Colofon

Editor Emelie Lynn Swart

Design Emelie Swrat

TU Delft
BG. Oost 490
Julianalaan 132-134
2628 BL Delft

Preface

This graduation project is done for the Dutch Housing Studio 2019/2020 as part of the MSc graduation track Architecture. The topic for this graduation was: In this Graduation Studio, which is part of the Architecture Track: "Between Standard and Ideals" the central question is asked: „How do we want to live in the future, and what kind of buildings do we need to make that possible?".

"Better Together" is a design of a residential building block that provides 200 homes for the New Middle Income family in the Minervahaven of Amsterdam. This design tries to answer questions that arose from in depth research and shows solutions for a more sustainable and compact way of living in the future. This does not only affect our envrionmental behaviour, but also how people will tend to live with eachother in the future.
Less space is needed per person, while shared and communal spaces will be given more attention. Family live asks for opportunites to join forces. Not only to be able to raise children safely in a highly urban environment, but also to build up a sense of home. A place from where they can develop and discover city life while continuously trying to balance working and private life while raising their children.

During the research- and design process I tried to engage with this target group as much as possible. Not only by reading literature, but also doing in- depth interviews, ask family advice and trying to translate this information into actual design tools. I have really enjoyed working on this topic for the last year and therefore I also want to thank my tutors: Pierijn van der Putt, Theo Kupers and Ferry Adema for the tutorings and the consistent mentoring during the chaning conditions in our education the last couple of months. I hope you will enjoy reading and discovering my final graduation project: "Better Together": A new residential program for the middle income family in Amsterdam.

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Problem statement

The middle income family in Amsterdam

Too many families are leaving the city because of the lack of affordable and suitable dwellings for them to grow and stay in the city center. Fragmentation on the Dwelling Market leads to the phenomenon that urban families are leaving the city center of Amsterdam because the rents are increasing. This is happening in such a way that the gap between social rent (low segment) and the high segment makes sure that families in the middle-class segment are shifting towards the higher segment. Because of this they are forced to search for better, suitable dwellings outside the city center. Therefore, solutions such as building more compact and with shared facilities can result in a more affordable and social resilient living environment that provides a stronger relation between neighborhood and city.
Amsterdam is becoming a more exclusive city as housing prices are rising because of the overpopulation. As a result, the middle class has a hard time staying in the city. Earning too much for social housing but too little for free sector, the gap between social housing and high income dwellings is growing, driving the middle class out of Amsterdam. Both socially and economically it is of great importance for Amsterdam to maintain this group. (Leupen & Mooij, 2008).

Therefore, I want to create affordable dwellings for these urban families in the Minervahaven of Amsterdam. Families are important for the city because they contribute to the economy and provide a stronger social relation between inhabitants. The New Urban Middle-class Families wants to live in a high dense urban environment. Particularly these types of families are important because they are bound socially and economically very strongly to the identity of urban living. Because of this, the social and economical balance of the city of Amsterdam is disturbed and going towards irreversible fragmentation on the housing market.

Leupen, B., & Mooij, H. (2008). Het ontwerpen van woningen: een handboek. Rotterdam: NAI.

Urban Context

Minervahaven Amsterdam

Just as many large cities in Europe, Amsterdam is booming. The tendency of people moving and staying in the city causes an increasingly growing number of inhabitants in the city of Amsterdam. As a result, new questions arise from this phenomenon. How will Amstedam cope with these increasing numbers? What is the future of the city and who will still live in the city center the upcoming years?

During the graduation studio of the chair of dwelling, we are challenged to think and to form our vision about what the future of larger cities and especially Amsterdam will look like. By taking a deeper research in the current situation of Amsterdam, tendencies, the housing market, the inhabitants and other global cities provides us the basis to form a critical manifest on the future of Amsterdam and together forms the fundament for our own personal design assignment and research subject.

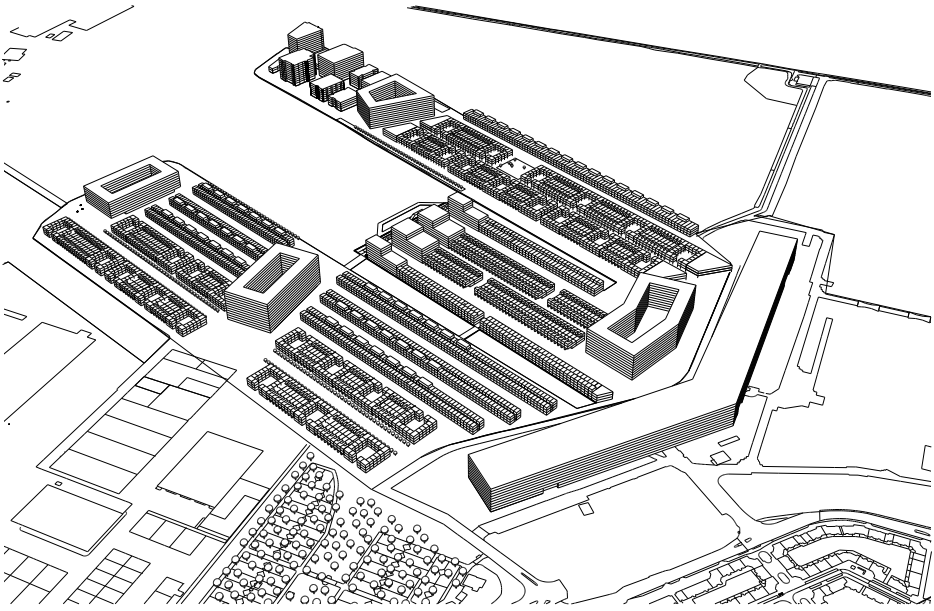
We focus on the area situated on the peninsula of the Minervahven in the eastern harbour of Amsterdam. This particular site is part of a large residential transformation process of the harbour. Hereby the function of the area will change from mainly labour, towards residential purposes. Currently the Minervahaven contains offices, warehouses, workshop places and factories but will be replaced by residential buildings in 2040.

Img 3. own pciture minerhaven amsterdam

Img 4. own pciture minerhaven amsterdam

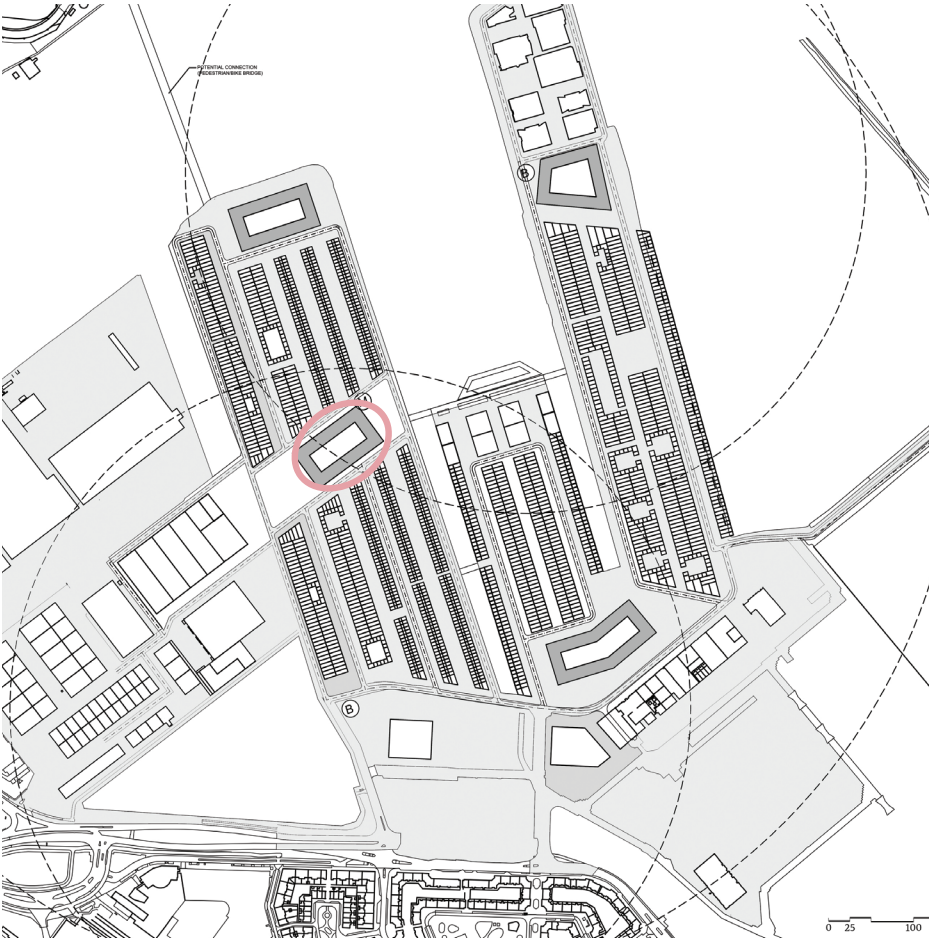
Urban Design

Low-Rise High Density



Borneo aan het IJ is the starting point for our urban design. By implementing the characteristic canal stripes to the Minervahaven it forms a relation with the excisting urban plan of Borneo-Sporenburg that we also can find in the Amsterdam Harbour area. Designed by West8 architects the system enhances a certain freedom of the different designed familiy houses which are all proposed by different architects. The DNA of the project consists of a rigid grid that is interrupted by the placement of "Icons" which each give a special character to the plan. Therefore the plan consists of a contrast between the high-densed low-rise dwelling strips and the larger ‚iconic' buildings. We tried to implement the system of Borneo on the site of Minervahaven and translate it towards the specific location characteristics.
The new Urban Design has been developed within the system of the same rigid low-rise grid and the cut-outs with the icons. Our plan consist of 4 larger Icons that each can have a special character that have a contextual relation with the Minervahaven.

Urban Plan 1:1000

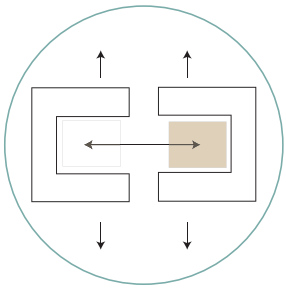


Urban Plan 1:1000

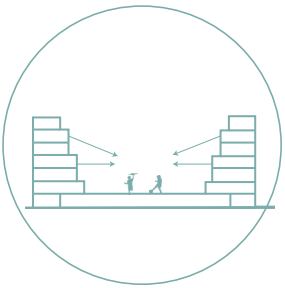
Design Brief

Building block development

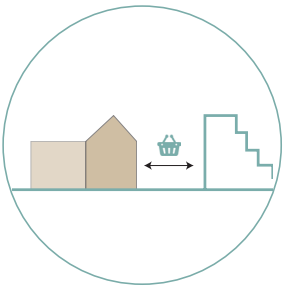
Neighborhood



Interaction
between blocks

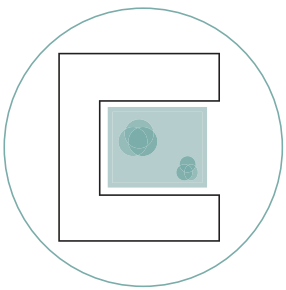


Human scale/
Sheltered
environment

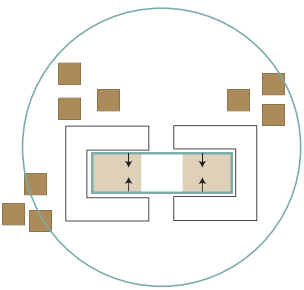


Near facilities

Community



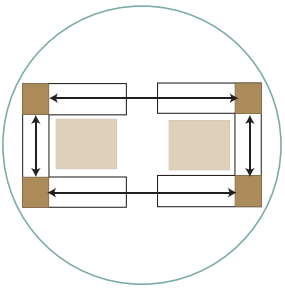
Intimate communal courtyards



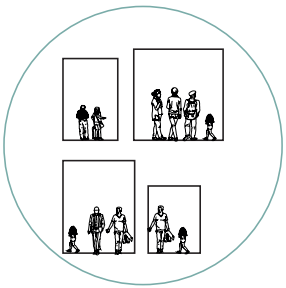
Self-
independency

Identity &
Expression

Cluster



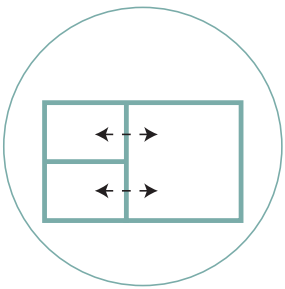
Shared resources



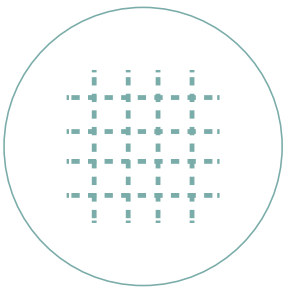
Diversity in dwelling types

Flexible construction

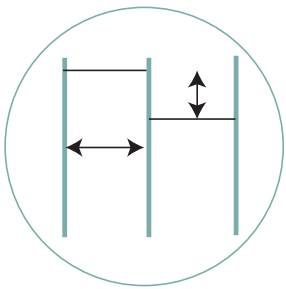
Dwelling



Functional Independency



Individualized Arrangements



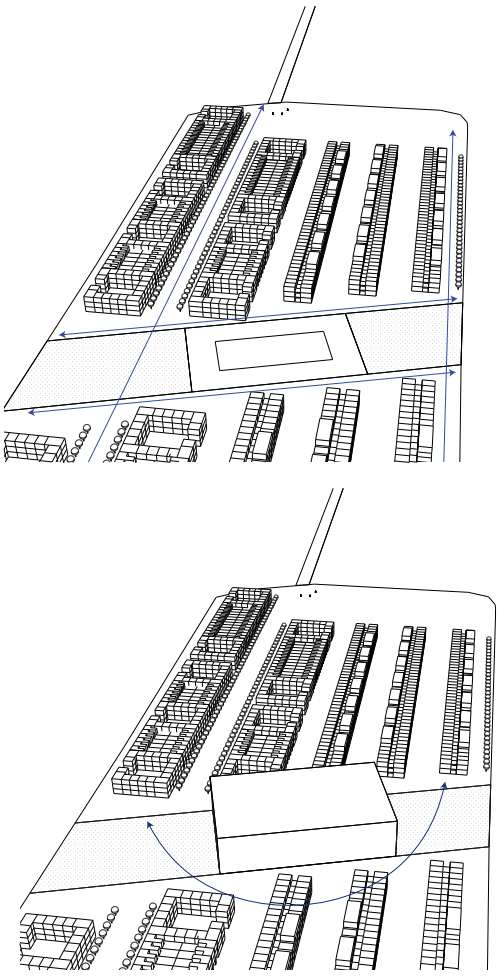
Expandability

Urban Embedding

Minervahaven Amsterdam

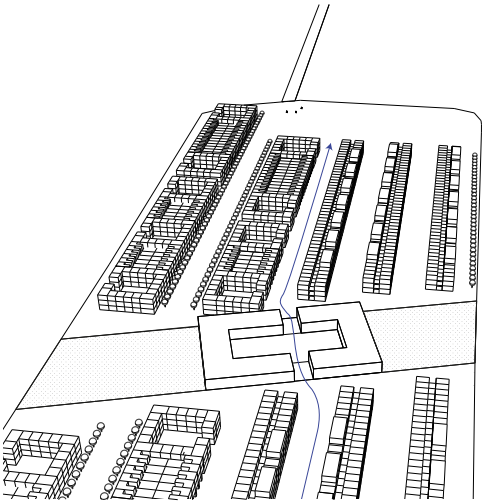
Step 1. After finishing the masterpelan, the placement of my building is embedded in the center of the Masterplan: an iconic block between the lineair stripes of rowhouses. At both sides of the block are squares that have been formed by the placement of the building plot in the center. Two car roads are placed adjacent to the block, meant for one direction traffic. This way the building is easily approachable, but will the car still have a redundant role in the Masterplan.

Step 2. The forming of a block. The first step after choosing my plot was creating a large volume on the plot. I was determining the heights and playing with the visibility of the block in order to let it function as an "icon".

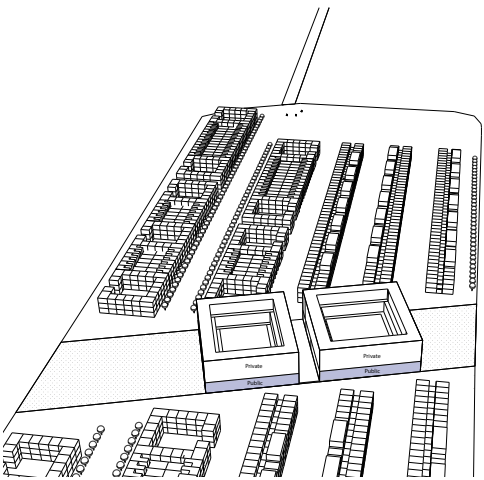


Step 1-2 Buliding block development: own illustration.

Step 3. After creating the massive volume, I decided to create two loose blocks which were much lower. I wanted to create an open courtyard, interrupted by a "back alley" to let the pedestrians cross the building plot. This was one of the most important steps in the forming of the actual building design.



Step 4. At this stage I chose to keep the alley in the middle and continue with the concept of the two building blocks. I therefore already decided that I wanted to create a distinction between the plinth and the upper levels of the building, which resulted in a public plinth with living functions in the levels above. Also the choice for two large courtyard blocks resulted in the fact that I let the upper dwellings be stacked in a terraced way. This means that the lowest dwellings are the deepest: a depth of 12 meters and the upper apartments the least depth: 6 meters.



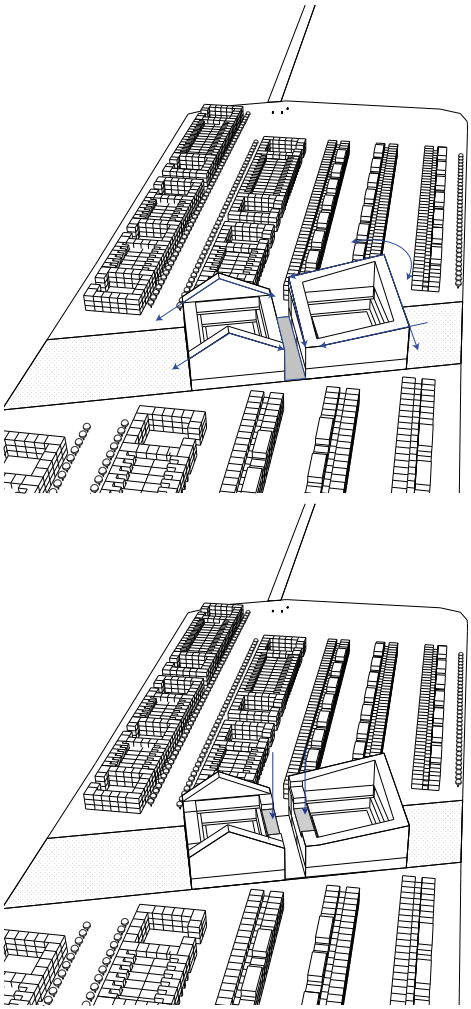
Step 3-4 Building block development: own illustration.

Urban Embedding

Minervahaven Amsterdam

Step 5. Forming of the roofs: in this stage I tried to create different volumes of the courtyard buildings and let them react on the solar studies that I did to examine the buildings heights. This resulted in a highest corner in the northeast direction of the right block, that slopes down to the south- west side. The left block differs from shape, but is similar in materialisation expression.

Step 6. Because of the narrow alley in between the two bulding blocks, it was necessary to create more daylight in the alley. Therefore I chose to remove one layer of dwellings from both facing sides of the building block facing the alley. This only goes up untill the 5th floor. There will still be shadow in the alley, but because of the sloped roofs and cuts in the heights, the space will be experienced way different.



Step 5-6 Buliding block development: own illustration.

Step 7. The next step was the finishing of the circulation system. The street in the air forms the main focus point and follows the measure system of a width of 2,5 meters. The most upper galleries (7th-9th floor) have a width of 1,5 meters because of the shading problem for the dwellings underneath. These galleries have easy access to the roof terraces which are placed on the 5th and 6th floors.

