Human scale site three levels of social interaction

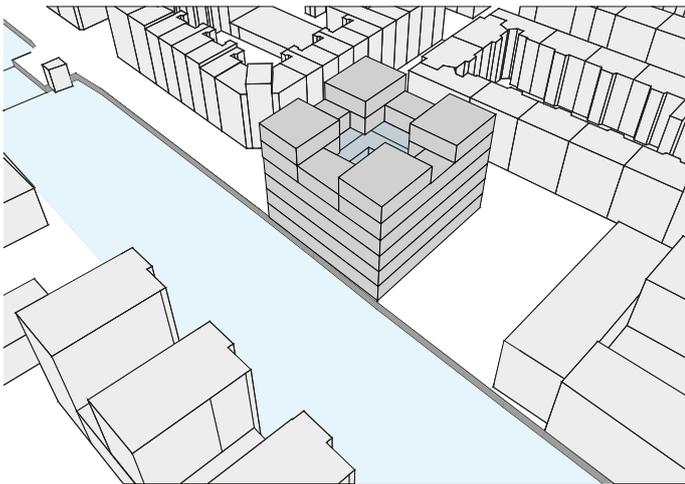


10.2 Building mass model

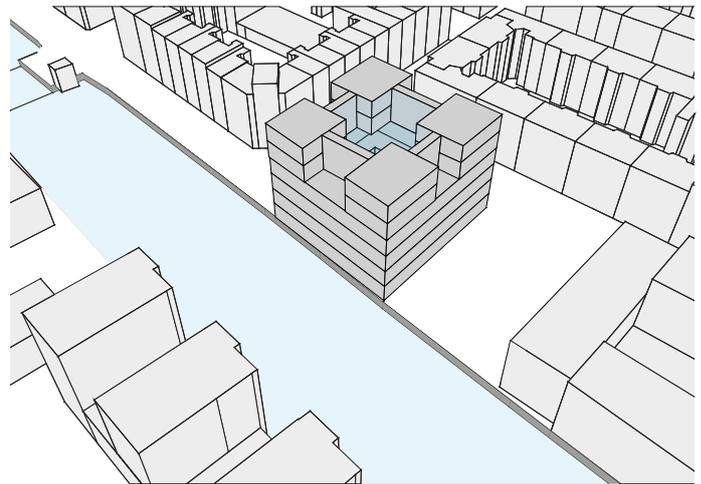
The fourth floor added will be part on the inside but will be the first layer that communicates the difference between existing and new (picture 10.41) on the outside. This communication will be developed further in the design. For the fifth and sixth level there will be multiple options such as a connection through one floor, the connection on the inside, a setback or a full atrium covering the whole building (picture 10.42 – 10.45). This will be developed further in the design but the corners need to be the parts for the small co-housing schemes. The reasoning behind this is that the middle needs to stay free for maximum day – and sunlight into the courtyard at the second floor. By not using fully enclosed blocks but by connecting them with an atrium for example the design can benefit the most of entering daylight and sunlight.



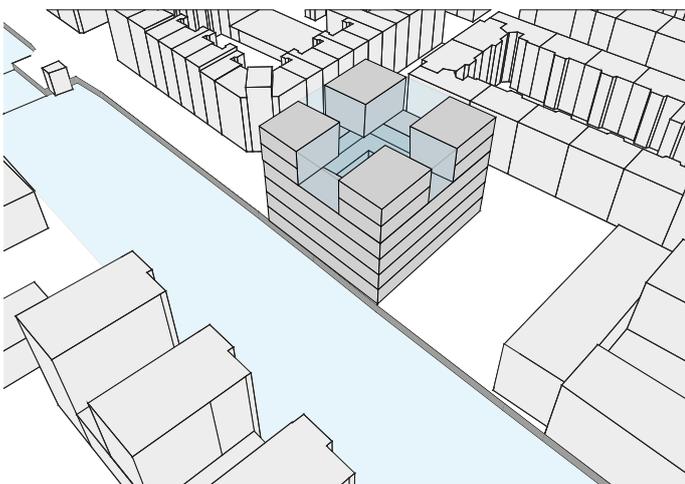
10.41 Added fourth level



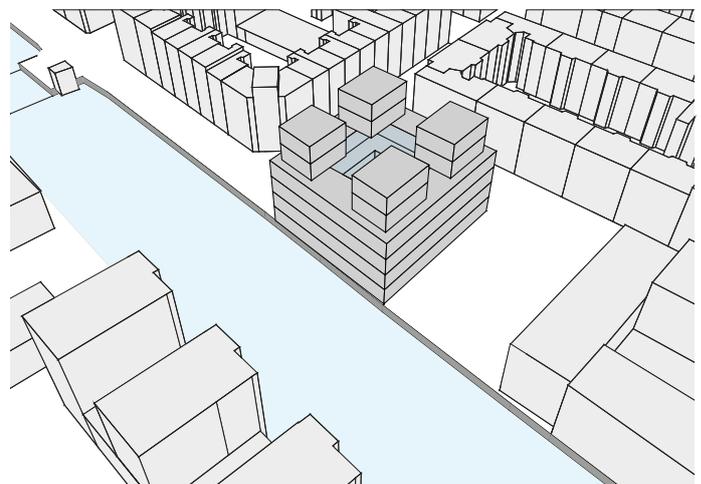
10.42 Connected trough fifth level



10.43 Connected inner circle



10.44 Full atrium



10.45 Setback



- XI -



11.1 The Frederik Hendrikbuurt



- XI -

Functions neighborhood

“Existing functions in the Frederik Hendrikbuurt”

Amsterdam is divided into districts. The site is located in district West: The Frederik Hendrikbuurt. The site is analyzed on several existing functions such as: care facilities, food related, schools, leisure functions and walkability.

This chapter gives an answer to the sub question:

What existing functions are in the neighborhood of the site that the urban design can benefit from?



Functions neighborhood

11.1 General description

Within the Frederik Hendrikbuurt there are already facilities available which the design can benefit from. It also determines for the neighborhood what is not available and can be added on the site to increase the quality for the neighbors as well the residents of the site. By adding a function that creates a leisure function for all it will also increase social interaction and make the site more part of the neighborhood and the city.

The neighborhood is analyzed on several aspects which are shown by segment in this chapter and will be used in chapter XIII (Design concept) to argument why a function is chosen. The functions will be balanced in a way that the residents and the neighborhood both will benefit and that the function help to stimulate social interaction.

Care (03 care center, 04 general practitioner, 05 physiotherapist):

These facilities support mostly the resident since they are more in need of care but can also be used by the neighbors in case of a general practitioner and physiotherapist. The social interaction which these function will be low. Also the general practitioner and physiotherapist are in walking distance and do house visits making it function less needed for the design.

Food related (06 restaurant, 07 dinner & lunchroom, 08 supermarket):

The most important activity an elderly person does is going to the supermarket according to Burton, E. & Mitchell, L. in "Inclusive Urban Design". It is not only for healthy elderly the most important activity but also for people with (mild) dementia. There are already a lot of supermarket in the neighborhood making it economically not efficient to provide the site with another one however, the existing ones are on the edge of the walkability of an elderly person (6.3 Walkability) meaning that the neighborhood should provide with good access roads and resting spots. ⁹¹

Within in the walkability distance there are also a variety of restaurants and dinner & lunchrooms providing activities of social interaction during the day and night. ⁹² However a food related function is a good function for social interaction and would bring people form the neighborhood to the site. Therefor it is still a function that should be added to the site. The way of interacting and the use of food can be changed for example, an area which can be used to cook, eat and do workshop will provide the social interaction and still be different than the existing available enriching the neighborhood.

Leisure (09 Sports, 10 Theater & museums & cinema, 11 Leisure & meeting center):

The amount of leisure are spread out through the neighborhood and in sufficient amount available. ⁹³ Most of these functions are not in the walking distance of elderly however these function are not a daily activity but would be used less frequently. These function can also be used in group activities making the distance acceptable as well as the use of a taxi or automobile. An important element such as music (5.0 Positive influence) can be integrated in the design without designing an area for theater.

91. Burton, E., Mitchell, L. (2006). p. 33-47

92. <https://maps.amsterdam.nl/functiekaart/?LANG=nl>.

93. <https://maps.amsterdam.nl/functiekaart/?LANG=nl>.

