The background of the cover is a detailed architectural site plan. It features a network of light blue canals and a grey road. Various building footprints are shown in dark grey and blue, some with internal room divisions. Green circles of varying sizes represent trees, clustered in certain areas. A small boat is depicted on one of the canals. The entire scene is framed by a thick black border.

Problem statement

Case studies

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Building concepts

ADVANCED HOUSING

Oskar Hermans



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- Introduction
- Affordable housing in the Netherlands
- Affordable housing in Midden Delfland
- Housing as a service
- Research method

Introduction

This research will focus on housing in a new landscape design of Midden Delfland and the landscape design is made by the landscape architect called ZUS. That landscape design is part of a speculative design exercise of the Delta project. The design by ZUS requires some changes of the Dutch landscape and give new opportunities for Dutch housing. This proposal of the new landscape can be distinguished in four different types of land: wetlands, peat land, forest, and urban areas. The Advanced Housing studio is exploring how to live in these types of land. This research will be part of that exploration by researching how affordable housing fits in this new plan.

Threw analysis of a few sites on the ZUS landscape were explored. The results show that De Zweth is an area with a lot of potential and opportunities as one of the pilot projects from the advanced housing studio. The ecology of the Zweth can be further expanded without destroying the current community.

Affordable housing in the Netherlands

In the Netherlands there is a housing shortage. In 2021 this was a shortage of 279.000, but this shortage is expected to rise to 317.000 in 2024. (Ministerie van Algemene Zaken, 2023) The housing prices have increased to a point where a lot of people are unable to find an affordable home that suits their needs. These raising prices have been caused by multiple factors. Prices of building materials have increased rapidly over the last years. At the same time the housing demand kept rising and the supply has not been able to keep up with this demand. This contributes to the shortage of housing on the market. (Brysch & Czischke, 2022) (Capital Value , 2020)



Figure 1 (Ministerie van Algemene Zaken, 2023)

Affordable housing in Midden Delfland

Focusing on affordable housing and the project location near the Zweth a few complications and challenges were found. The results show that there are a lot of jobs for seasonal workers. The jobs in this area are important to consider for affordable housing. Because what makes a house affordable is not only based on the value of a home, but also the income of its residents. The living situation of seasonal workers differs a lot.

A large portion of the seasonal workers are working in South & North Holland. The largest amount of seasonal work is from tourism, catering, entertainment and the agriculture sector. (Vier Dingen Die Je Moet Weten Over Seizoenswerk in 2021., 2021) 19% of agriculture and horticulture jobs are seasonal work and 60% of that is horticulture. (Vermaas, 2021) To many migrant workers are still living in bad conditions in the Netherlands. (Ministerie van Algemene Zaken, 2023b)

According to the CBS (Centraal Bureau voor de Statistiek), the number of jobs in agriculture and green sector is the highest in the months Juni & Juli (Dutch summer). The peaks are a fluctuation of around 21% of the total number of jobs in these sectors. (WERKbedrijf, 2024) With a residence permit for seasonal work, you are allowed to work in the agricultural sector of the Netherlands for up to 24 weeks. (Naturalisatiedienst, 2023) This creates living situations, where people want to live for a short period, just for their work. Sometimes they will move to these temporary locations with a part of their family and sometimes alone or only with their partner. This requires homes that are flexible in the duration of stay and a variety of home sizes.

This concept formed the conclusion of a missing housing type in this area. A housing type that allows its residents to stay the duration they need, to pay for only what they use, and not be bound to a contract that lasts longer than a week.

Seizoenkrachten in de landbouw, corop, 2019

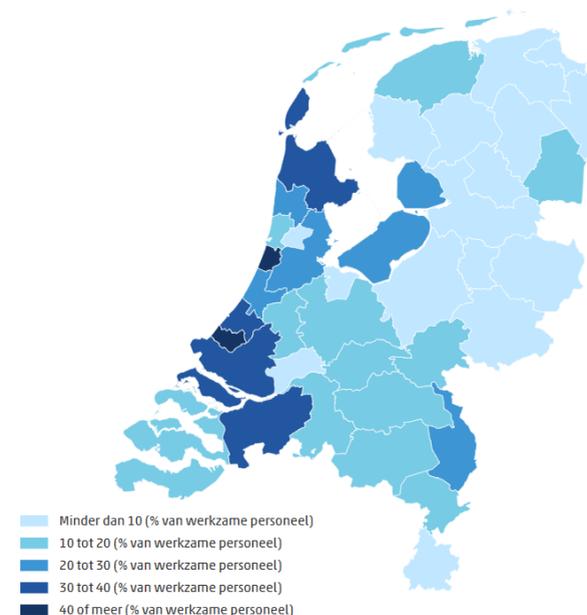


Figure 2 Seasonal workers in agriculture (Centraal Bureau voor de Statistiek, 2020)

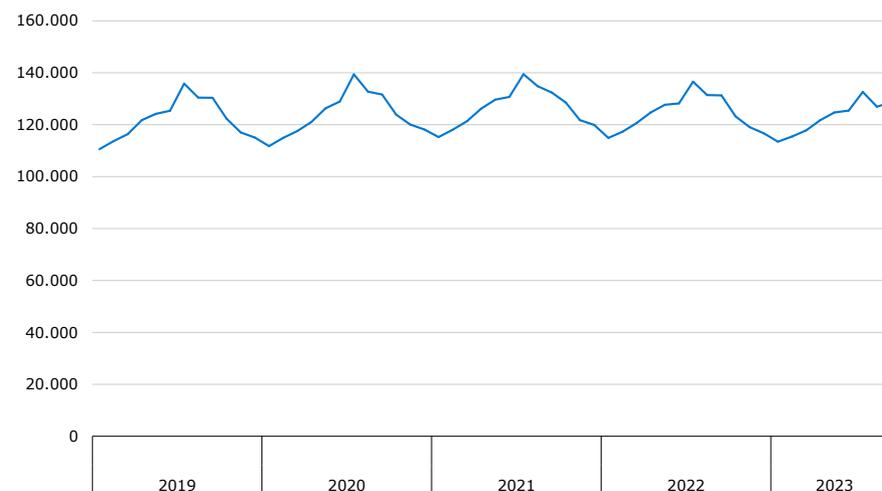


Figure 3 Agriculture sector seasons (WERKbedrijf, 2024)

Housing as a service

Housing as a service is a type of ownership of real estate property. According to Rafael Presa (Presa, 2019), A lot of residents don't need to own their own real estate property. Minimalism their way of life, due to a wide spectrum of reasons. Most popular reasons for that pivot, includes environmental concerns, financial concerns, and the desire to have more time and freedom enjoying life. (Presa, 2019).

The user of the property pays in real time for what they use, instead of a more traditional and restrictive monthly period. The benefit of this model is that residents have more freedom, and more costs can be shared collectively.

In this graduation project there is a lot of potential for this housing as a service model as well. This brings a lot of design influence. Dwellings are a very personal space. When applying the housing as a service model, the dwellings could become mono apartments, where all the dwellings are alike, and the personality of a home is lost. To avoid this, clear design ambitions need to be formulated. A clear distinction between private use and collective use, as well as ownership, needs to be made. For example, does someone own their own fridge or is there only one fridge in a shared kitchen and with how many dwellings is this kitchen shared or does each dwelling need their own kitchen?

This research will focus on architectural design of the housing as a service concept. Thinking of spatial design, programming, experience, and use. For example, by exploring a large variety of dwellings where the user can choose a dwelling to fit their needs and pay only for the space they use. Perhaps the dwellings need to allow for easy minor adjustments to fit a large variety of possibilities. It might also be possible to include the furniture in the variety. Therefore, the people who will move often are still

able to live as they like, without the need for moving their own furniture to everywhere they go. Allowing for more freedom by owning less.

Housing as a service still has financial concerns as well. With this model, the residents are paying the owner of the real estate for the things they use. This could mean the owner of the real estate is able to generate profit on every little thing that is being 'borrowed'. In this study a more cooperative inclusion of the residents is expected, to overcome these concerns of affordability. The overall owner of the housing as a service concept should be combined with a non-profit organization. Perhaps there is not one company that owns all that is being shared to turn a profit. Instead, multiple small businesses can be involved in this shared concept. Where the shared laundry is a local business and all the buildings are not owned by one individual, but a few buildings are owned by locals instead.

The position this project will take in housing as a service is one focused on a non-profit ownership model. Furthermore, residents should have the freedom to live as they want. Not to be bound by things such as monthly payments. However, the dwellings should be able to spatially fit those different living styles and allow for personal items to create one's own home experience.

The problem statement and the theory of housing as a service, creates the following research question:

How can affordable housing be designed to provides the service of housing for short and long stay residents?

Research method

The Advanced Housing studio of which this research is part of, already contains a direction of research with the specific themes that it includes. The method on how the process will approach the topics in different scales will be explained.

With each step, all themes of the studio (living with water, social inclusion, affordability, gender equity, sustainability, resources) will be presented and explored through design. Although in each step, one theme might be more present than the other theme. For example, social inclusion has a lot to do with the programming of the master plan and the dwelling types, as well as how the dwellings are connected to each other. While a theme such as resources is most present during the step where construction and material will be explored.

Qualitative Methods

Qualitative research is based on non-numerical data. It may contain fieldwork, mapping, field notes with information about the experience, attitudes, and beliefs. (Pathak, Bijayini, & Kalra, 2013)

The plan by ZUS for the site shows drastic changes. By using a qualitative approach, a better understanding of their approach and the context of the site will be gathered. The site and context in its current form and the site as planned in the design of ZUS will be documented to gather information that is relevant to the approach of designing affordable housing. Mapping and analyzing are a good way to document the large scope of information surrounding the environment of the site. Although it often lacks the feel and experience of the place. Through site visits this feel, and experience can be captured. By sketching, the key components of this experience will be documented. This allows for a more comprehensive analysis to complete an overview of the location.

Case-Study - morphological analysis

Housing as a service creates complex problems to be explored within architectural design. Morphological analysis is a method that can identify possible relations contained in a multidimensional problem. (Bird, Menzies, & Zimmermann, 2015)

The programming of the affordable housing design also has one of the largest impacts on the living costs and conditions of affordable housing. By finding important relations with this analysis, a clear overview will be presented, with important structures. Therefore, the programming of affordable housing design will be explored with existing projects. Case studies of these projects will be studied and compared. With the information gained from those studies, different floor plans can be tested for the design in Midden Delfland.

Speculative design method

Speculative design is a way of not only creating things but also ideas. It's to imagine the future of how things could be, by asking the question "what if?" This method aims to start a discussion about what people want or don't want. (Dunne & Raby, 2013)

For the design of this study, the future will be explored with this method. Therefore, the design in the location will be explored by creating variants. In this method, different aspects such as the figure, arrival, form, and the design relation to the environment can be tested. The design will be tested in the landscape, by visualizing the design in the landscape with either sketching or models. This step will also focus on how the residents experience the arrival to the dwellings and how they enter and interact with the dwellings.

Research by Design

Throughout this study the method of research by design will be used. This method explores the research that may arise from design, a proposal, model, or experiment. By consciously extracting rules about the object, with investigations such as analysis, criticism, selection, and problem formulation. (Hauberg, 2011)

This method will explore aspects such as flexibility. The building structure is an important aspect of flexibility and therefore of affordable housing as well. To find an optimal solution, different alternatives will be explored through design. Building elements and their relation or physical connection to one another goes further into the aspects of flexibility and sustainability of the design, therefore this method of research will also explore the design throughout the detailing of the project.

Landscape design by ZUS



Figure 4 Landscape design by ZUS architects

Research by Design

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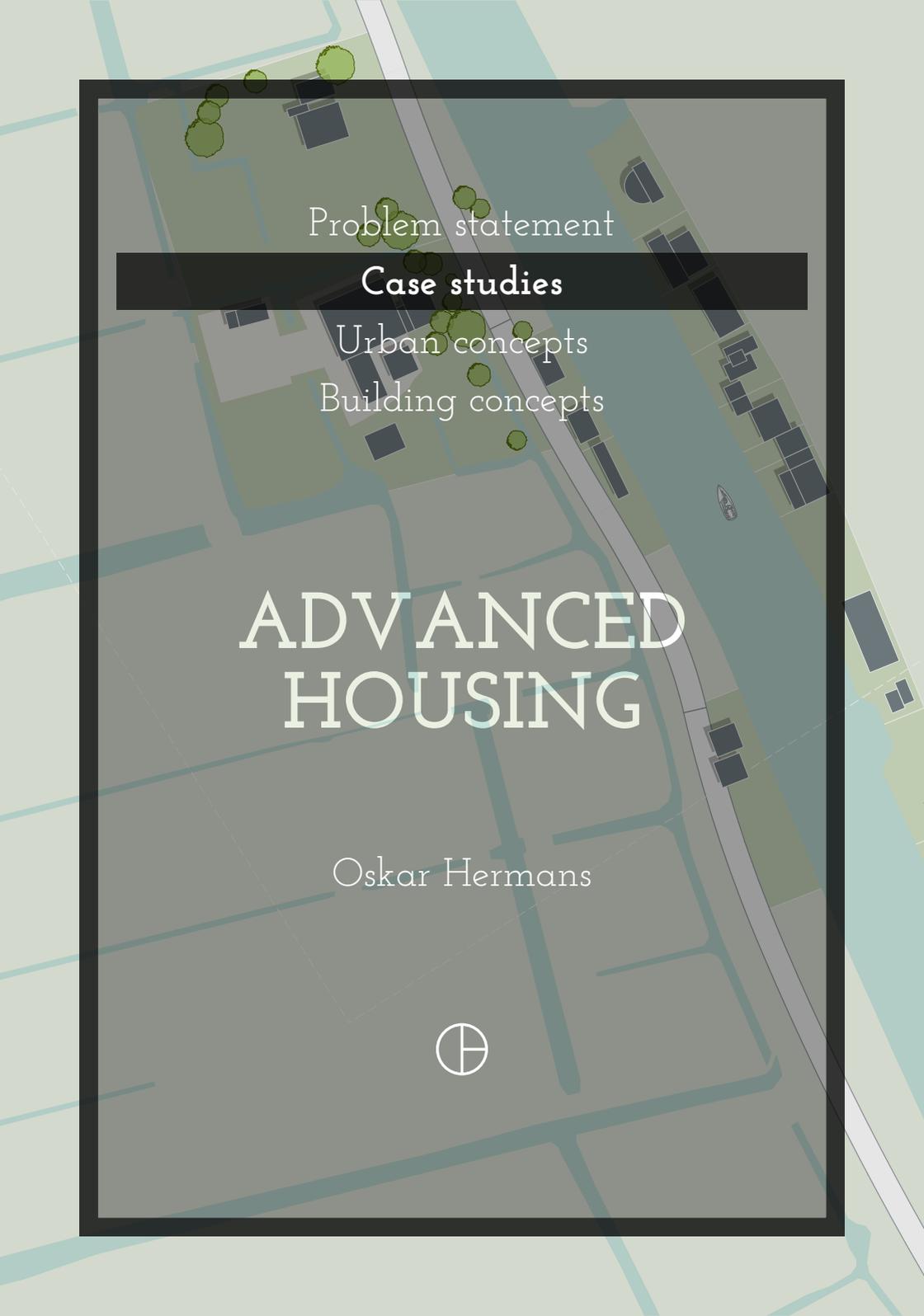
ADVANCED HOUSING



Oskar Hermans

TU Delft

21-06-2024

The background of the cover is a detailed architectural site plan. It features a network of light blue canals and a grey road. Various building footprints are shown in dark grey and blue, some with internal room divisions. Green circles of varying sizes represent trees, and a small boat is depicted on one of the canals. The entire scene is framed by a thick black border.

Problem statement

Case studies

Urban concepts

Building concepts

ADVANCED HOUSING

Oskar Hermans



Case selection

Designing requires to look at the past, for inspiration and improving on previous experiments. Therefore a search for examples of housing as a service has been performed. But these projects are not common especially with the architectural aspects that suite the design of this project. The solution to this missing information is, to gather information from multiple cases that contain the aspects that this design is asking for.

This is how five cases have been selected to be studied. The analysis aims to also identify how these aspects work in each projects by answering the following questions: How are the **dwelling types** configured in the cases? What is the relation to the dwellings with **sharing**, and what do they share, and with who? How does the individual relate to the **community**?

Case 1929
The Narkomfin building, Russia

Collective living, Affordable, Employees

Case 1998
Windsong CO-Housing, Canada

Collective street, C.P.C.

Case 2009
Satelliten-Wohnung Haus A, Switzerland

Collective living, Affordable

Case 2017
Bremer Punkt, Germany

Versatile, Social mix, Affordable

Case 2020
Eldenbosch, Netherlands

Shared living, Affordable, Temporary stay

WETLAND HOUSING SERVICE

Analysis

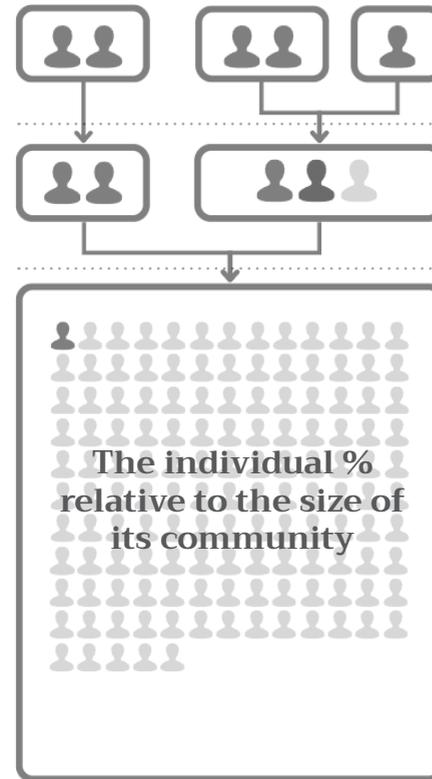
This analysis model has been created to gather information of each case in a similar way. Creating an overview of dwelling types and how the sharing is related to its community.

First row of this model shows the amount of bedrooms per dwelling type and how many people per bedroom. This shows what dwelling types the case project contains and how many residents live per dwelling.

The second row shows how many residents live per dwelling. This is used to know how many people share space and functions within the dwelling it self. This is followed by collective spaces and how many people share the collective functions located outside the private dwellings.

Then finally there is the total amount of people living in one building. This is the community that share all general or collective building functions and gives an idea on how the individual is involved in this community.

Scheme diagram index



Scheme data index

1. Bedrooms and people per bedroom...

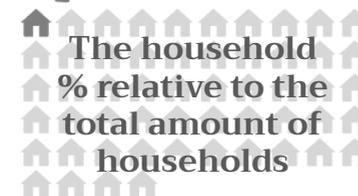
2. People per dwelling... and what they share...

3. Approximate size of community...

With list of space and functions of what they community shares...



Average people per household



Total households and estimate per dwelling size...

Case 1929 The Narkomfin building

The Narkomfin building is one of the few buildings that was actually built to respond to constructivist aim of reinventing the everyday life of people. It was designed to host collective housing for employees of the Narodnoy Kommissariat Finansov.

The main principle of this design is the collectivization of areas that correspond to collective functions.

What is most noticeable is that a large amount of the dwellings were made without a kitchen, with the intend that they collectively cook and eat together. But later on the residents added a kitchen to their dwellings.

Designed by:
Moisei Ginzburg
Ignatii Milinis

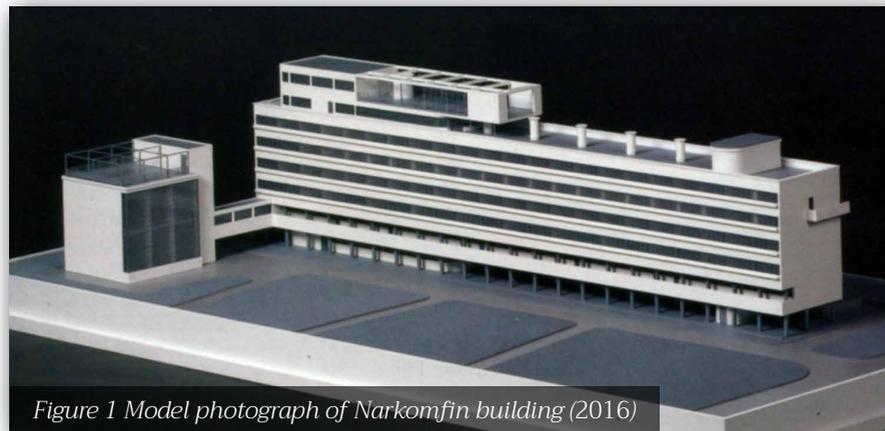


Figure 1 Model photograph of Narkomfin building (2016)

Dwelling types

This building essentially contains two types of dwelling. A two bedroom apartment and a single bedroom apartment. All dwellings are focused on families or starting families and therefore always have space for couples

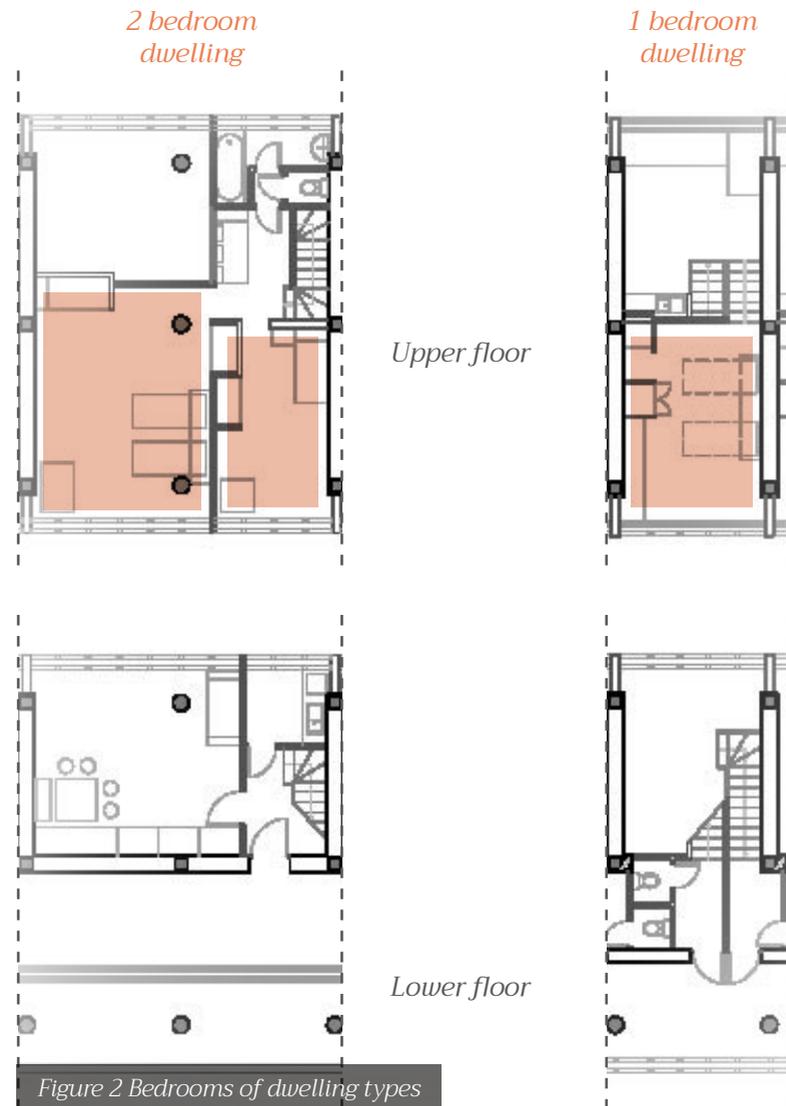


Figure 2 Bedrooms of dwelling types

Shared household functions

Within the family dwellings there is a bathroom, living room and kitchen that is shared with only the dwelling it self. Therefore, the dwellings are not depending on any other collective spaces for the essential household functions.