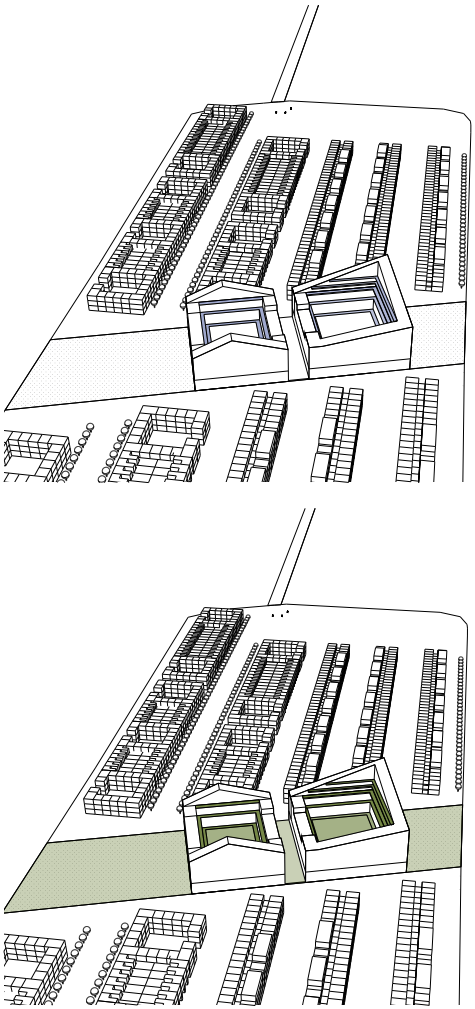
Step 8. The final step was the linking of the playspaces to the age of the children. Research from Lia Karsten has shown that the action range is very important to let children play safely in and around the buliding.

children 0-4 years old

children 4-8 years old

children 10> years old

The youngest children need to play under strict supervision: the street in the air. Children from 4-8 years old can play also on the street in the air and the communal courtyard. Children from 10 years and older can play outside of the building blocks on the squares.



Step 7-8 Building block development: own illustration.

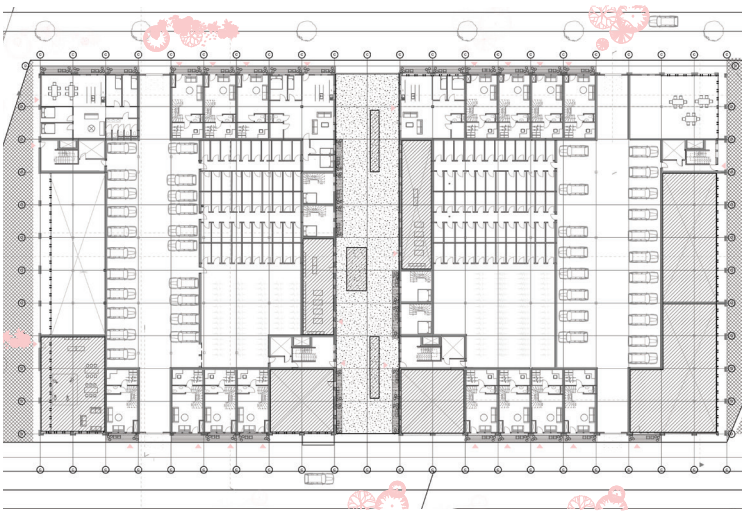
Building Design

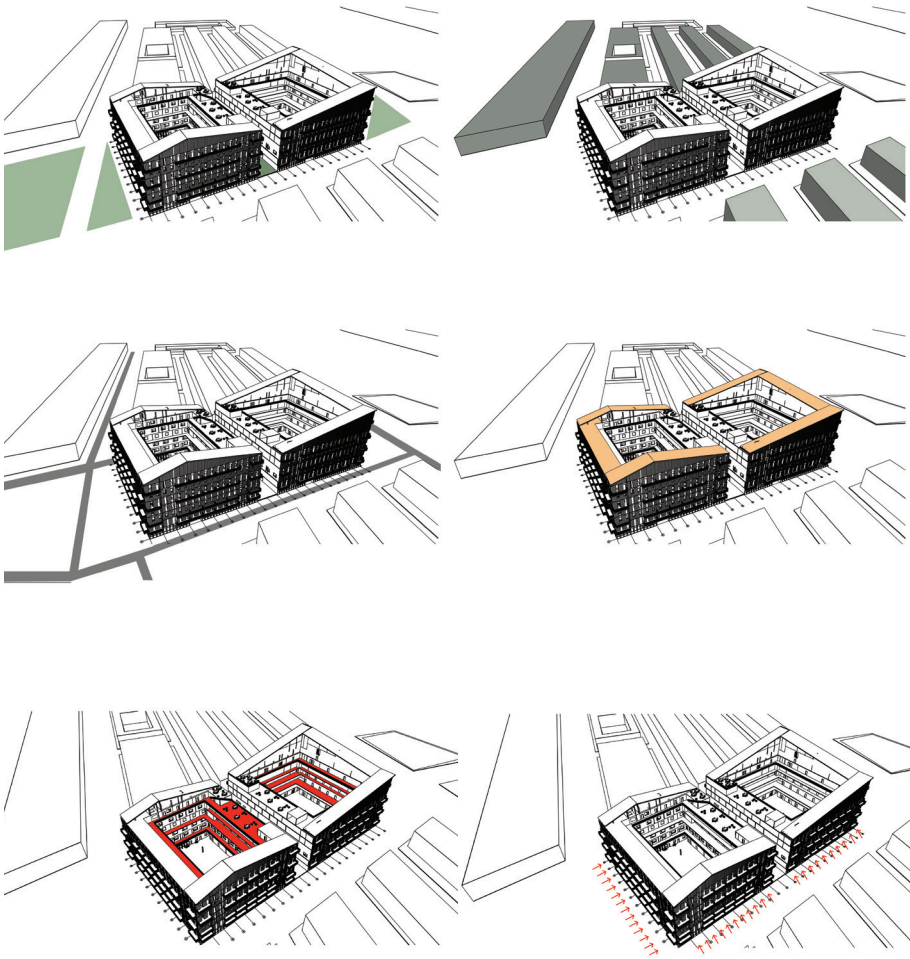
Building block development

The urban embedding gives two clear features which return in the organisation of the individual floorplans. The first one is the use of public functions and the second is the design and distance to the playspaces in and around the building. In the plinth a daycare, a library and a care facility are situated. All functions are visible from the streets around the building and have their own public car free zone in front or the entrance. This makes the functions better accessible, in particular for children since them don't need to move along roads. Besides the functions all dwellings on the ground floor have a front door on the ground floor what makes the street a place of life. People will move around the entire building which interacting with the different dwellings rather than walking across a blind wall where interaction is impossible. The use of these dwellings does not only stimulate interaction but also increases the social safety.

Not visible in this view but visible in the urban plan multiple road bumps are added to prevent fast car travel. The cars that are present are kept away from the school and are directed from the main street around the island to the

ramp of the parking garage at the south west corner of the building. The squares around the block are designed according the functions next to it. For the school this is a playground and for the library a terrace.



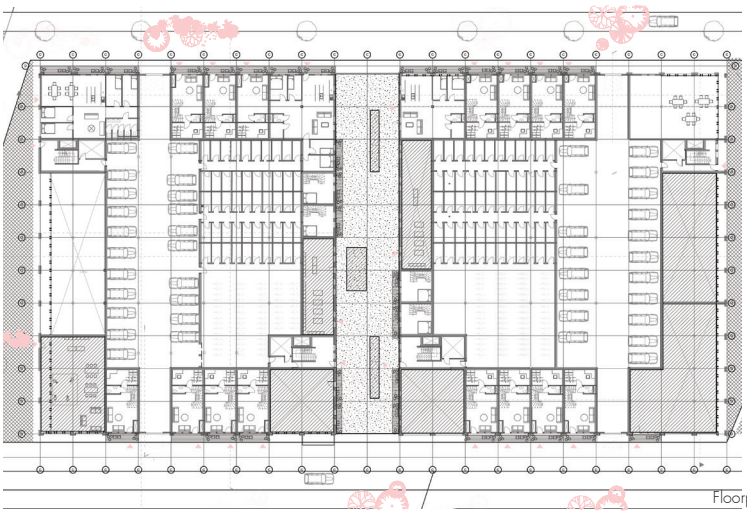


Diagrams building characteristics. Own illustration

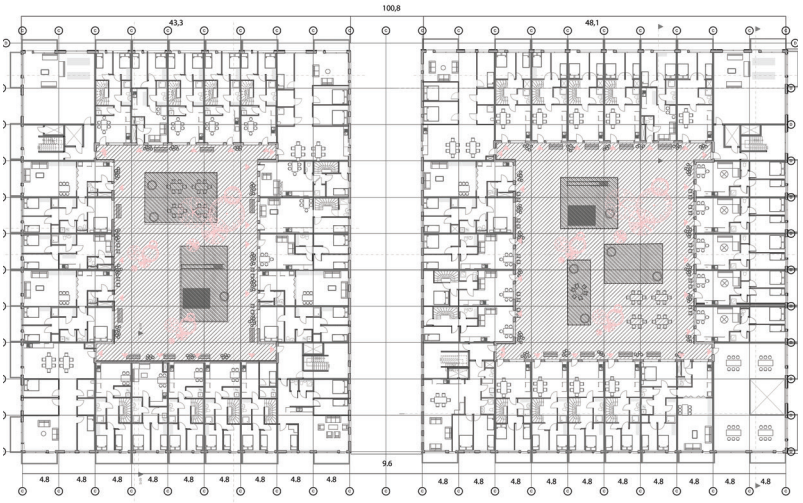
Building Design

Building block development

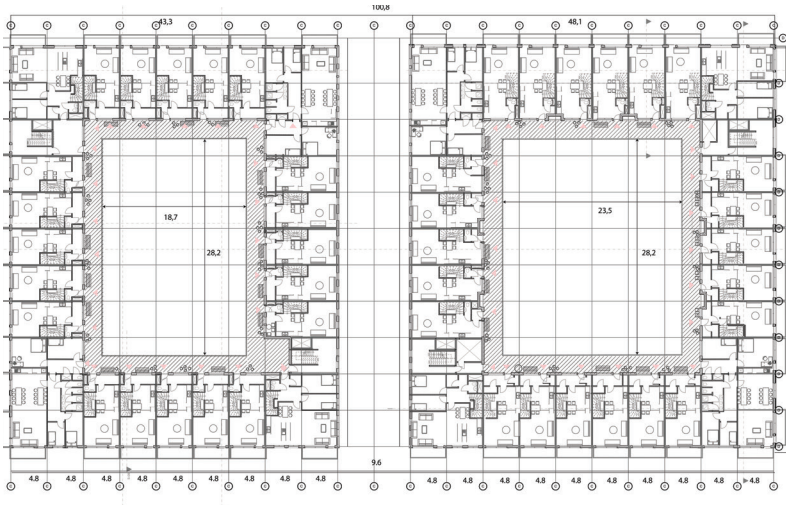
All types of people sometimes need the use of cars, however in Amsterdam, the idea of sustainability and the new functions which are closely the need for a private car is increased. Therefore the building block provides parking spots for shared cars. At the same time every family member in contrast to other target groups has a private bike. Therefore, in the underground parking a lot of space is reserved for bikes. The calculations come down to at least 1 free spot for every person in the building. Besides the collective parking sport every dwelling has a private storage room for additional bikes or materials. A specific parking spot is reserved for cargo bikes. In the standard storage, bikes for children can parked on the ground row, and bikes of parents can be parked on the raised row above the children's bikes. All bikes can enter the garage on the ground floor. Besides the bikes, cars and storage there are two main rooms reserved for underground water storage. These storage rooms are used to store rain water to reuse in the grey water system of the building. The dwellings on the ground floor are connected with the inside garden of the building block on the first floor. It has the intention the make both the garden and street an place of interaction while keeping the garden closed for the people outside the block.



Floorplans 1:300 GF



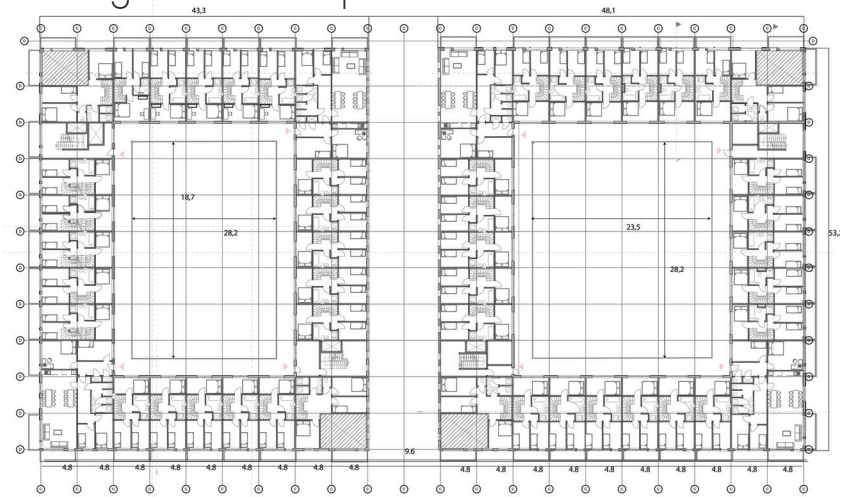
Floorplans 1:300 +1



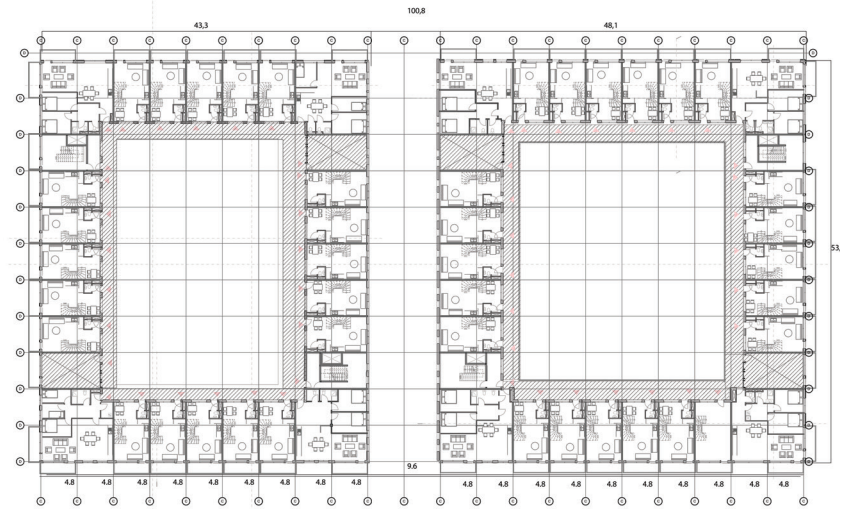
Floorplans 1:300 +2

Building Design

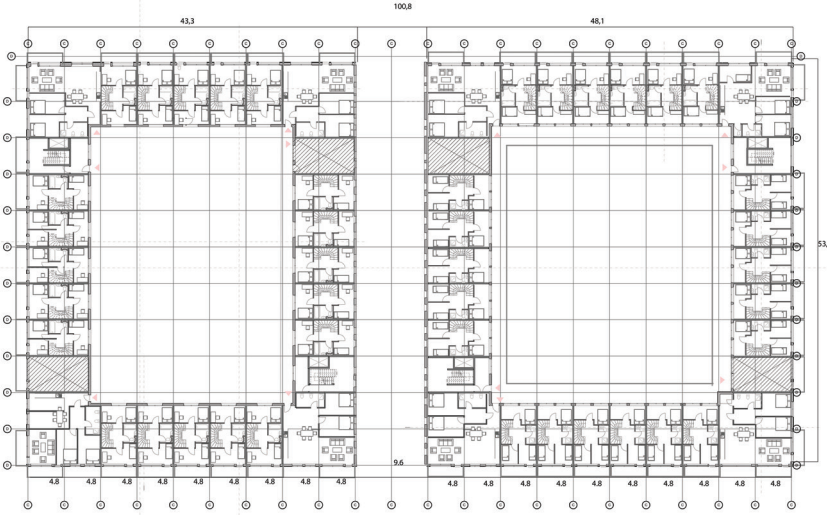
Building block development



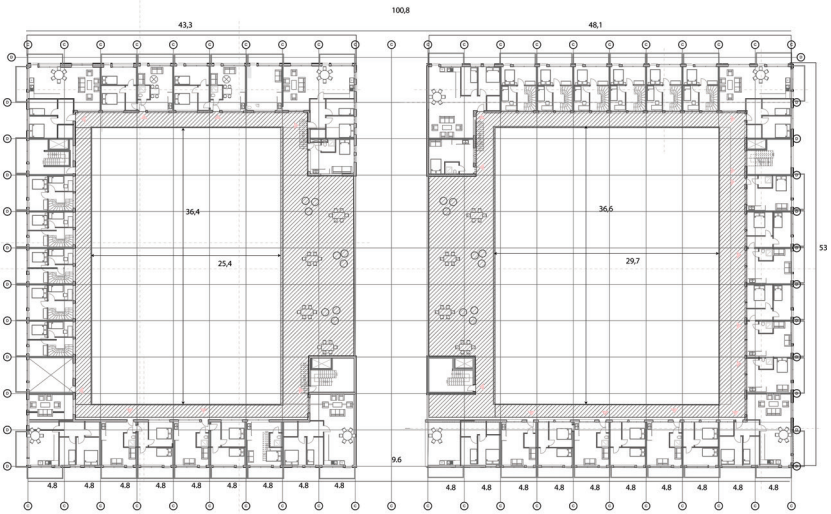
Floorplans 1:300 +3



Floorplans 1:300 +4



Floorplans 1:300 +5

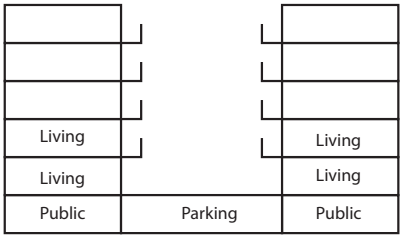


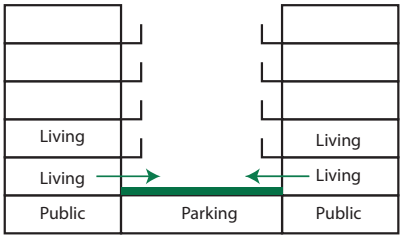
Floorplans 1:300 +6

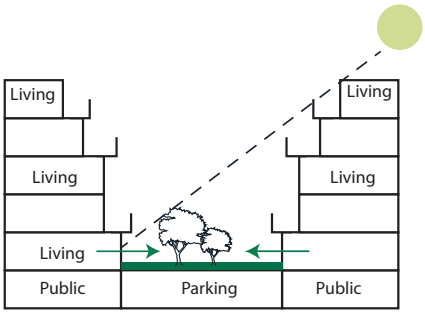
Building Design

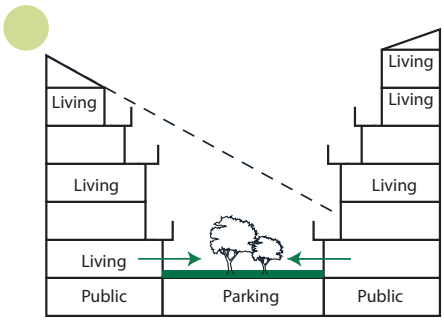
Section development

As already mentioned before, the stepped facade is something extracted from the case studies of Babel and the Family. I started with building volume in its original form with two linear volumes. The plinth was reserved by parking and public functions. By making the raised deck a place to be and by placing dwellings on the ground floor, daily life is introduced in the plinth of the building. By mixing both dwelling and functions there is a constant use of the plinth during the day.
At this point the stepped facade made its entry to bring more light into the block and to give room to different typologies and a gallery of 2,5 meter width. The last step was the shaping of the roofs. By introducing the sloped roofs, the building gets it's iconic character and extra storage space for the upper dwellings.