Functions neighborhood



11.1 General description

Schools (12 Daycare, 13 Elementary school, 14 Secondary school):

Within the Frederik Hendrikbuurt there are a number of daycares & elementary schools and also a secondary school. Having all the stages of schools in one neighborhood is important for kids in terms of making friends (out of the neighborhood) and travel distance. The site has a playground next to it which can provide the outside activity space needed for schools. The size is only big enough to fit a daycare. A daycare can be a good function to add to the site because it creates a day activity which the residents can benefit from, such is shown in an example of innovative typology use in chapter VII Case studies. Also the municipality district West has in their vision plans youth as one of their priorities.^{94 95}

Walkability (15 Bus & tram, 16 benches resting spots, 17 postal office function, 18 primary roads, 19 secondary roads, 20 crossover):

Besides supermarkets one of the main functions elderly use is a post office. This function is in the neighborhood on a good walking distance providing the side with a good urban surrounding. For longer distances elderly mostly use a bus or tram which are also available in walking distance. However the crossovers are there but not always in the shortest route possible available. This should be resolved in the urban design by adding cross over point for safety or by adding resting spots which are also lacking currently in the area of the site.^{96 97}

94. Gemeente Amsterdam. (2017). p. 5-9

95. <https://maps.amsterdam.nl/functiekaart/?LANG=nl>.

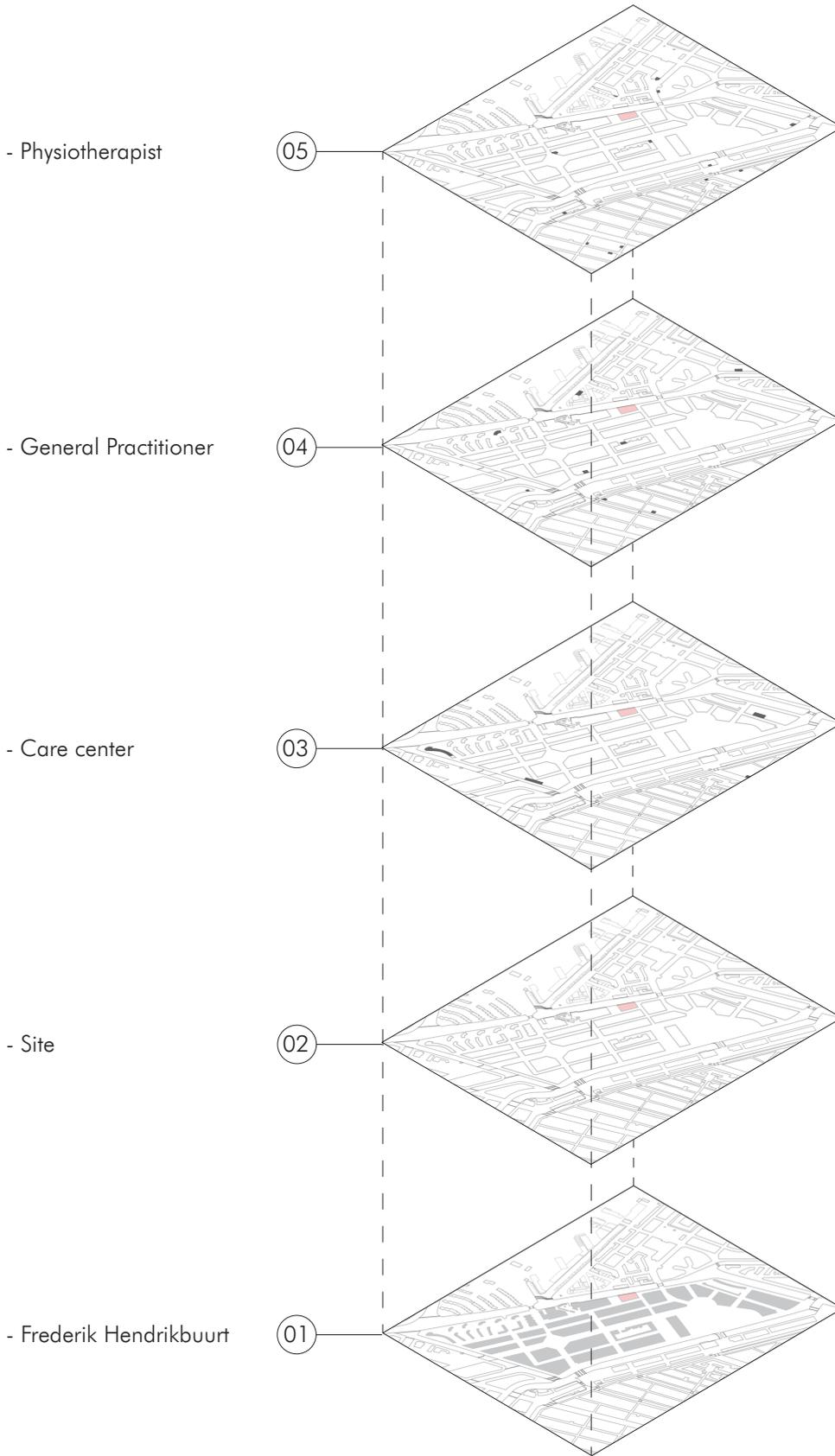
96. Burton, E., Mitchell, L. (2006). p. 33-47

97. <https://maps.amsterdam.nl/functiekaart/?LANG=nl>.