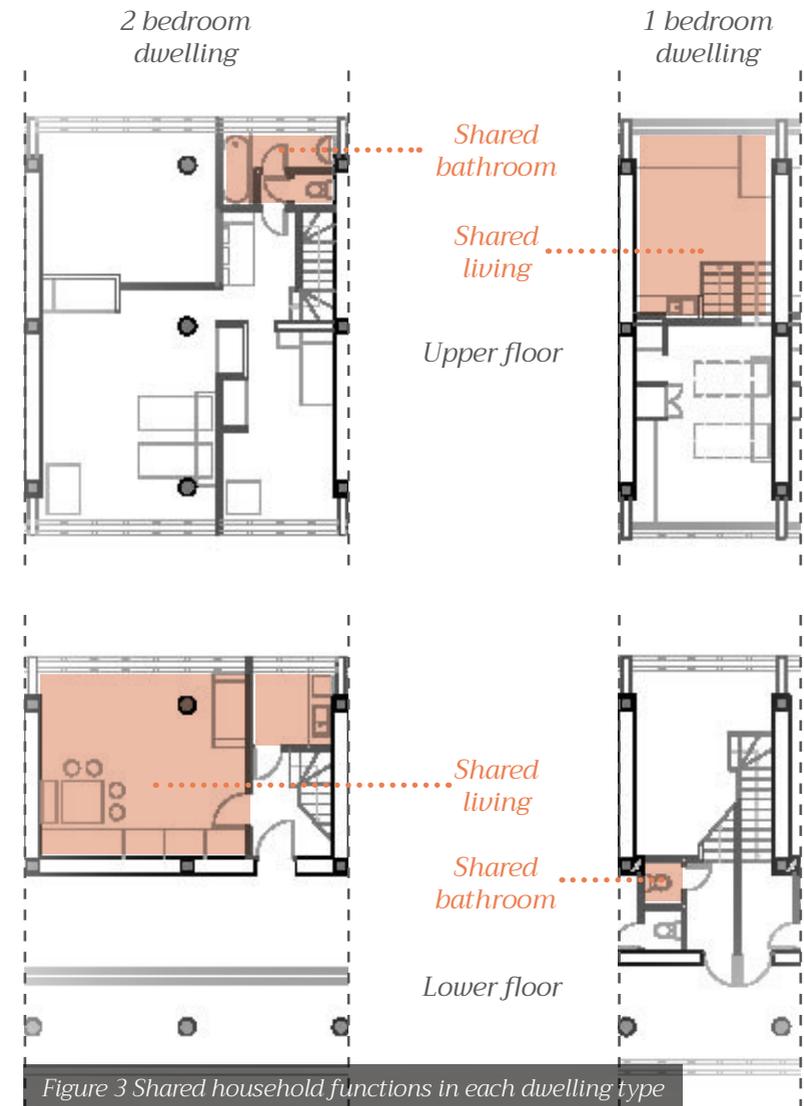


Figure 3 Shared household functions in each dwelling type

Collective space

The building is originally designed with its collective space & functions grouped vertically, on either side of the building. These collective functions are accessible through the staircases. This gives all the residents from each floor access to use all the collective spaces of each floor. This means all residents of the buildings are part of one community that uses the same collective spaces, where the individual in this community is only a small percentage.



135 people sharing:
play area for children
kitchen (in the early times)

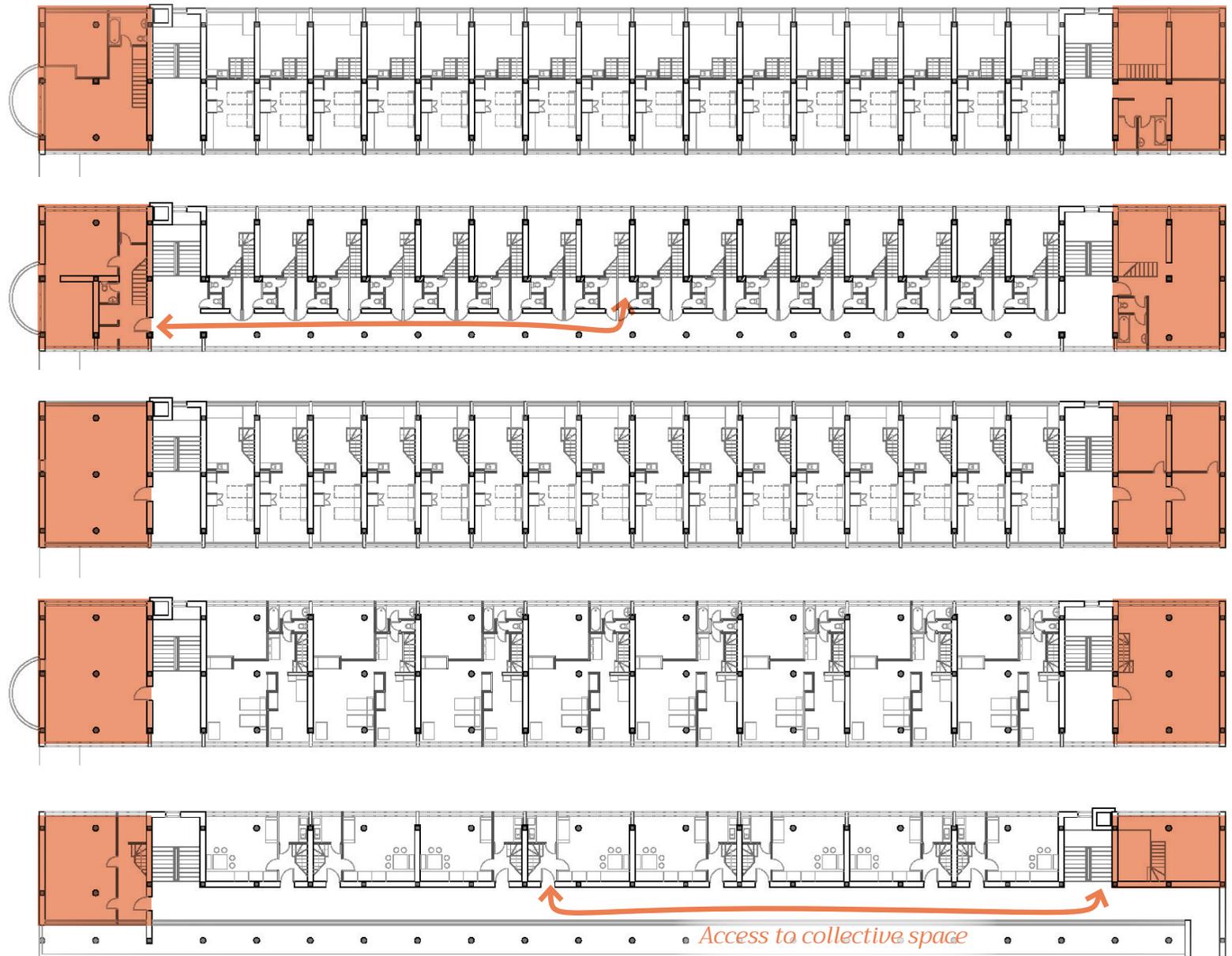


Figure 4 Collective space and the relation to dwellings

Structure concept

However successful the collective functions are, the original design of grouping the collective functions has its benefits. By design, this allows the building structure to be relatively simple. This allows for the use of standard construction elements and methods, which is more affordable.

From this case; ambition, principle, & strategy followed for future design:

Ambition

Simplistic structure

Principle

Grouping & simplifying functions, for clear and more affordable design

Strategy

Group space & functions with similar structures

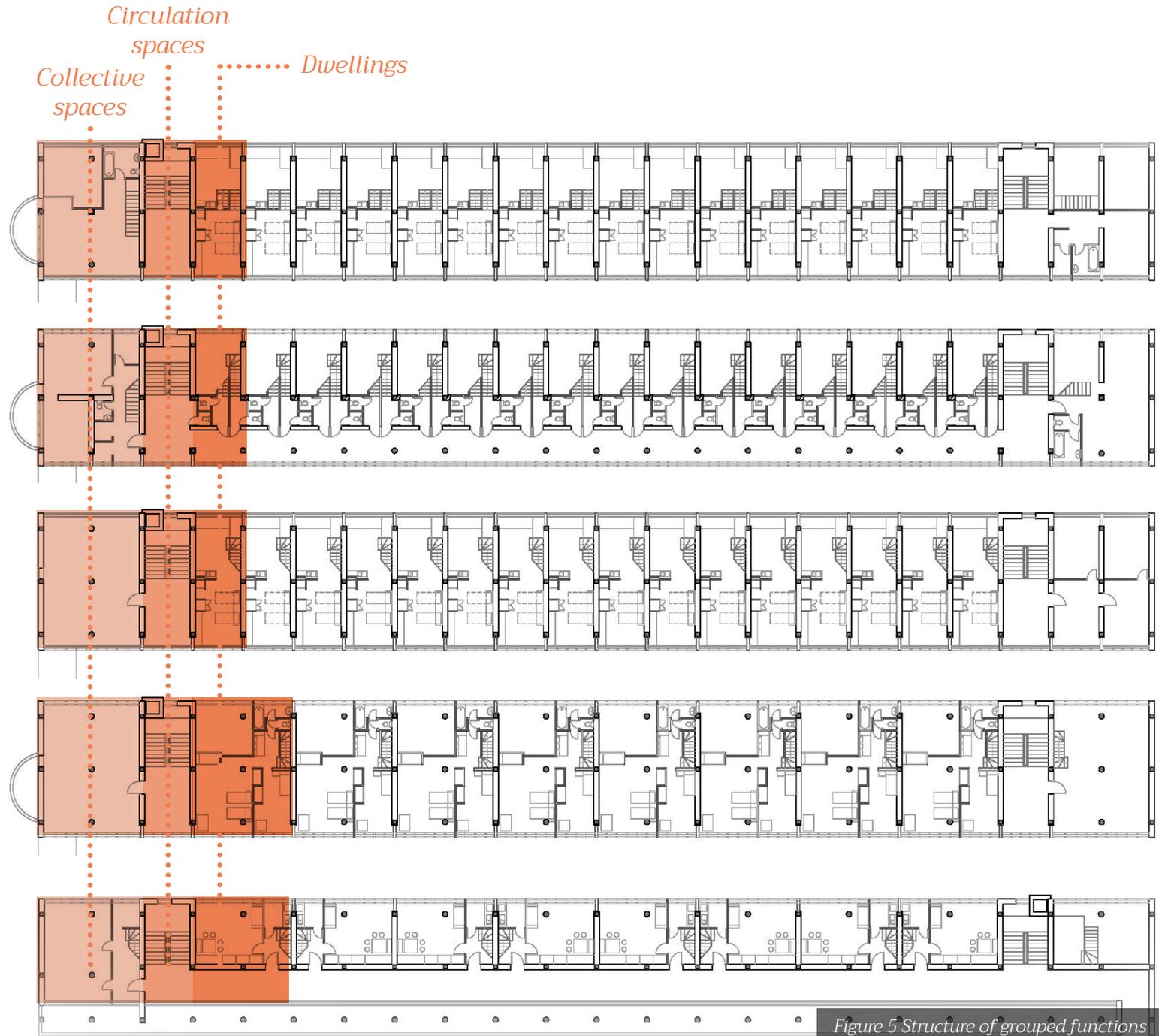
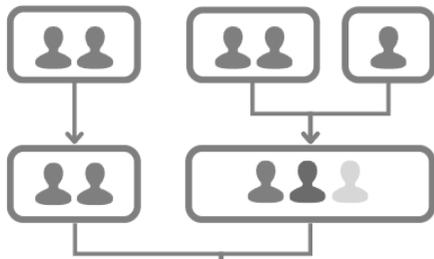


Figure 5 Structure of grouped functions

Case statistics



1-2 people sharing bedroom
(designed for families)

2-3 people sharing
(designed for families):
bathroom
living room
kitchen



135 people sharing:
play area for children
kitchen (in the early times)



Average of 3,5 people per household



54 households
estimated:
14 households for 3 people
40 households for 2 people

Positives & Negatives

This building has dwellings for small families. It was designed to have collective space grouped together. But the collective spaces were not being used as much as intended. Within the analysis was discovered that the connection from dwellings to collective space need more attention, but the grouping of these collective functions does have benefit for the affordable structure.

- + Grouping collective space
- + Simplistic structure
- Connection collective space to dwellings

Case 1998 Windsong CO-Housing Canada

In the early 1990's a community formed out of a sustainable living interest in Langley, Canada.

There are several things that make this co housing remarkable.

One of which is the shared indoor street. Which creates a place for every dwelling to use as some sort of front garden. It is a place where kids can play and social interactions occur.

Designed by:
David Simpson

Architecture firm:
dys architecture, Vancouver



Figure 6 Photograph of Windsong CO-Housing indoor street

Eerste en tweede verdieping
First and second floor

- 1 Gemeenschapsruimte
- 2 Speelkamer
- 3 Tienerkamer Teenage club
- 4 Wasruimte Laundry room
- 5 Kantoor Office space
- 6 Hobbyruimte Studio
- 7 Moestuinen Vegetable garden
- 8 Zolder Attic

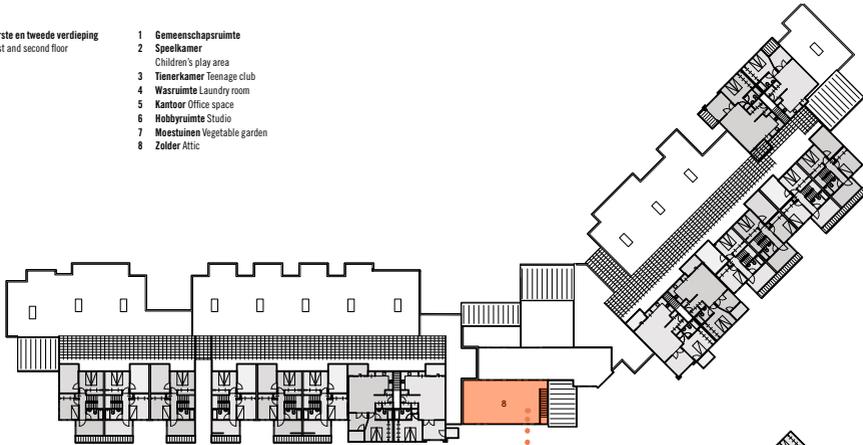


Figure 7 Floor plan second floor (Van Der Putt, 2013)

Collective spaces

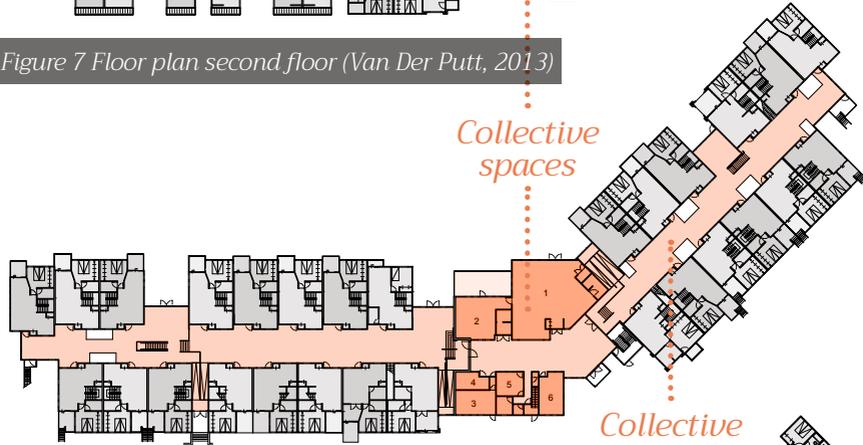


Figure 8 Floor plan first floor (Van Der Putt, 2013)

Collective street

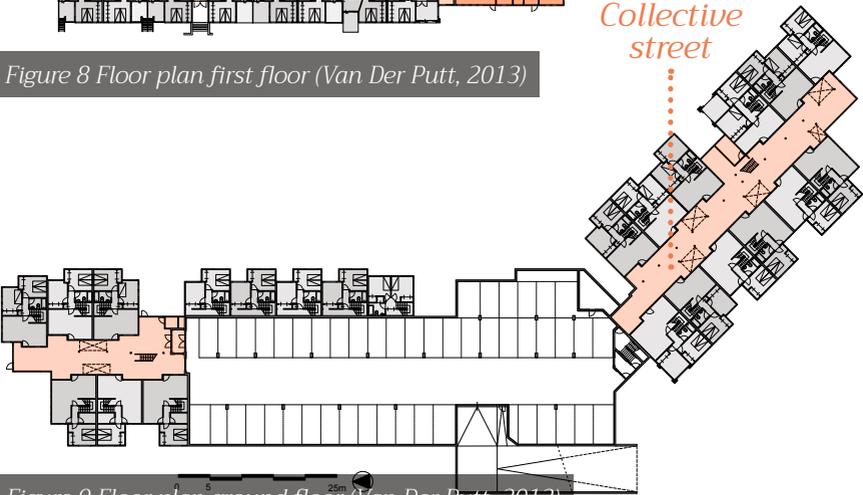


Figure 9 Floor plan ground floor (Van Der Putt, 2013)

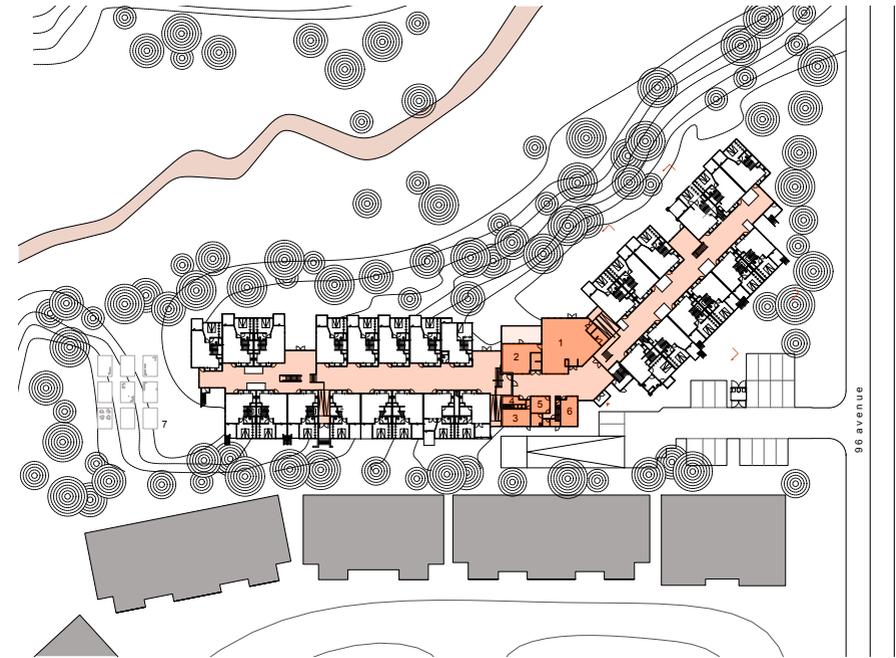


Figure 10 Site plan (Van Der Putt, 2013)

- 1 Gemeenschapsruimte
- Gemeenschappelijke binnenstraat
- 2 Speelkamer
- Collective interior street
- 3 Tienerkamer Teenage club
- Gemeenschappelijke ruimten
- 4 Wasruimte Laundry room
- Collective spaces
- 5 Kantoor Office space
- 6 Hobbyruimte Studio
- 7 Moestuinen Vegetable garden
- 8 Zolder Attic

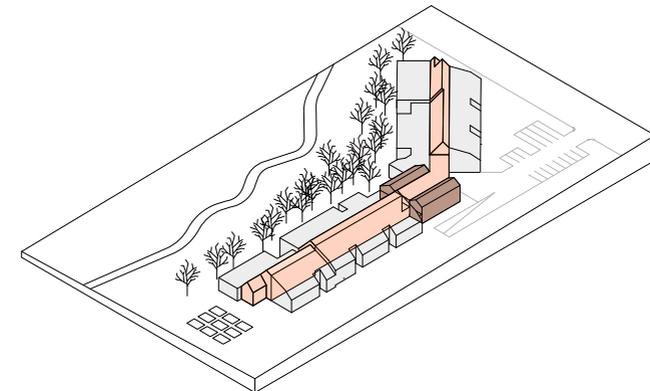
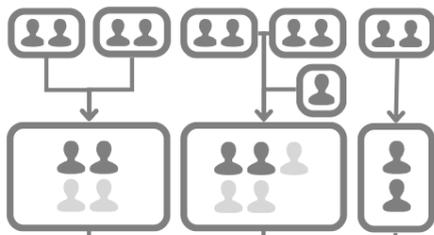


Figure 11 Axonometric (Van Der Putt, 2013)



Case statistics



1-2 person bedroom
(designed for work families)

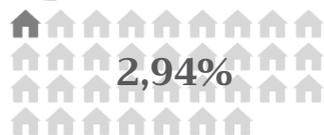
2-5 people sharing
(designed for work families)
bathroom
living room
kitchen
balcony



100 people sharing:
47 parking spots
Community space
Children's play area
Teenage club
Laundry room
Office space
Studio
Vegetable garden
Attic



Average of 4,5 people per household



34 Households
estimated:
12 households for 5 people
16 households for 4 people
6 households for 2 people

Positives & Negatives

All the dwellings are essentially in dependable of the collective space, but collective space still has its purpose. The space in between the dwellings is designed as a collective street, that all the dwellings connect to with their front door. This spaces acts as a front garden to the dwellings, creating space for social interaction.

The collective spaces of this case, are non-household functions. Therefore can be shared amongst larger groups, since there is less personal use involved. Personal use such as a kitchen requires smaller groups to take care of the shared space. Collective non-household functions are not essential to the home itself. Therefore are not part of shared space as affordable space. This is why, the collective space in this case, is mostly just extra space.

However this case is designed by the residents themselves. So even though the personal involvement of the individual within the size of the community that uses the

collective functions, is only 1%. The individual user still feels involved. Therefore the collective spaces are more likely to be used, by the residents in the way they were designed.

Therefore the main positive and negatives in this case study are:

- + Direct connection to collective street
- + Space as space for social interaction
- No shared household functions

From this case; ambition, principle, & strategy followed for future design:

Ambition

Social inclusive design

Principle

Centralizing collective space

Strategy

Connect front doors of dwellings to collective spaces

Case 2009 Satelliten-Wohnung Haus A Switzerland

In building A there is an average of 17 people per building story, with around 97 people in total in the building

Mehr als wohnen designed an urban living space. The design transformation was possible by applying the principle to build an urban quarter.

Architecture firm:
Duplex Architekten

Plot Area: 40000 m²

Gross Area: 60000 m²

Of which residential: 85%

Public/communal areas: 5%

Facilities for the public: 5%

Business/trade: 3%

Offices: 2%

Number of residential units:
370

Typology of users: families

Total building costs Euros:
170000000

Building Cost = Total Building
Cost / Gross Area: 2830

Floor area ratio = Gross Area /
Plot Area: 1.5

Work started on date: Sunday,
1st July 2012

Work completion date:
Saturday, 16th May 2015



Figure 12 Photograph of Hause A scale model
(Housing Cooperative Mehr als Wohnen , n.d.)



Figure 13 Common floor, floor plan

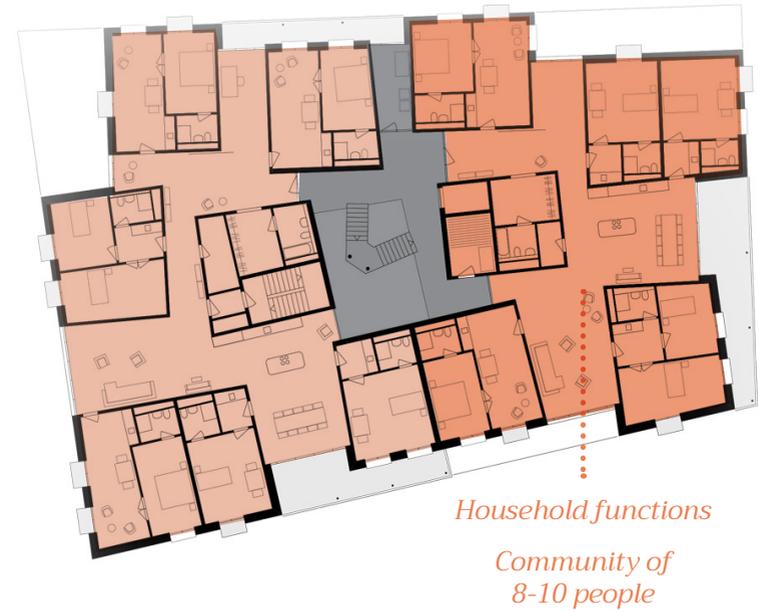


Figure 15 Common floor, floor plan collective function



Figure 14 Floor plan ground floor



Figure 16 Floor plan ground floor collective function

Community of ~100 people

This case is designed with sharing as a way of affordable living. The cost of housing can be shared, by sharing essential functions (household functions) that every new home these days have. This case designed household functions such as the living room, kitchen, and bathroom to be shared amongst multiple dwellings. This allows multiple dwellings to enjoy a larger space, while sharing the cost with each other.