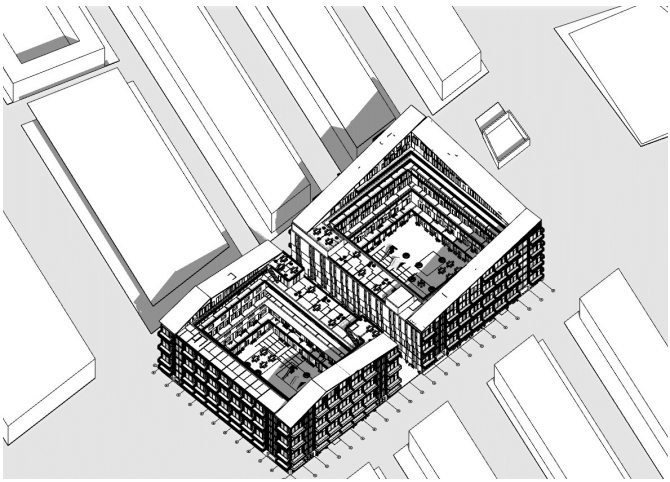




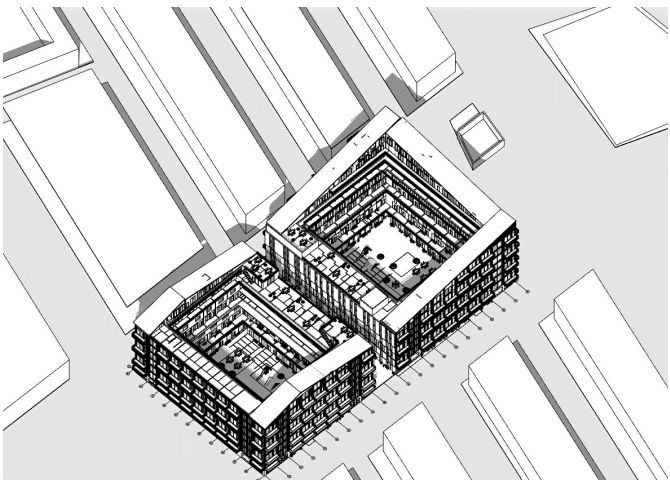
Building Section Development

Building Design

Solar studies



March 31st 12:00



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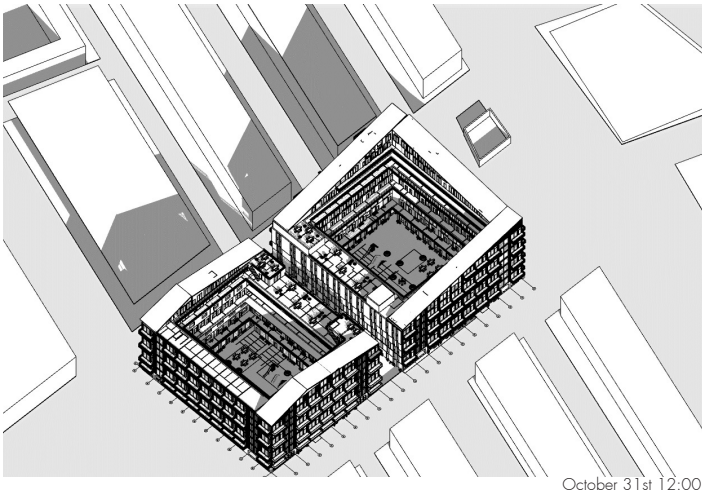
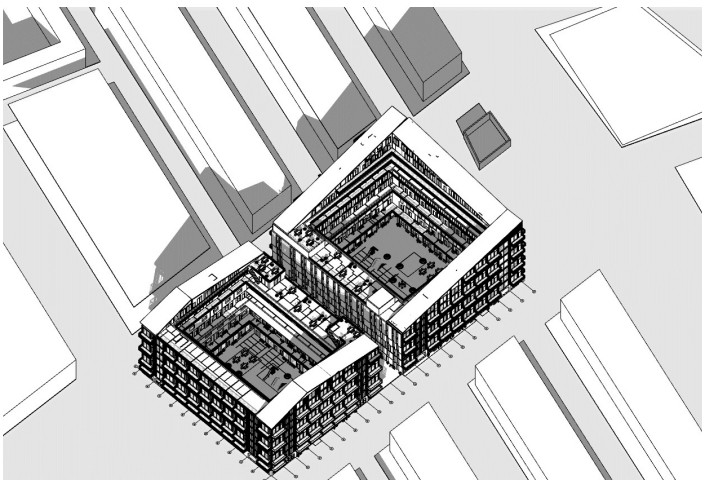


October 31st 12:00



October 31st 12:00

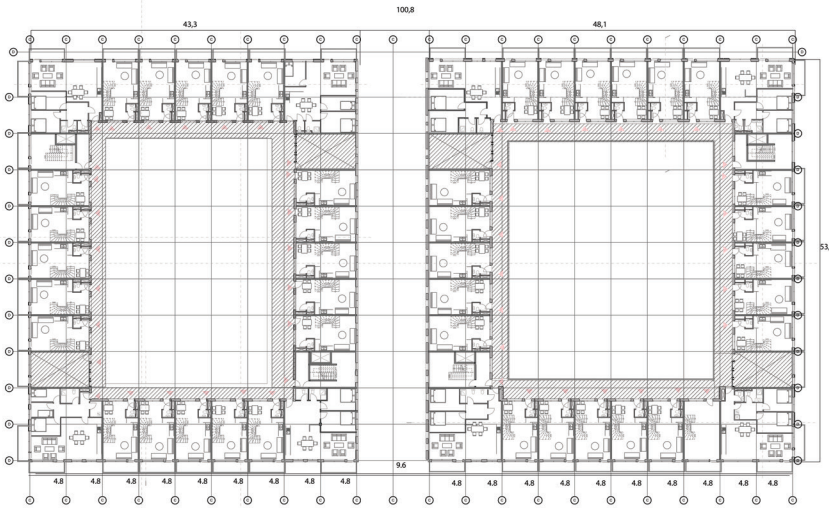
Building Design

Building block development

The middle section of the block gives shape to the different galleries and playgroud on the galleries. These galleries have a depth of 2,5meter. This 2,5 meter is based on the case study research of both Babel as Justus van Effenblok. With this design tool the "Street in the air" is most of the time under supervision of at least one parent or a person passing by, which prevents unsafe situations.

The street in the air is divided into a leisure and a play zone. The leisure zone has a width of 1,00 meter and the play zone 1,5 meter. The 1,00 meter is meant for parents to place outdoor furniture and use the gallery also as an outdoor terrace/balcony,

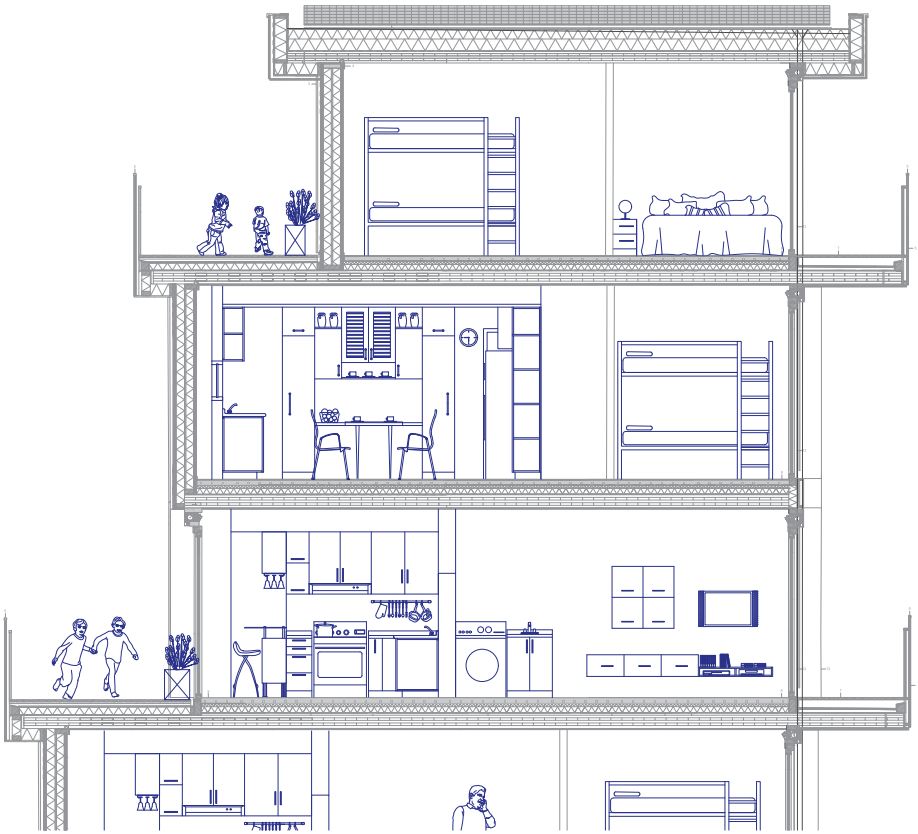
Children need space for playing and to freely run. Therefore the 1,5 is necessary for them to be able to use the gallery really as a "Street in the air" just as in the described case-studies.



4th floor 1:300 Sstreet in the air

Street in the air

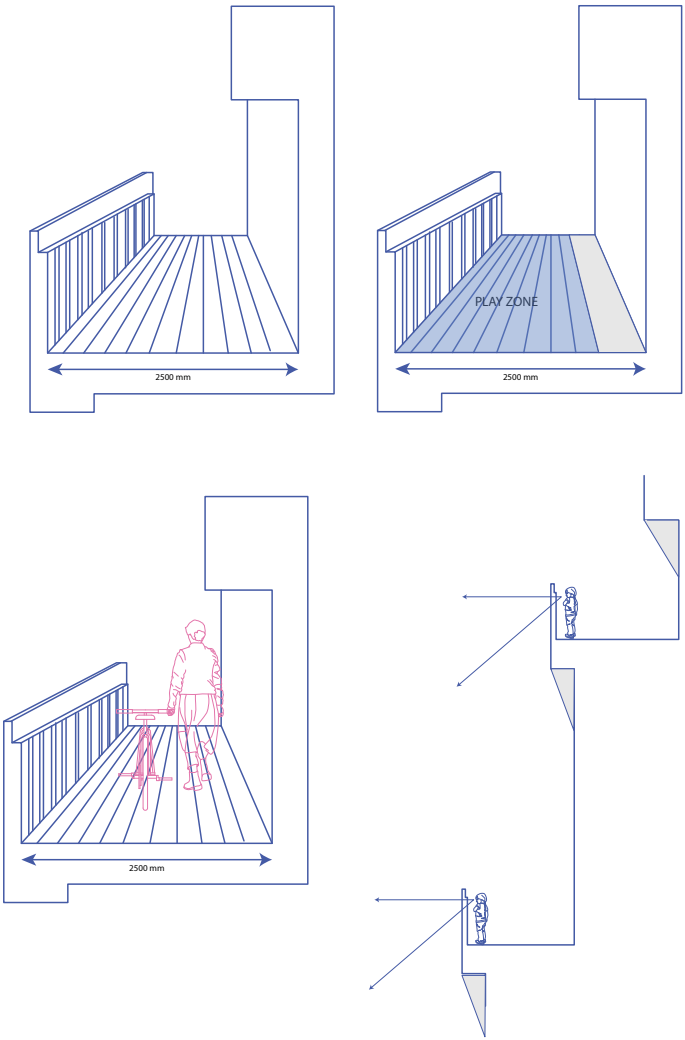
Concept development



Section 1:20 Street in the air

Street in the air

Concept development



Diagrams street in the air concept

Street in the air gallery view

On the highest levels of the building are smaller houses located designed for single parents which have a need for more social support of like minded people and therefore have a greater need for a smaller but closer community. Therefore the playspots are smaller and moved to the rooftops. The gallery on the 6th floor goes slowly over in a wider playspace, that forms the roofterrace. Stairs give access to the higher levels and the smaller roofterraces on the 7th floor.

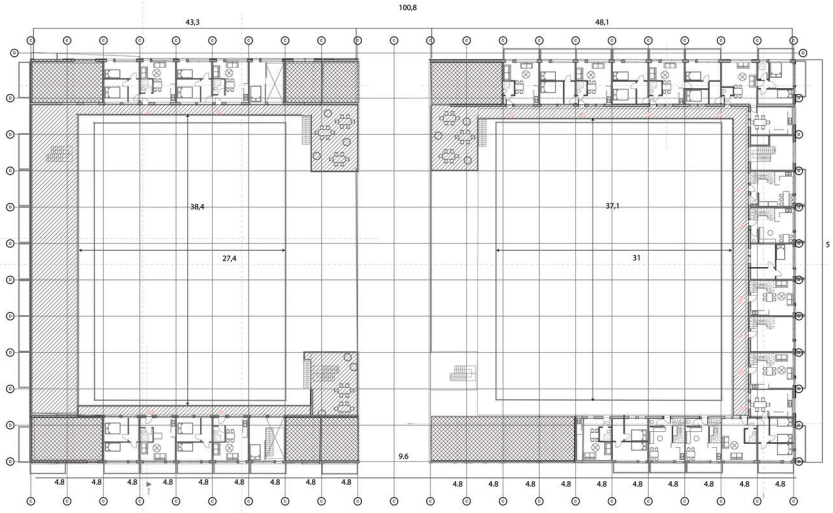
6th floor 1:300 Roofterraces

The roofscapes provide a lot of space for children to play safely on the terraces. A double fence provides safety for the smallest children and there is enough space for parents to leisure, organize activities for the residents and so on. Furthermore providing the building with roof terraces gives an other type of privacy then for example making use of the communal courtyard. Interviews that I did in the Nautilus building in Amsterdam, showed that parents with older children actually prefer to use a common space like a roofgarden over a courtyard garden.

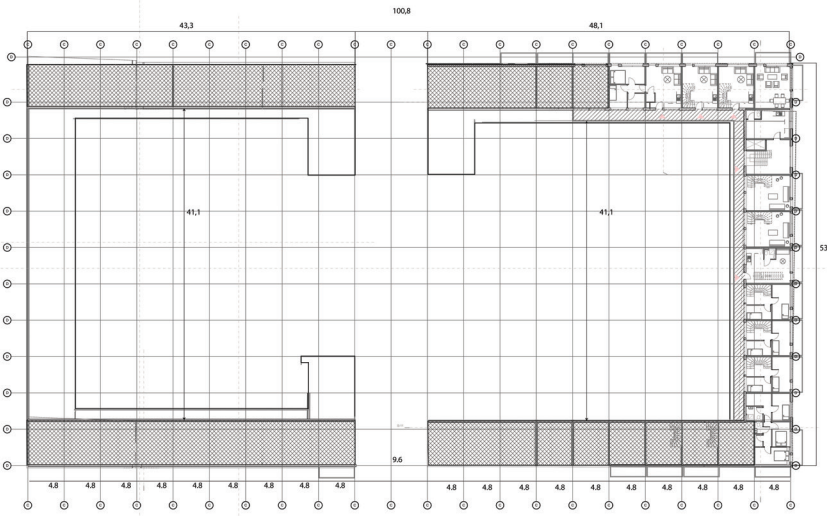
Roofterrace view 6th floor

Building Design

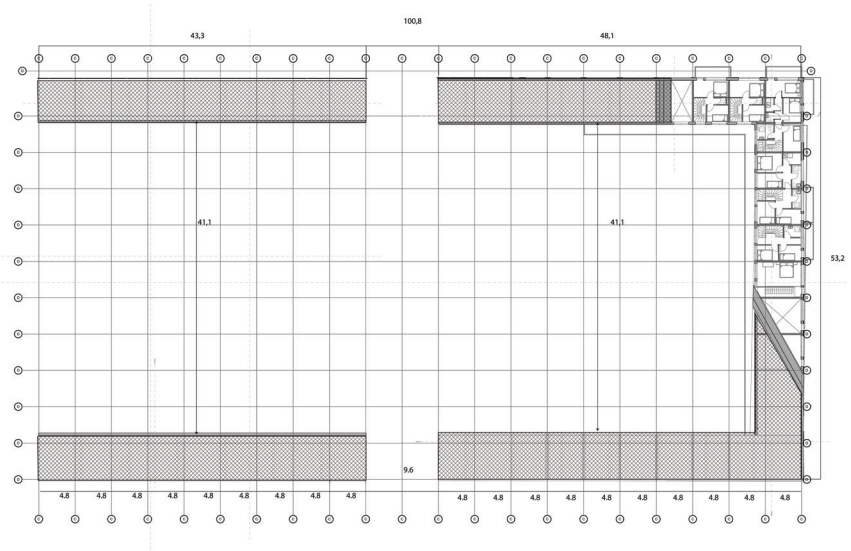
Building block development



Floorplans 1:300 +7



Floorplans 1:300 +8

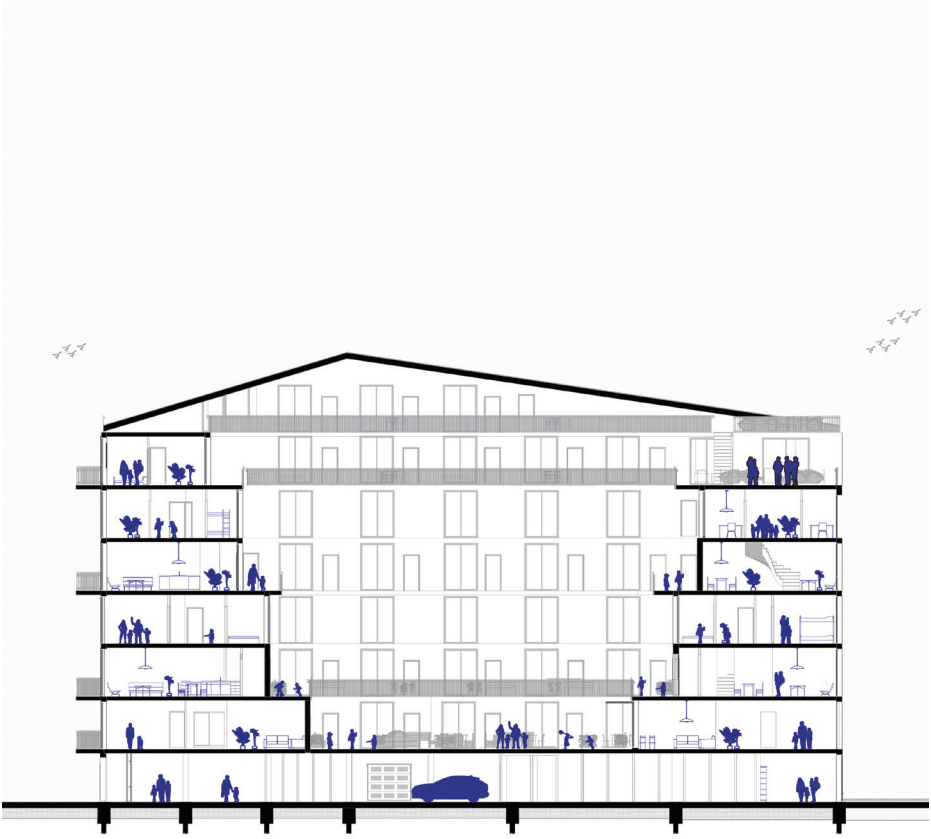


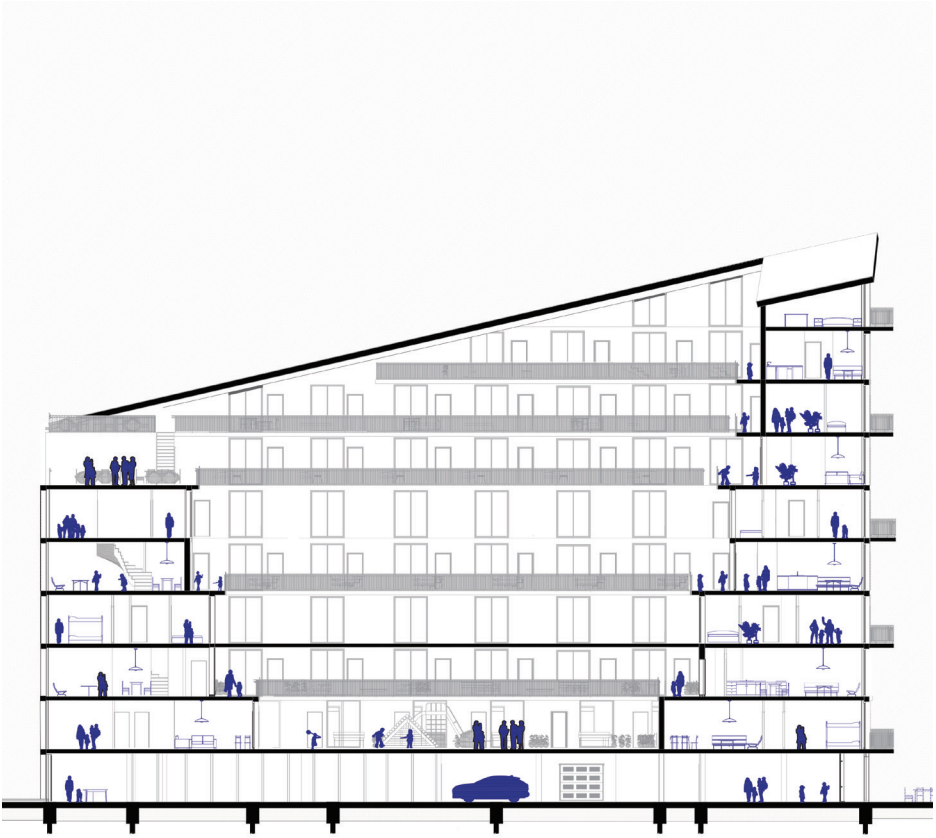
Floorplans 1:300 +9

Roofterrace overview 6th floor

Sections

Longitudinal

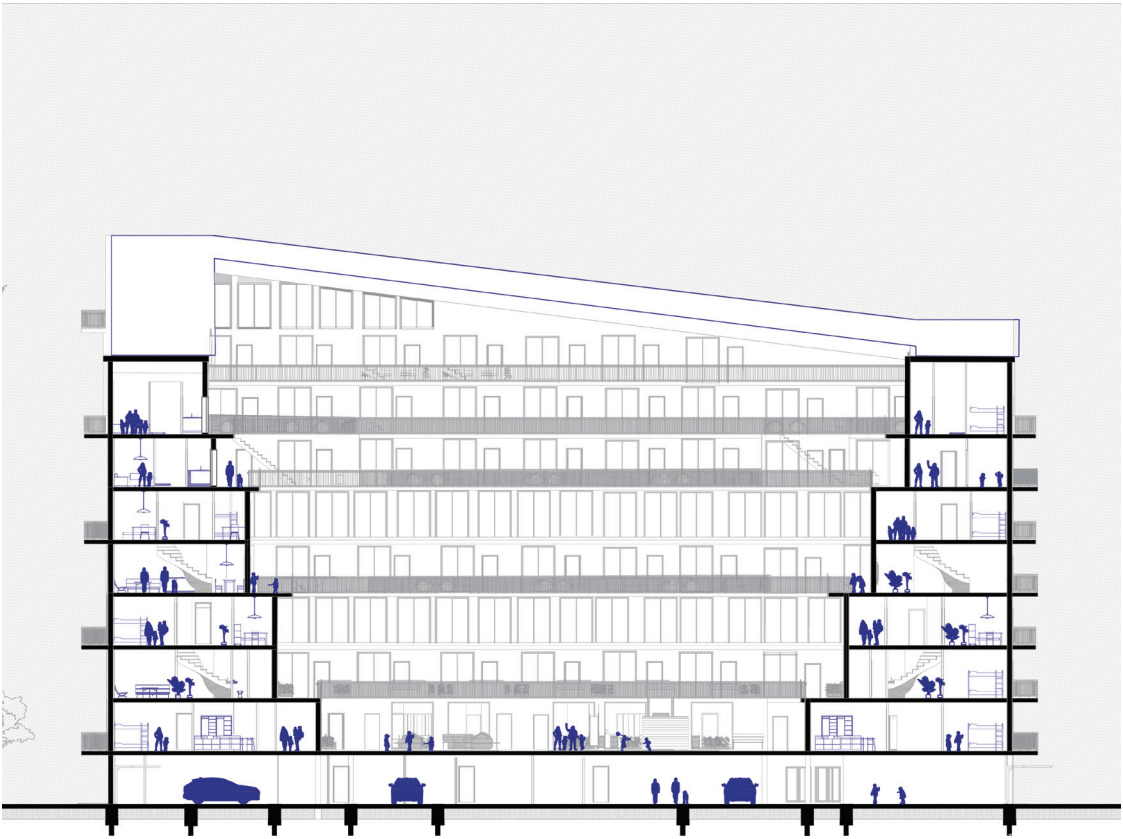




Longitudinal Section 1:200

Sections

Cross



Cross Section 1:200

Building overview

Facades

The facades represent a new expression with natural materials and the division trough a strong concrete plinth. The external facade knows a repetitive grid with large widows which show the life in the individual dwelling. In the external facade are three elements which differ. The first element is the concrete plinth with the setback to create a sheltered walkway and a transitional zone between public and private. This represents the continuous line of sight from the street through the public functions. The second element is the glass facade of the public functions. These glass facades create a different perception of the functions behind, than the residential functions, which have wooden doors and window frames. Concrete arches give the building a classic touch and forms a tension field with the iconic roofshapes and the CLT optopping.