Functions neighborhood

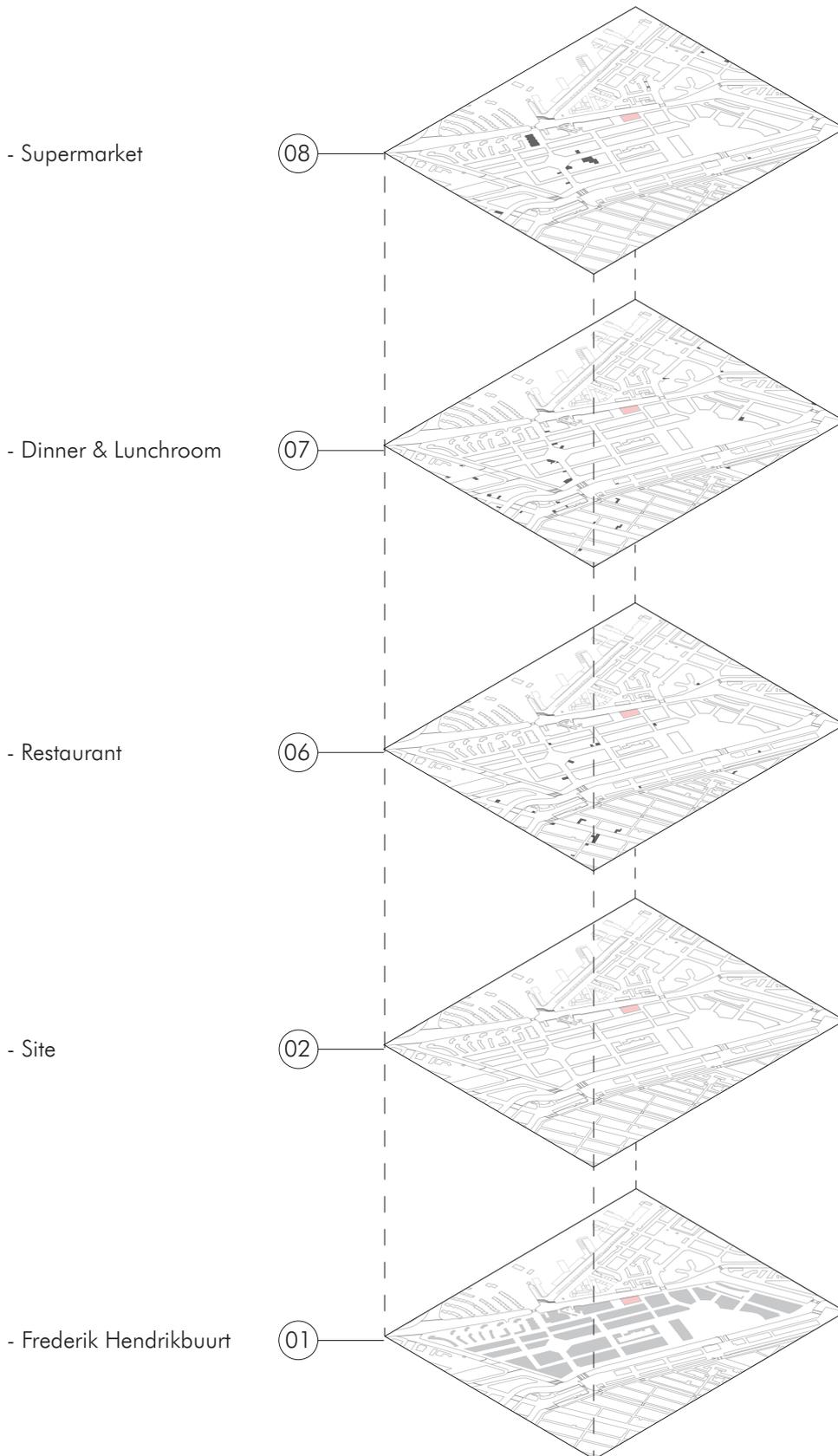
11.2 Care



11.2 Care

Functions neighborhood

11.3 Food related

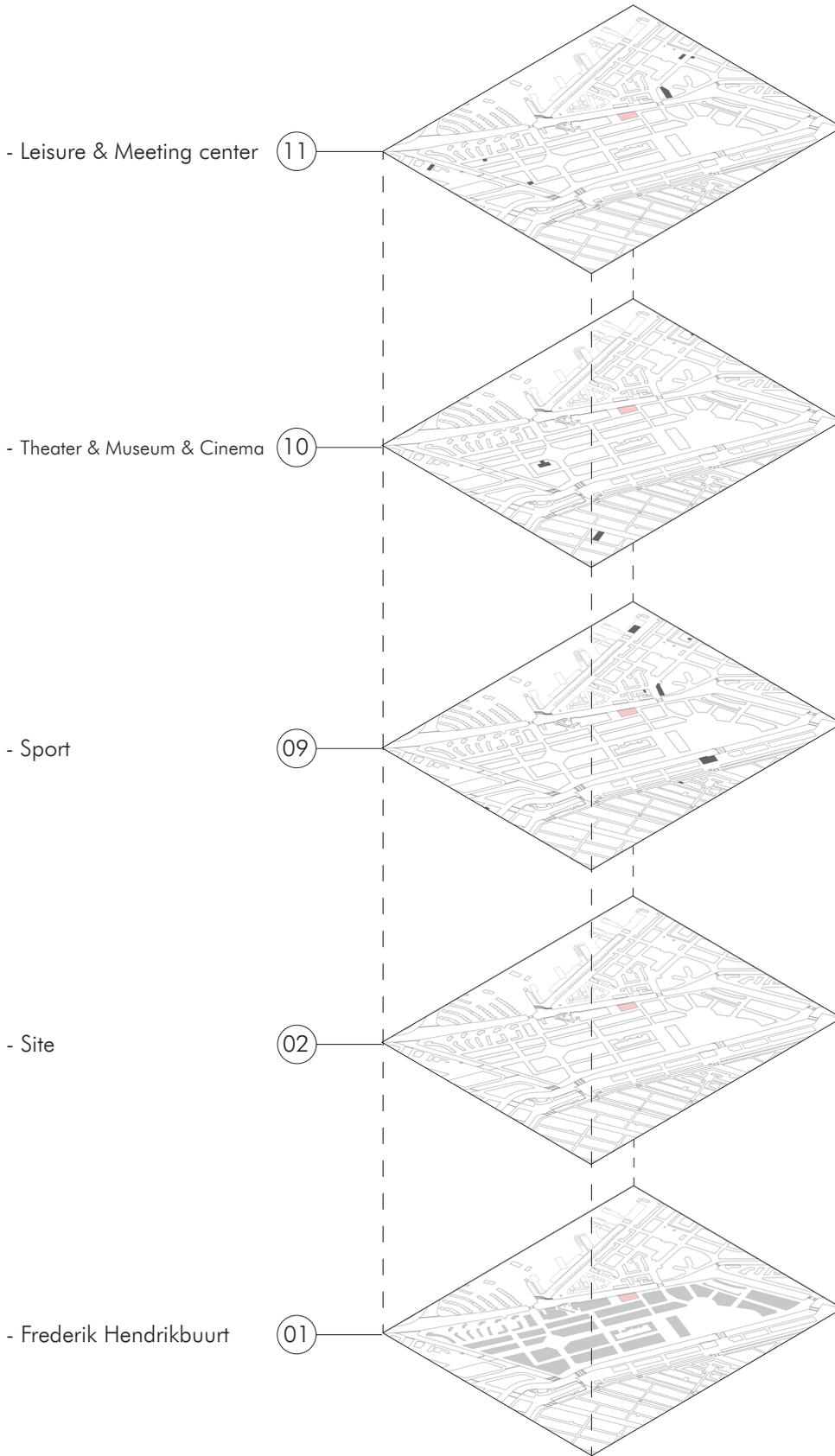


11.3 Food related



Functions neighborhood

11.4 Leisure



11.4 Leisure

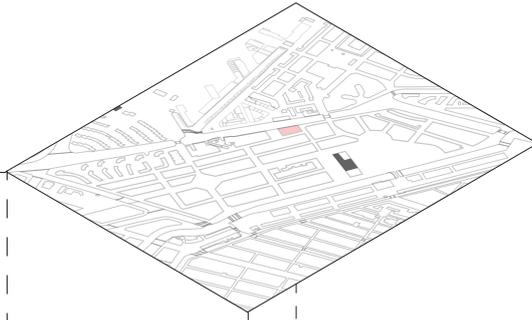
Functions neighborhood

11.5 Schools



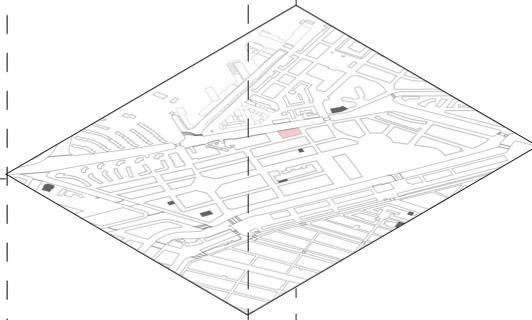
- Secondary school

14



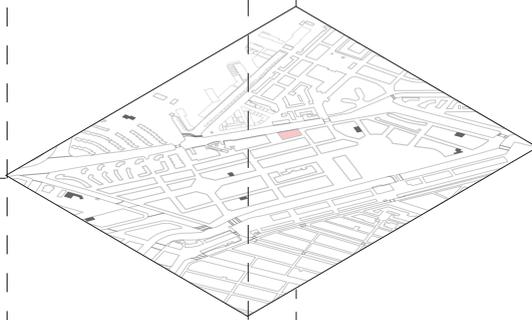
- Elementary school

13



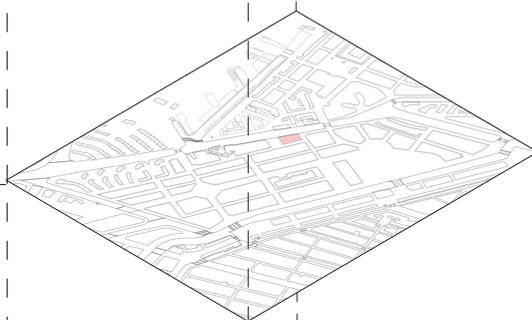
- Daycare

12



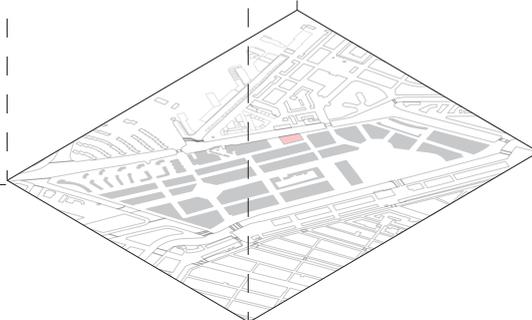
- Site

02



- Frederik Hendrikbuurt

01

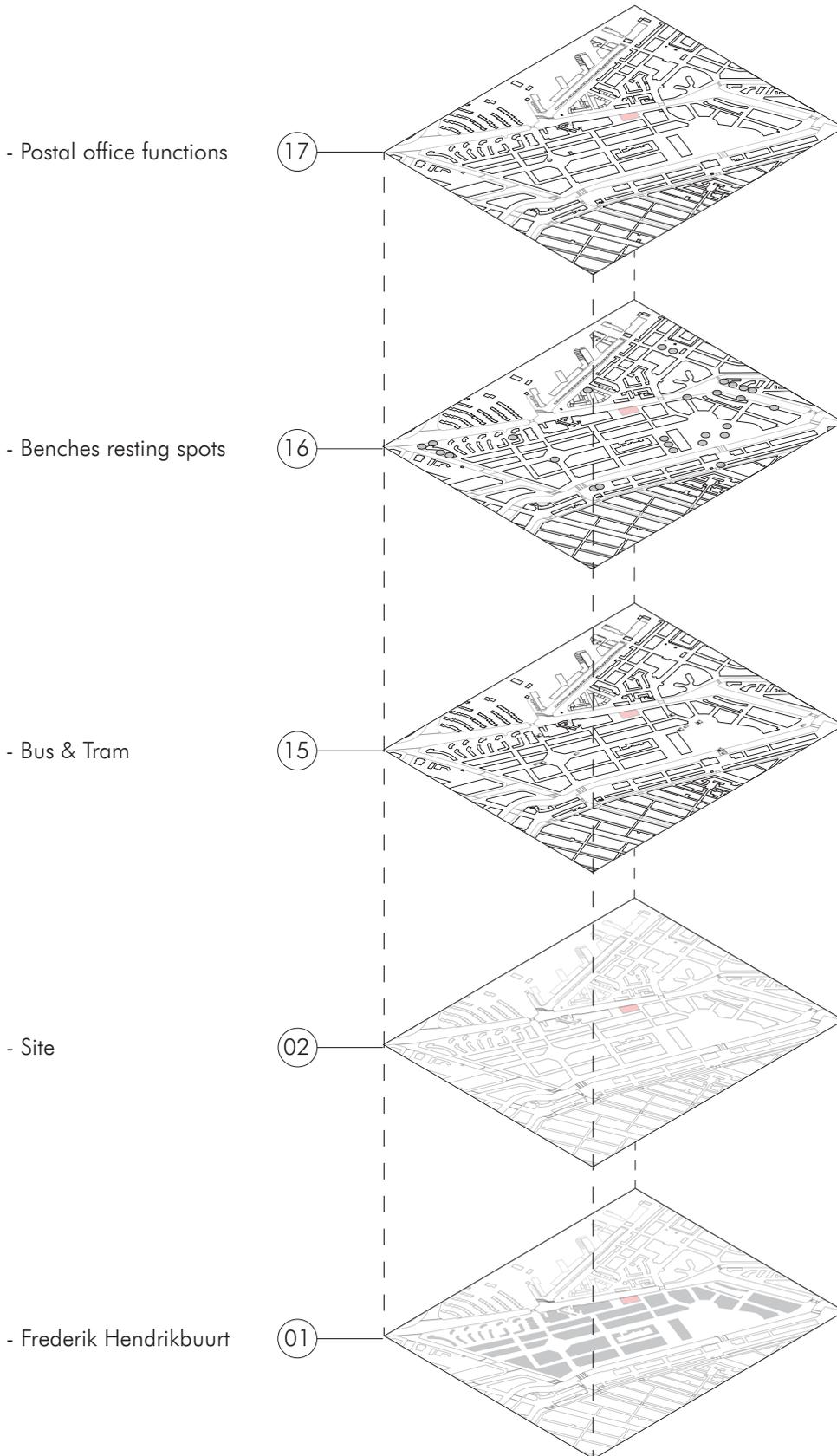


11.5 Schools



Functions neighborhood

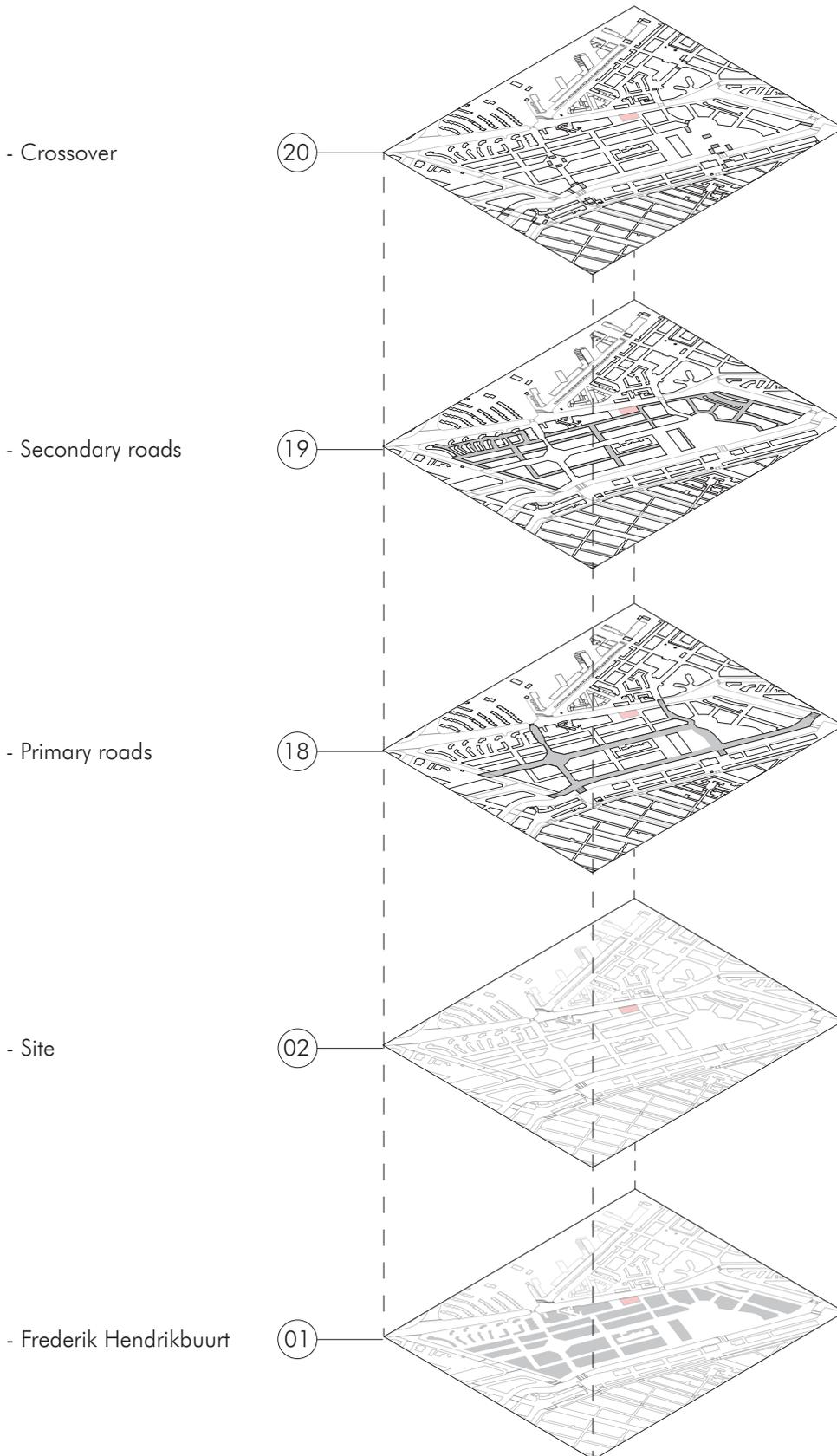
11.6 Walkability



11.6 Walkability (1)

Functions neighborhood

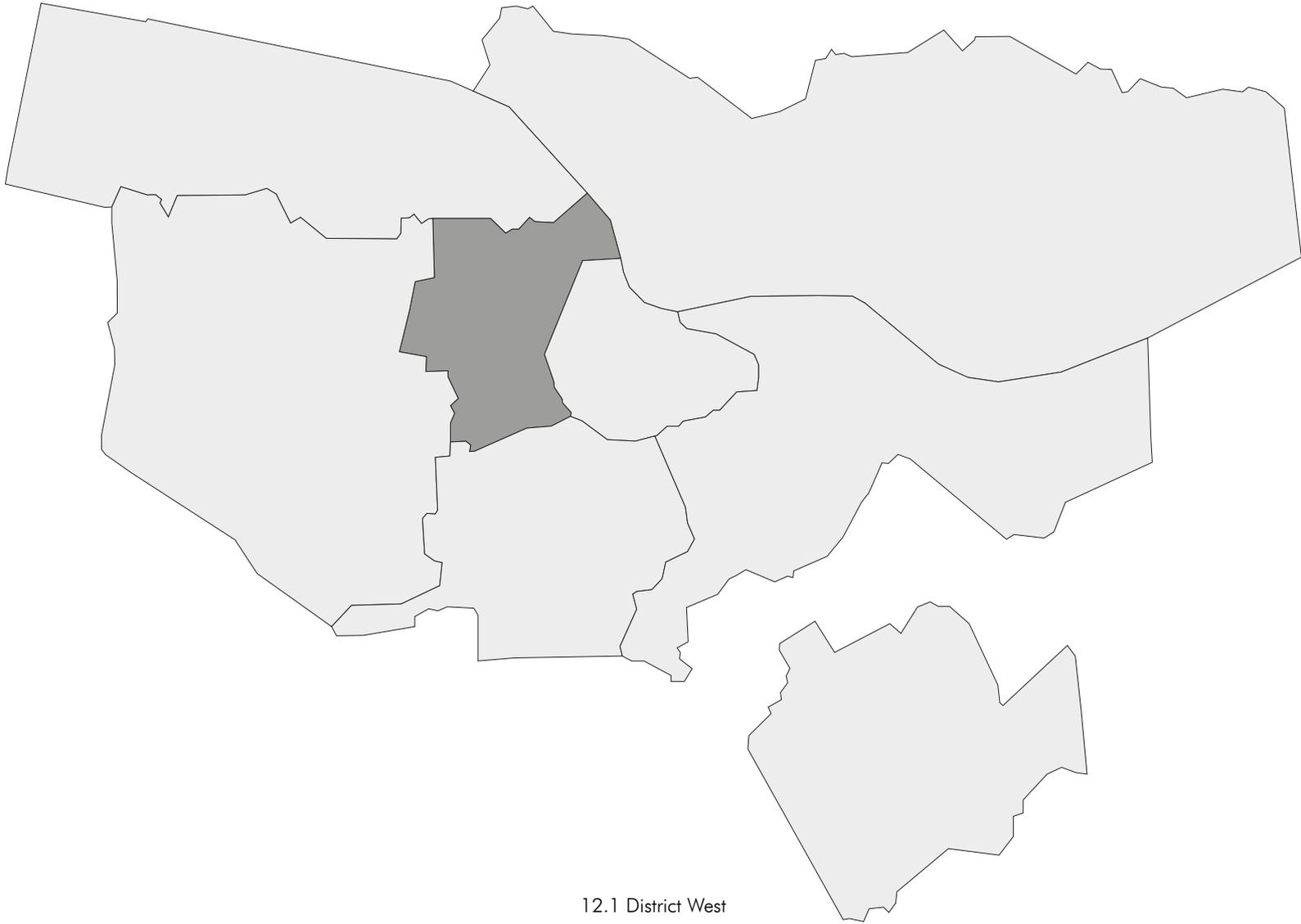
11.6 Walkability



11.7 Walkability (2)



- XII -





- XII -

District West towards 2040

“Vision of the municipality”

Amsterdam is divided into districts. The site is located in district West: The Frederik Hendrikbuurt. The municipality made a vision for the year 2040. In this chapter the vision is analyzed and used as input for the urban design. The analysis consist of three parts; the green structure, square improvement and the embankment.

This chapter gives an answer to the sub question:

What is the vision of the municipality towards 2040 for the neighborhood; Fredrik Hendrikbuurt?



District West towards 2040

12.1 General description