These household functions do require to be taken care for (by their users). This case designed the shared household functions to be used in relatively small collective of 4 to 5 dwellings (which is 8 to 10 residents). This allows the residents to form better social connections within this collective. This also allows the individual of the collective, to have a large impact on the collective and its shared spaces.

There are also non-household functions that are shared within the building of this case. These functions are not essential for a household, but do improve living in general to a form of luxury or convenience. Examples of these functions are shared-office spaces, meeting rooms, play areas, clubs, etc. In a way these spaces also improve affordability, for example, the shared office space will remove the need for all residents to have their own home working space within their dwelling. But most of these functions are extra space to improve urban living, therefore these spaces can be shared amongst larger groups of people. This case designed these non-household functions to be accessible by all residents of the building, which is a community of around a 100 people.

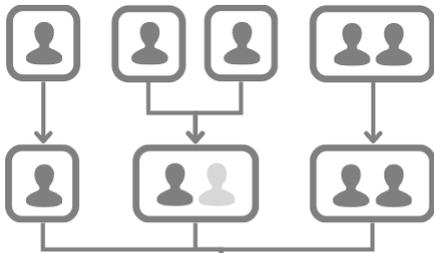


Figure 17 Common floor, floor plan

Privacy is also very important in the design of dwelling and shared living. This case designed the dwelling with their own buffer zone. In this case, the zone is a room that is in between the access to collective space and the access

to the bedroom of the dwelling. This allows the residents to have their own private spaces to retreat. It also allows residents to receive guests in their own space, outside of the very private space (the bedroom).

Case statistics



1-2 person bedroom

1-2 person sharing

bathroom

kitchen

French balcony

8-10 people sharing

collective bathroom

collective living room

collective kitchen

collective balcony

collective storage

10,00%

1,07%

93 people sharing:

Bicycle storage

Office space

Meeting room

Average of 1,5 people per household

55 Households

estimated:

7-38 households for 2 people

3-17 households for 1 person

1,81%

Ambitions

Manageable community size

Principle

Limit size of sharing communities

Strategies

Share kitchen & living room with no more than 8-10 people

Ambitions

Share household space & costs

Principle

Share functions (that allow for social interaction)

Strategies

Share: kitchen, living room, circulation

Ambitions

Respect the individual

Principle

Boundary between collective & private

Strategies

Bedroom not connected to collective

Case 2009 Hunziker Areal Switzerland

Case 2009 Satelliten-Wohnung Haus A, in Switzerland is designed as part of a urban plan called: Hunziker Areal. “Mehr als wohnen“ is the housing corporation of this project and they took the opportunity to create an urban living space. The design transformation was possible by applying the principle to build an urban quarter. All ground floors have public use local supply, shops, service providers, cultural spaces childcare or common rooms. To make this happen, the urban plan is formed with a set of rules. To guide the architects with designing their buildings, so that they work together in the urban function.

From this case; ambition, principle, & strategy followed for future design:

Ambition

Interplay of public & private space

Principle

Different urban sequences

Strategy

Allow morphology to determine open & closed spaces (public & private spaces)

Ambition

Orientate public & private space

Principle

A public center

Strategy

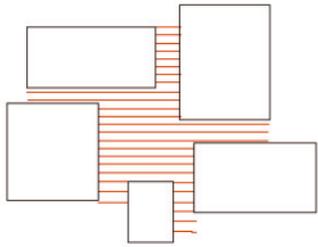
A plaza in the center forming open space between buildings as a public square



Figure 18 Urban plan of Hunziker Areal Switzerland

Set of urban rules

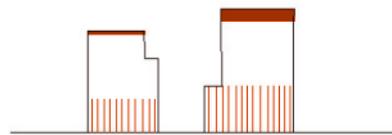
Coat line



the proposed portion of air in the Coat line volume is ca. 12%, which can be placed freely. Courtyard- and Facadincisions are Possible as long as the Facadeside is filled mostly. The primary Volume should be readable after all.

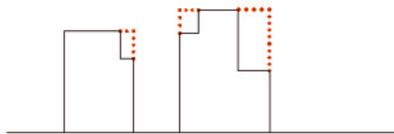
The three dimensional Coat line defines the maximal Building volume in the Masterplan. The Coatline has to be build on in principle. Single protuding Building parts like Oriel an Balconies can punkture the Coat line, as long s the cubik appearence is sustained.

Facade layout



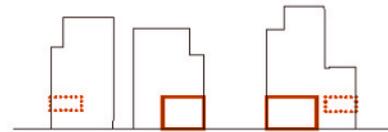
For the superior interaction between the single Buildings and the overall Yardstick a three-part buildingstruckture is to be respected. The architectural tools to implement a ground Floor and a roof closure are free.

Subtraction prinziple



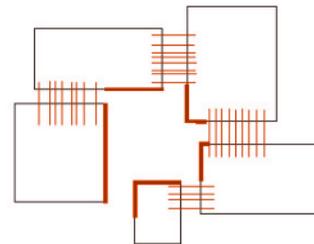
The exceptional Building depth up to 32m requires additional measures , to guarantee a optimal Lightning of apartments. Therefor

Distribution of use



The Allocation of the uses in the ground floor is decisive for the Character of the urban Spaces and therfor oblige. Community and public orientated uses accumulate around the squares. Residential uses maintain the necessary privacy due to the averted position and the Arrangement in the raised ground floor

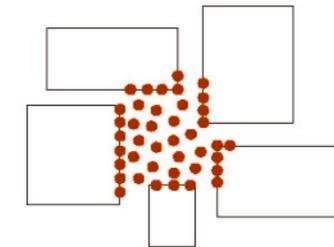
Adresses



Facades assigned to the squares are to be used extensively for Community usage.

The entrances to the apartments are to be ordered to the Street sides and bottlenecks averted to the square. This results in recognizable streets which consist identifiable addresses of the houses. Through the thick volumes a house usually has several Addresses.

Accents



The central square is the middle of the urban plan. The facades facing the square support its accentuation and differ from the facades turned away from the building by their representative character.

Case 2009 Satelliten-Wohnung Haus A, in Switzerland is designed for housing corporation "Mehr als wohnen". They took the opportunity to design an urban living space. The design transformation was possible by applying the principle to build an urban quarter. All ground floors have public use local supply, shops, service providers, cultural spaces childcare or common rooms.

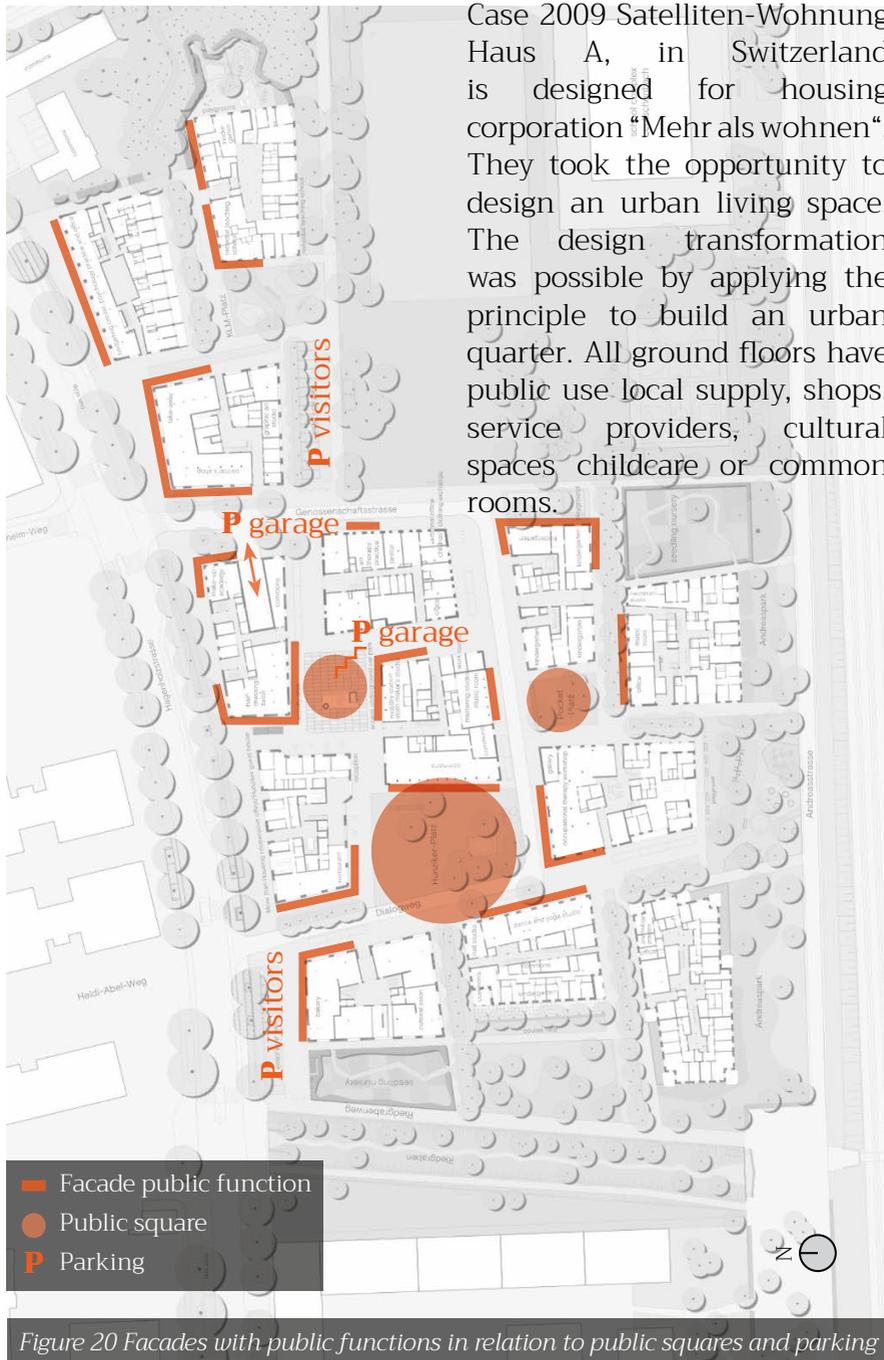


Figure 20 Facades with public functions in relation to public squares and parking

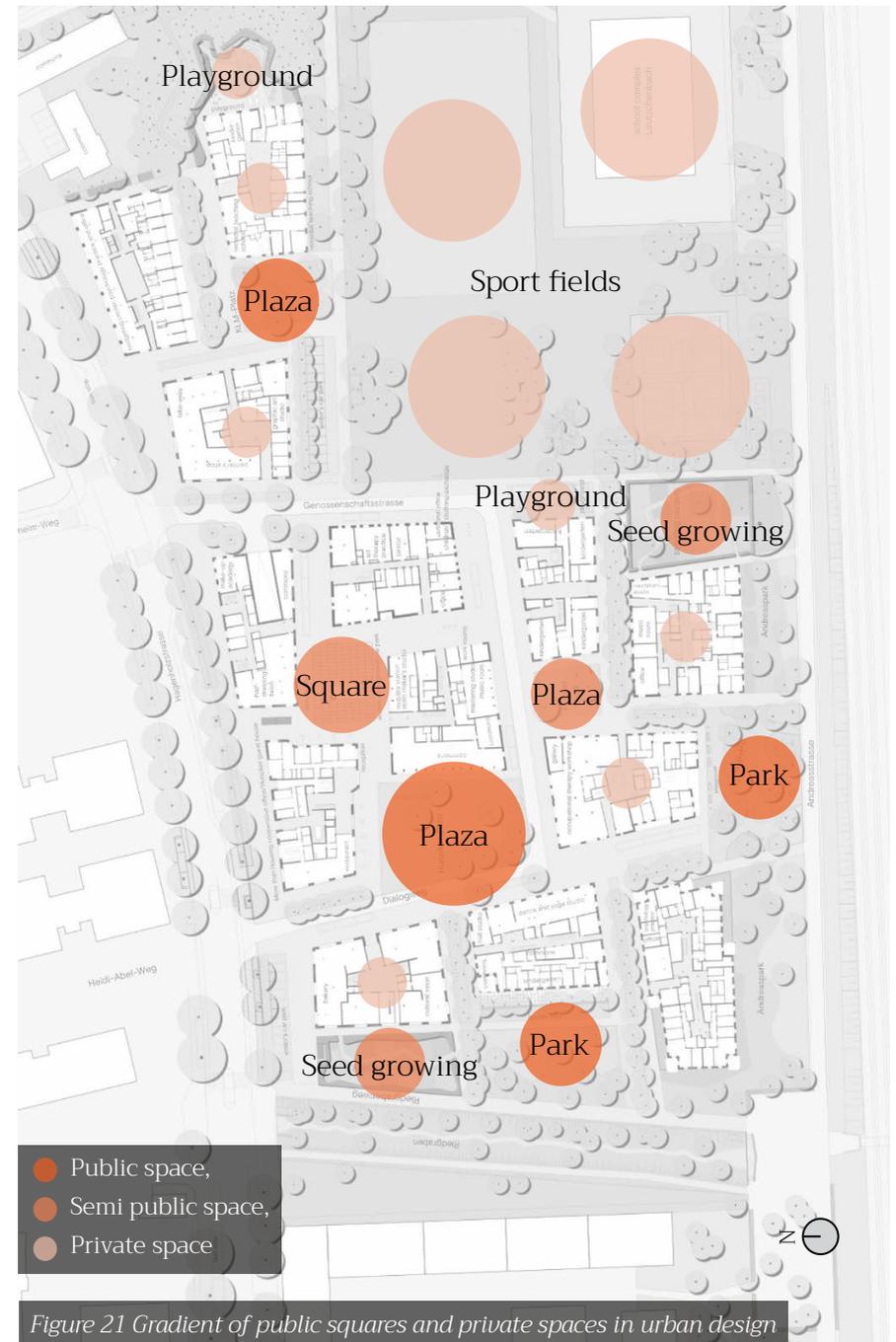


Figure 21 Gradient of public squares and private spaces in urban design

Case 2017 Bremer Punkt Germany

The project from 2017 has a good example of a building designed by ... this case has a relatively small type of size of building with a wide variation of dwellings that fit inside its profile. This allows the project to house a large diversity, increasing the social mix.

It is designed to fit in the smaller areas of existing neighborhoods. This way it is able to densify cities even further.

Project leader: Corinna Bühring

Location: Germany

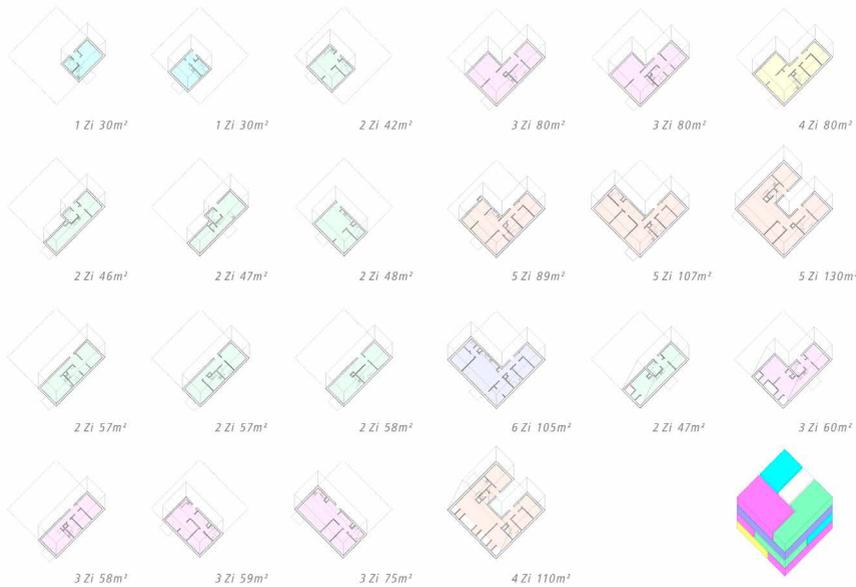
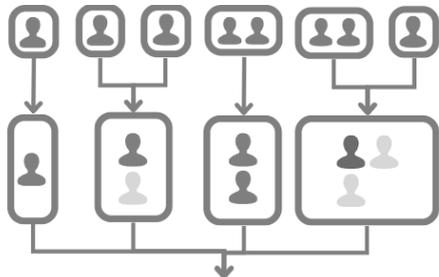


Figure 22 Dwellings (Bremer Punkt 1-10 Vielfalt in Serie | Lin-a, n.d.)



Figure 23 Dwellings (Bremer Punkt 1-10 Vielfalt in Serie | Lin-a, n.d.)

Case statistics



1-3 person bedroom

1-3 people sharing

bathroom
living room
kitchen
balcony

16 people sharing:

bicycle storage



6,25%

Average of 1,9 people per household

9 Households

estimated:

1 households for 3 people
14 households for 2 people
1 household for 1 person



11,11%



Bremer Punkt 1, 1st floor

Figure 24 A possible floor plan of the Bremer Punkt 1st floor

(Bremer Punkt 1-10 Vielfalt in Serie | Lin-a, n.d.)



floor plans Bremer Punkt 1-7

Figure 25 Floor plan variants (Bremer Punkt 1-10 Vielfalt in Serie | Lin-a, n.d.)

Case 2020 Eldenbosch

This case received positive feedback from neighborhood. (*Buurt rond Polencomplex, 2021*) and Province Zuid-Holland shows Eldenbosch as the example for migrant work housing (*Huisvesting Arbeidsmigranten, n.d.*)

The dwellings vary in depth, to either fit a 2 bedroom apartment or a apartment with a larger living room and 3 bedrooms. The dwellings are externally connected by a corridor in the center of the building. The finished of the building seem to have a simplistic aesthetics.

The product specification of these flex units also states that the interior walls are removable. This would allow for dwellings to be changed to accommodate for two person sized bedrooms, for people with partners.



Figure 26 Impression of a homeflex design

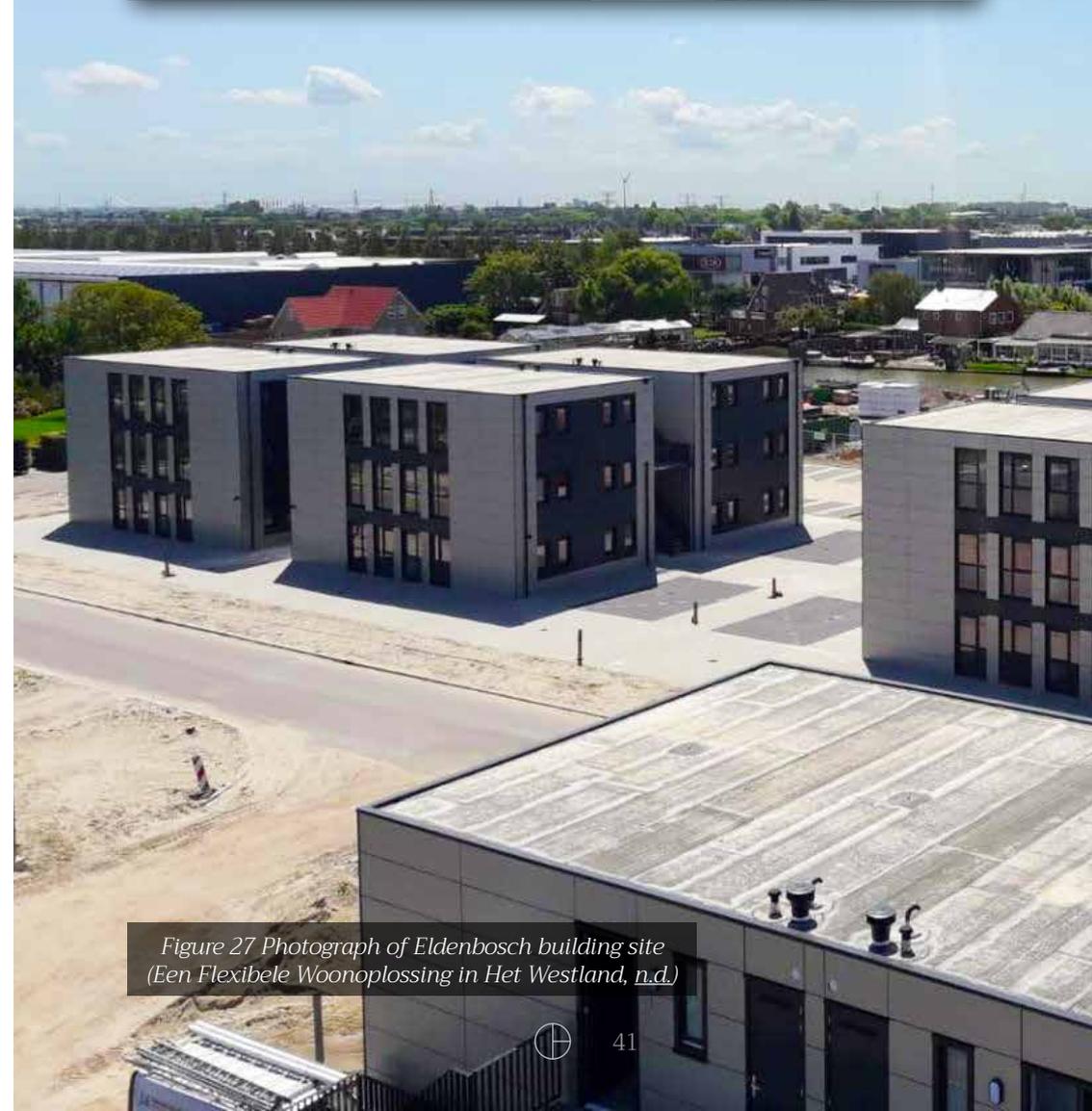


Figure 27 Photograph of Eldenbosch building site (*Een Flexibele Woonoplossing in Het Westland, n.d.*)

Case statistics



1 person bedroom
(designed for work immigrants)



2-3 people sharing
bathroom
living room
kitchen



0,56%

177 people sharing:
small courtyard
bicycle storage
54 parking spots

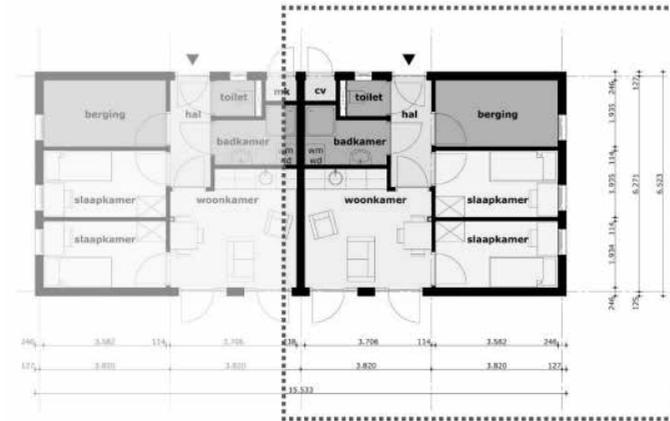


Average of 3,5 people per household



1,41%

71 households
estimated:
35 households for 3 people
36 households for 2 people



TYPE A

2-PERS. WOONEENHEID
50,7 m² [BVO]
44,2 m² [GO]

- geschikt voor 2 personen
- open woon/ eetkamer
- aparte badkamer/ toilet
- flexibele indeling mogelijk middels uitneembare wand



TYPE B

3-PERS. WOONEENHEID
66,6 m² [BVO]
59,2 m² [GO]

- geschikt voor 3 personen
- open woon/ eetkamer
- aparte badkamer/ toilet
- flexibele indeling mogelijk middels uitneembare wand

Figure 28 Floor plan of Eldenbosch (Homeflex, 2020)

Extra information on public space



In addition to the 5 case studies, some extra information was explored regarding public space. Shared functions are not limited only with in building design. Shared living extends to every scale. Urban, Building & Interior, from sharing books, to sharing the kitchen, to sharing transportation.