West facade 1:200

South facade 1:200

Where the building is an obstacle the functions are spaces to move trough. The last element is the materialisation of the entrance doors. These doors are accentuated with a wooden frame to make them better visible from all directions around the block. The visibility is further strengthened by the offset outwards of these frames. The wood breaks the traditional materialisation of housing for families and is a link to the breaking with traditions of modern families compared to traditional families. The wood also gives a warmer feeling to the interior of the block. Both the interior facade and interior facade are made out of sustainable materials in the form of HSB facade elements and European Larch slats as finishing. The interior facade differs only in terms of finishing: to create a contrast with the exterior, white plaster forms the finishing of the facades on the street in the air.

East facade 1:200

North facade 1:200

Building Design

Collective garden +1

Courtyard View

Building Design

Overview

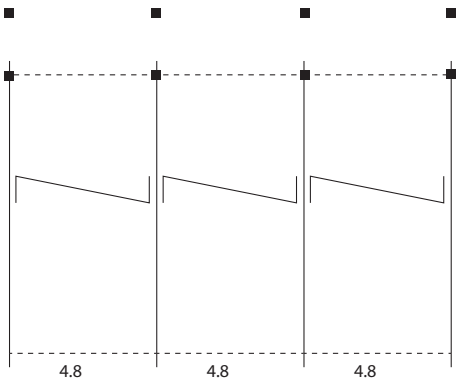
Urban view

Work & Living

Type & Target Group

Every family is different so are the needs for the dwellings and the organisation of the floorplans. Out of the research I selected flexibility, storage and multifunctional spaces as core elements or the design. The construction span I used is 4.8 meters. Because I want to create affordable and compact family dwellings, this size is optimal to arrange more smaller rooms instead of less rooms who are larger. Therefore the grid size of 4.8 meters can be combined to create apartments, or stacked as maisonettes, to create a modern version of the traditional Amsterdam canal houses.

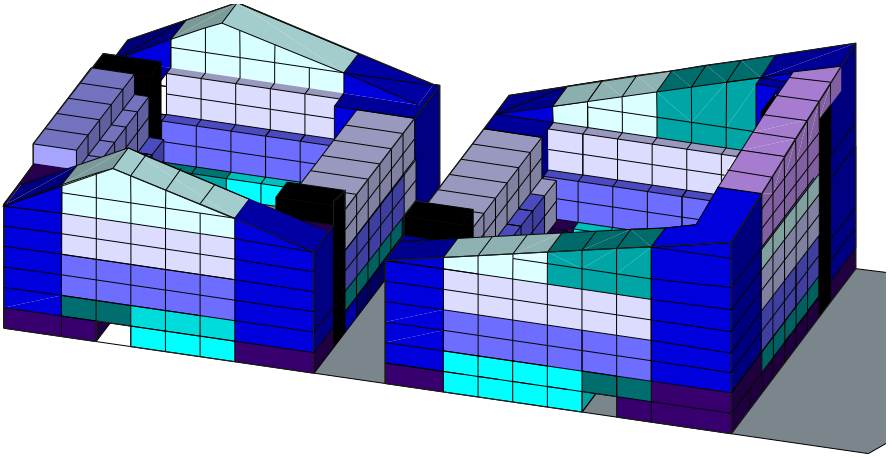
The ambition to use less material as possible, but at the same time create an affordable and atmospheric living environment for families is translated into several typical family dwellings that are divided into two categories: private and communal units. The private dwelling units are mainly focussed on traditional, nuclear families with 1-3 children. The communal units are focussed on patchwork or single families. They have the ability to share the living space and kitchen and so reinforce social bonds and have the opportunity to share resources which is beneficial for the living costs.



Construction width

Dwelling Typologies

Overview



- Public functions: stores/workshopspace
- work/living maisonette 96 m2
- Collective living units 90-140 m2
- Private apartments 115 m2
- Private maisonettes 96- 125 m2
- Private maisonettes 76 m2
- Private micro apartments/maisonette 57 m2
- Private micro apartments/maisonette 86 m2
- Private micro maisonettes 57m2
- Communal staircases

Type A

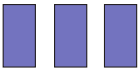
Type A1

Parents with young children

Type B

Parents with 2-3 children

Type C



Type C1

Parents with 2-3 children

Type D

Type D1

Single parents with 1-2 children

Type E

Type E1

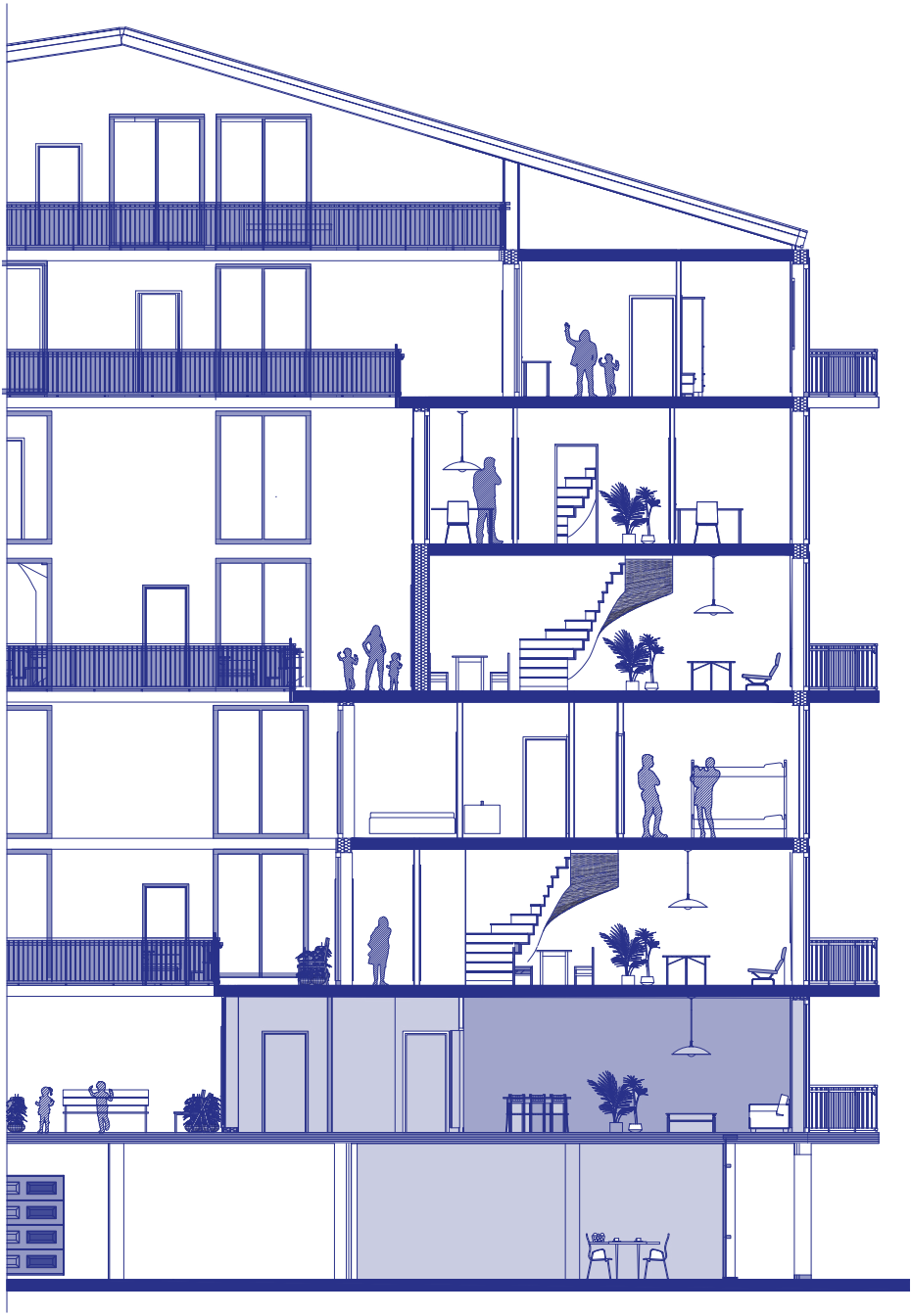
Single parents with 1-2 children

Type F+G
+ H

Patchwork families/ divorced parents

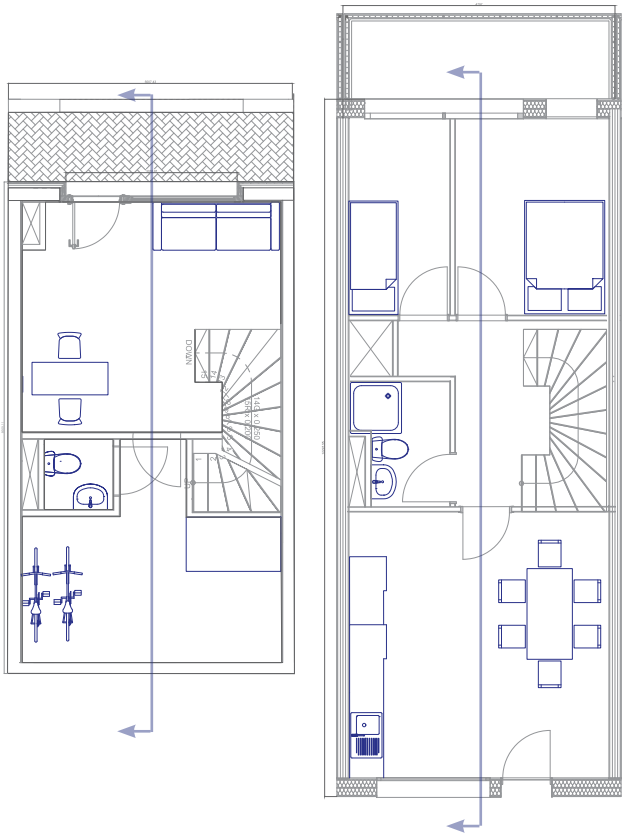
Dwelling Typologies

Private Living

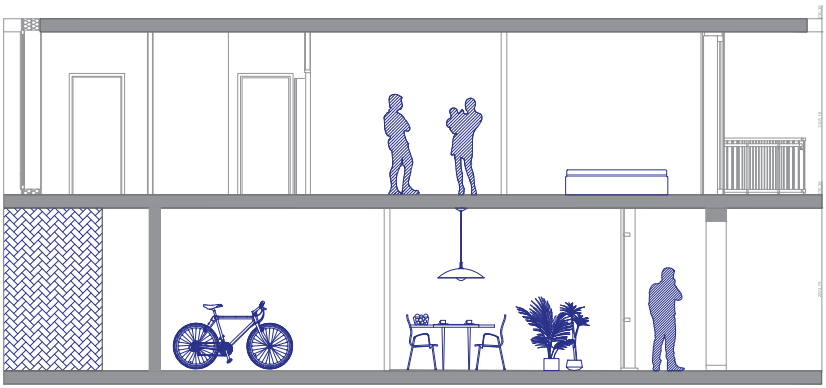


Dwelling Typologies

Type A The work unit



Dwelling type A 1:100



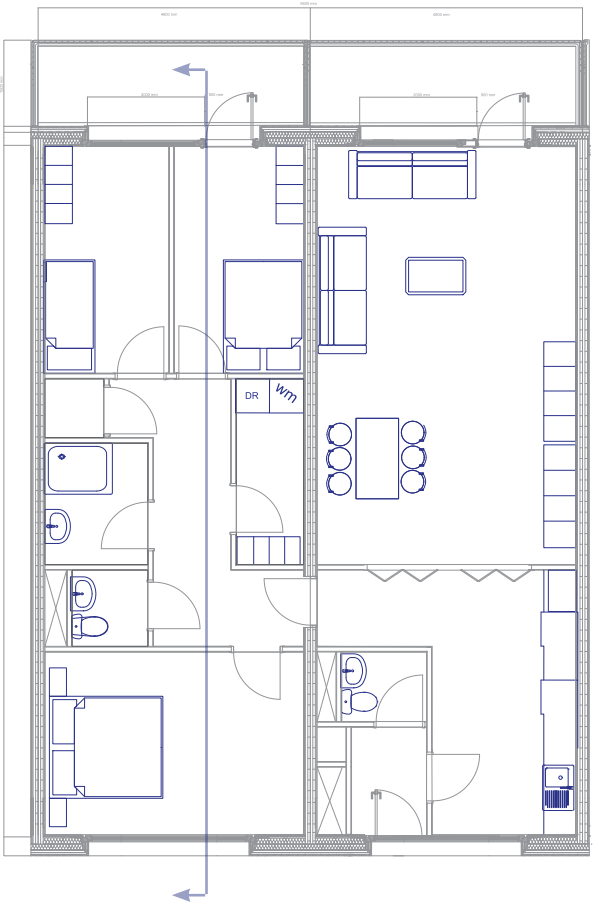
The work- living unit is 105 m2 and is meant for families who want to work from home. There is the possibility to create more bedrooms when this is not desirable. Qualities of the dwelling are the large storage space on the ground floor, the front entrance at the street and the connection with the inner collective garden on the first floor. This dwelling is suitable for young families with 1-2 children.

Dwelling Typologies

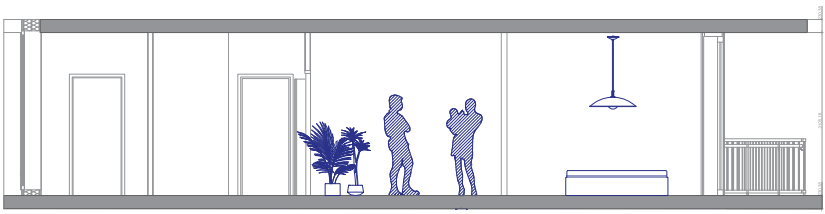
Type A1: The family apartment

Dwelling Typologies

Type A1: The family apartment



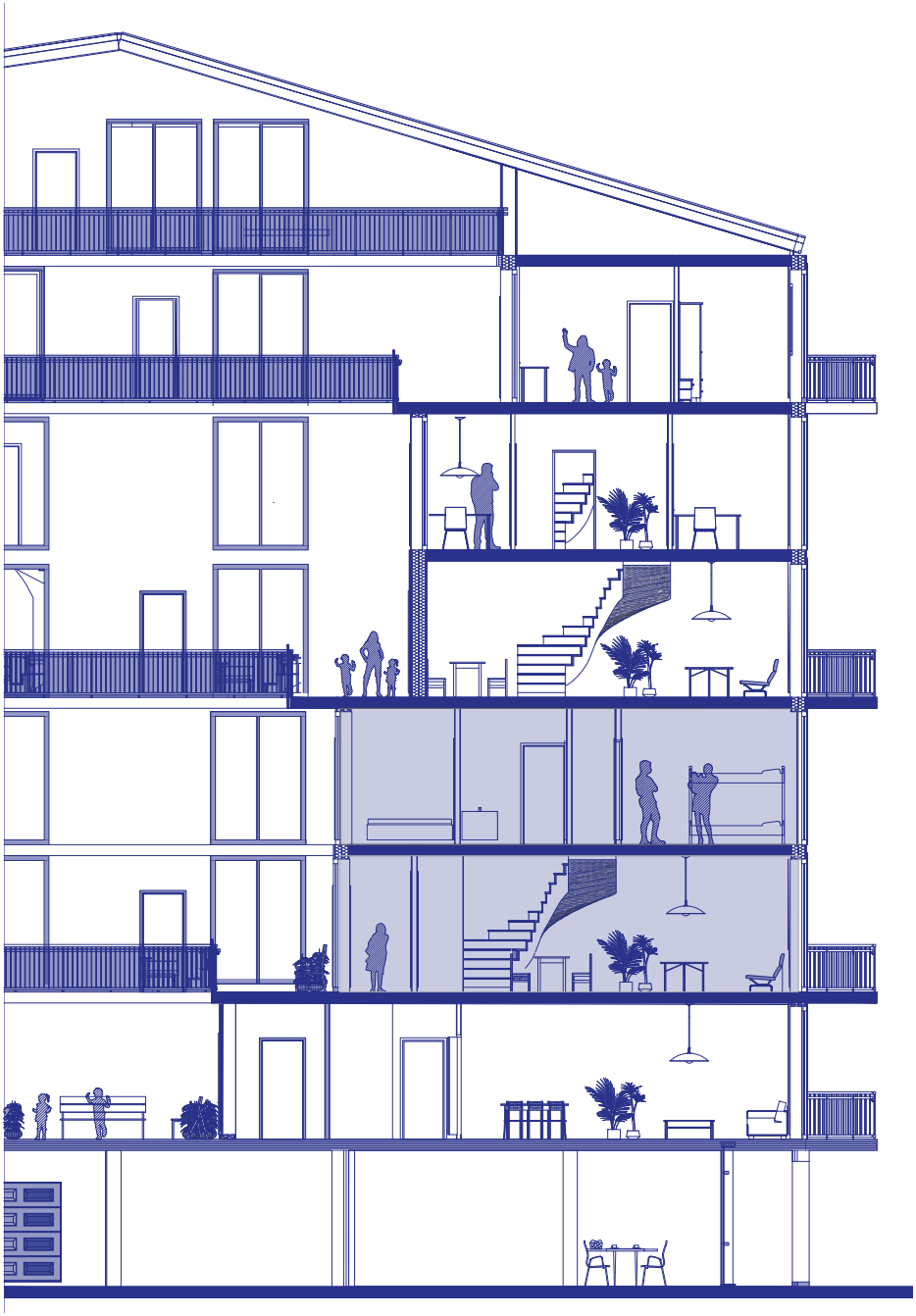
Dwelling type A1 1:100



The family maisonette is 115 m2 and is ment for large families with 2-4 children. The dwelling can be very flexible arranged and there are a lot of possibilities to create work spaces. Another quality is the large kitchen/ living room with windows at both sides which can be separated by a folding door. The dwelling has two balconies and borders at the collective garden on the inside of the building