The municipality of Amsterdam district West made a vision for 2040 on the Frederik Hendrikbuurt where they describe multiple aspects such as the green, square, roads and how they can improve these elements towards 2040. This vision is analyzed on these point looking at how the design can incorporate the vision and contribute to these vision in making a better public place. In the vision of district West they want a clean, green, safe and sustainable environment where the public places such as open square are of good quality to provide the ability for neighborhood activity all within the identity of the Frederik Hendrikbuurt. ⁹⁸

Green & water (21 Water, 22 “groene loper”, 23 Green vision):

The vision on the green area is focused on the bigger scheme of Amsterdam with the green carpet (groene loper). This vision incorporates the Frederik Hendrikplantsoen as a starting or ending point of this green carpet. Because this park is the biggest green element in the neighborhood it provide a good leisure quality at the border of the walkability from the site which is important to the new residents and the neighborhood. Smaller elements can be integrated in the design to complete the overall green vision. ⁹⁹

Square improvement (24 square & boulevard, 25 arts, 26 playgrounds):

There is one larger square within the Frederik Hendrikbuurt. This one is near a school an connected to the city center at the Singelgracht. This part will be made more accessible for car, bicycles and pedestrian in the vision plan. This site is hard to reach due to a main road in between and it is outside the walkability zone of the elderly. Although the boulevard with streets and the square can improve social interaction these facilities are also closer to the site available which are easier to reach. The improvements of playgrounds and adding of art to the public space can be of value to the residents and the neighbors since the square in front of the building is child friendly. For the art it is important that it is something that people with dementia can recognize. By referring to the past it can give an quality to people with dementia as well (5.0 Positive influence). ¹⁰⁰

Embankment route (27 Embankment, 28 “recharge points”, 29 “hot spots”):

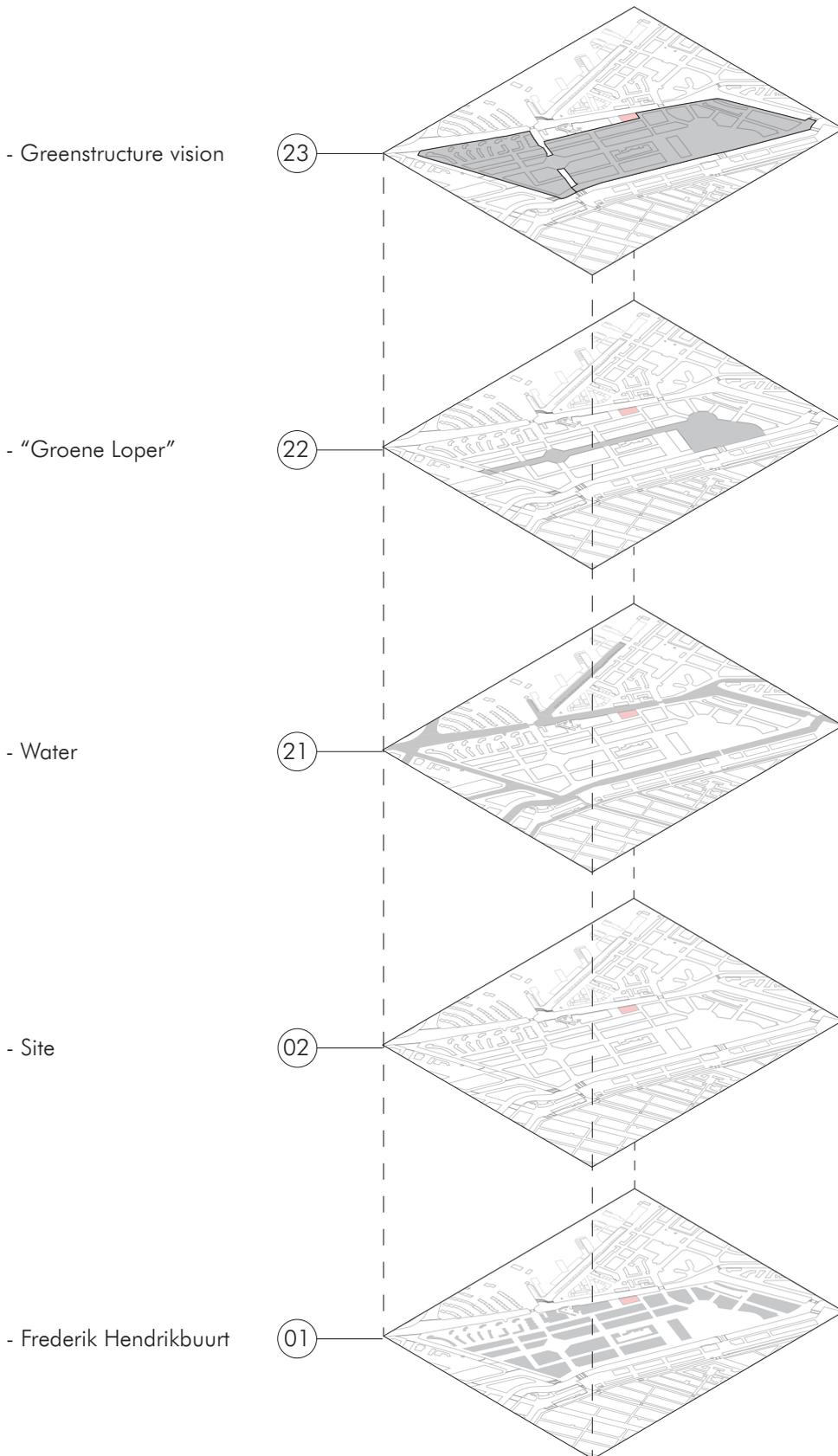
The opposite side of the Singelgracht is the embankment that district West one to improve as a primary zone for pedestrian. The site can be an important endpoint in the first part of the embankment route. Within the vision there are two elements describe within this embankment route which are recharge points and hot spots. The recharge points are spots where people taking a walk can rest and enjoy the view and hot spots are to location which provide a good facility enjoying the view of the water. One of these hot spots is the square in front of the building and one recharge point is located in front of the site. This can be combined with the function of the building making it as a whole a place where you can socially interact, enjoy the view and take a rest. ¹⁰¹