Culdesac Tempe, is a dwelling case that is designed as a car free neighborhood. It focuses on a 5 minute city design. Where all the essentials (corner market, a club, restaurant) is within 5 minutes walking. It also includes methods of sharing transport.

- 15% off all Lyft rides
- Free rides on the metro
- Car sharing starting at \$5/hour with Envoy
- Bird scooters on-site
- 1,000+ Bike parking spots



Culdesac Tempe is a rent residential project and offers the 5 minute city experience. Within this project are shared courtyards as well. Providing space for the community to socialize and meet.

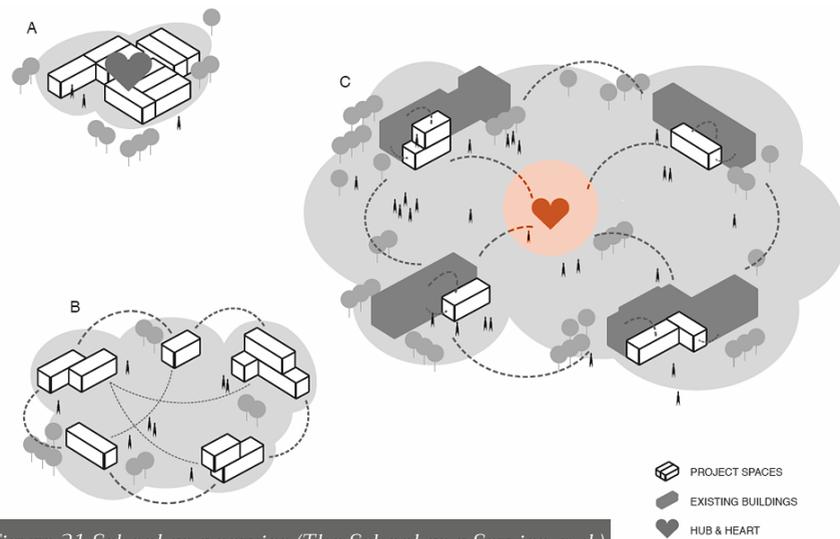


Figure 31 School as a service (*The School as a Service, n.d.*)

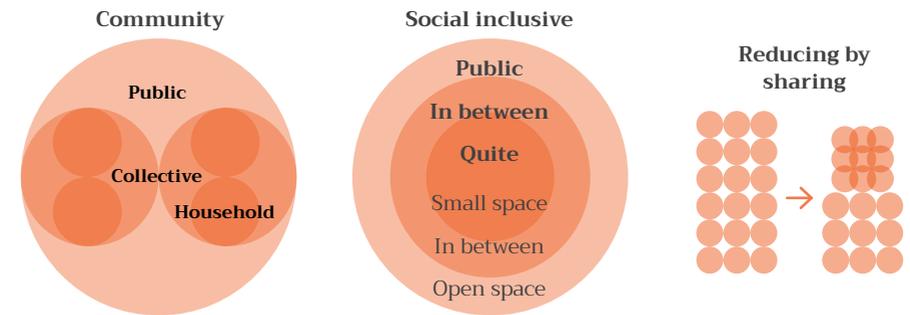
Another example of sharing public space is “school as a service” (SaaS). This concept allows the public the use the school facilities during hours that these were not being used a lot. This type of sharing increases the financial income for the school, making the spaces more affordable.

SaaS is built on a service architecture concept, which describes architecture as a instrument to deliver the services.

Key learning points

The case studies are good examples of what collective housing can be. However by comparing the studies, it becomes noticeable that the connection with the collective community becomes a struggle when the individual is less than 1% of the community. One of the cases seems to tackle this problem, by introducing a smaller group of residents and dwellings that are grouped together. This is one of the key components that seem to be important for the success of social inclusive design.

This topic shows the main ambitions that followed from the information and research of the case studies. For these ambitions principles and strategies have been set for the design of this project.



Ambitions	Principle	Strategies
Social inclusive design	Centralizing collective space Moving from open space to closed	Connect front doors of dwellings to collective spaces
Share space & costs	Share functions (that allow for social interaction)	Share kitchen, living room, circulation
Respect the individual	Boundary between collective & private	Bedroom not connected to collective
Manageable community size	Limit size of sharing communities	Share kitchen & living room with no more than 8-10 people
Pay for space you need	Variety of space & use Dwellings for individuals, couples, & families	Dwelling variety in space & use Dwellings with 1-2 bedrooms Dwellings with 2-4 bedrooms

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ADVANCED HOUSING



Oskar Hermans

TU Delft

21-06-2024



Problem statement

Case studies

Urban concepts

Building concepts

ADVANCED HOUSING

Oskar Hermans



Geographic view of Midden Delfland



Figure 1 Geographic view of Midden Delfland

2



C



3

Satellite view of Midden Delfland

Delft

Midden-Delfland

Schiedam

Rotterdam

Figure 2 Satellite view of Midden Delfland

ZUS plan of Midden Delfland



Delft

Midden-Delfland

Schiedam

Rotterdam

Figure 3 ZUS plan of Midden Delfland

6



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7

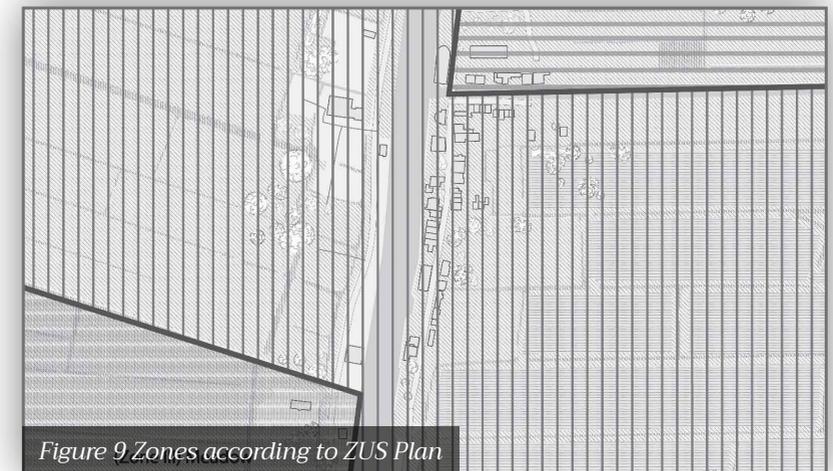
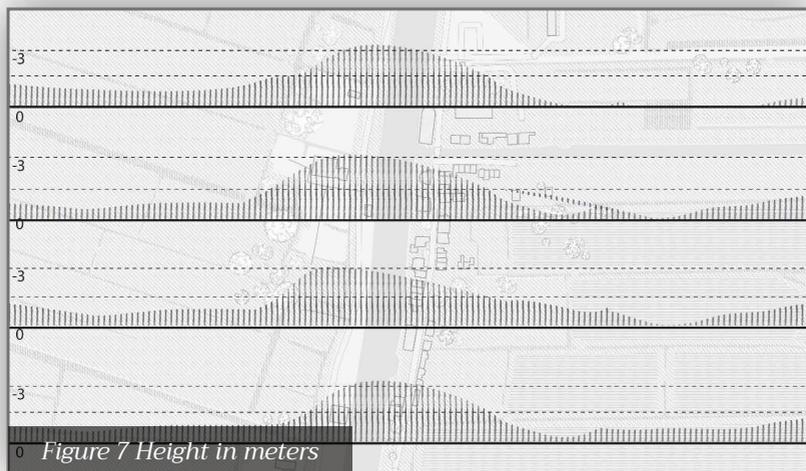
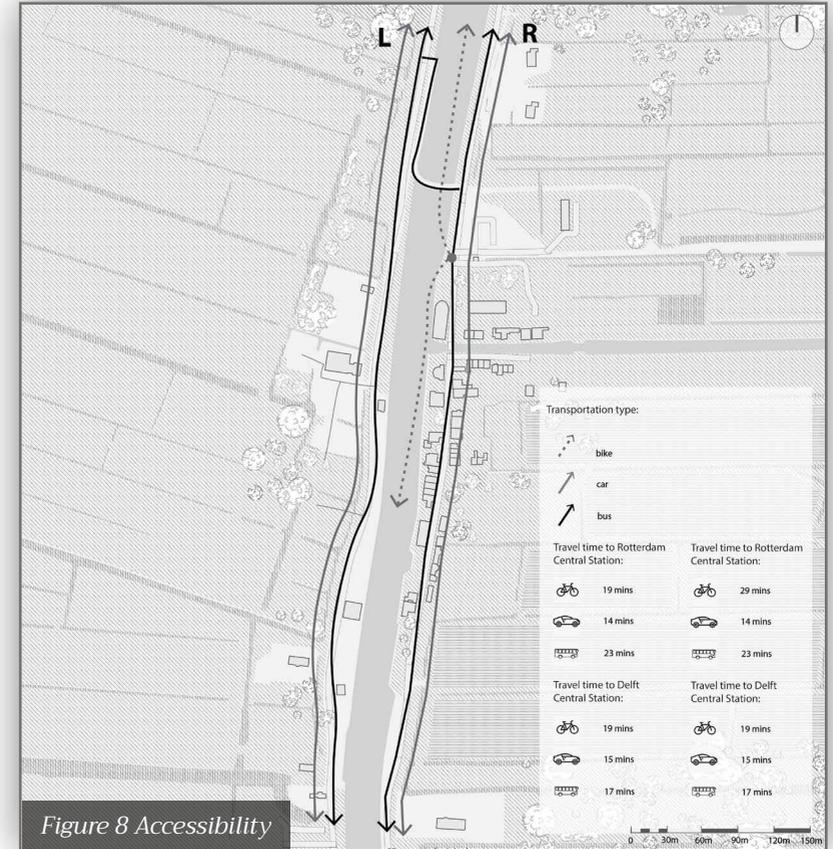
Existing site of De Zweth



Figure 5 Existing site of De Zweth



Analysis of group work



Existing site of De Zweth

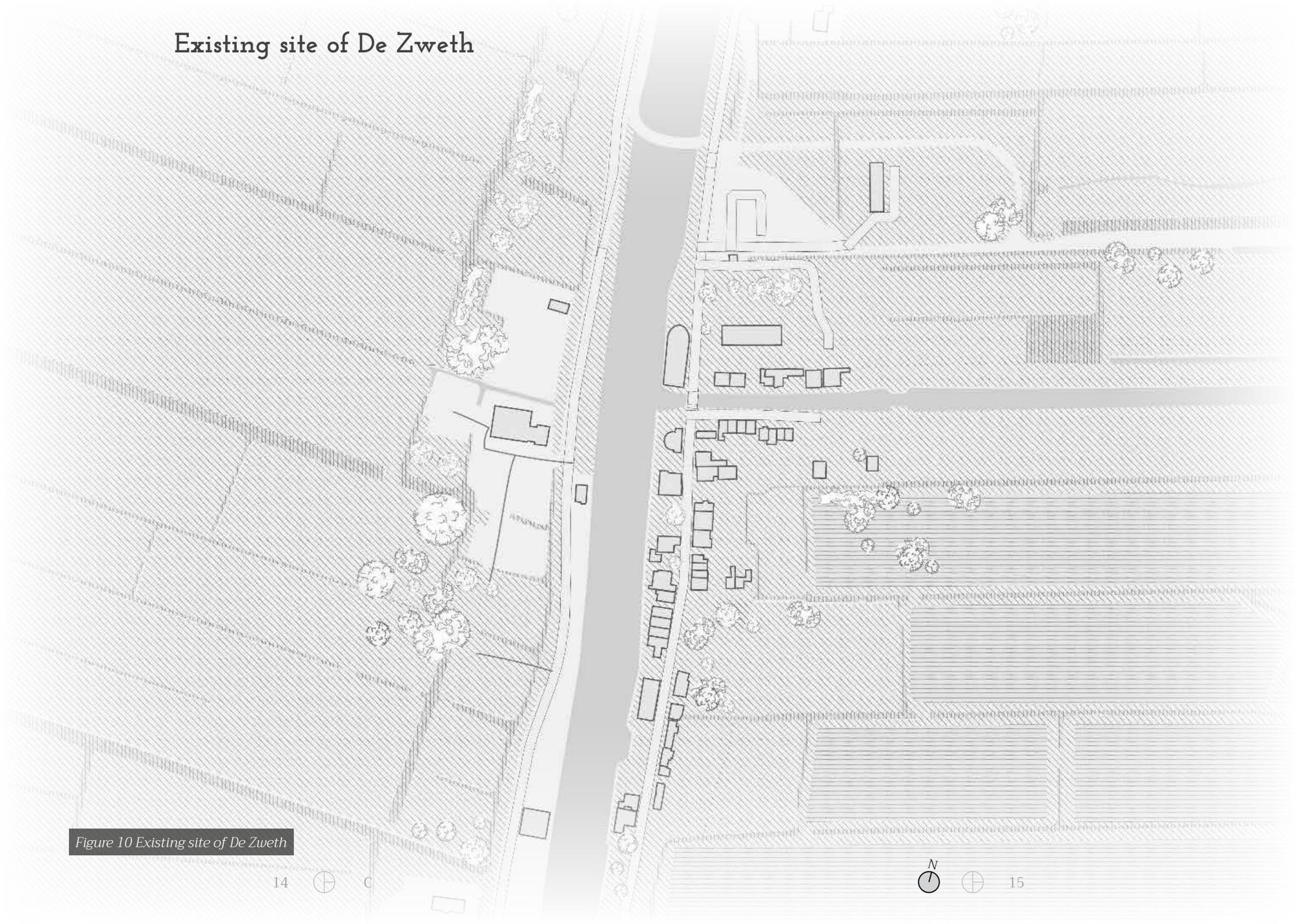


Figure 10 Existing site of De Zweth

Group master plan of De Zweth



Figure 11 Group master plan of De Zweth

Urban sections

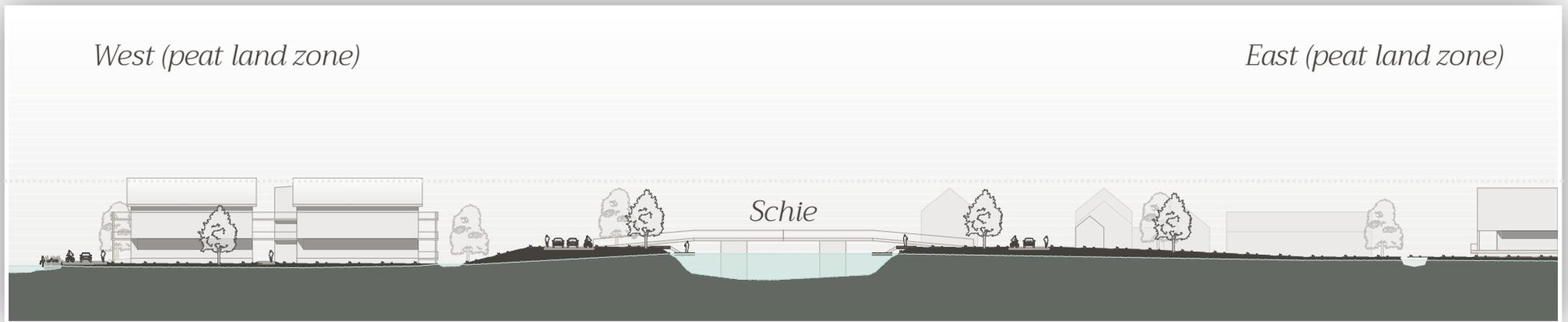


Figure 12 Urban section A-A

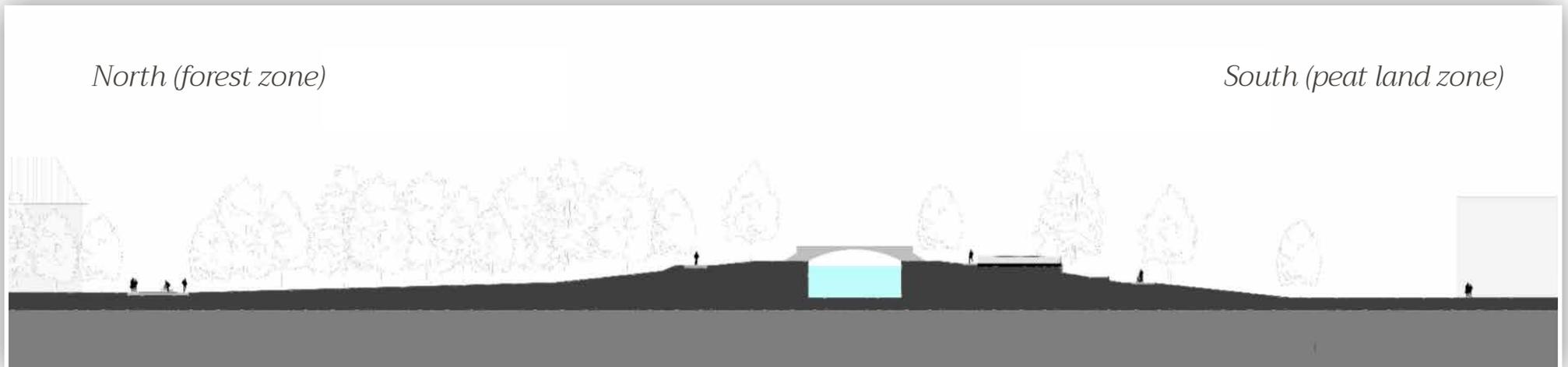


Figure 13 Urban section B-B

Tackling affordability in different ways

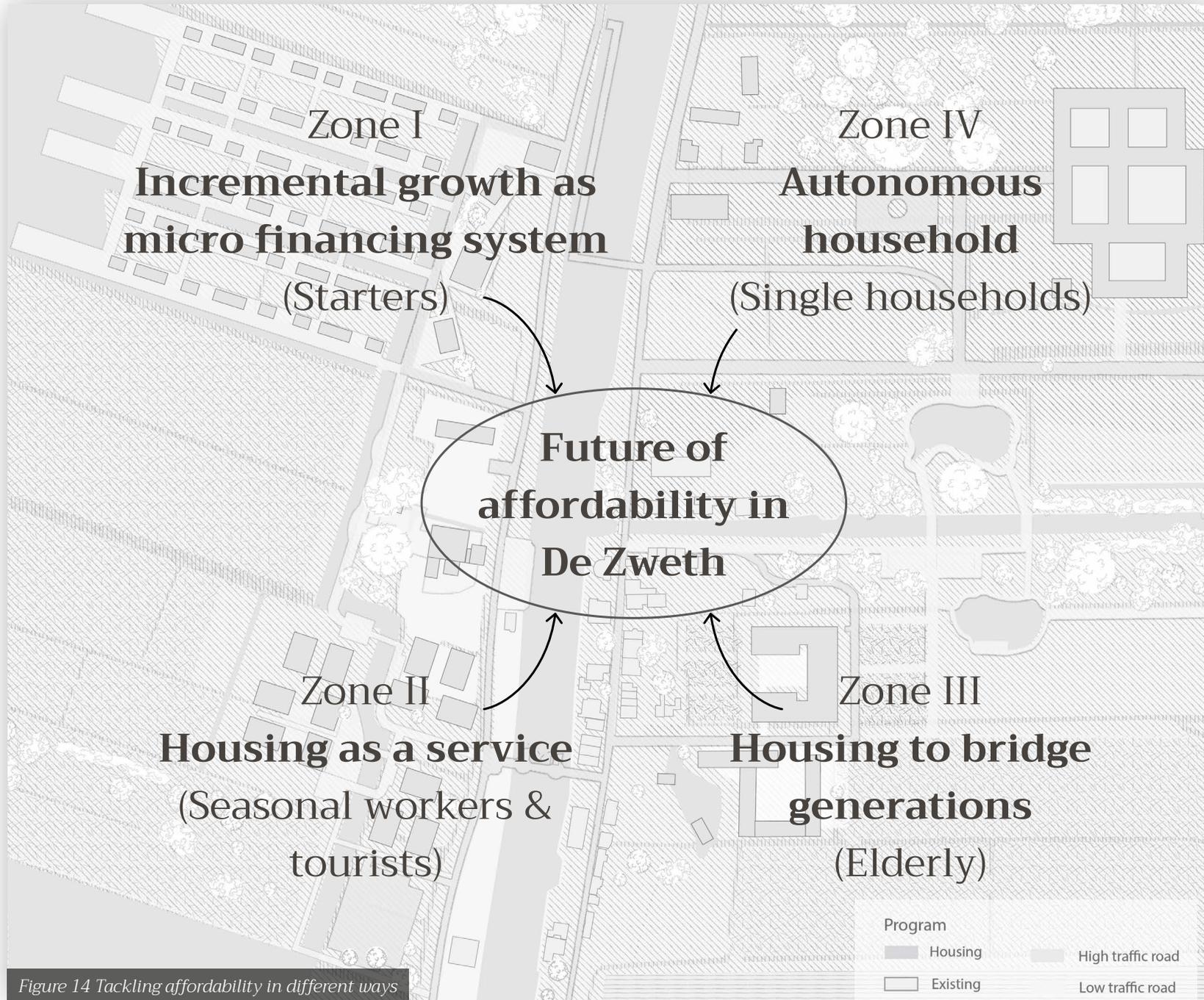


Figure 14 Tackling affordability in different ways

Project site West of De Zweth



Figure 15 Existing urban situation 1:2000

22 ⊕ c

N ⊕ 23

Master plan existing water system

Figure 17 Master plan existing water system 1:2000

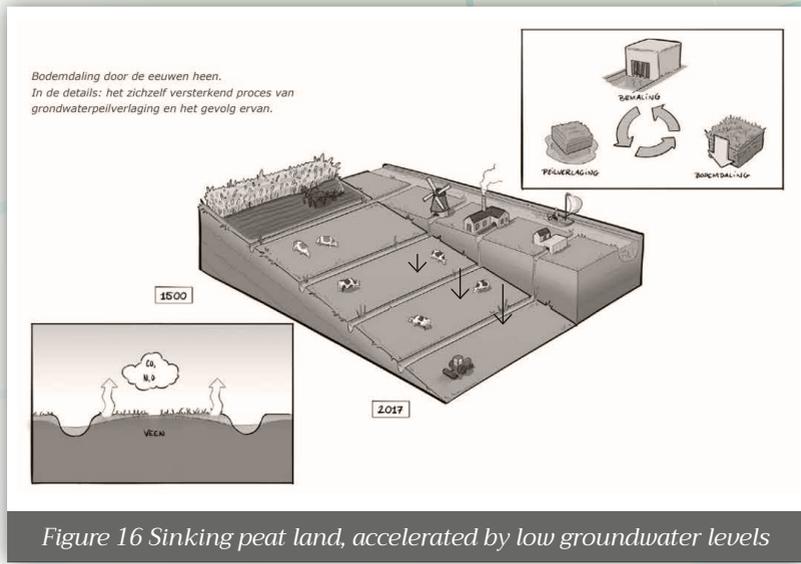


Figure 16 Sinking peat land, accelerated by low groundwater levels



Present (2023) water



Figure 18 Current water level

Future water



Figure 20 Future water level (Jumbo Realty, 2022)