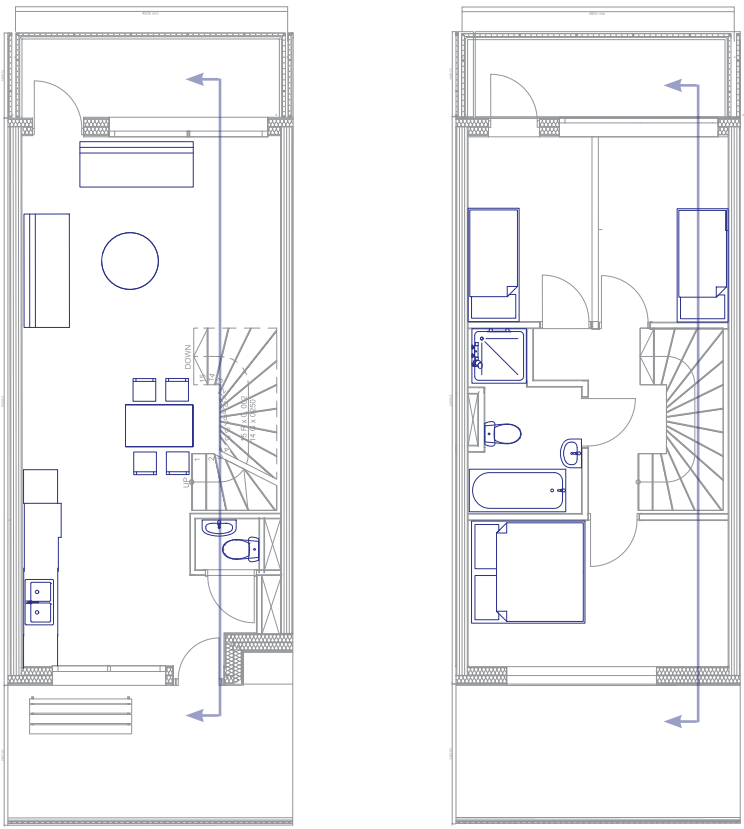
Dwelling Typologies

Type B The famliy maisonette

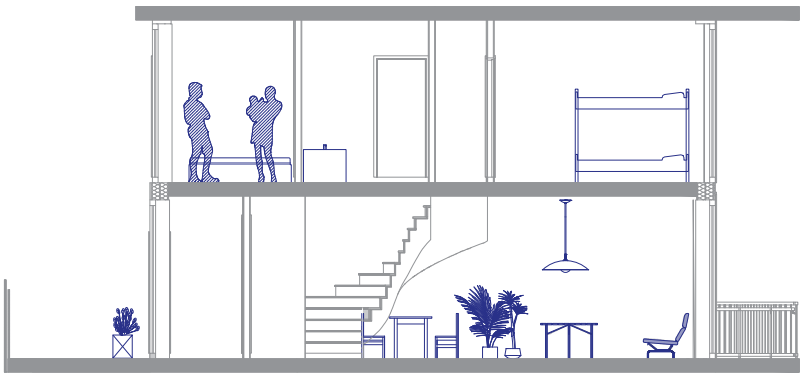


Dwelling Typologies

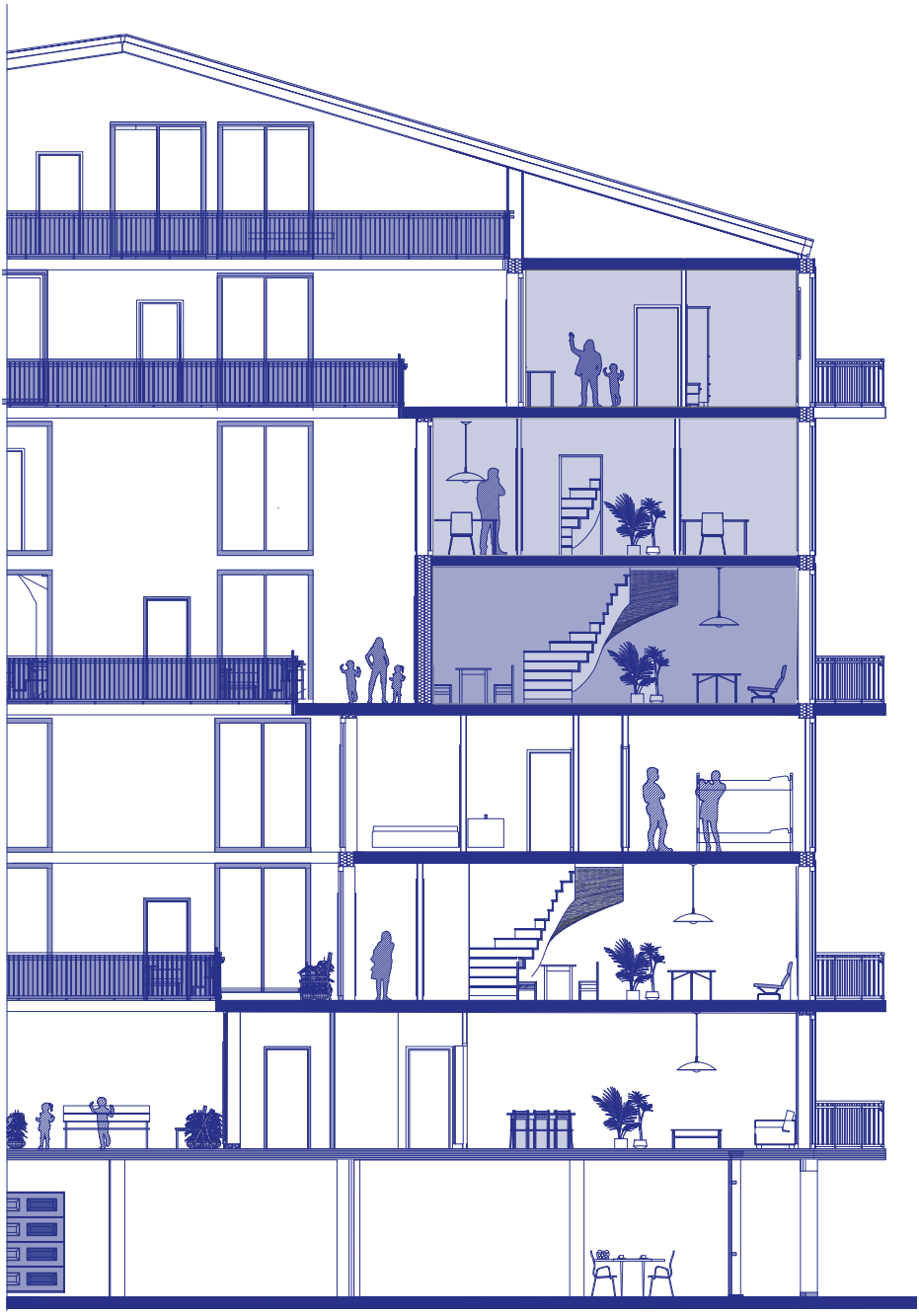
Type B: The family Maisonette



Dwelling type B 1:100

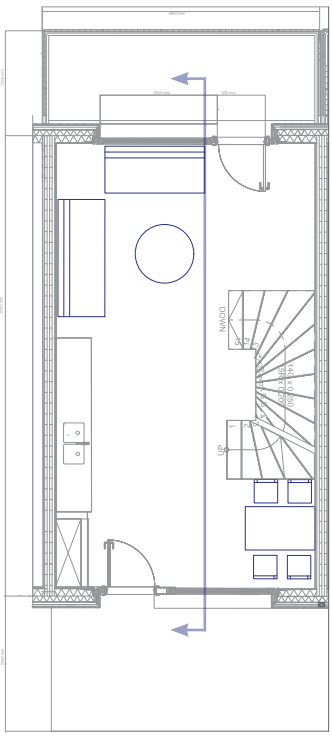


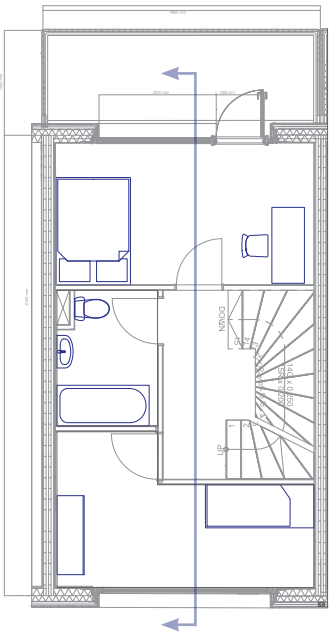
The family maisoentte is especially sutiable for nuclear families with 2-3 children. The house is quite compect with 96 m2 for a large family house, but still very suitable for a high-densed urban environment. The qualities of this dwelling are the many small rooms and the outdoor spaces: balcony and access to the street in the air.



Dwelling Typologies

Type C1: The work-living Maisonette

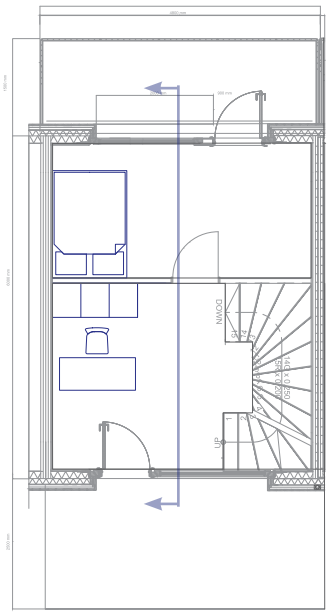




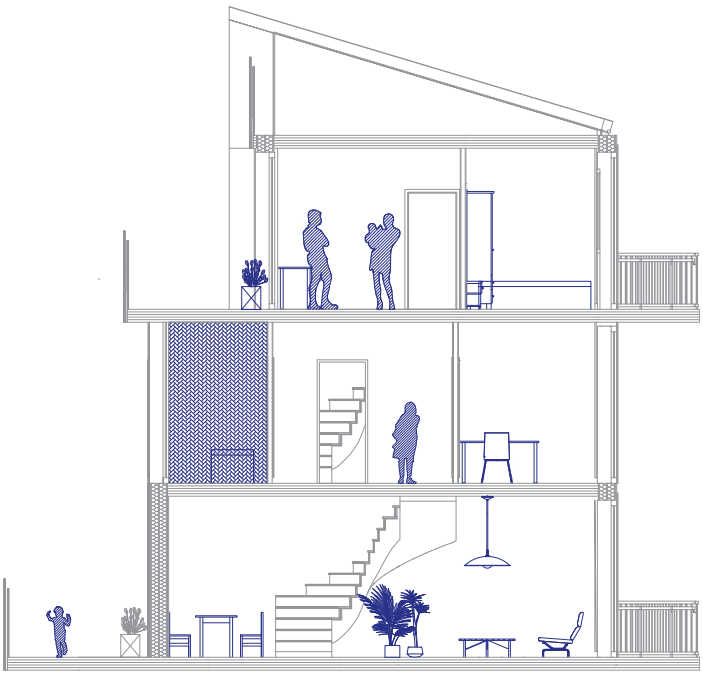
Dwelling type C 1:50

Dwelling Typologies

Type C1: The work-living Maisonette



Dwelling type C 1:50

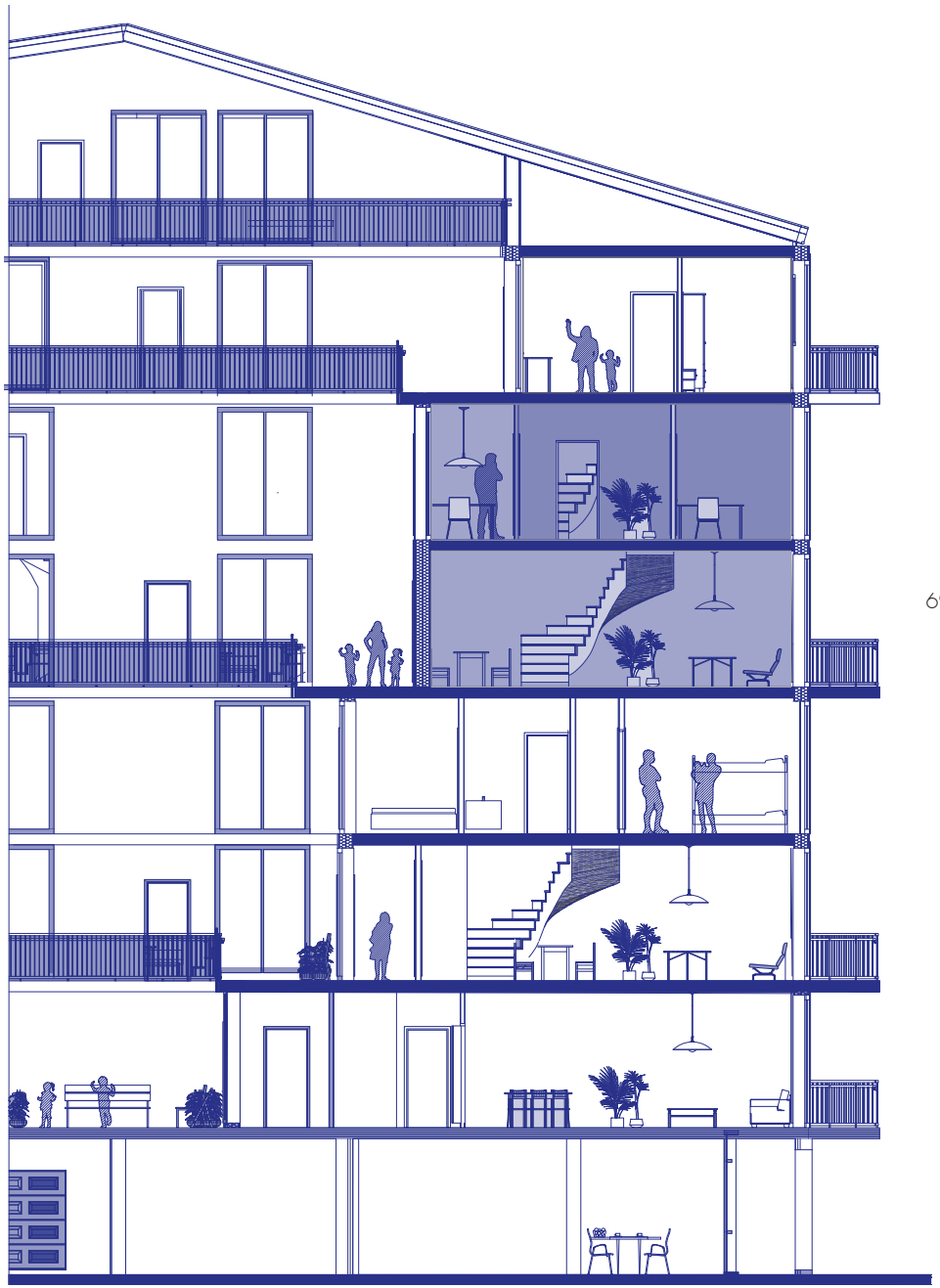


This 3 stories dwelling type is 105 m2 and has two entrances: a front entrance at the 4th floor and a "back" entrance at the 6th floor. This dwelling is suitable for families with 2-3 children that want to have the possibility to work from home or let grandparents stay over.

Dwelling type C 1:50

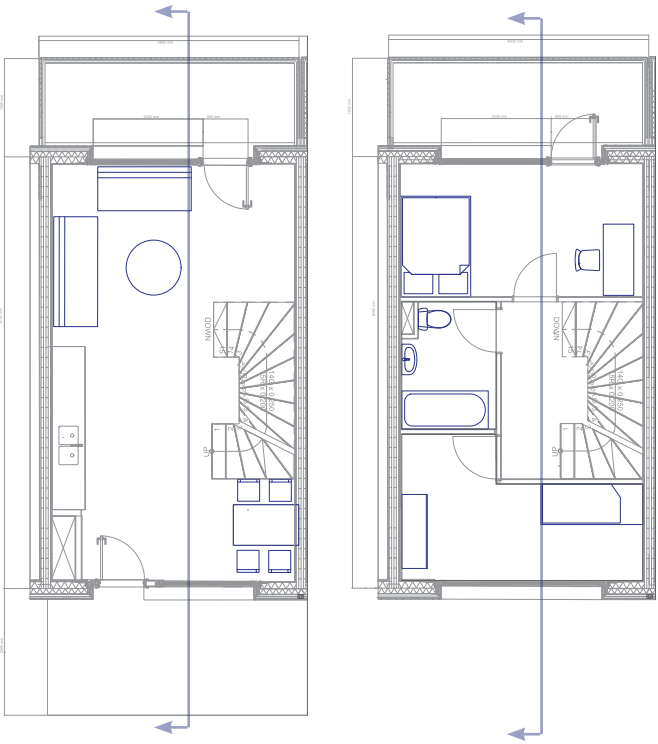
Dwelling Typologies

Type C: The small family Maisonette

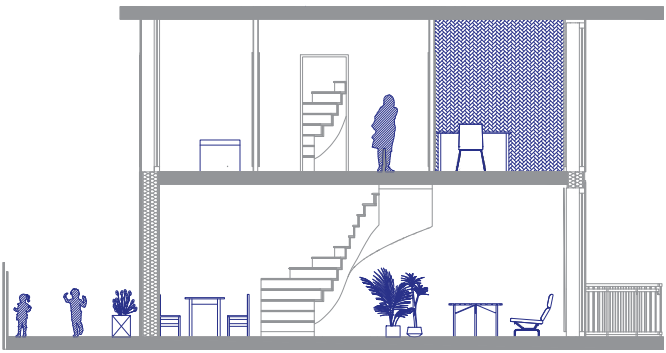


Dwelling Typologies

Type C: The small family Maisonette



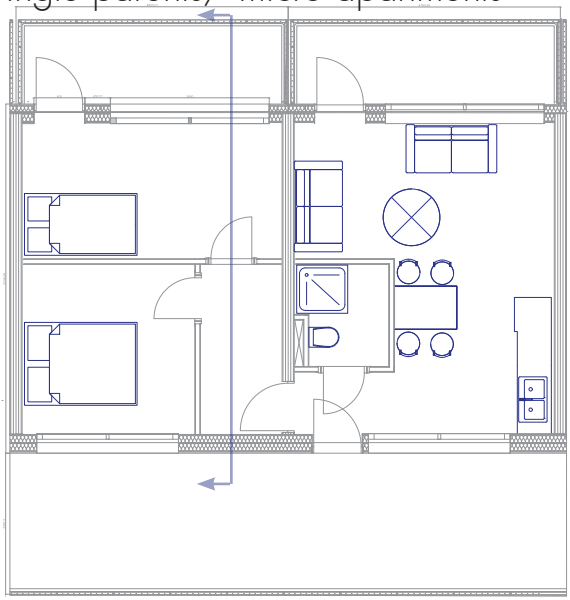
Dwelling type C1 1:100

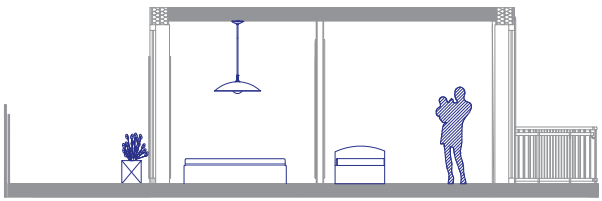


This dwelling is 76 m2 and suitable for families with 1-2 children. This compact dwelling unit is especially suitable for young parents that are looking for an affordable and practical dwelling.

Dwelling Typologies

Type D Single parents/ micro apartments



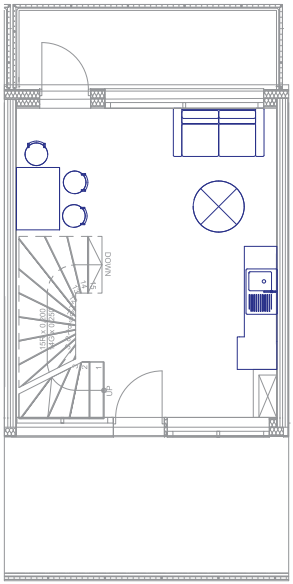


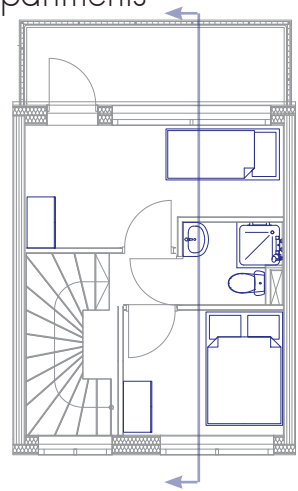
This apartment is 57 m2 and is meant for single parents with aprox. 1 child. These micro apartments are suitable for low-income parents that are still want to live in a communal complex to share resources.