98. Doesberg van, H., Grool, H. (2014). p. 3

99. Burton, E., Mitchell, L. (2006). p. 33-47

100. Doesberg van, H., Grool, H. (2014). p. 15-27

101. Doesberg van, H., Grool, H. (2014). p. 15-27



12.2 Green & water

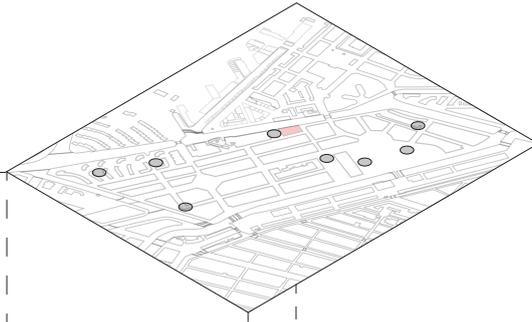


District West towards 2040

12.3 Square improvement

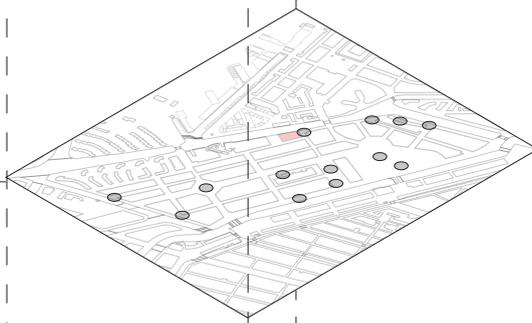
- Playgrounds

26



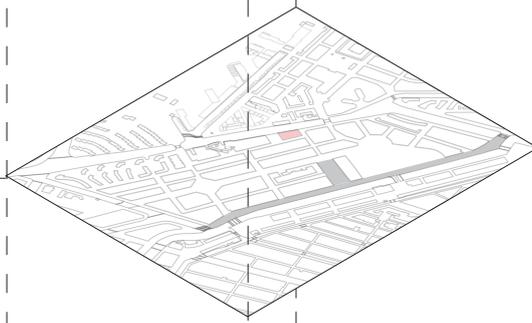
- Art

25



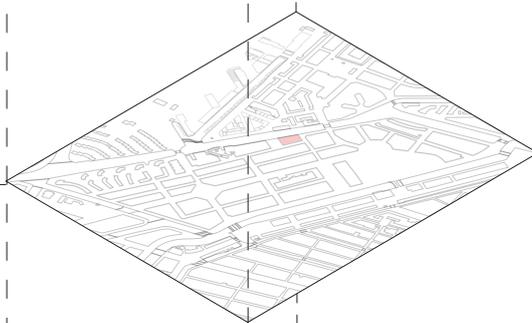
- Square & Boulevard

24



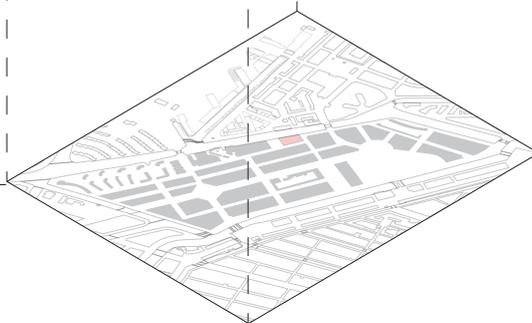
- Site

02



- Frederik Hendrikbuurt

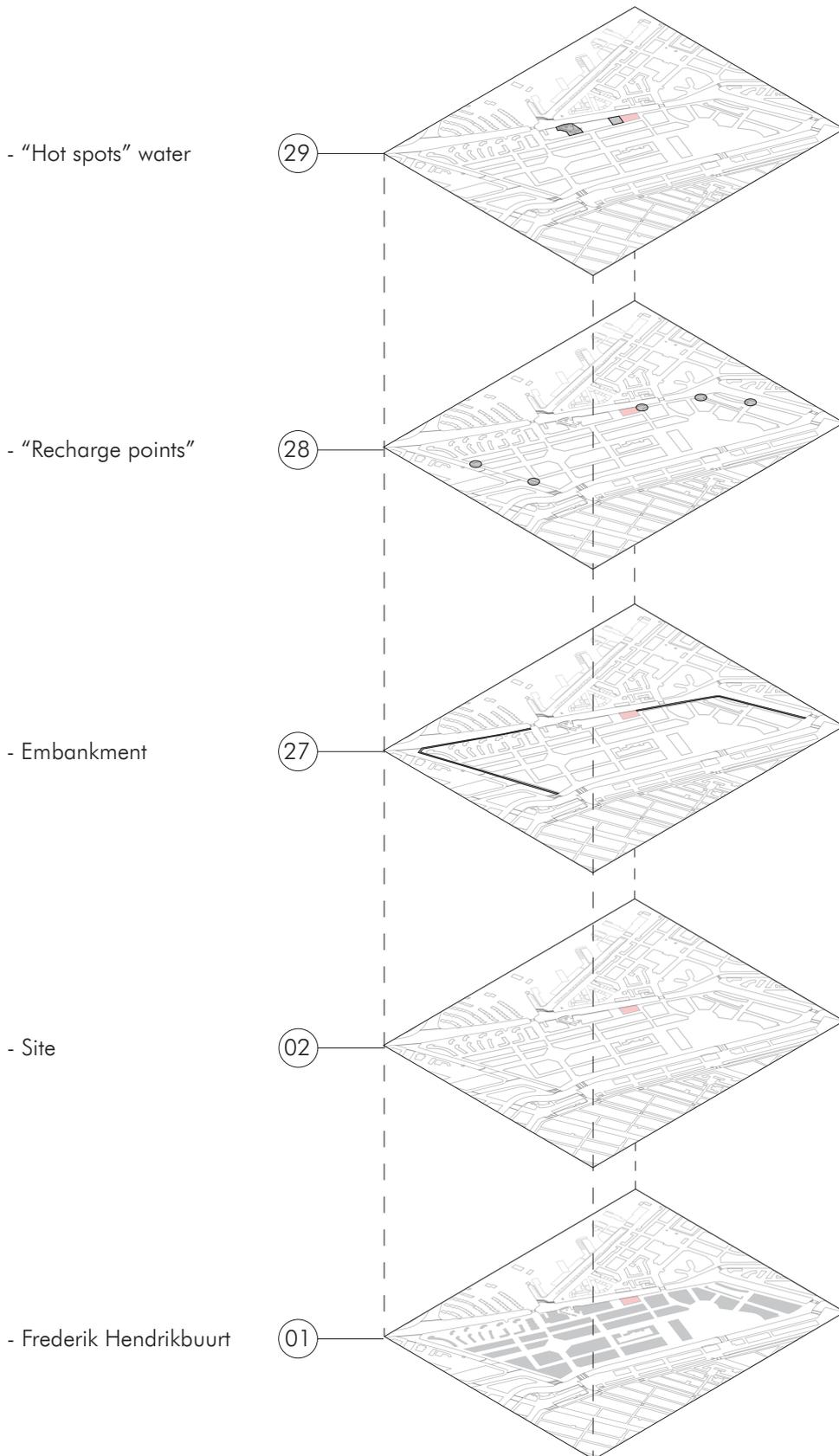
01



12.3 Square improvement

District West towards 2040

12.4 Embankment route



12.4 Embankment route



- XIII -



13.1 Elderly hugging



- XIII -

Design concept - brief

This chapter is the conclusion of the research. It will provide an answer for the main research question:

‘What architectural aspects can help people with dementia, to live safely with the possibility to be part of the society, in the center of Amsterdam in 2040?’

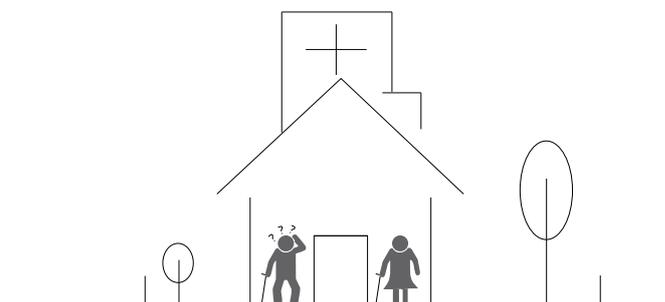


Design concept - brief

13.1 Concept - brief

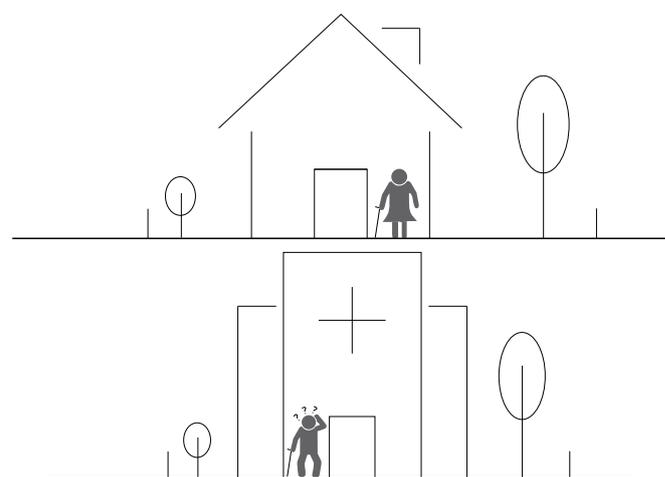
(The concept is further described in #02 design booklet.)