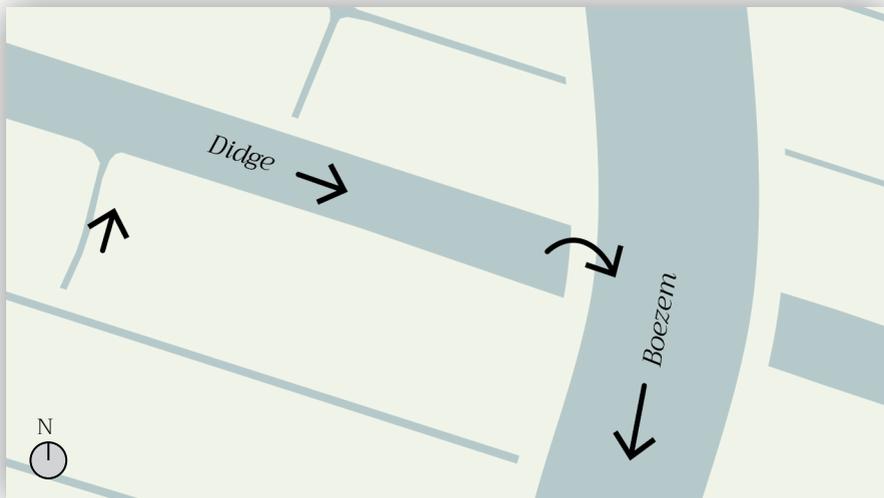


Figure 19 Current water flow

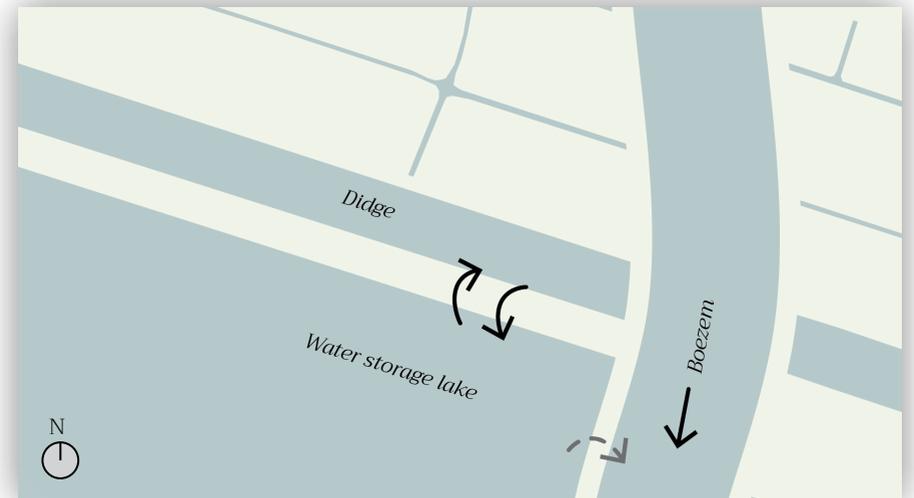


Figure 21 Future water flow

Master plan New water system

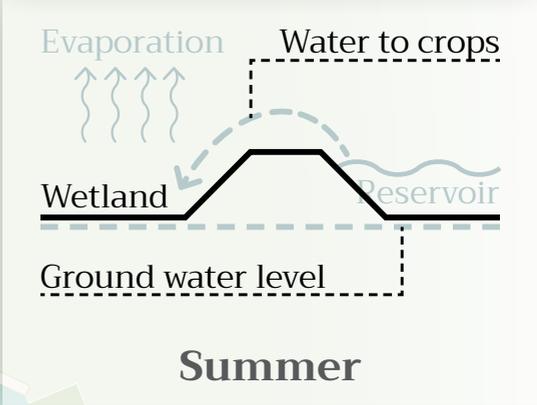
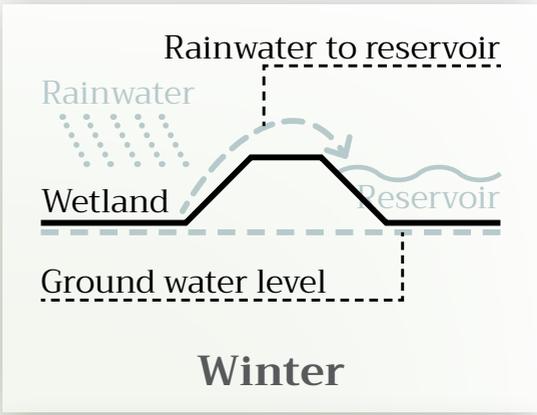
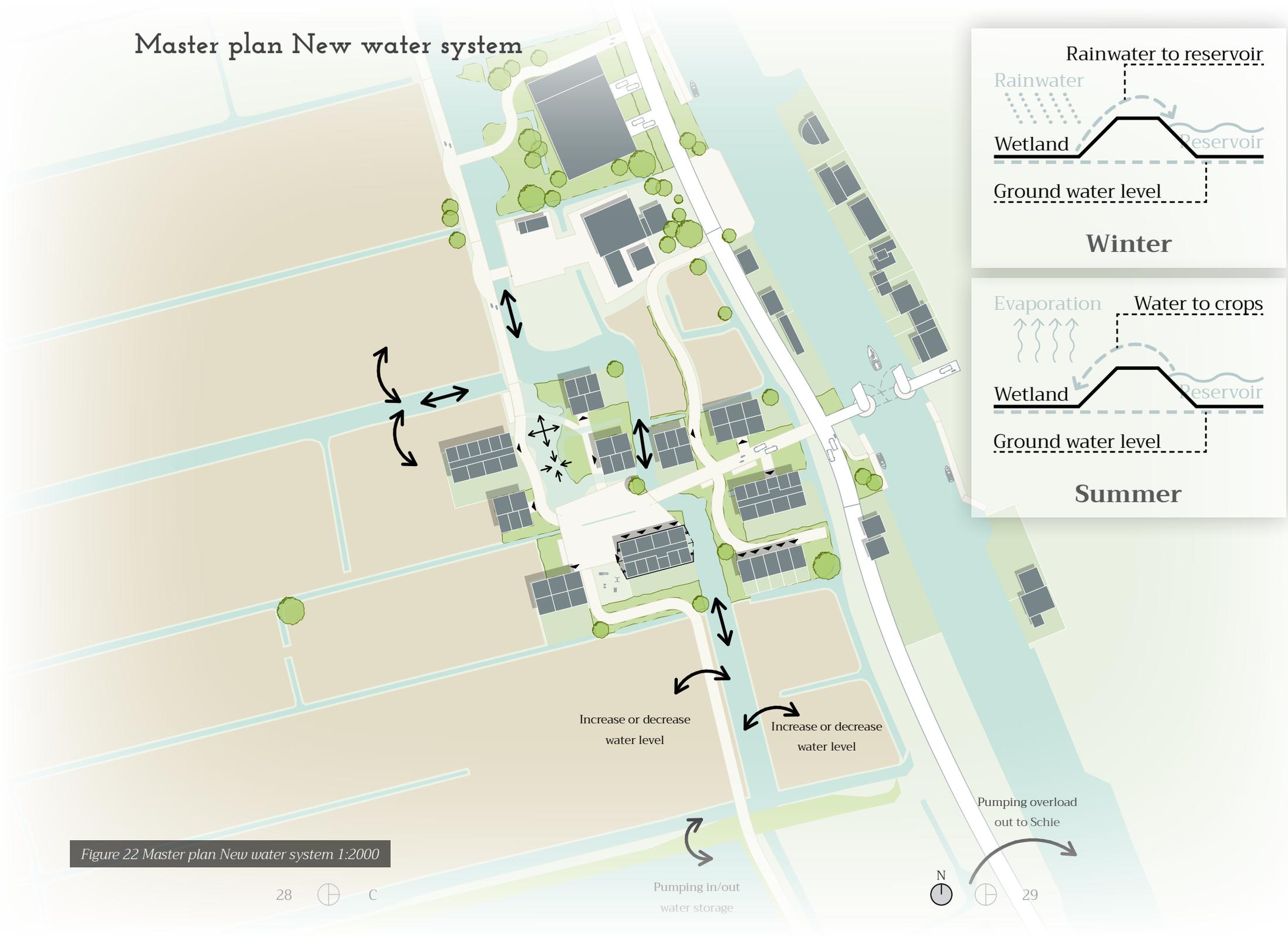


Figure 22 Master plan New water system 1:2000

Wetland road access



Figure 23 Master plan New water system 1:2000



Figure 24 Gravel road



Figure 25 Wood as base layer

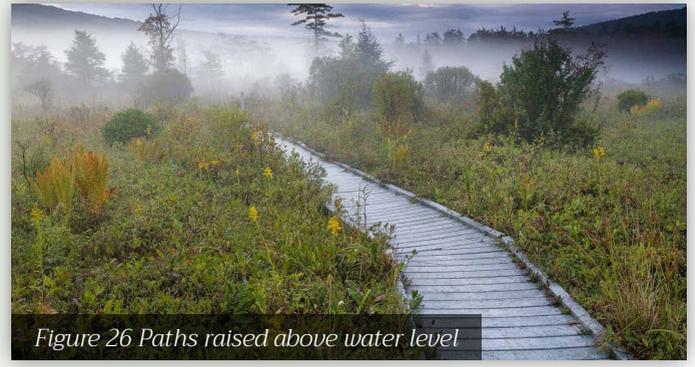
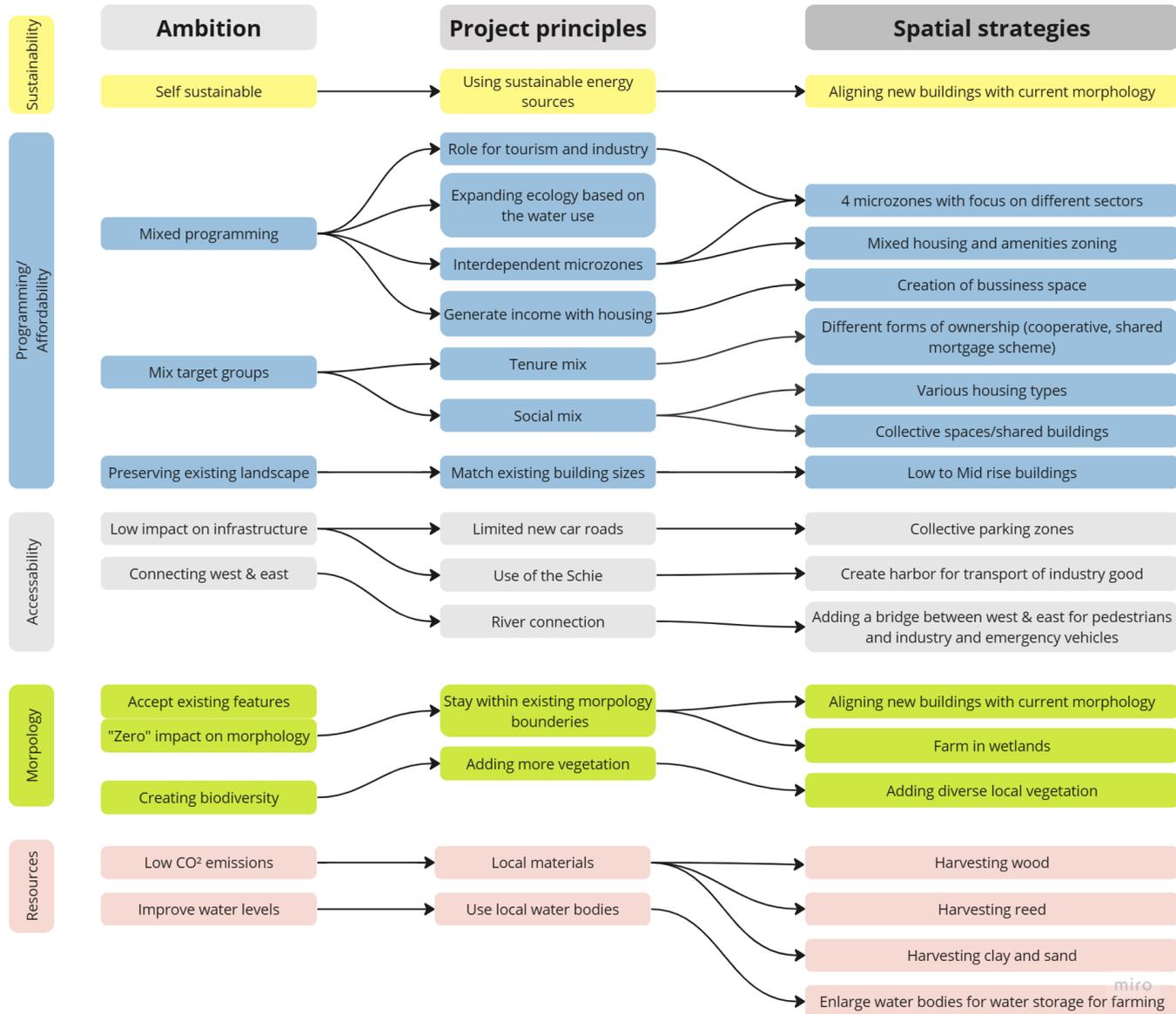
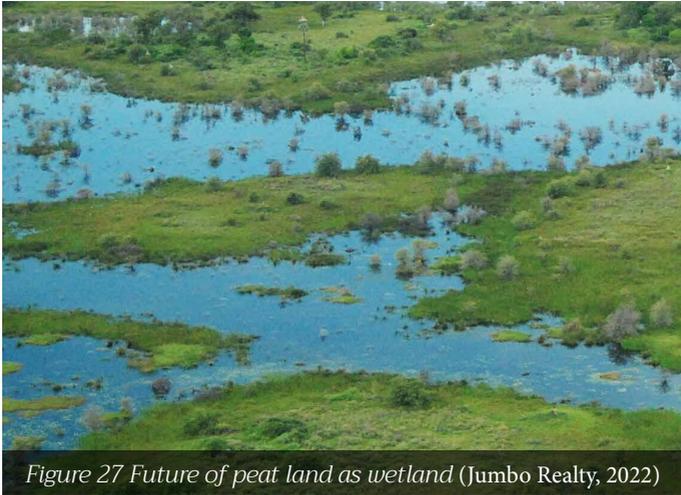


Figure 26 Paths raised above water level

Master plan group ambitions



Master plan first iteration SO.1



Living IN the wetlands



Centralizing the living experience in the wetlands



Existing urban situation



The wetlands as view point, opening the plan to keep the view lines open



Light weight infrastructure, by parking outside of urban area



Mixed use, activating different parts of urban plan



Figure 28 Master plan SO.1 1:2000

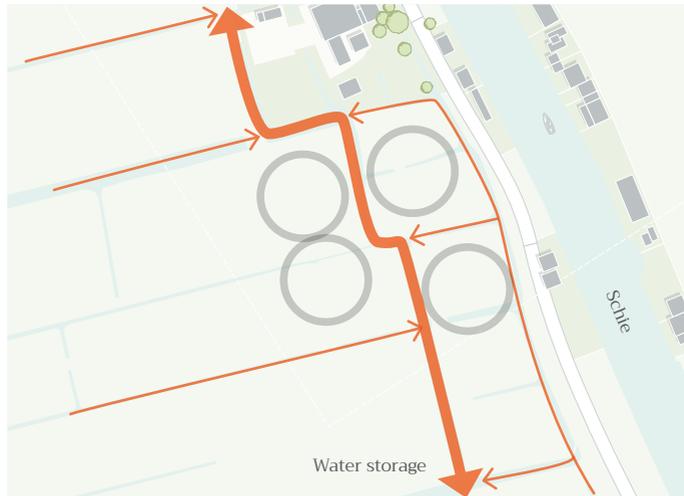
Master plan SO.2

New variant based on a more inviting entrance to the center of the plan, with the Plaza being with in this center. Using the new bridge as a new sight line straight to this center point in the project, marking this location.

- Grass
- Vegetation
- Farmland
- Roads
- Water
- Buildings
- Amenities

Figure 29 Master plan SO.2 version one 1:2000

Master plan SO.2



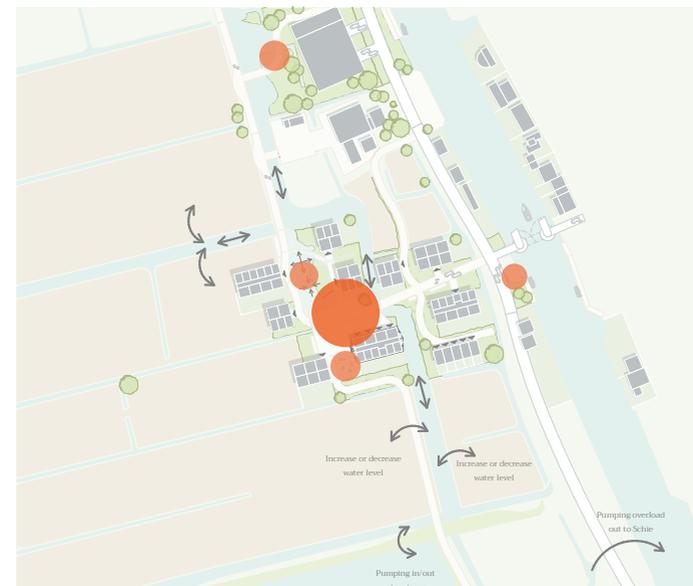
Widen water way, allowing leisure activities & better flow



Connecting moving and space



View & space, moving in to the wetland



Opening the plan for events and gathering with public spaces



Sharing parking and transportation with the area



Front facades, maintaining privacy for dwellings. While amenities on ground floor contrast in large openings, inviting the public.



Figure 30 Master plan SO.2 1:2000

Master plan SO.2 section

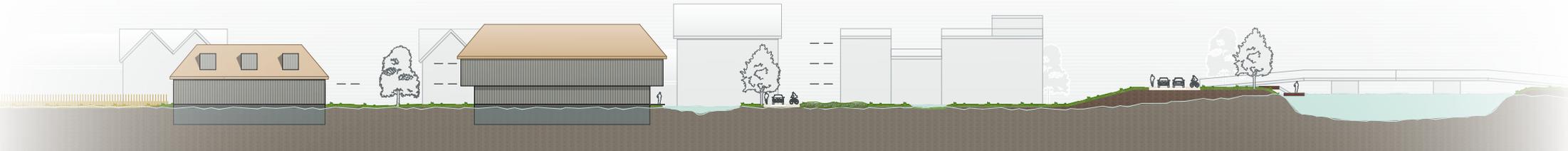


Figure 31 Master plan SO.2 section 1:1000

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45

Master plan SO.3



Building circulation working together



Cluster buildings with outdoor space



Figure 32 Master plan SO.3 1:2000

Master plan SO.4

Step 1 Morphology & Nature

Use of existing morphology and ditch structure, to maintain a low impact on the environment.

Islands too small to create courtyard blocks. Environment too delicate for large buildings. Solution: smaller buildings sharing a collective outdoor yard.



Cluster buildings with ditch structure



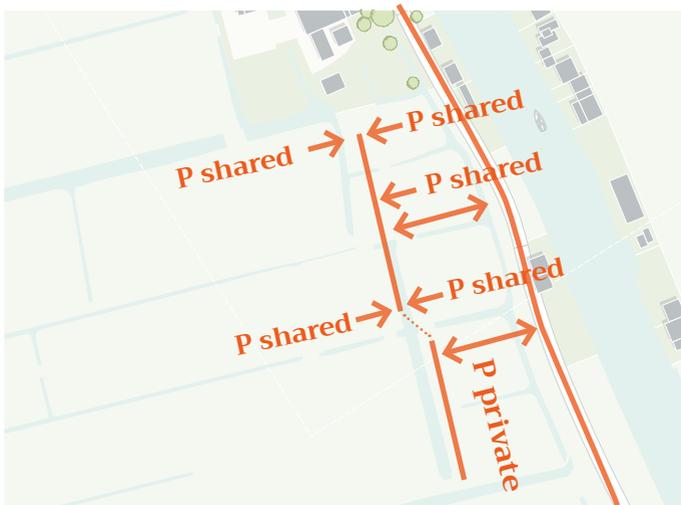
Figure 33 Master plan SO.4 cluster setup

Step 2 Mobility

Privately owned cars have a large impact on infrastructure, space, and environment. While a shared vehicle can replace the parking space of 10 privately owned vehicles. (*Deelauto's: Wat Is De Reductiefactor? - VEXPAN, 2023*)

This design aims to primarily design for those shared vehicles, as part of the housing as a service concept. Therefore a number of shared vehicles is spread around the urban plan. While also keeping private parking, outside of the living space.

Estimated households:
 100 apartments
 72 collective households
 172 in total
 293 parking places (1,7 norm of private parking without shared vehicles) (lokaleregelgeving, n.d.)
 103 private parking (0,6 norm of private parking separate from shared parking)
 $(293 - 103) / 10 = 20$ required shared vehicles



Centralizing shared vehicles, while keeping space for privately owned vehicles.

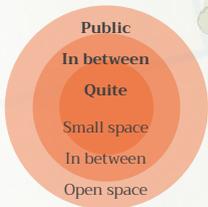


Figure 34 Master plan SO.4 mobility

Public gradient

Open space

Open space as quality of public space and giving breathing space between public relation and privacy. While testing, if the view angles of the original concept still remains



Testing the possibility of a gradient in public space. Were the individual is able to move through active public space gradually to more quieter space.

Figure 35 Master plan SO.4 public space



Figure 36 Master plan SO.4 sight lines



Step 3 Public park structure

Instead of building along side roads, the buildings are set within nature. The buildings are then connected by a continuous path flowing through the plan, just as a park.

Ambition

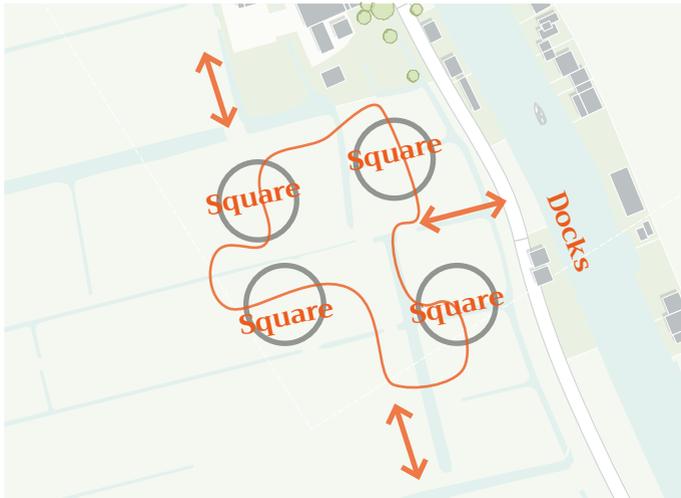
A natural urban plan

Principle

Setting buildings within the landscape, creating a park structure

Strategies

Let the buildings stand as islands within nature and connect those islands by a natural flowing path.