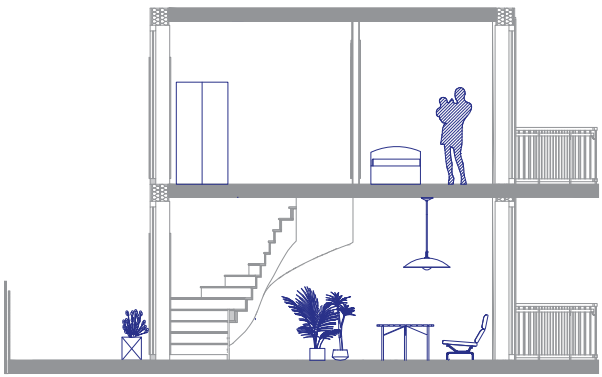
Dwelling type D 1:100

Dwelling Typologies

Type D1 Single parents/ micro apartments





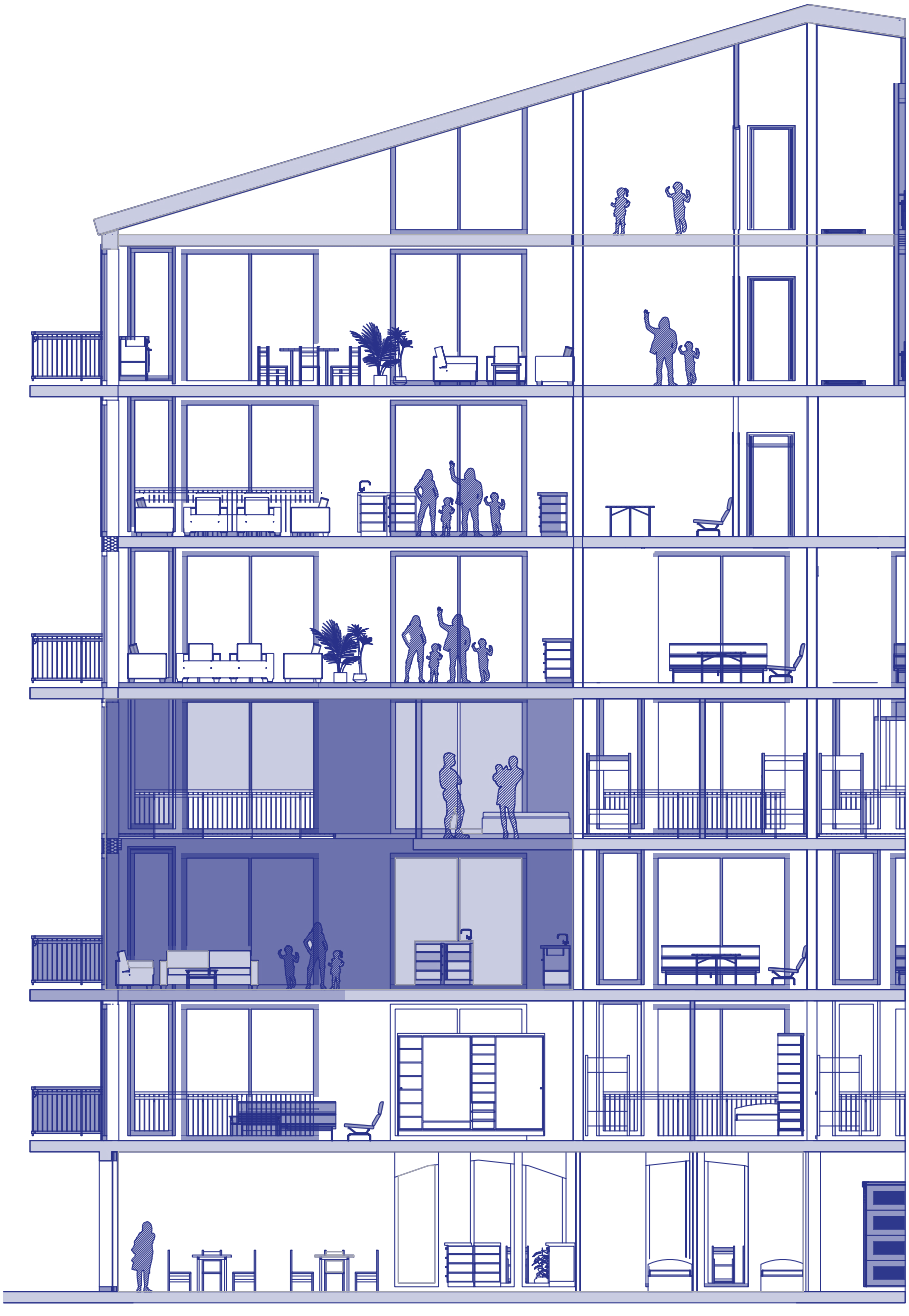


This maisonette is 57 m2 and is meant for single parents with aprox. 1 child. These micro apartments are suitable for low-income parents that are still want to live in a communal complex to share resources.

Dwelling type D1 1:100

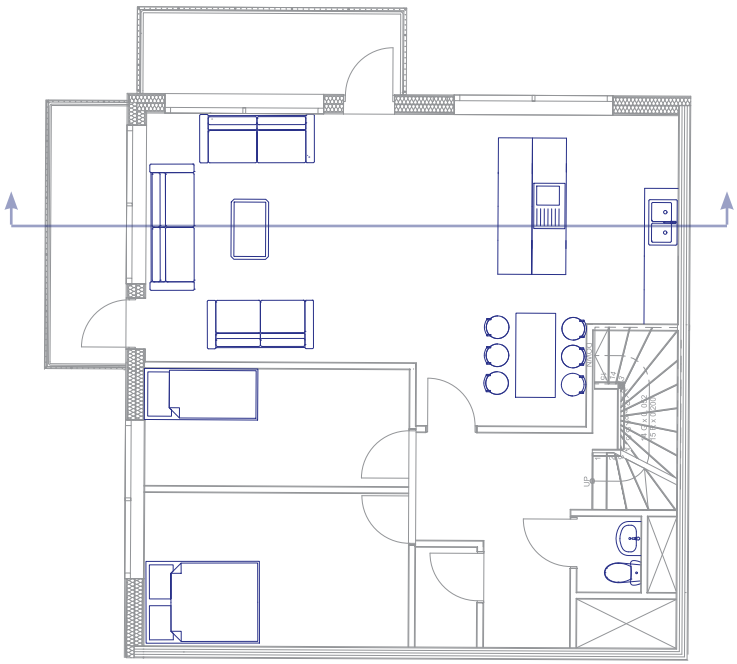
Dwelling Typologies

Communal Living: Type F

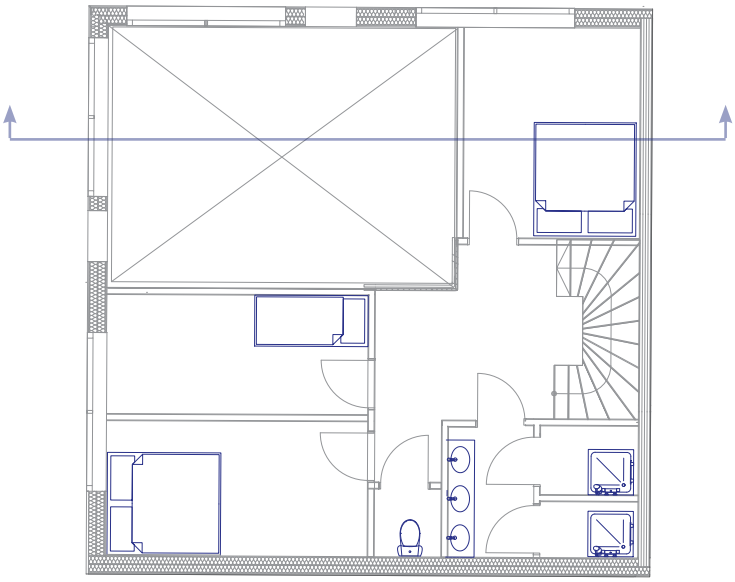


Dwelling Typologies

Communal Living: Type F



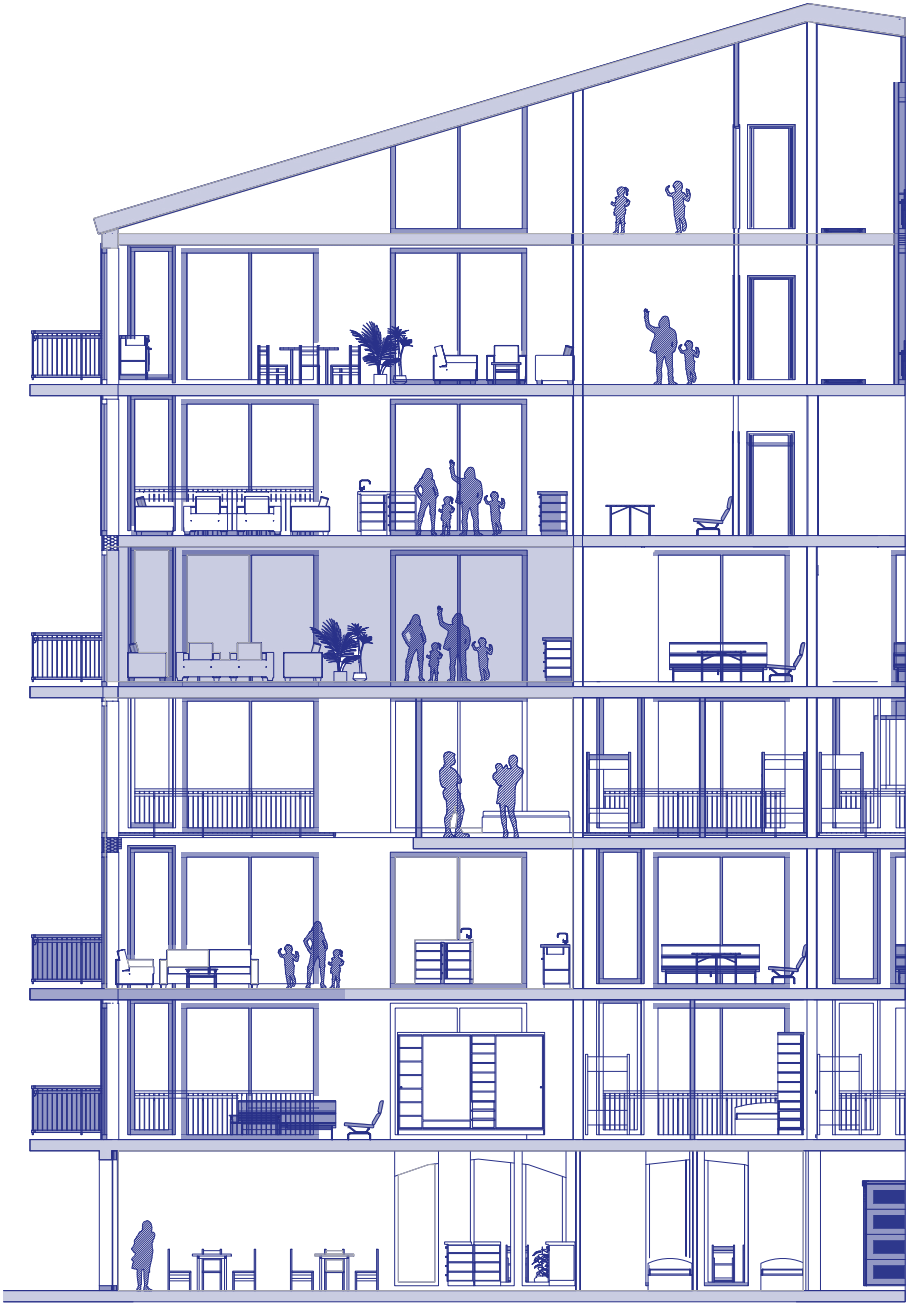
Dwelling type F 1:100



This communal dwelling unit is 185 m2 and consists of 5 bedrooms. This dwelling is meant for patchwork families or single residents that want to live with like-minded people. A large vide gives extra quality of space to the dwelling and has a nice view from the balconies.

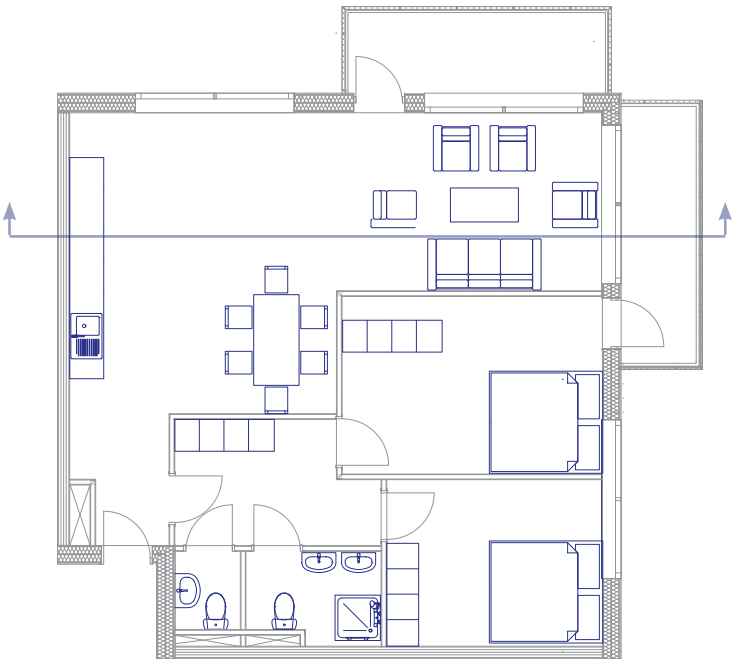
Dwelling Typologies

Communal Living: Type G

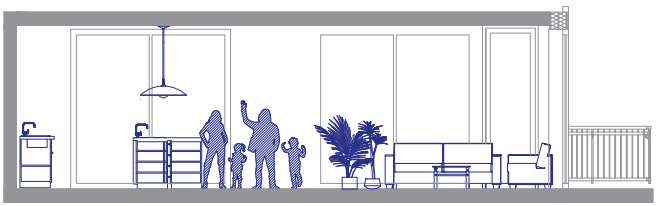


Dwelling Typologies

Communal Living: Type G



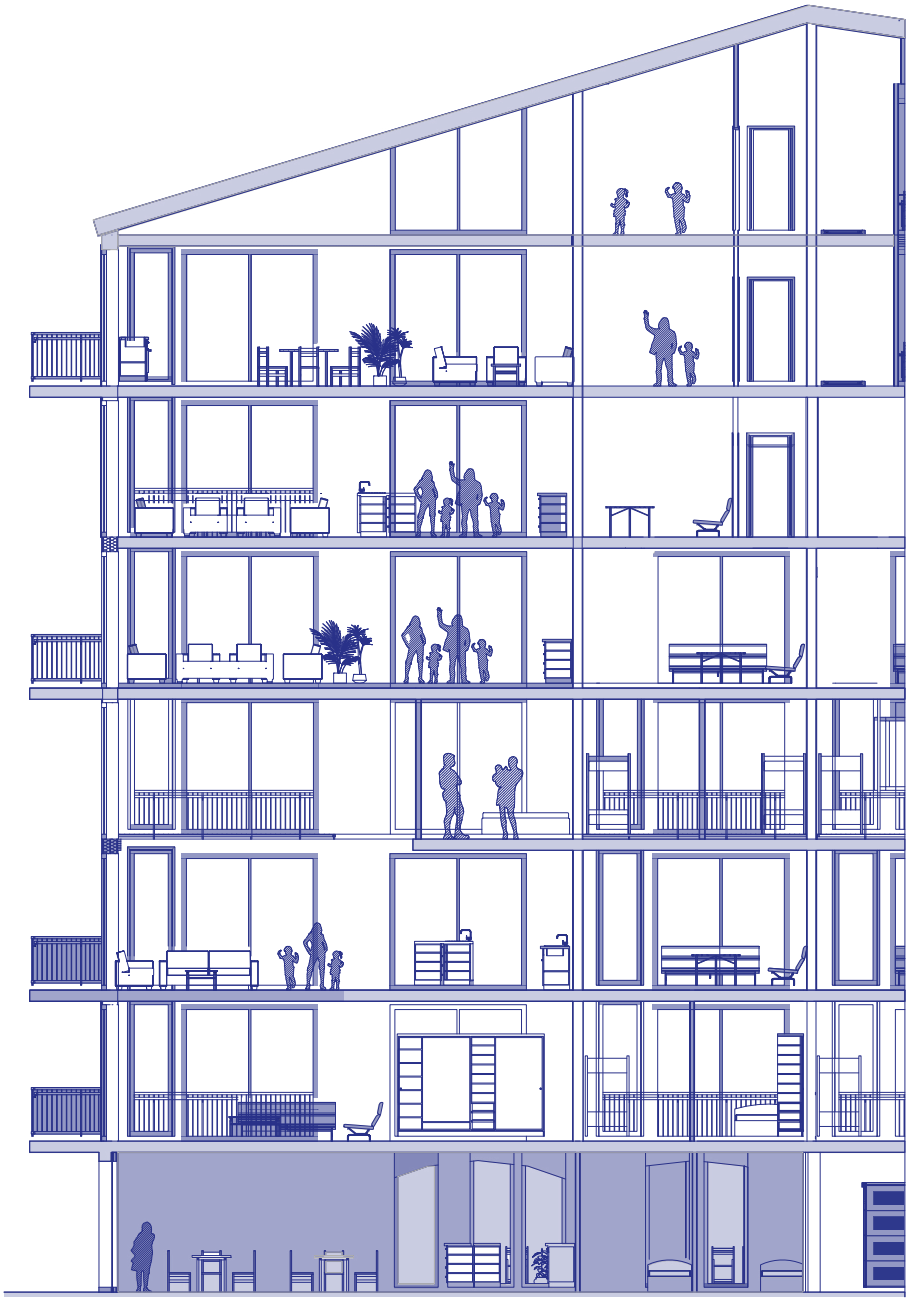
Dwelling type G 1:100



This communal unit is 92 m2 and is meant for patchwork families. The dwelling gives the opportunity to create more bedrooms and is flexbily rearrangable.

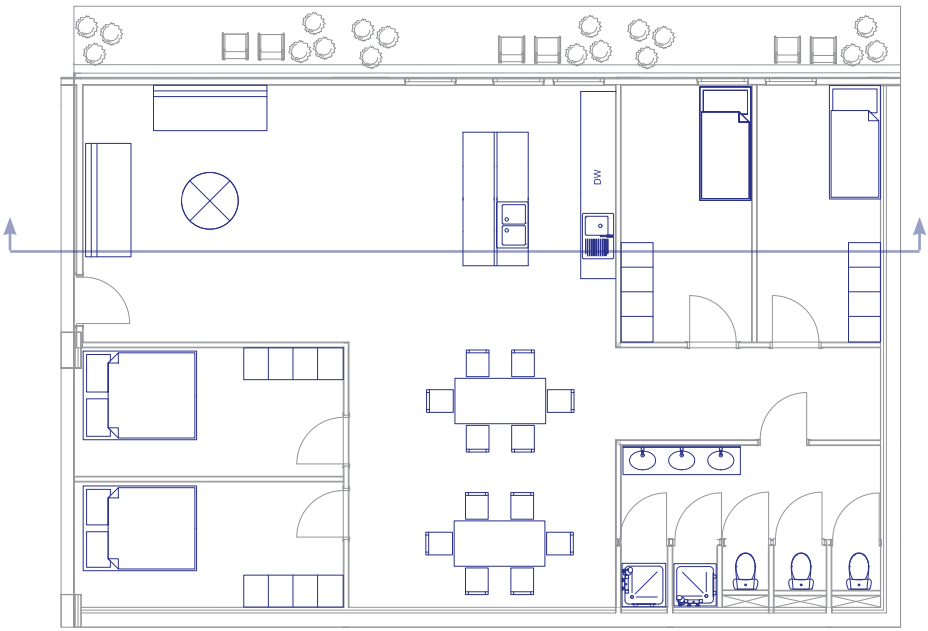
Dwelling Typologies

Communal Living: Type H

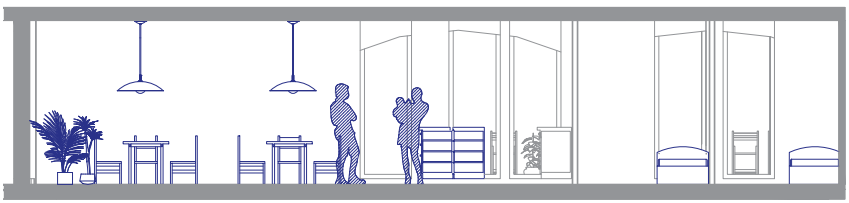


Dwelling Typologies

Communal Living: Type H



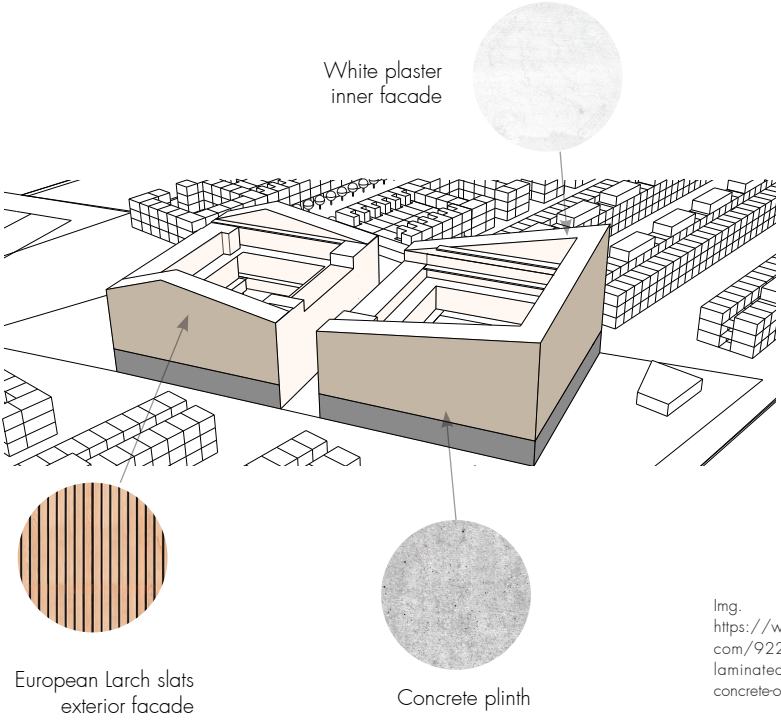
Dwelling type H 1:100



This third communal living type is 138 m2 and meant for single residents that want to share a household. Sharing living area and kitchen is the main aspect, next to having a private bedroom.