Within our current system there are two options when a person is diagnosed with dementia. The home can be made "life proof" and the person with dementia is being cared for by loved ones mainly the spouse (picture 13.2). The second option is to place the person with dementia in a nursing home (picture 13.3). In both cases there is a problem with the current care system being too expensive, workload too high and lack of personal attention. Within this system it can also cause problems with the housing market. Homes suitable for families will be (longer) occupied by elderly because of the "life proofing". Separating loved ones by placing the person with dementia in a nursing home will also cause emotional stress.



13.2 Home "life proof" (1)

The concept introduces a third option where both the "healthy" spouse and the person with dementia move into a home suitable for the care needed. The house is shared with individuals with the same problems creating the possibility to "share the care". By sharing the workload becomes less, costs can be lowered, personal attention increases and there is no separation between loved ones (picture 13.4). The downside would be when the person with dementia passes on and the "healthy" spouse still has to live in the home. The design therefore needs to provide a new home for the "healthy" widowers as well.



13.3 Individual (2)

1. "Life proof" home:

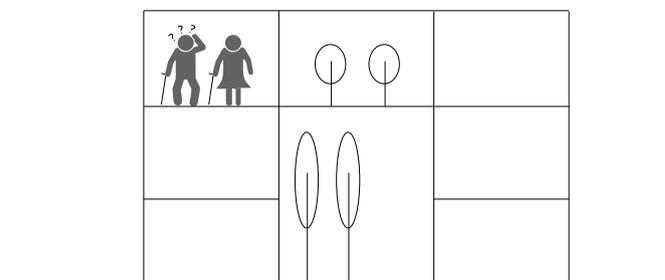
- + Together with the one you love
- + Home is "life proof" (both people)
- Eventually home is not life proof for dementia
- Spouse will have trouble with work load caregiving
- House size suitable for families

2. Individual:

- + "Share" the care
- Live separately
- With the care individual contact minimal
- Nursing home a real "home"..?
- House size suitable for families

3. Co-housing "share the care":

- + Together with the one you love
- + "Share" the care
- + Home is "life proof" (both people)
- + Old home can be used for families
- Adapting to new home (individual to shared living)
- Spouse left behind can not return to old home



13.4 Together in co-housing (3)



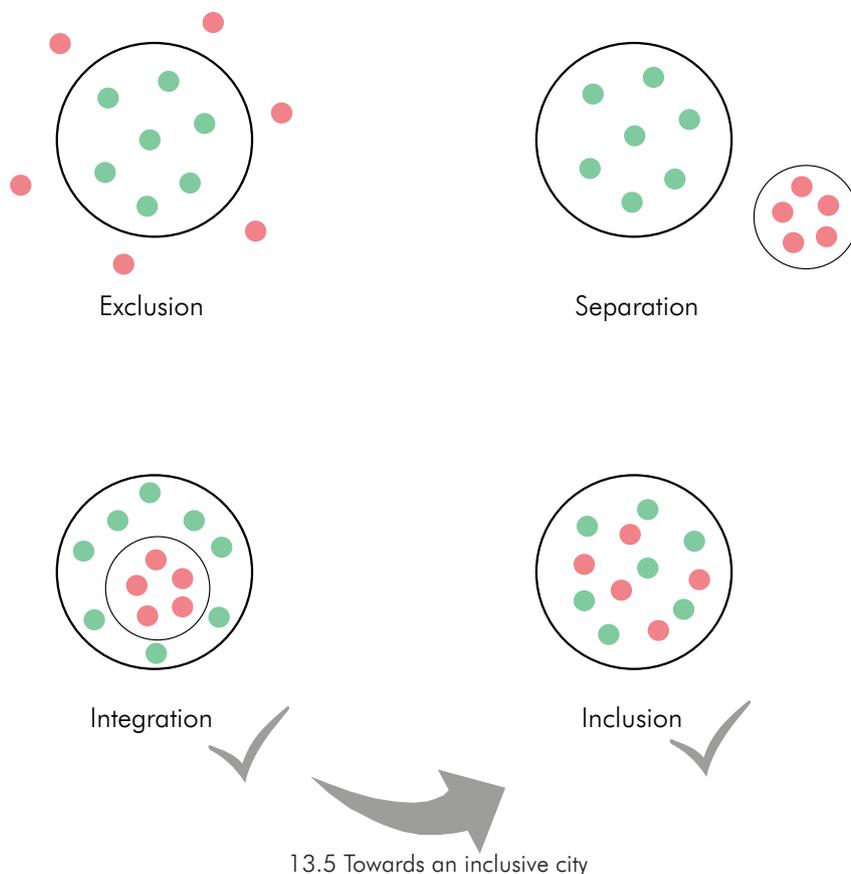
13.1 Concept - brief

Solutions in our current healthcare system are focused at exclusion and separation (picture 13.5). The existing nursing homes provide no to little contact with neighbors or target groups other than the residents. Elderly placed outside the city in nursing homes are missing the social interaction resulting in loneliness and depression. To increase the social interaction a home for elderly should be integrated in the city, being part of the neighborhood.

The concept can be integrated in the city. This will be the first step towards an inclusive city. By adding functions in the building that can be used by the neighborhood, the building will provide possibilities for social interaction of the residents and neighbors. By adjusting the environment into a dementia / elderly friendly neighborhood the design can be part of the inclusive city.

The site chosen for the design is an existing building. For the concept an existing building is not needed but it will bring something extra to the design. In case of this design it is a building that is unique in appearance in the neighborhood making it stand out. Older buildings attract people and give them a positive feeling. By adding the neighborhood function in a building that is recognizable, stands out and makes people feel happy the circulation in and around the building will be high providing many opportunities for social interaction making the elderly residents part of an inclusive city.

This is not only positive for the neighborhood but also for the people with dementia and the spouses living with them who can keep a social life as well (beside being a caregiver).





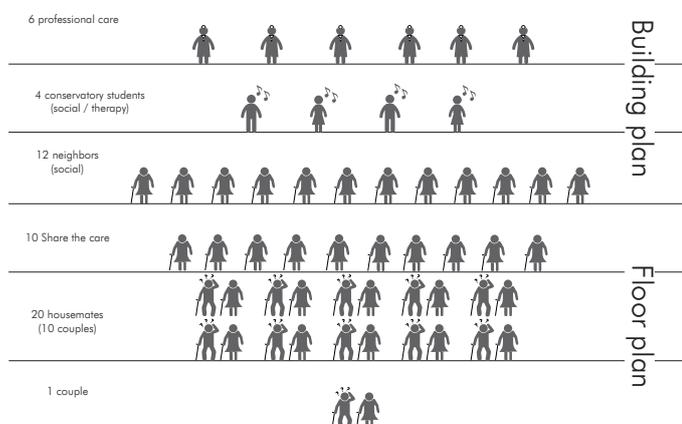
Design concept - brief

13.1 Concept - brief

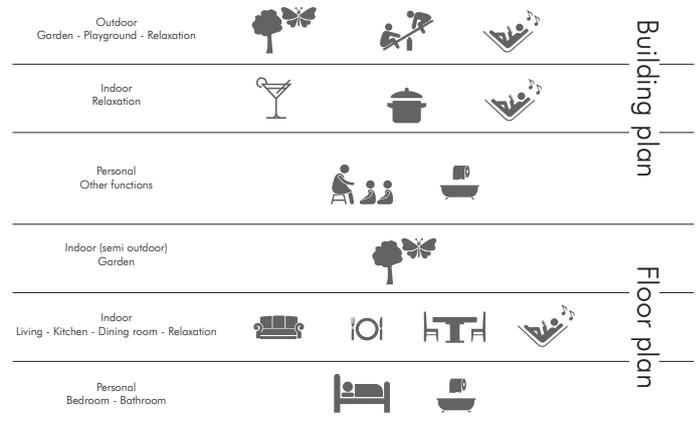
In this concept the social interaction is crucial in creating an interactive neighborhood for the person with dementia and for the spouse. The interaction needs to be controlled for the person with dementia because too much stimulation has a negative effect. An interaction that has positive results is music. By combining conservatory students in the design, music will be available (practice several hours a day), providing the right stimulation. The social interaction of students with the elderly spouses and widowers will also contribute positively. The amount of interaction can be controlled through the design. The floor plan needs to be designed that the people with dementia and spouses live separately from the conservatory students and widowers but interact in spaces designed for both (picture 13.6 – 13.7).

The contact a person with dementia has with others is controlled because the amount of interaction is divided in two levels; the floor plan and building. At the floor plan level the contact is with the other couples, making it possible to share the care. This is supported by professional caregivers who function at the building level. At the building level there is also a social sharing available with the widowers and conservatory students.

This is no direct contact in living but through the use of a communal space that is shared. The configuration of spaces is divided in personal, shared indoor and shared outdoor space. These spaces are divided in a floor plan level and a building level making it possible to have privacy but with the focus on social interaction.