Public park with center plaza, all connected by one path

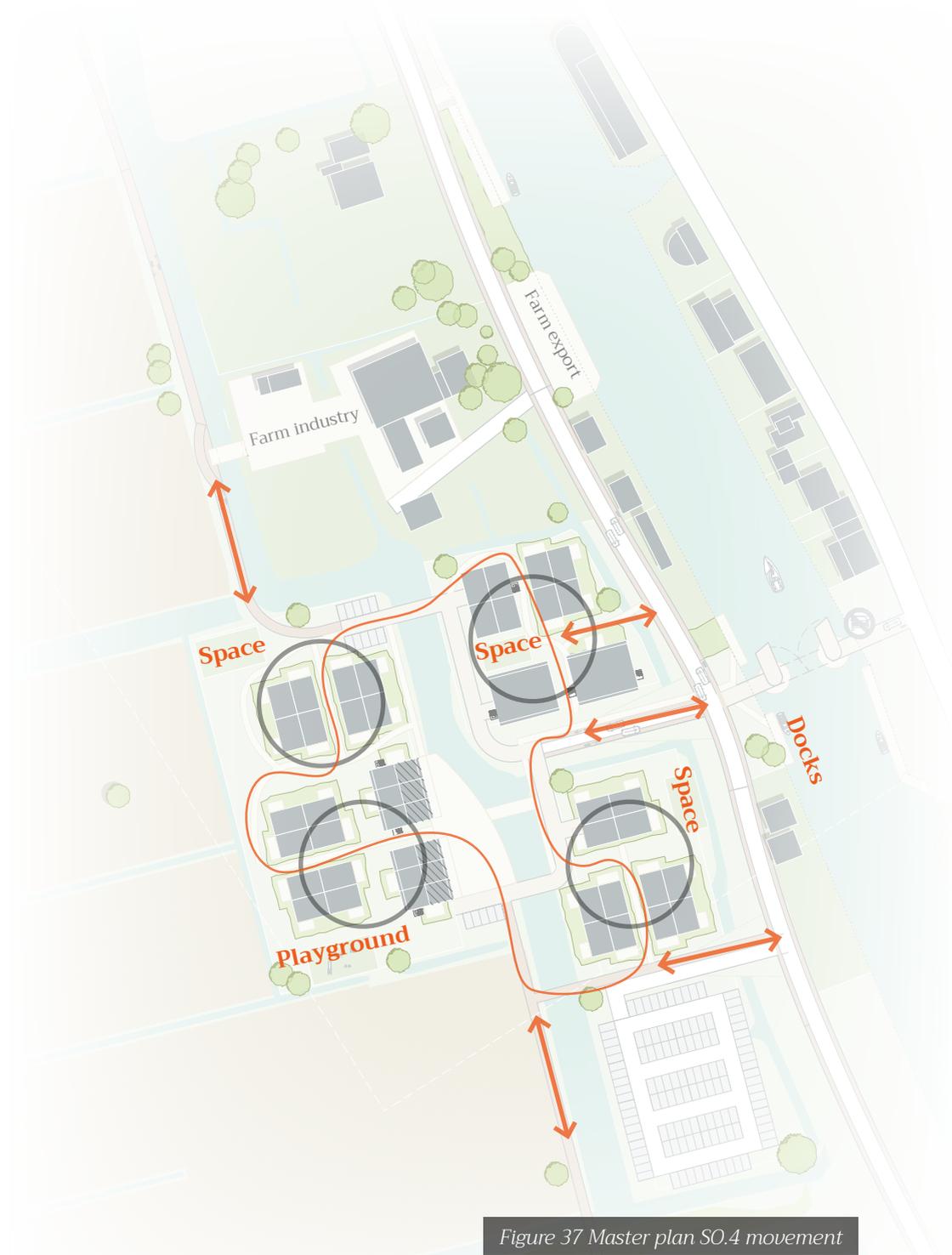


Figure 37 Master plan SO.4 movement

Step 4 Public plaza's and facilities

Within this shared living urban plan, a few public amenities are required for the use of all buildings. Center these functions, connected to a public plaza. The plaza then acts as a place for business and market. Clearly visible from the main entrance of the urban plan, the plaza also becomes a center for social interaction.

Public dock

Bicycle connection

- Bicycle renting
- Car renting

Loading & offloading areas

Public center

Ground floor facilities

- Self service laundry
- Local stores



Figure 38 Master plan SO.4 1:2000

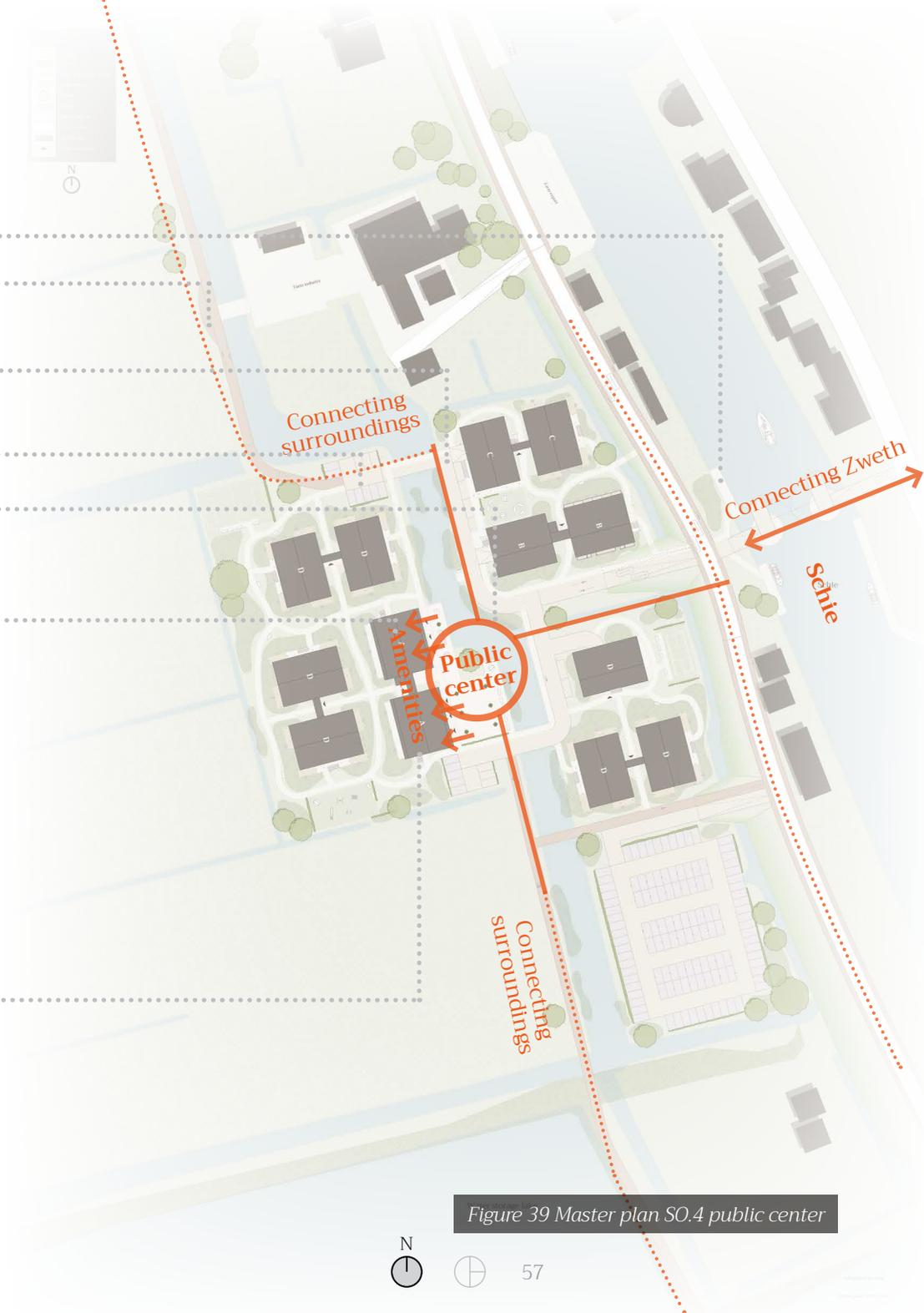


Figure 39 Master plan SO.4 public center

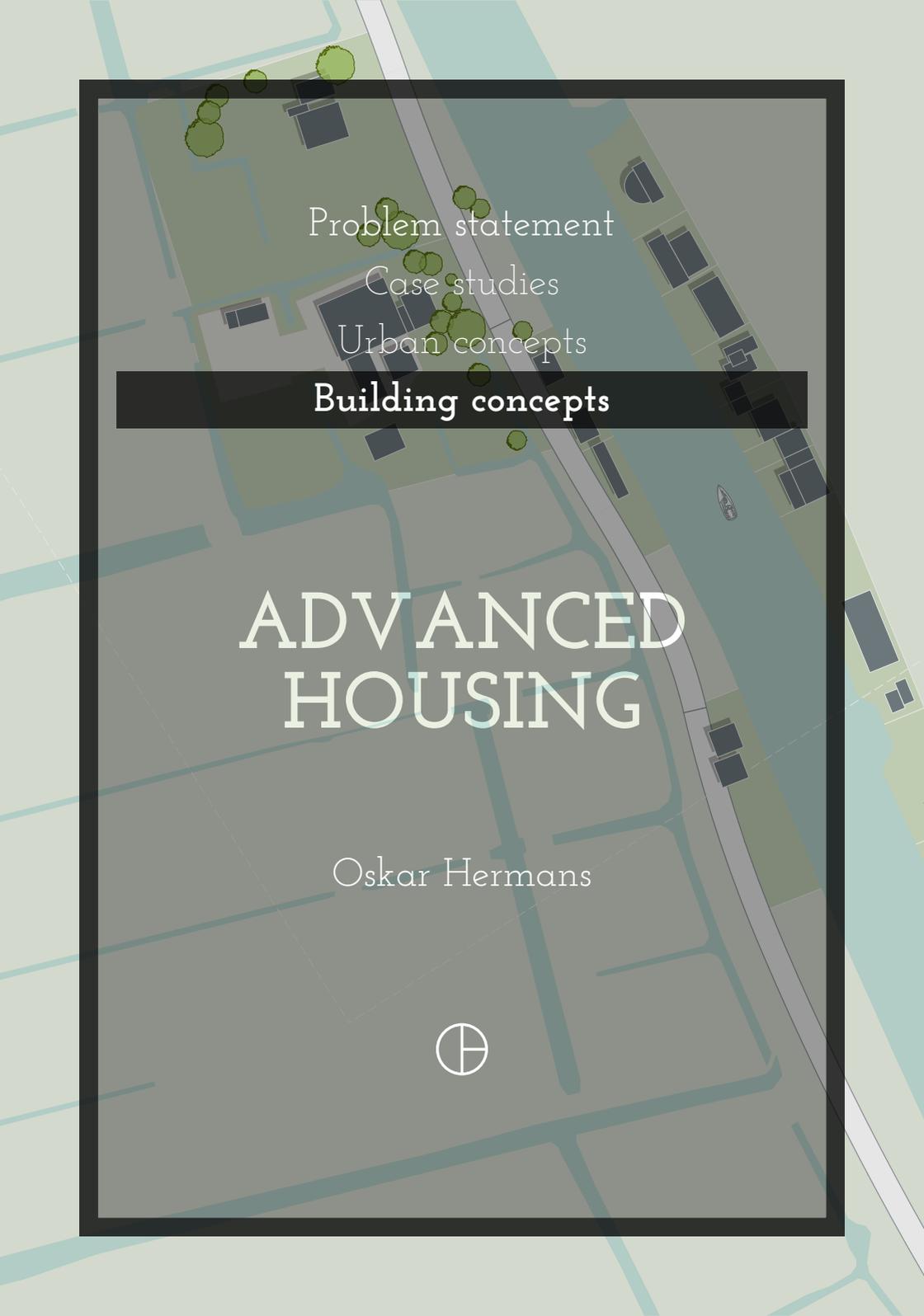
ADVANCED HOUSING



Oskar Hermans

TU Delft

21-06-2024



Problem statement

Case studies

Urban concepts

Building concepts

ADVANCED HOUSING

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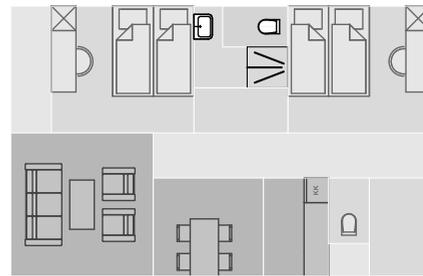


Dwelling types

The case studies helped to define what type of housing this wetland services needs. With design concepts of shared living, these two types were formed to create the bases for the urban plan.

The collective living allows for residents to own their own bathroom and share a large living space.

The multi functional shared home, is a apartment that can be shared by renting out the bedrooms separately. This home could also be rented as a whole by a single family. This provides a more range of different use of a single type. In its shared form, the residents share a bathroom and the living room and kitchen, but with less people then they would in a collective. With these simple differences, all needs for the target group can be satisfied.



Starters

70,00 m²



Starters

70,00 m²

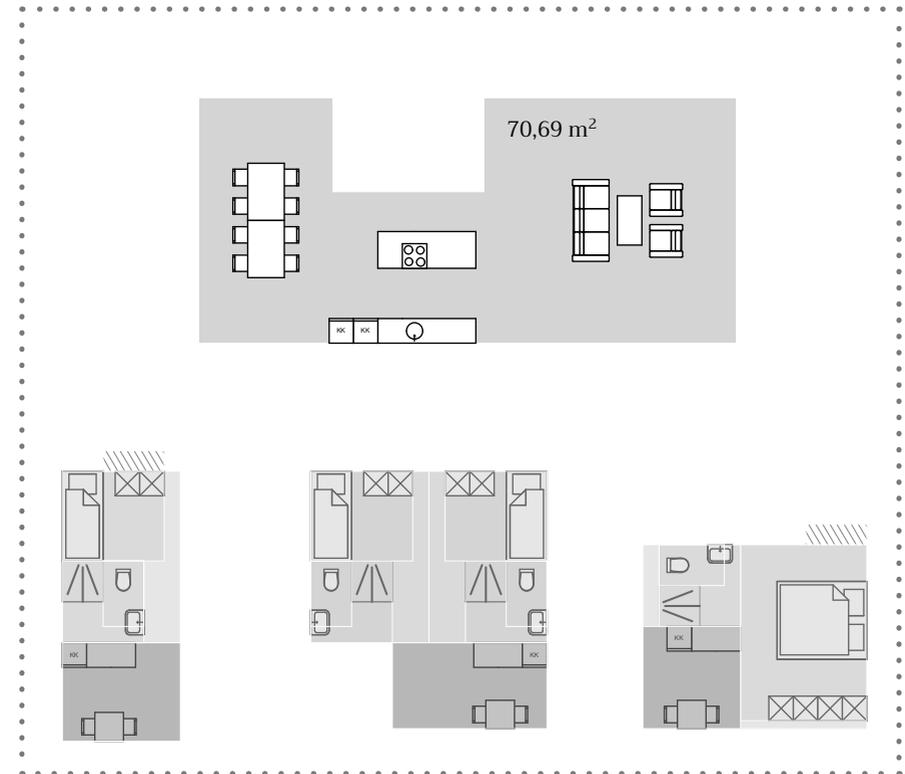


Couples

70,00 m²



Figure 1 Multi functional shared home



70,69 m²

Individual

+ 40 m² collective

20,00 m²



Individual

+ 40 m² collective

30,00 m²



Couples

+ 40 m² collective

30,00 m²



Figure 2 Collective living

Site plan SO.3



Main plan entrance as open space, continuing a view into the far stretching landscape.

Figure 3 Site plan SO.3

Site plan SO.4

Main plan entrance drawing the attention to the public center space with public functions.

Figure 4 Site plan ground floor SO.4



Cluster SO.3

Building scale cluster

In the vision of the urban plan, it is planned to avoid large overwhelming volumes in this low wet landscape. But this doesn't mean two buildings can't work together.

Certain spaces can be shared with multiple buildings to increase affordability and avoid unused space:

- Bicycle storage
- Washing room
- Workshop
- Work/Office space

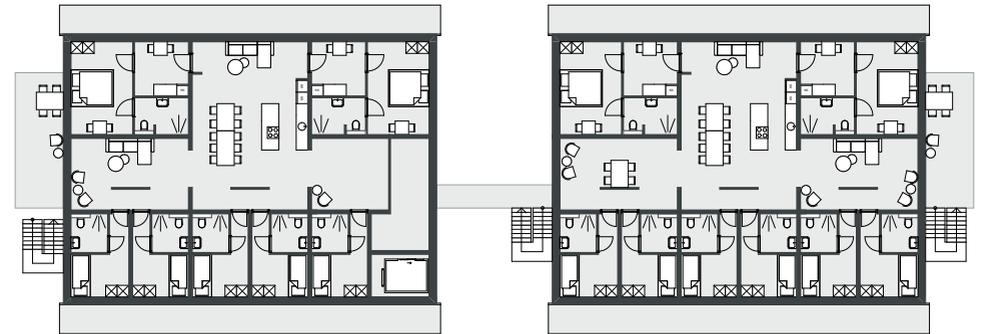


Figure 6 First 2nd floor, floor plan sketch of apartments in Building B

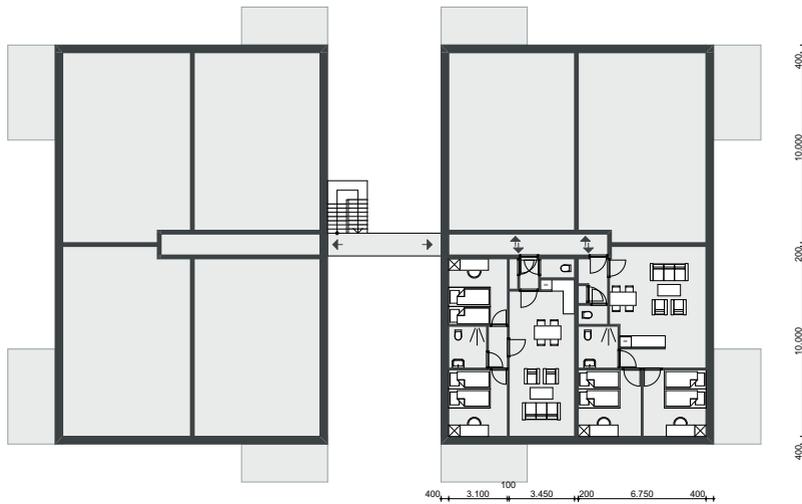


Figure 5 First common floor, floor plan sketch of apartments in Building C

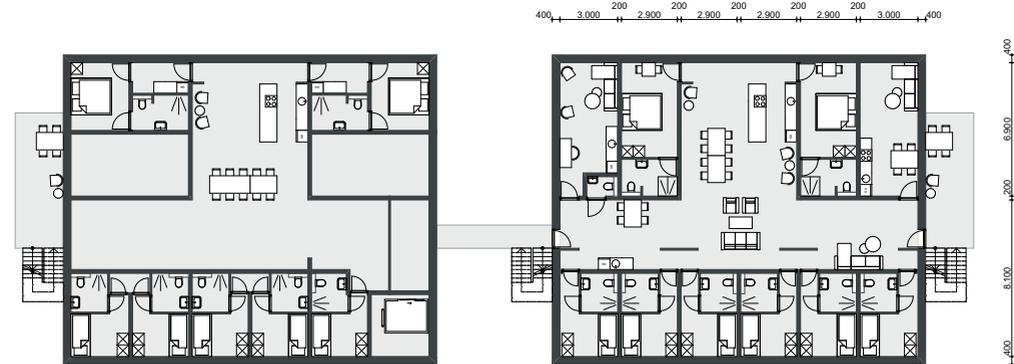


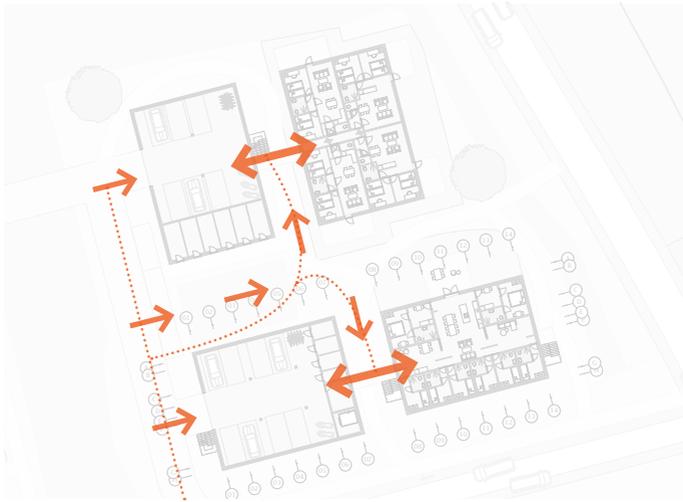
Figure 7 First ground floor, floor plan sketch of apartments in Building B

Site plan SO.4

Orientation



Outdoor orientated to outer edge with buffer zone of privacy between public and private space.



Center circulation through the courtyard, to create opportunity for meeting and social interaction.

Outdoor spaces are orientated to the outer edge of the building site.

The buildings have centralized access point from the courtyard. Allowing the courtyard to be a place for meeting and social interaction.

Living on the ground floor brings the complication of living within public space. To gain more privacy and rest, space between public movement en activities can create a buffer of privacy.



Figure 8 Site plan ground floor SO.4

Structure

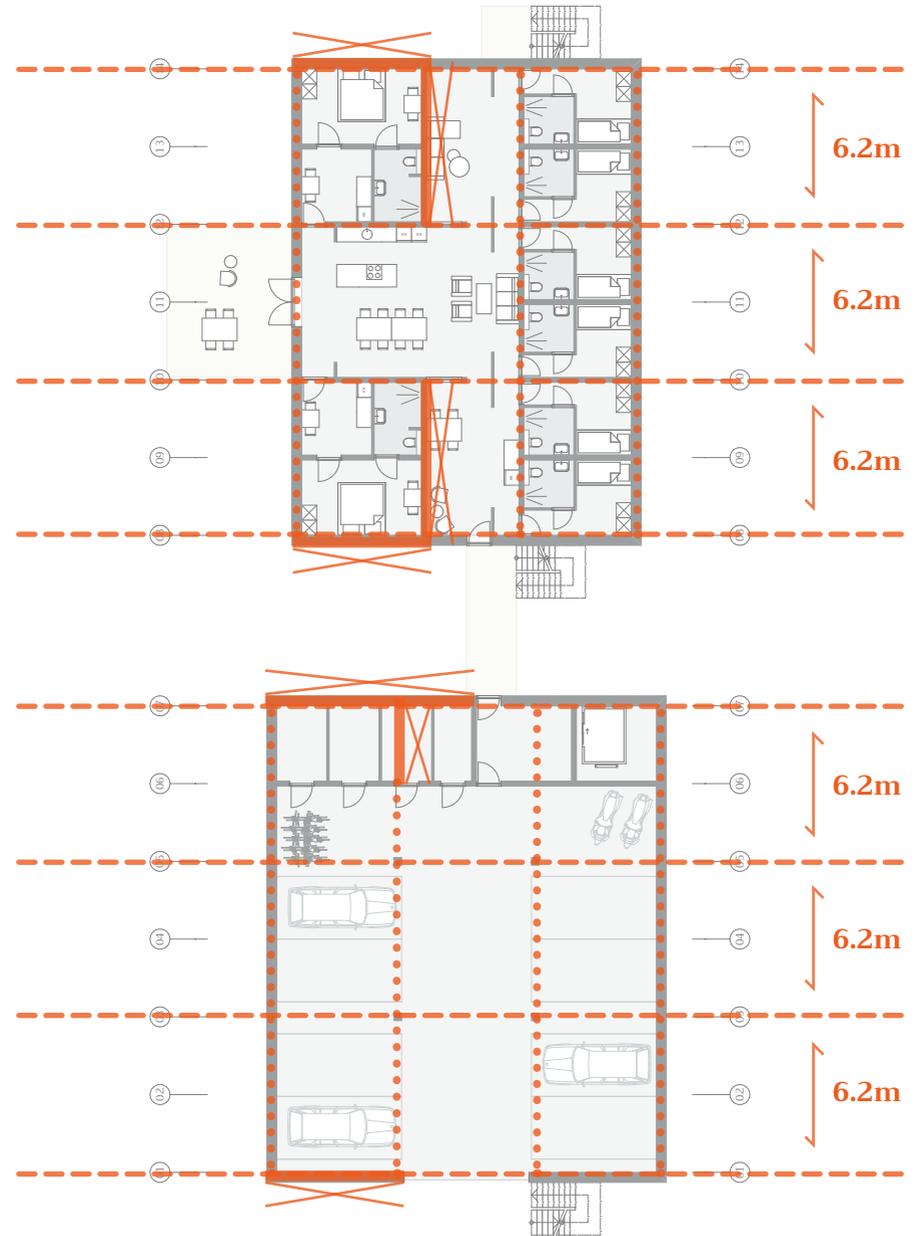


Figure 9 Ground floor SO.4 building C structure

Figure 10 Ground floor SO.4 building B structure

Exploring variant of dwellings

Daylight functions are positioned along the facade of the building. While grouping the more private functions such as bedrooms and bathrooms together. Allowing free movement between private space without crossing living room or kitchen.