Materialisation

Facade Design

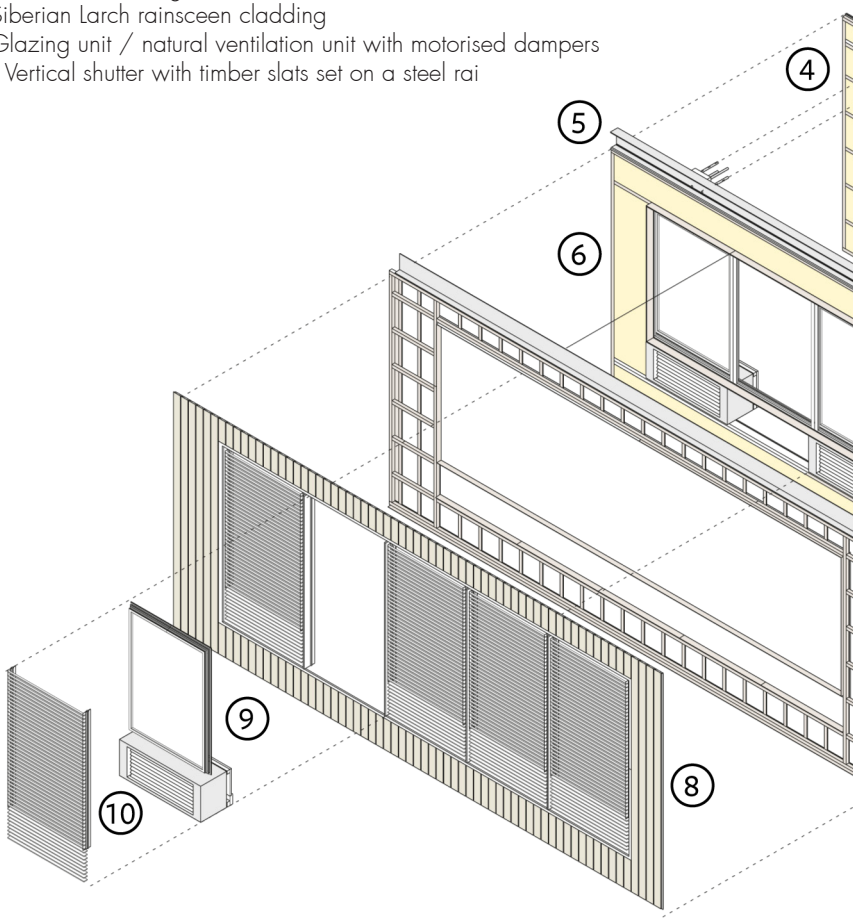


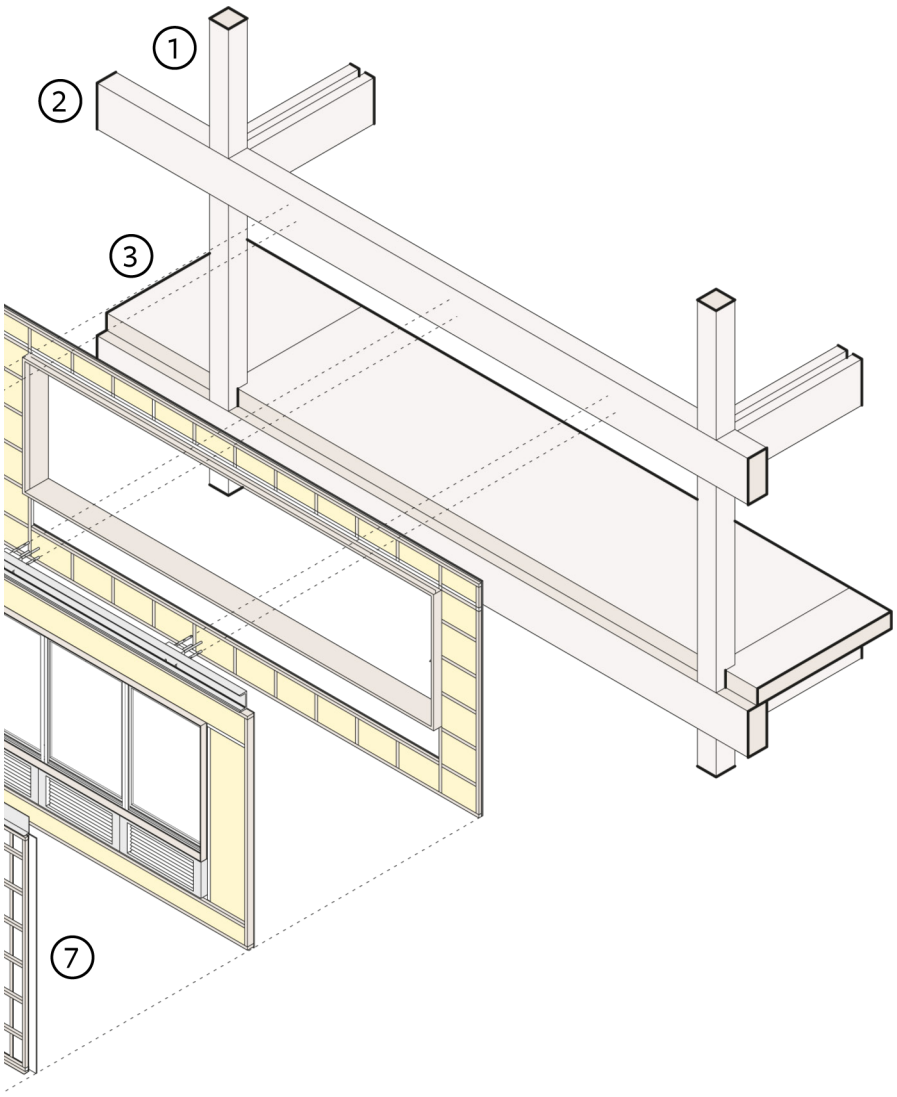
Img.
https://www.archdaily.com/922980/is-cross-laminated-timber-clt-the-concrete-of-the-future

Materialisation

Facade Design

1. GluLam column 300x300mm
2. GluLam beam 300x640mm
3. Cross-laminated floor panel
4. Accoustic insulation set in timber stud frame
5. Steel section tied back to timber structure
6. Thermal insulation set in timber stud frame and timber window frame
7. Rainscreen backing with timber studs, aluminium sill
8. Siberian Larch rainsceen cladding
9. Glazing unit / natural ventilation unit with motorised dampers
10. Vertical shutter with timber slats set on a steel rai




1
2
3
7

Future Vision

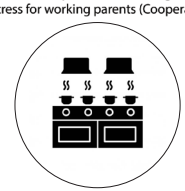
Sustainability

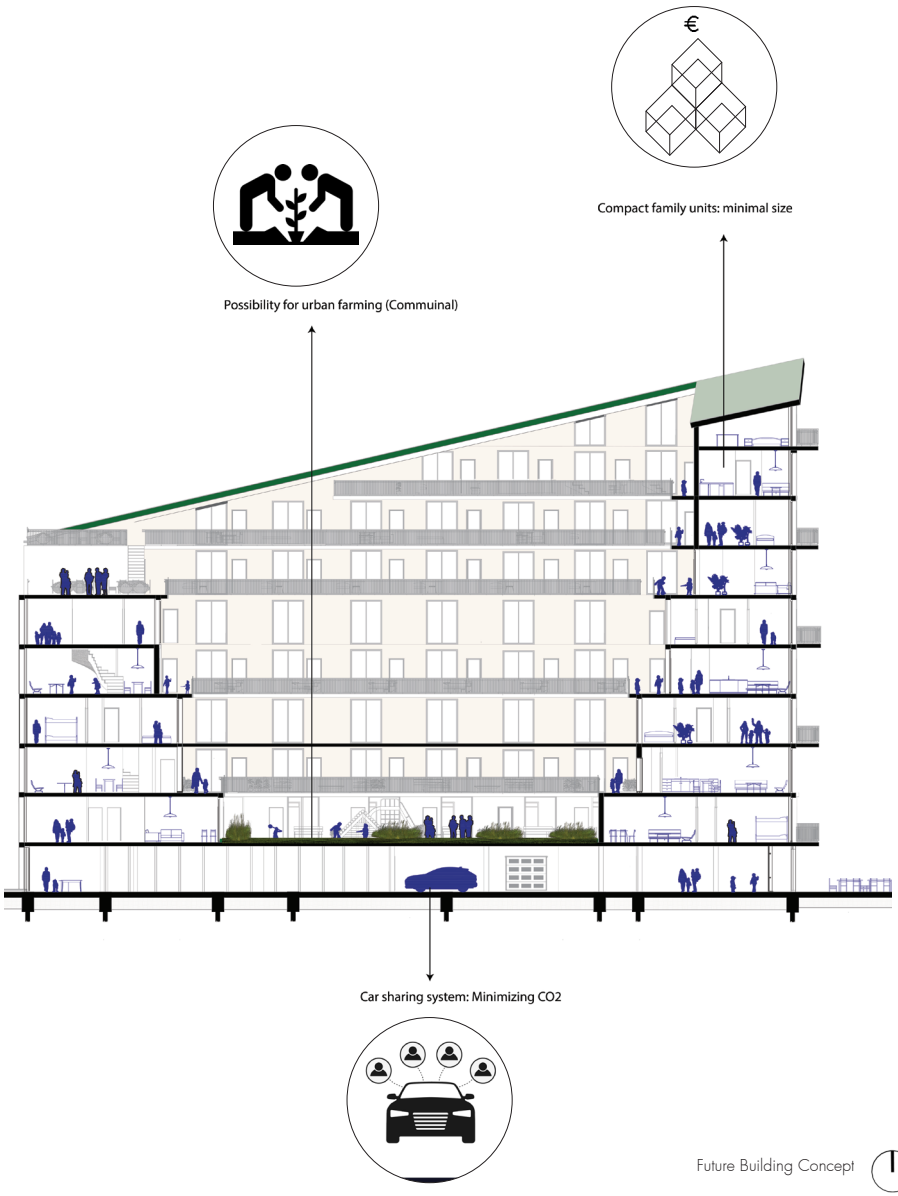
Sustainable facade materials: European Larch (Hardwood)

Green roof for water capturing

CLT Timber construction

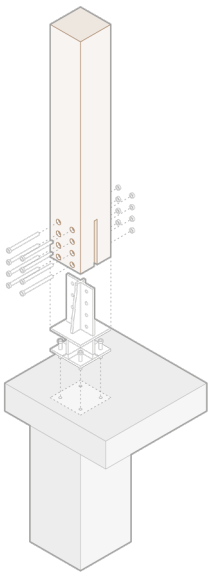
Communal spaces: food-sharing & reducing stress for working parents (Cooperation)

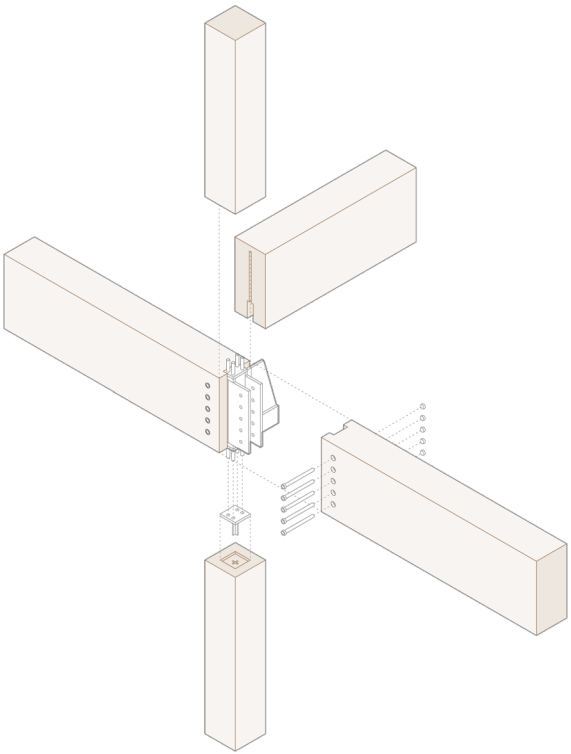



€
Compact family units: minimal size
Possibility for urban farming (Commuinal)
Car sharing system: Minimizing CO2

Design for Disassembly

Sustainability



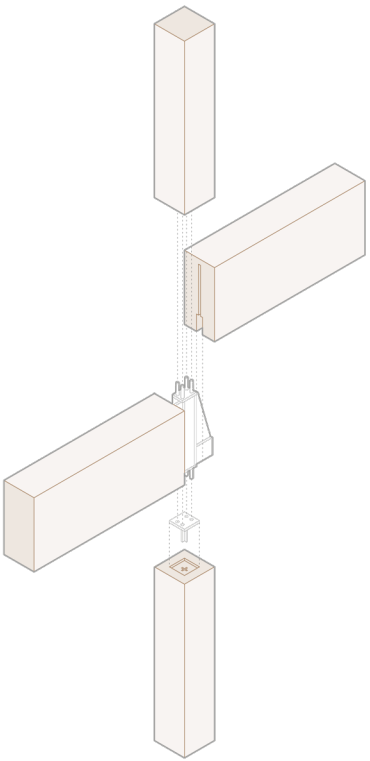


Plinth Connector

Base connection of the timber column down to the concrete structure

Perimeter Connector

Edge connection back to primary perimeter beam



Typical Connector

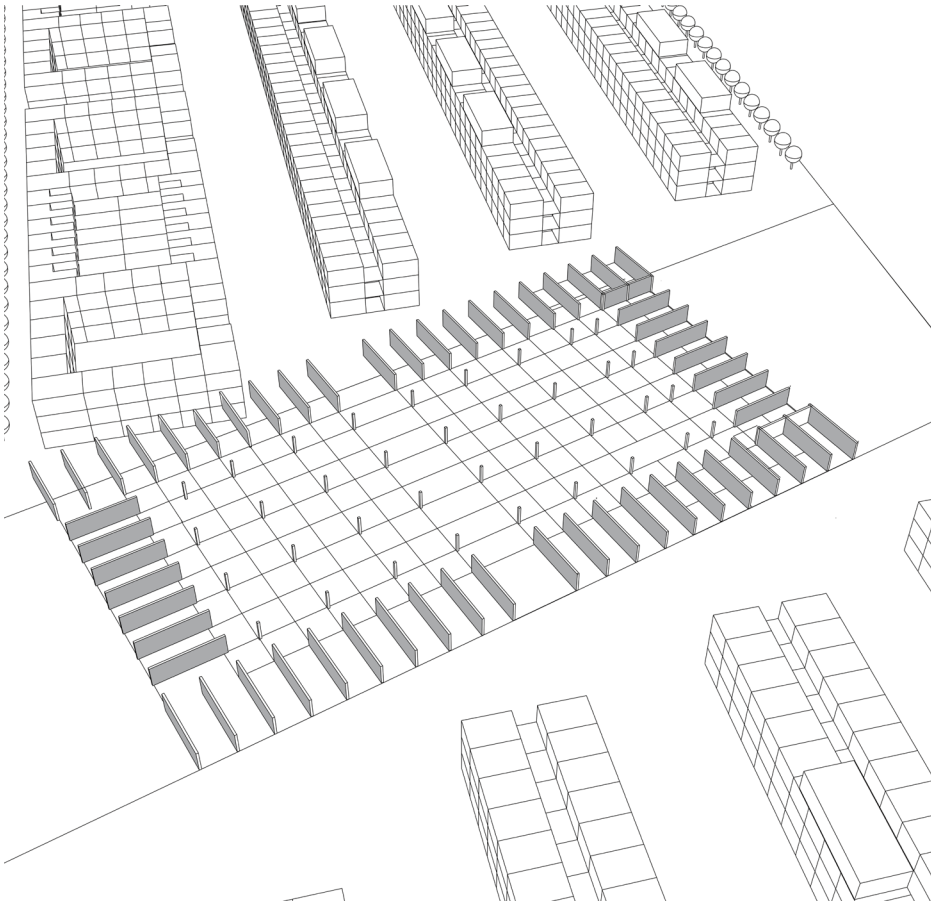
Typical structural connection in the middle of the floorplate.

CLT connections:

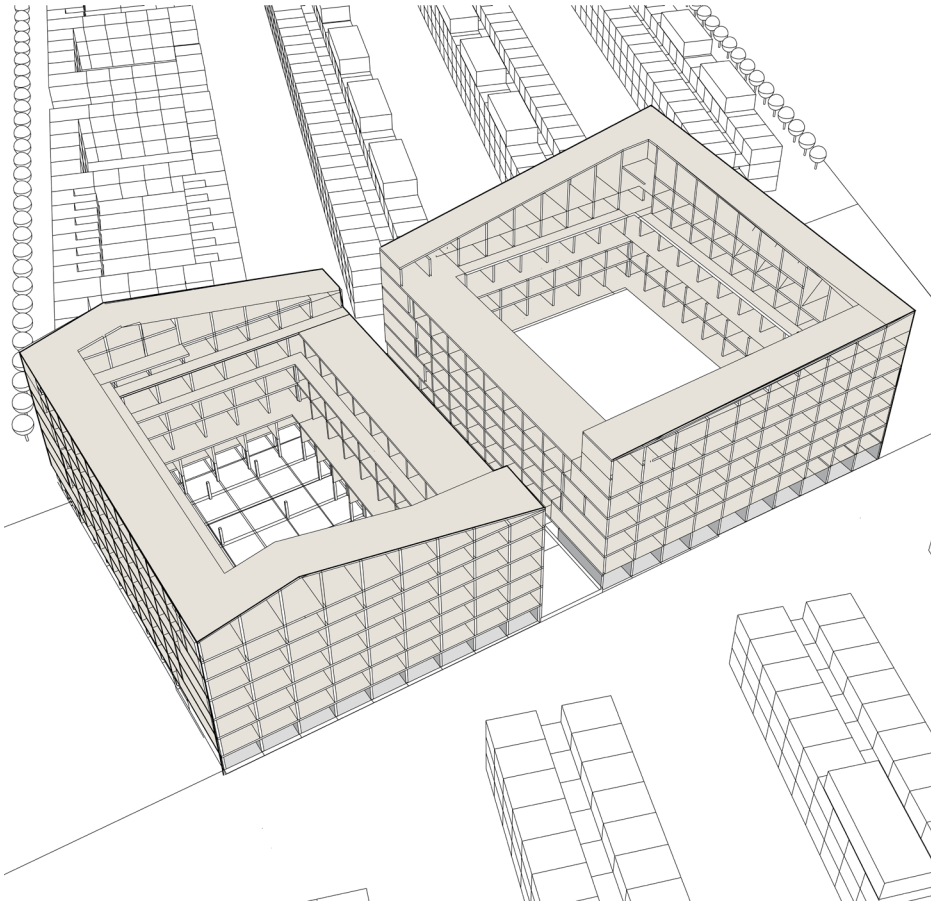
The CLT slabs and columns are forming a combination of a stable construction typology that has particular connections where 4 beams are coming together. The floor- and wall slabs are placed in between. This will give more flexibility and reinforcement to the construction.

Design for Disassembly

Construction Process



Concrete base walls placed on foundation forms the basis for the CLT concrete construction placed on top.