13.6 Social interaction - care sharing



13.7 Social interaction - facility sharing

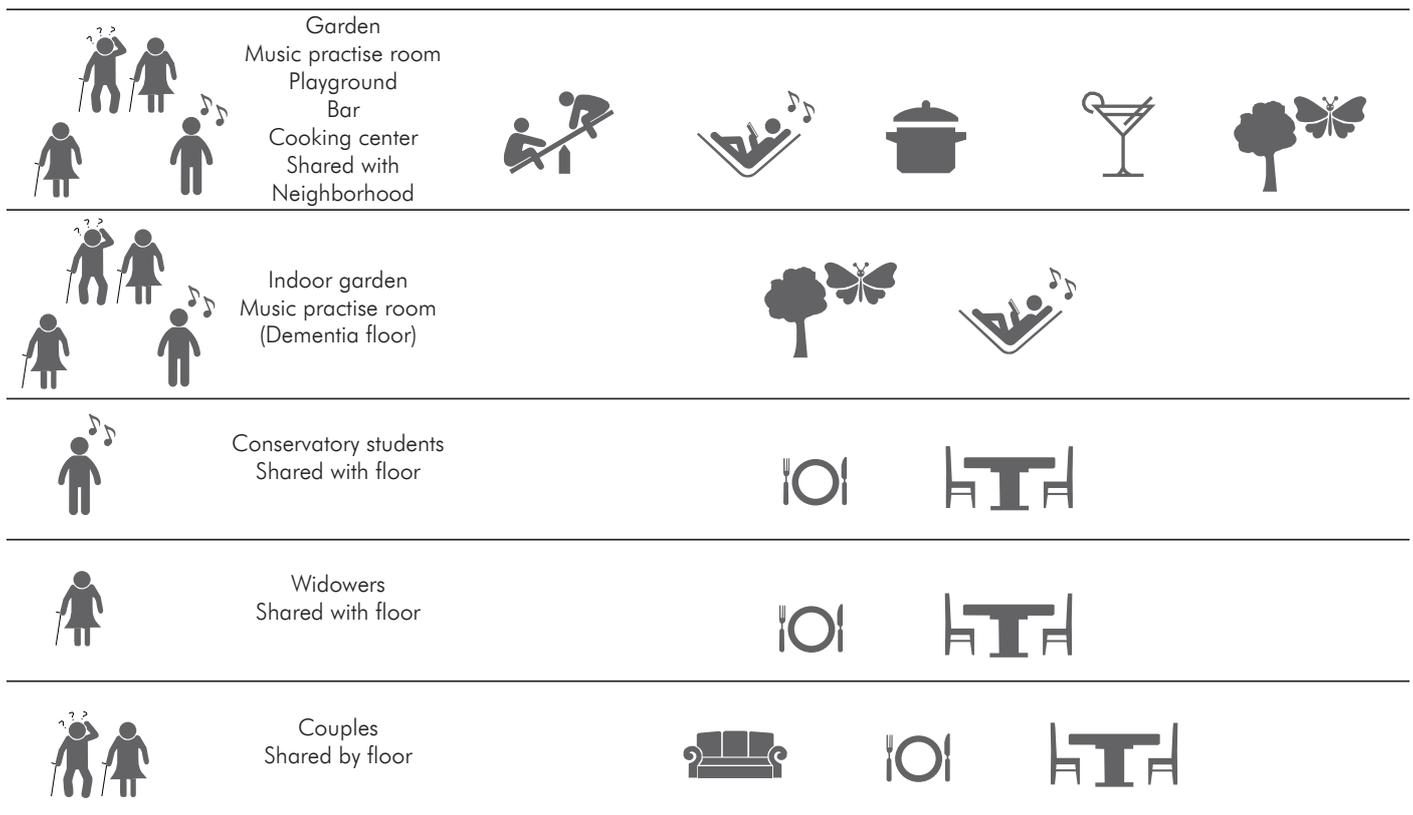
Design concept - brief



13.1 Concept - brief

There are three types of floor plans which are designed to share the care and the facilities. The main floor is designed for different functions providing interaction with the neighborhood. The other floor plans are divided in two types. One for the person with dementia and spouse and the other for widows and the conservatory student. Each target group has its own private bedroom and bathroom as personal space but shares the living, kitchen and dining with others. This makes it possible for the people with dementia that the personal care can be given as for the "healthy" spouses and widowers a communal space where they can socially interact preventing loneliness (picture 13.8).

The relaxation room (music practice) and garden are located at the floor with the people that have dementia. This is done to provide everything needed for a person with dementia on one floor but also to create a space where the interaction between a person with dementia, spouse, widower and conservatory student can take place increasing the social interaction.



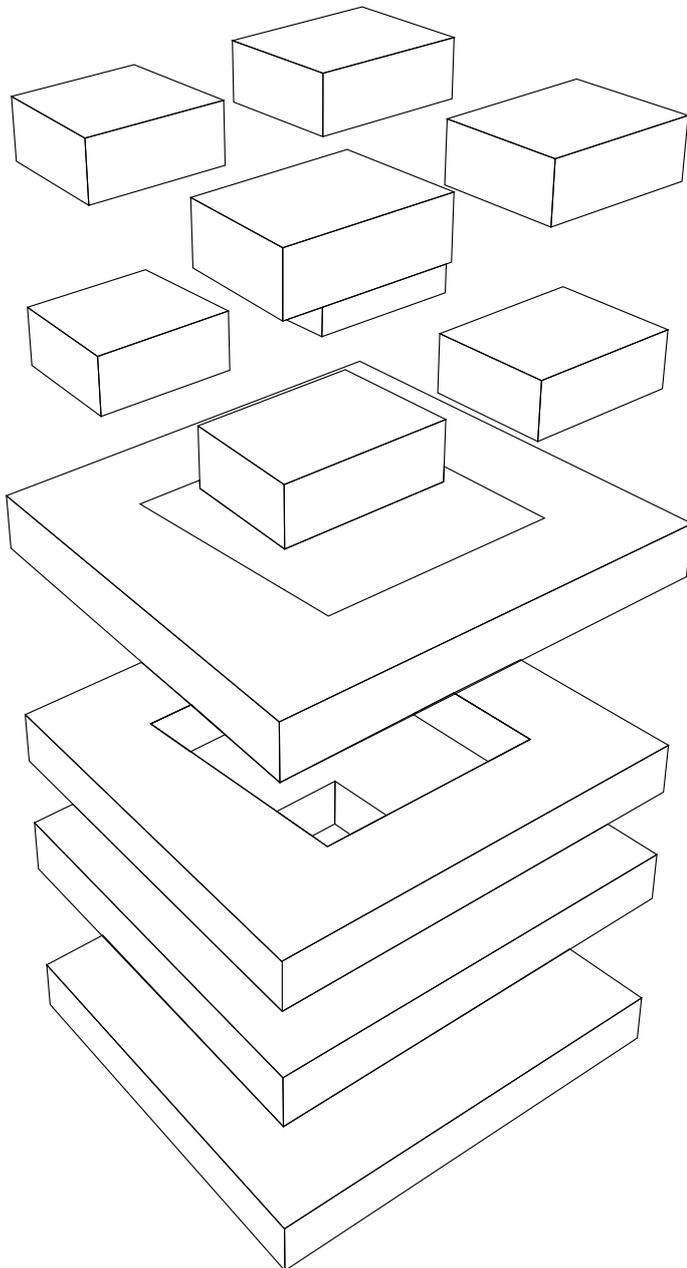
13.8 Sharing = social interaction = inclusive city



Design concept - brief

13.1 Concept - brief

The concept translated in the following brief for the existing building with the three added layers on top. The program is a mixture of utility and dwelling units with co-housing scheme varying in size used by persons with dementia and their spouses, with an mixed in floor of single units used for elderly and conservatory students (picture 13.9).



Floor:	Program:	Circulation:
<u>level 06</u>	Small co-housing scheme	Elevator - gallery
	Group size: 4	
	Amount of people = 16	
<u>level 05</u>	Small co-housing scheme	Elevator - gallery
	Group size: 4	
	Amount of people = 16	
<u>level 04</u>	Single units	Gallery
	Floor size: 16	
	Amount of people = 16	
<u>level 03</u>	Small co-housing scheme	Elevator
	Group size: 10	
	Amount of people = 20	
<u>level 02</u>	Co-housing scheme	Elevator
	Group size: 11	
	Amount of people = 22	
<u>level 01</u>	Multifunctional floor	-
Ground floor	Daycare	
	Cooking center	
	Cafe	



- XIV -



14.1 Book shelving



- XIV -

References

“Literature, articles, websites & pictures”

The literature is divided into four categories: books, articles, websites and pictures.
The pictures sources are divided and numbered by chapter.



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14.4 Pictures

XIII

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