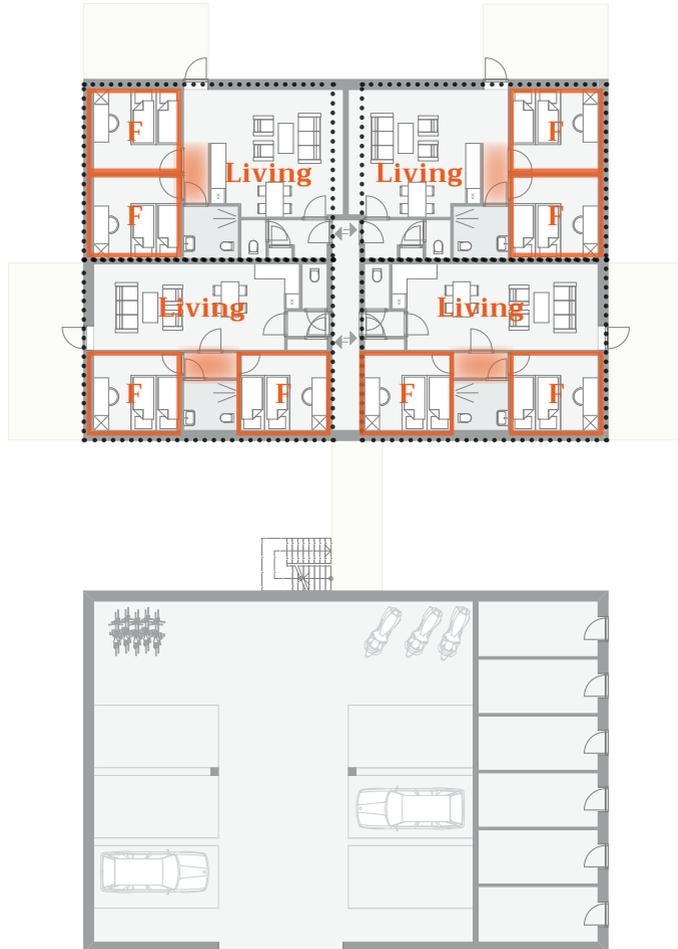


Figure 11 Ground floor SO.4 building C structure

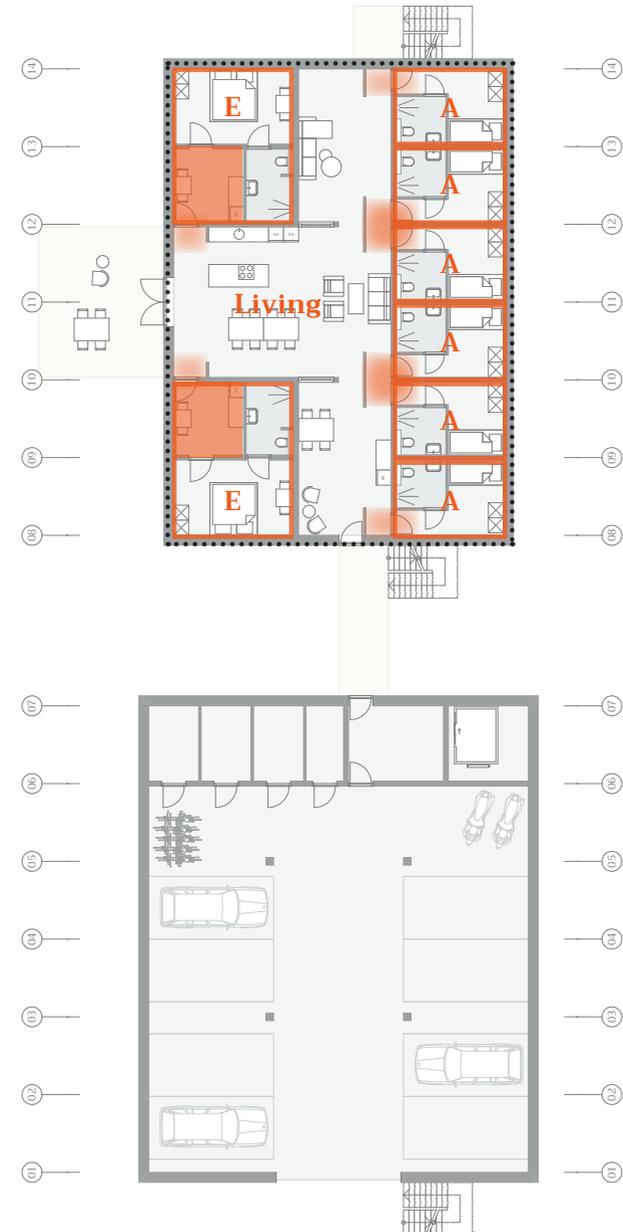


Figure 12 Ground floor SO.4 building B, buffer zones

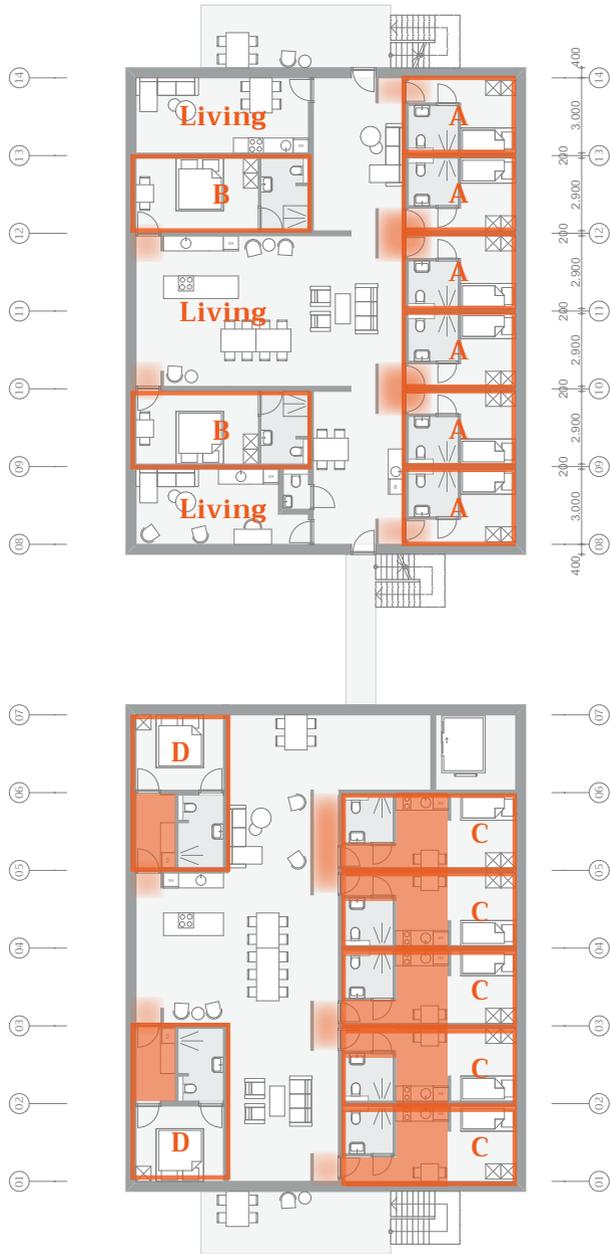


Figure 13 First floor Building A, functions



Figure 14 Second floor SO.4 building A, functions

Step 1 Circulation axonometric

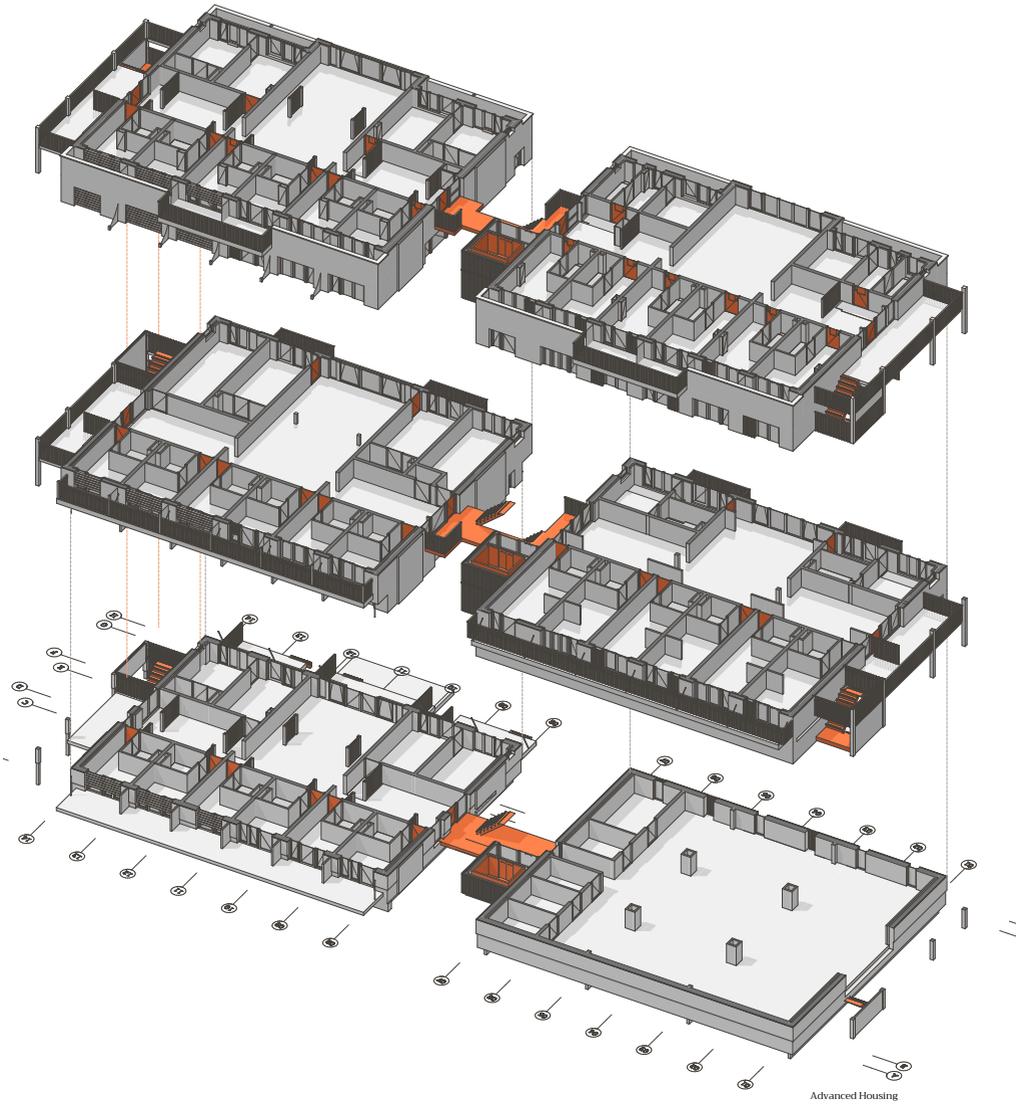


Figure 15 Circulation axonometric Building B

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Building B Circulation
Oskar Hermans

SO.1 early section concept of Building A

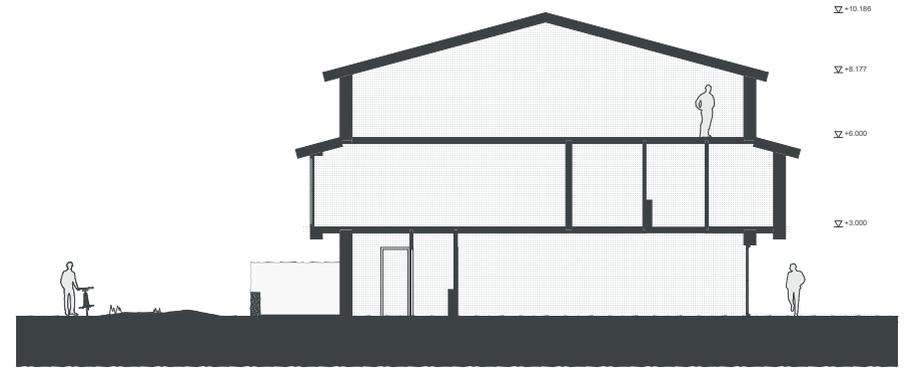


Figure 16 Section F-F building A

1/2M 1M 2M

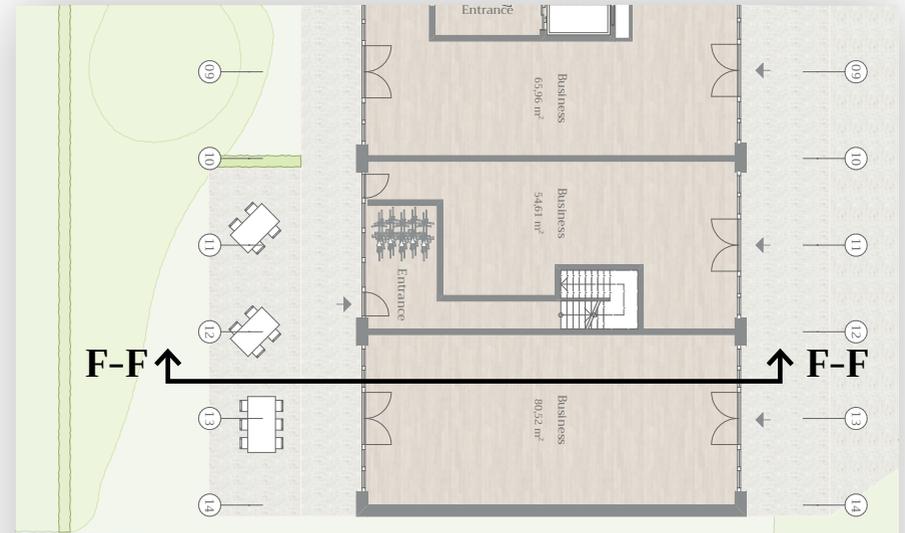


Figure 17 Ground floor building A

SO.1 early space concept of public ground floor function (Building A)

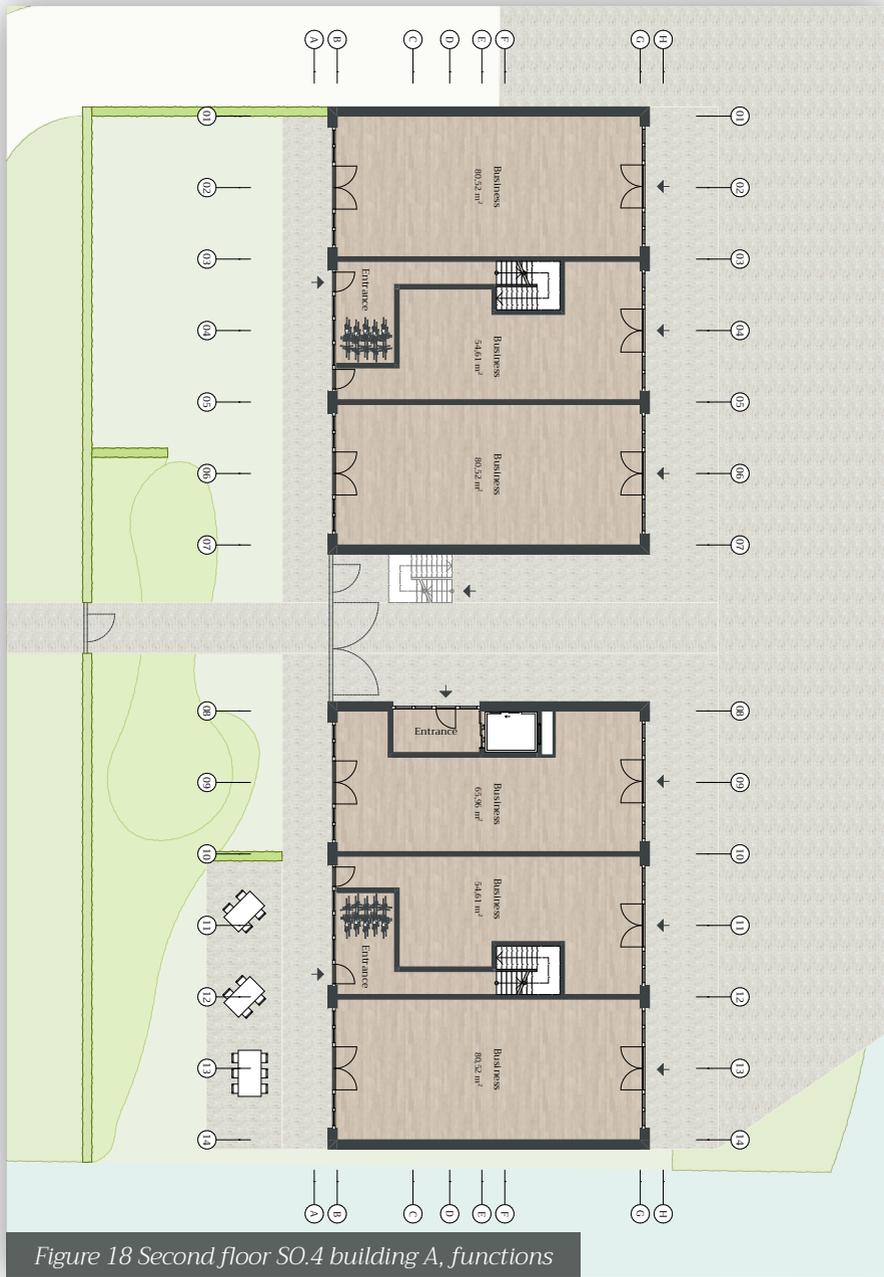


Figure 18 Second floor SO.4 building A, functions

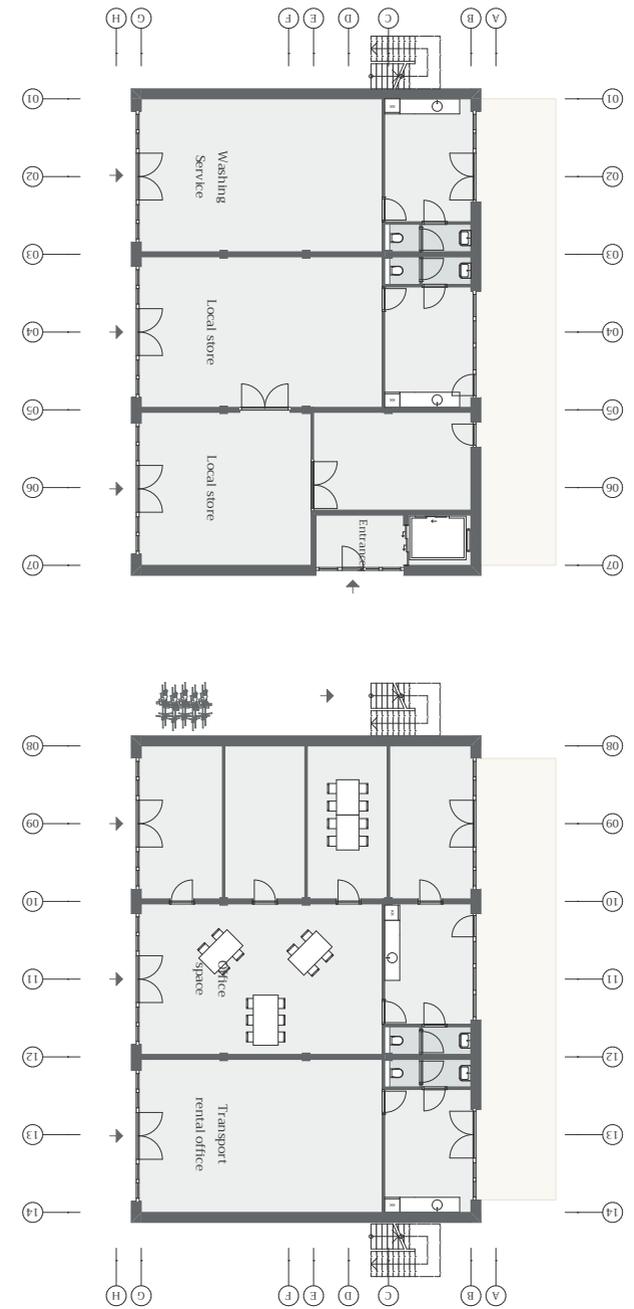


Figure 19 Ground floor functions SO.4 building A

Step 99 Functions

Exploring the possibility of splitting up space with room dividers, such as columns, thin walls or different use of materials. The purpose of this test is finding more use for the shared space, rather than it being only one large living room or kitchen. While also keeping a clear walkway to avoid the need of moving through a space to get to another.

..... Room dividing line

Collective zone

Household zone

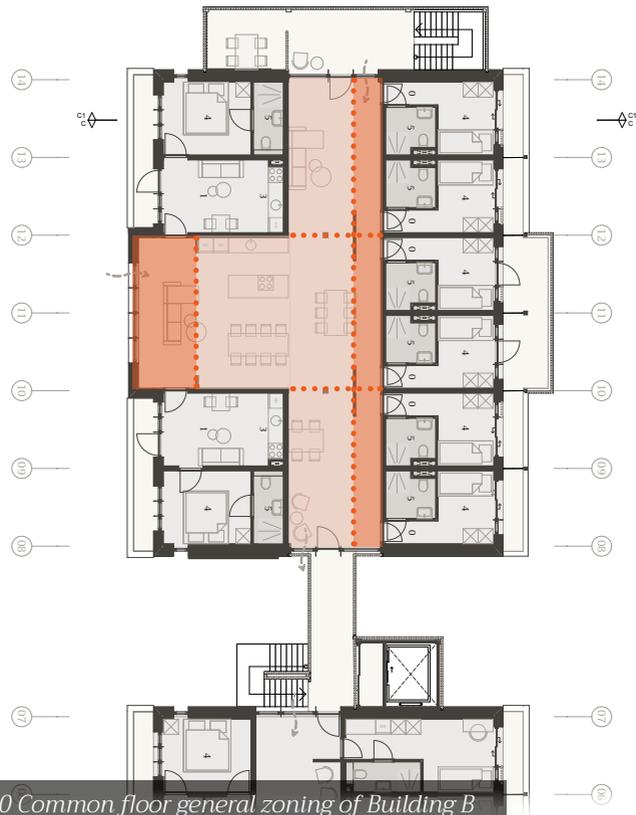


Figure 20 Common floor general zoning of Building B

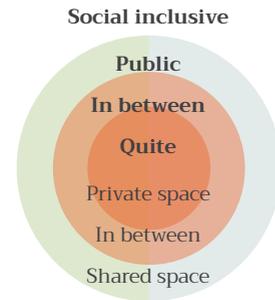
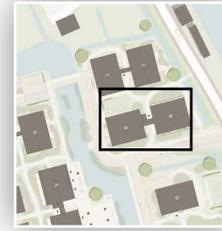


Figure 21 Common floor zoning gradient of Building B

Building C common floor plan



Advanced Housing
 Building C Floorplan
 © 2014

Figure 22 Building C common floor plan



Building B common floor plan

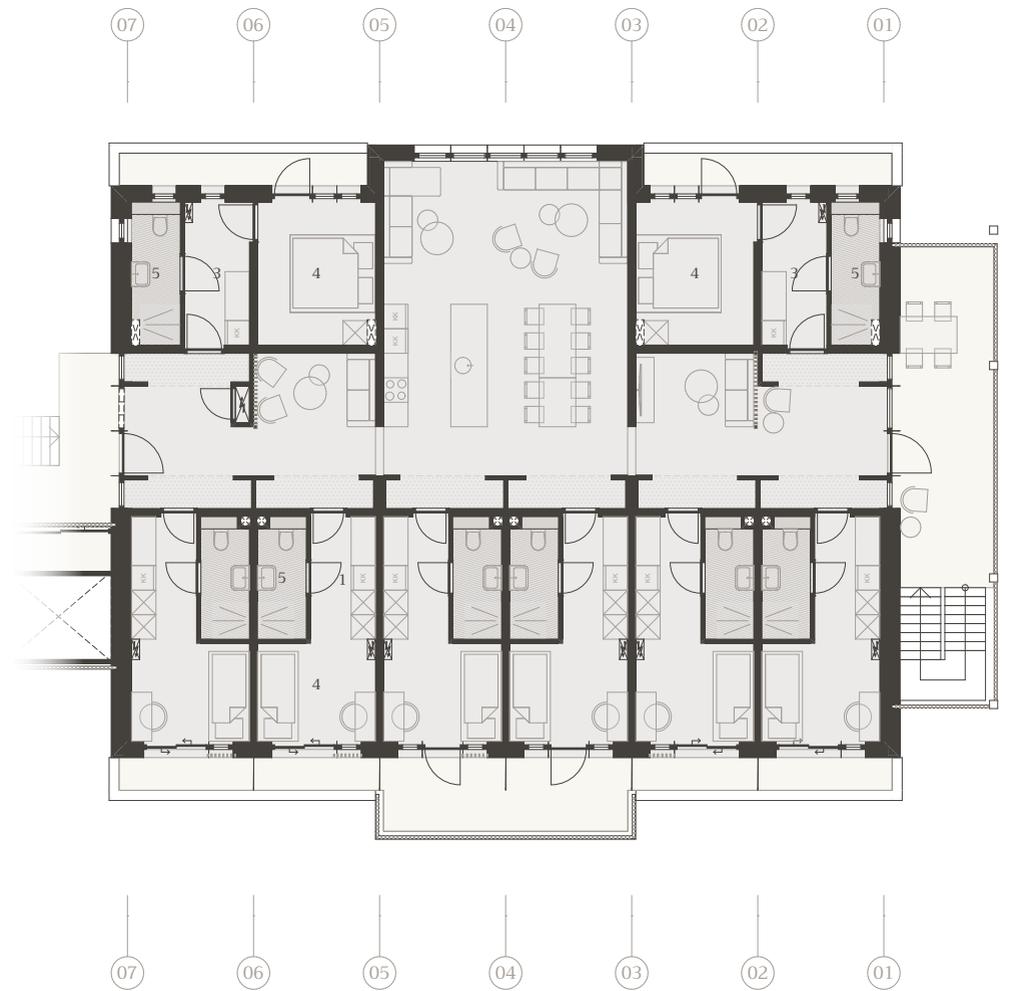
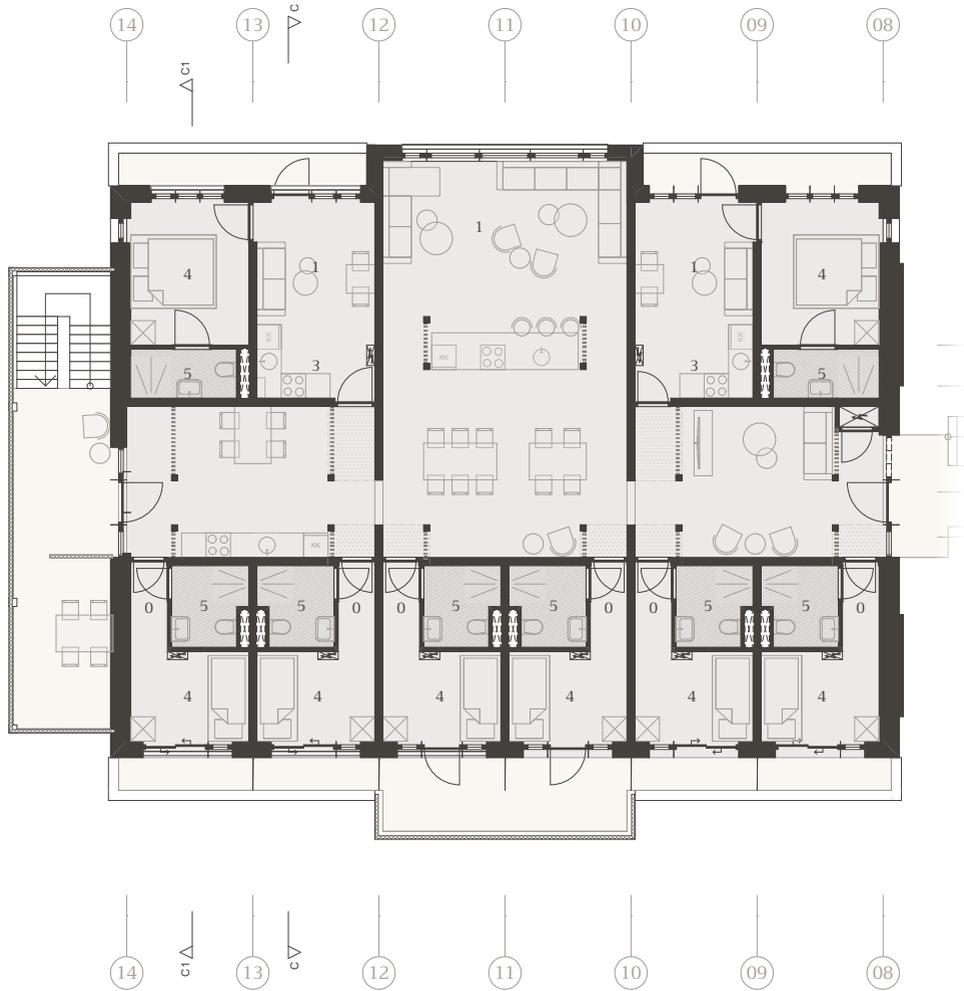
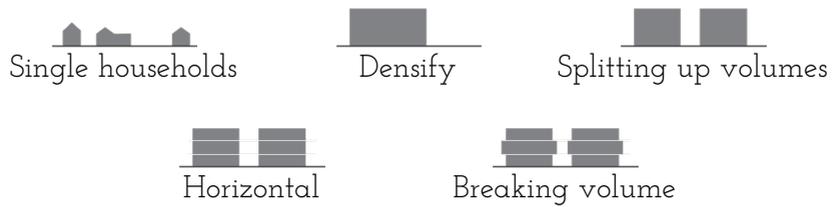
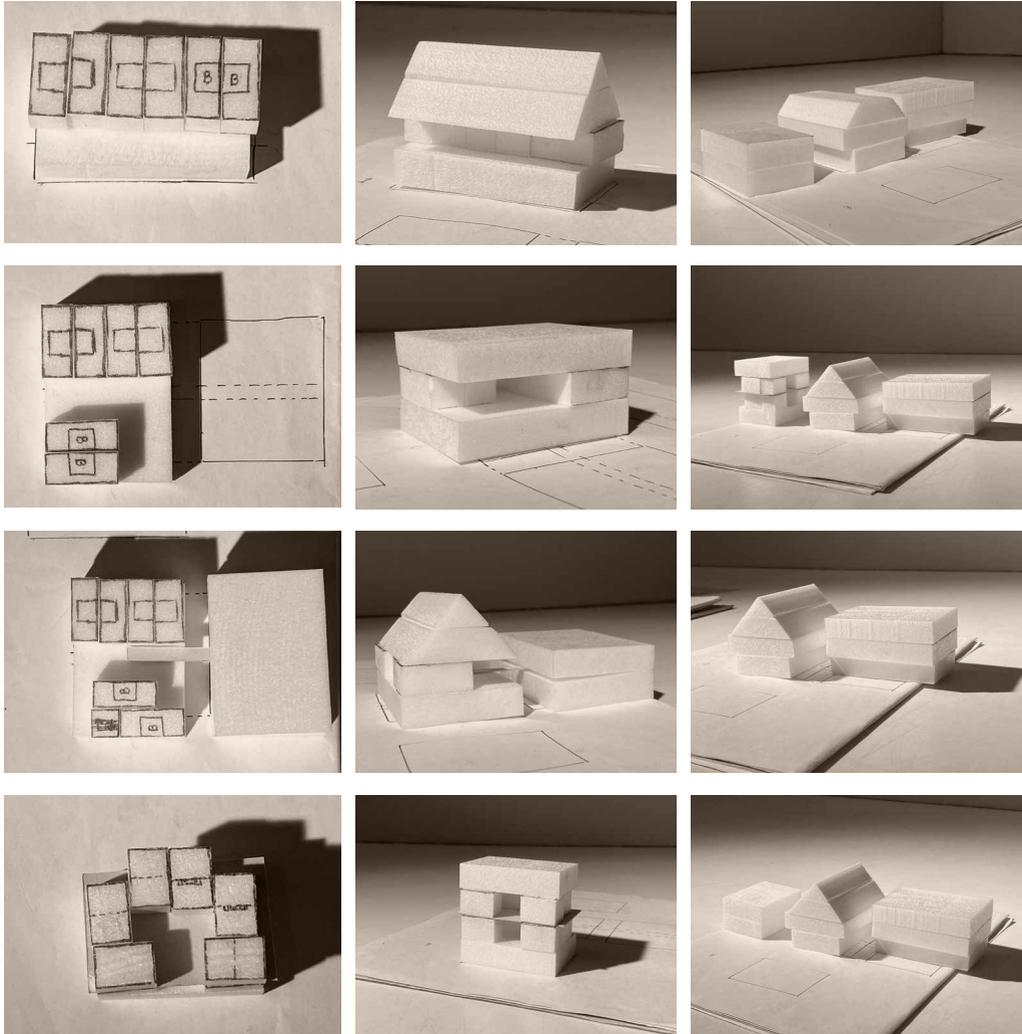


Figure 23 Building B common floor plan

Volume and program study Building B & C



Form studies

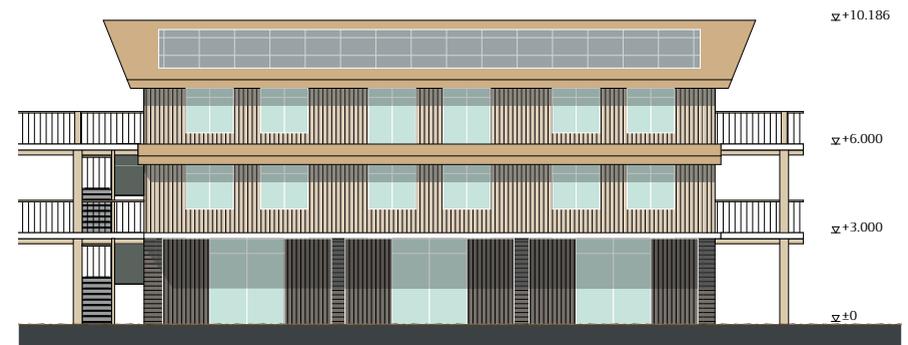


Figure 27 Early facade concept of Building B

SO.4 Cluster 3D concept



Figure 28 Master plan SO.4 cluster, 3D concept

Facades SO.4



Figure 29 Building B left facade



Figure 30 Building B front facade



Figure 31 Building C front facade



Figure 32 Building C right facade

Weather

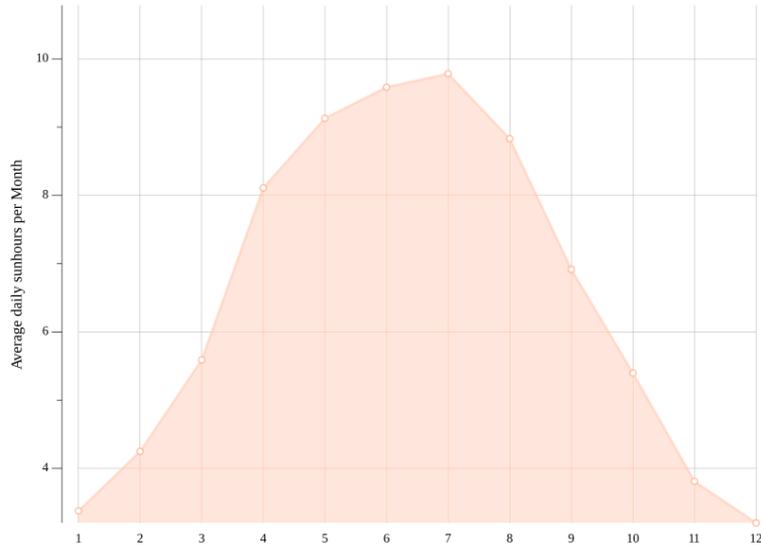


Figure 33 Average daily sun hours per month in region Rotterdam

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	3.9 °C (39) °F	4 °C (39.2) °F	6.3 °C (43.4) °F	9.8 °C (49.7) °F	13.4 °C (56.1) °F	16.2 °C (61.2) °F	18.3 °C (64.9) °F	17.9 °C (64.3) °F	15.5 °C (59.8) °F	11.8 °C (53.2) °F	7.7 °C (45.8) °F	4.7 °C (40.4) °F
Min. Temperature °C (°F)	1.8 °C (35.2) °F	1.4 °C (34.5) °F	3 °C (37.5) °F	5.7 °C (42.3) °F	9.4 °C (48.9) °F	12.2 °C (53.9) °F	14.5 °C (58.1) °F	14.3 °C (57.8) °F	12.3 °C (54.1) °F	9.1 °C (48.3) °F	5.5 °C (41.8) °F	2.7 °C (36.8) °F
Max. Temperature °C (°F)	6.1 °C (42.9) °F	6.8 °C (44.2) °F	9.8 °C (49.7) °F	13.9 °C (57) °F	17.2 °C (63) °F	20 °C (67.9) °F	21.9 °C (71.4) °F	21.5 °C (70.7) °F	18.8 °C (65.9) °F	14.7 °C (58.5) °F	10 °C (50) °F	6.7 °C (44) °F
Precipitation / Rainfall mm (in)	68 (2)	56 (2)	57 (2)	54 (2)	66 (2)	70 (2)	84 (3)	83 (3)	77 (3)	72 (2)	73 (2)	75 (2)
Humidity(%)	85%	82%	79%	74%	73%	73%	74%	76%	79%	82%	86%	85%
Rainy days (d)	9	9	9	9	9	9	11	10	9	9	10	10
avg. Sun hours (hours)	3.4	4.2	5.6	8.1	9.1	9.6	9.8	8.8	6.9	5.4	3.8	3.2

Data: 1991 - 2021 Min. Temperature °C (°F), Max. Temperature °C (°F), Precipitation / Rainfall mm (in), Humidity, Rainy days. Data: 1999 - 2019: avg. Sun hours

Figure 35 Average climate per month in region Rotterdam

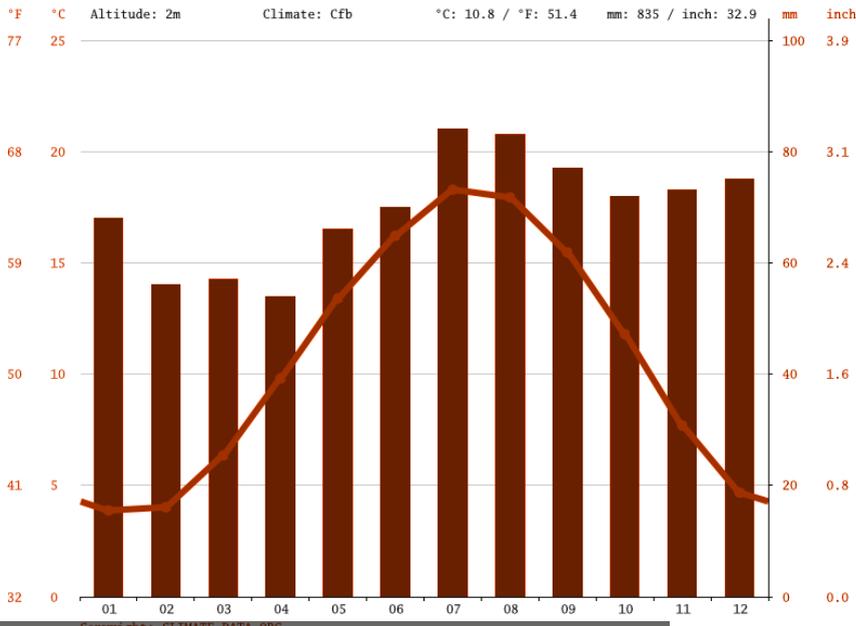


Figure 34 Average rainfall per month in region Rotterdam

-  **Energy:** Minimize CO² emissions (energy neutral)
-  **Environment:** Reduce fresh water use (collect rainwater)
-  **Resources:** Minimize CO² emissions (material choices)
-  **Climate:** Reduce need for energy (efficiency)
-  **Sustainability:** Design for expected lifetime
-  **Circularity:** Choice of material (demount ability)

Figure 36 List of building technology design goals

Sustainability & circularity principles

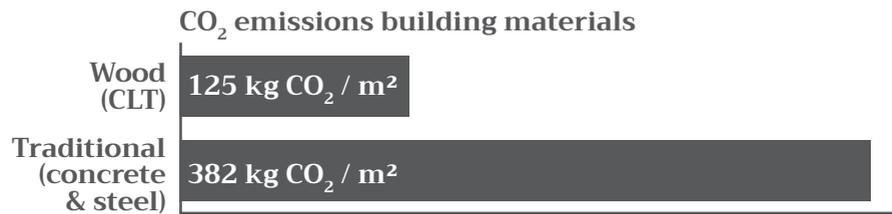


Figure 37 CO₂ of wood or concrete (Op zoek naar de CO₂-kiloknallers, 2023)

Climate sustainability & circularity

Today's home climate standards are high. Most people expect to have full control over their indoor climate and not to be dependable on weather. With the changing weather of the Netherlands and the high standards for home climate, there must be activate climate control.

- Standard: full control
- Sustainability: 50 years
- Circularity: Reuse, Recycle, Re-purpose, etc.
- Environment: Low CO₂

Facade & roof sustainability & circularity

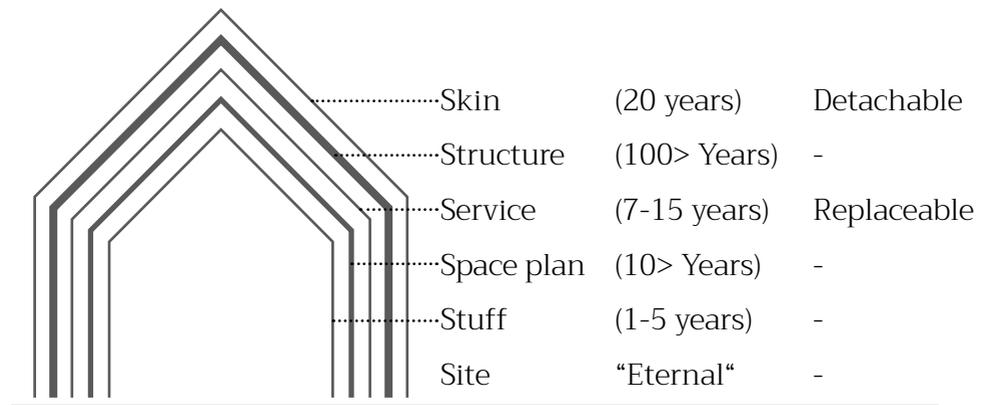


Figure 38 Expected lifetime of building materials per building layer

Impression urban space

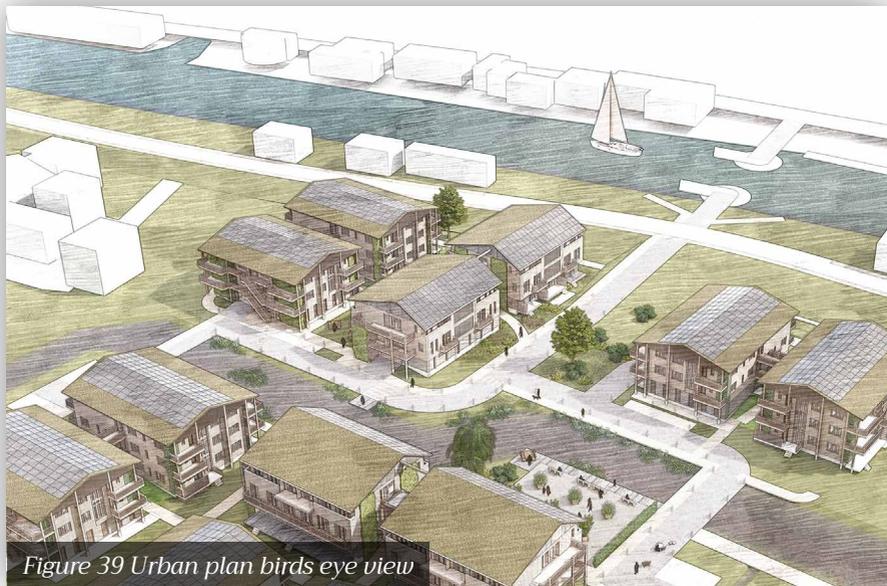


Figure 39 Urban plan birds eye view



Figure 41 Space in between buildings of a cluster



Figure 40 Public center space



Figure 42 Residential access space

Impression interior space



Figure 43 Main collective (living & dining) space, second floor



Figure 45 Additional collective living space



Figure 44 Main collective (living & dining) space, first floor



Figure 46 Private dwelling access 1.



Figure 47 Private dwelling access 2.

ADVANCED HOUSING



Oskar Hermans

TU Delft

21-06-2024



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Reflection

Relation between graduation project topic, the studio master track (Ar) and the master program (MSc AUBS)

The graduation topic “Housing as a service” is related to the studio topic “Affordable housing” and to the track Architecture. As was mentioned in the theoretical framework, Housing as a service is a way of affordable living, where the residents only pay for what they use. This type of housing allows residents to stay for short durations and do not bind them to long term contracts. This is a housing type that’s uncommon in the Netherlands.

Affordable housing is a highly discussed current topic, due the current housing shortage. This graduation project will explore the architecture of housing as a service in Midden Delfland. This project will also explore, how it improves the available affordable housing possibilities for the Dutch housing market.

Relation between research and design

In my project I have been looking into, how housing can be designed as a service for residents looking for short or long stay affordable residency in Midden Delfland. However, this project also came with other challenges formed by the future landscape design by landscape architect ZUS. Therefore the design is explored on multiple scales: the urban scale, building scale and dwelling scale, to integrate a proposed solution to all challenges.

To start of the process of design, group ambitions (on mobility, building size, impact on morphology, water system, etc.) were formed that arrived from the group analysis. In combination with my own volume study to explore how to respond to the location, I explored a first concept of urban design to address these ambitions for the location.

The next step in the process is further defining the idea for housing as a service to find what this could be. Therefore multiple

case studies were explored as example that can be the different ingredients for this project. From that research new ambitions were added and with that, a new urban design variant that address the importance of: sharing of mobility, gradient of public space and social inclusion of communities.

On building scale, some of the cases were found to be working better for todays standards then others. The case of 1929 The Narkomfin building, turned out to be less successful in its shared living design. But still had an impact on the project, because that cases was an example on the importance of connecting shared living and dining close to dwellings, to activate the shared space. The cases were an important example for designing on the dwelling scale as well, with variation studies to refine the design with the mentor. The dwellings were designed by incorporating different shared living aspects from each case study to find the most suitable design for this project target group, while keeping in mind the privacy of the individual. The experience of those spaces were further developed and tested with visualizations and adjusted in the design.

Assessment of approach, methods and methodology

In my research I used different methods such as: case studies, volume study, variant studies. The case studies were very useful to learn how ideologies and concepts of those cases have been incorporated in urban scale, building scale and dwelling scale. By using cases that cover different aspects of (shared) living, design concepts and space, I was able to compare case with one another. Also testing which design concepts works better, for this project and its target group. The cases also acted as reference point to test my own design variants on multiple aspects.

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

My project aims to design a housing type that is at the moment of design, not or barely present near the location of Midden Delfland. Which is a housing type that offers housing that doesn't bind its residents to the property for a long period of time, but instead offers the space for also shorter periods then a month. This allows seasonal workers to obtain housing for the duration that they require it, which is often bound to the time of their work.

With this project I hope to show the possibilities of housing as a service in an affordable way, by sharing costs and space. By offering different types of space, because this target group has people with different needs as well. It also shows the value of sharing in providing a social inclusive design, with space for different needs.

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

I would say the transferability value of my project is high, in the sense that this is a housing type that is not very common in the Netherlands, while there is a large target group for them. This project provides more ways of living and also in a more affordable way by sharing. Even though the target group for this project is mainly focusing on seasonal workers. This type of housing is also suitable for many other target groups as well. Besides the type of housing of this project it also explores sustainable design in a more wet landscape, which can also be applied to different areas then Midden Delfland. It provides insight on more possibilities of Dutch housing design for present and possible future scenario's.