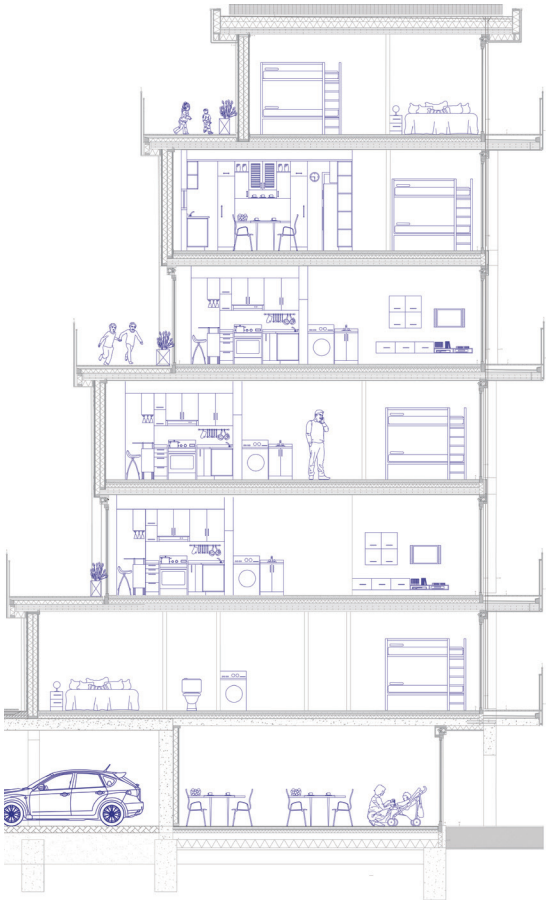


CLT upper base slabs combined with wooden columsn 300 x 300 mm placed on the concrete base foundation.

Design for Disassembly

Section & Detail

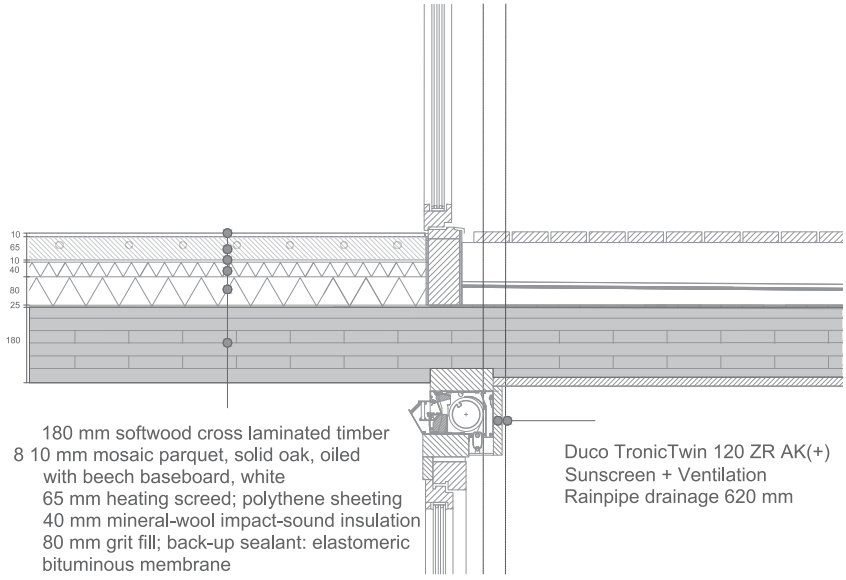
Section 1:50



Section 1:50

Design for Disassembly

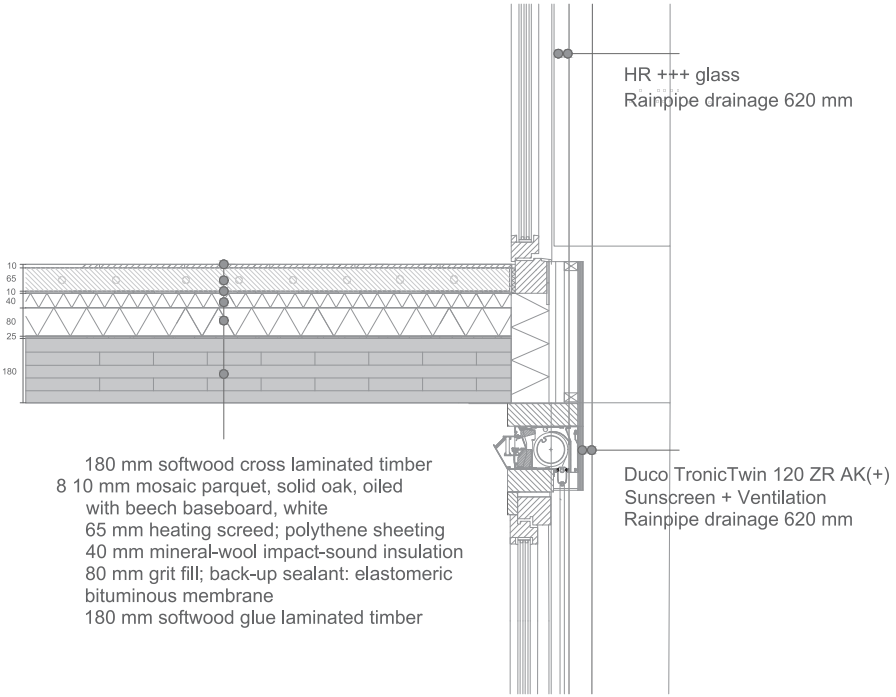
Section & Detail



180 mm softwood cross laminated timber
8 10 mm mosaic parquet, solid oak, oiled
with beech baseboard, white
65 mm heating screed; polythene sheeting
40 mm mineral-wool impact-sound insulation
80 mm grit fill; back-up sealant: elastomeric
bituminous membrane

Duco TronicTwin 120 ZR AK(+)
Sunscreen + Ventilation
Rainpipe drainage 620 mm

Detail 1 1:5

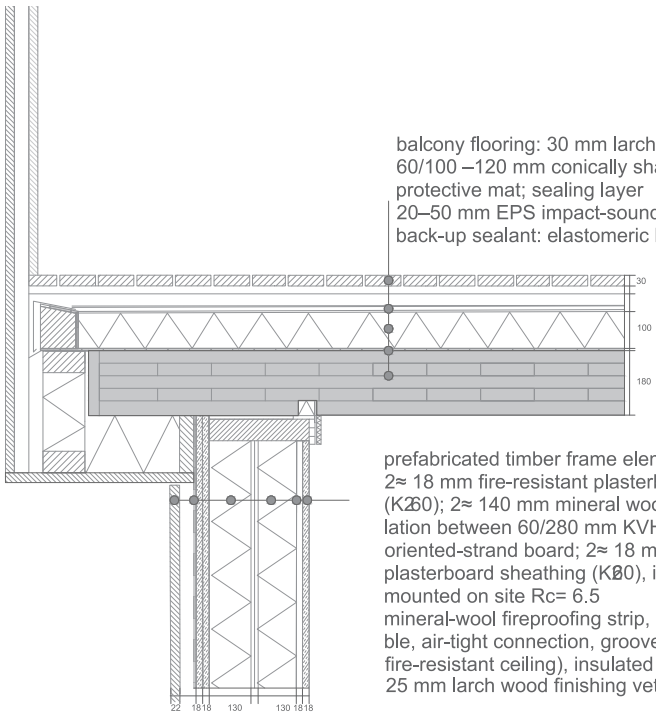

HR +++ glass
Rainpipe drainage 620 mm
10
65
10
40
80
25
180
180 mm softwood cross laminated timber
8 10 mm mosaic parquet, solid oak, oiled
with beech baseboard, white
65 mm heating screed; polythene sheeting
40 mm mineral-wool impact-sound insulation
80 mm grit fill; back-up sealant: elastomeric
bituminous membrane
180 mm softwood glue laminated timber
Duco TronicTwin 120 ZR AK(+)
Sunscreen + Ventilation
Rainpipe drainage 620 mm

Detail 2 1:5

Design for Disassembly

Section & Detail

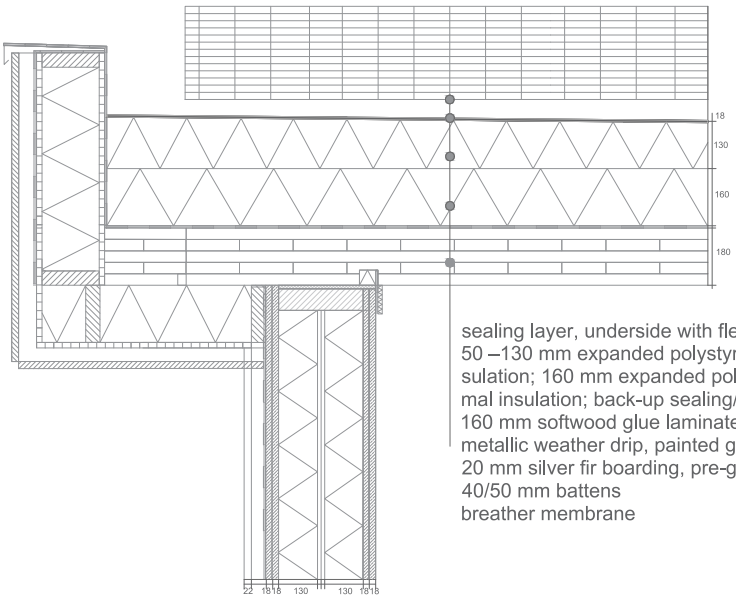
100



balcony flooring: 30 mm larch, treated
60/100 –120 mm conically shaped KVH
protective mat; sealing layer
20–50 mm EPS impact-sound insulation
back-up sealant: elastomeric bitum. membr.

prefabricated timber frame element:
2≈ 18 mm fire-resistant plasterboard sheathing (K260); 2≈ 140 mm mineral wool thermal insulation between 60/280 mm KVH posts; 15 mm oriented-strand board; 2≈ 18 mm fire-resistant plasterboard sheathing (K260), inner board mounted on site Rc= 6.5
mineral-wool fireproofing strip, non-combustible, air-tight connection, grooved (underside of fire-resistant ceiling), insulated
25 mm larch wood finishing vetical slats

Detail 3 1:5

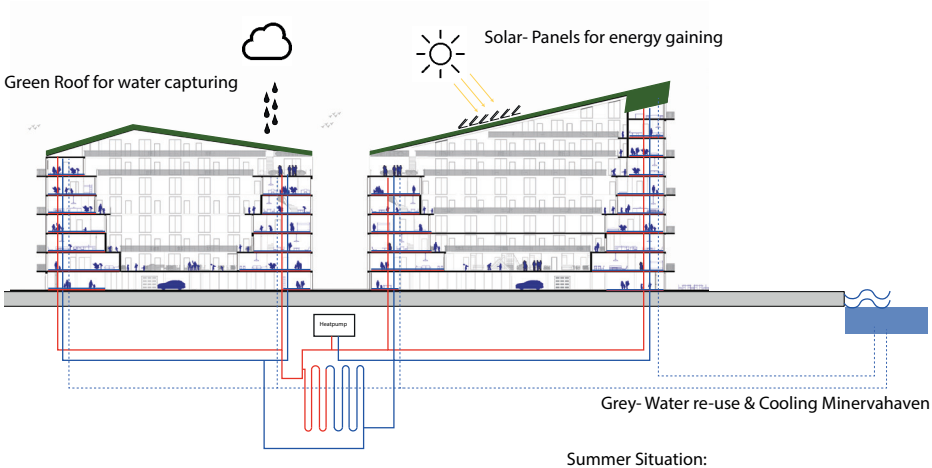


sealing layer, underside with fleece
50 –130 mm expanded polystyrene thermal insulation; 160 mm expanded polystyrene thermal insulation; back-up sealing/vapour barrier
160 mm softwood glue laminated timber
metallic weather drip, painted grey-black
20 mm silver fir boarding, pre-greyed
40/50 mm battens
breather membrane

Detail 4 1:5

Climate Design

Passive Systems



Groundsource heatpump:
Geothermal Heating/
Cooling system

Cooling

Heating

Summer Situation:

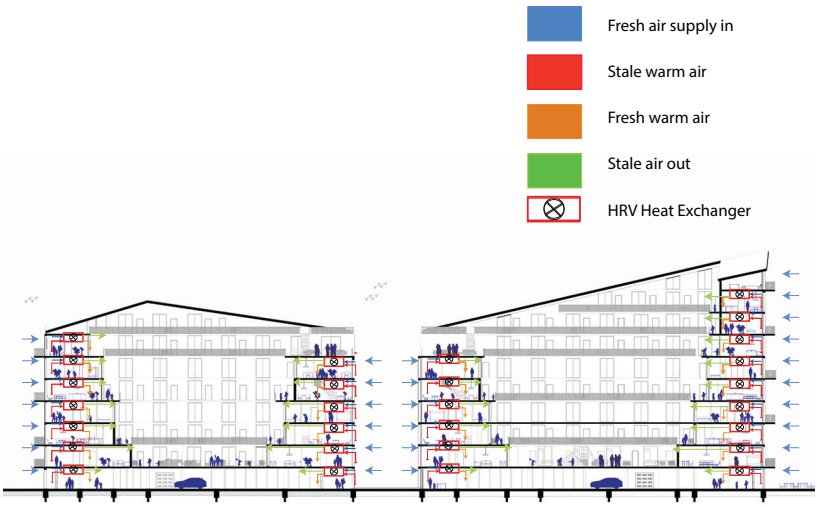
Heat is dispersed into the ground: Cold air circulates trough the building

Winter Situation:

Heat is dispersed from the ground: Warm air circulates trough the building

The system of groundsource heating and cooling uses temperature difference in summer and winter situation for heating and cooling in the ground. The ground source heat pump extracts ground heat in the winter (for heating) and transfers heat back into the ground in the summer (for cooling). This design takes advantage of the moderate temperatures in the ground to boost efficiency and reduce the operational costs of heating and cooling systems, and combined with solar heating it forms a geosolar system with even greater efficiency. In addition I use the water of the Minervahaven for extra cooling/ re-use of grey water for the building. A heat-recovery ventilator (HRV) is similar to a balanced ventilation system, except it uses the heat in the outgoing stale air to warm up the fresh air. A typical unit features two fans: one to take out household air and the other to bring in fresh air. I use this system in my building in order to control the air-flows and create an

Heating/Cooling system diagram

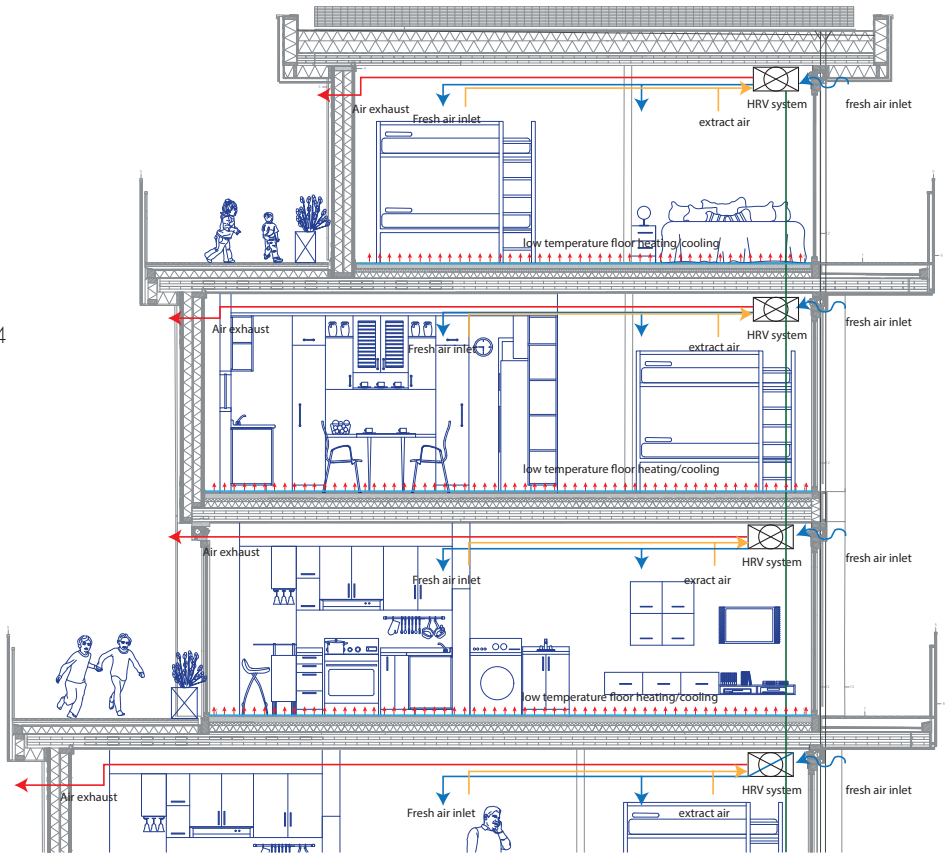


optimum indoor climate for the residents that supports the passive system of the ground source heatpump. The system is a controlled ventilation system that helps reduce high humidity, pollutants and odours by replacing stale air with fresh warm air. The exhaust air is not only stale and damp, but (providing there is existing heating in the home) warmer than the outdoor temperature. It is this warmth that is used to pre-heat fresh air as it enters your home. All Genuine HRVs have two fans and an in-built "Air to Air" Heat Exchanger, which transfers available heat from the exhaust air stream to the cold fresh air supply. By the natural laws of physics, whenever cold air is warmed, relative humidity is reduced, and condensation control is the result. The two air streams are 100% separated at all times. The outdoor air introduced helps create a dryer, healthy, indoor environment. A Genuine HRV can recover up to 5 times more energy than it costs to operate.

Ventilation system diagram

Climate Design

Passive Systems: HRV ventilation system



Section 1:50
Ventilation system HRV

Reflection

Design Process

Introduction Reflection Report

After finishing my Bachelor Studies at the faculty of Architecture and the Built Environment I have now arrived at the end of the Master program. The last project is called: **Better Together,** Future Living Standards for the New Middle Income Family in the Minervahaven of Amsterdam.

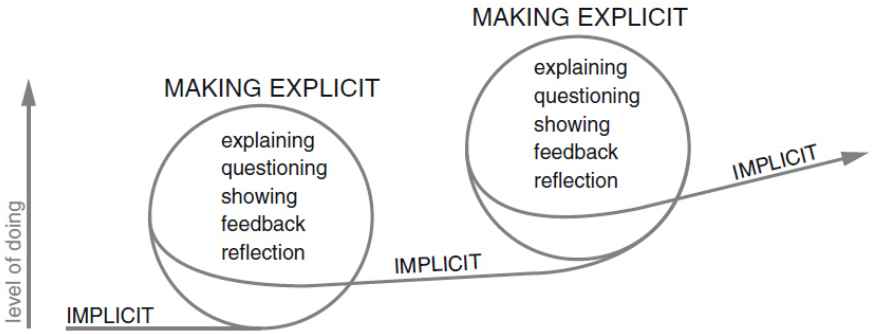
In this Graduation Studio, which is part of the Architecture Track: "Between Standard and Ideals" the central question is asked: **„How do we want to live in the future, and what kind of buildings do we need to make that possible?".**

We needed to choose a relevant topic and target group to tackle this question. The city of Amsterdam is changing and needs to find solutions for these new, future living conditions. Therefore we had to design a residential complex that focusses on these future demands.As a guiding theme, the topic 'Collective Housing Design' is chosen. Besides choosing this guiding theme, the target group plays an important role for the topic and vice versa.

In the first half year we had to write a research report, which includes findings of the research on the topic Collective Housing Design for the New Middle Income family in Amsterdam. Furthermore, several case-studies that address these topics have been analysed and a first design concept is included in this report.

This reflection report is the result of both MSC3 and MSC4 preliminary field research, literature - and experimental research for the Dutch Housing Graduation Studio in the Minervahaven of Amsterdam. The strategies used in the documentation of these research examples will be explained and taken into further account.

Important hereby is the methodology used for these different types of research strategies. Field research requires for example a different approach than a literature or-design research. Therefore I will focus first on the half year of the design project: the Research Phase followed up by the Design Phase.



Making Explicit in the Design Process: Elise van Dooren (2014)

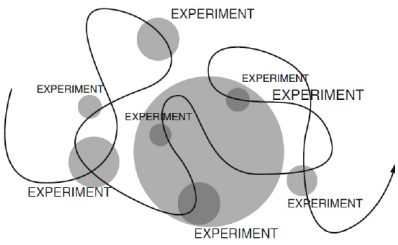


Fig. 3 Designing is experimenting: a process of exploring and deciding, of trial-and-error

Experimentation in the Design Process: Elise van Dooren (2014)

The 'Möbius -Ring'. Groeneveld (2006)

Index

Preface

This reflection paper is written in order to provide insight in the design process and research methods that have been used during the graduation studio. It is important to understand which specific research methods lead to certain design decisions.
During the research and design phase I used practical methods like sketching and modelling, but also theoretical methods: typological and praxeology for example. Both methods gain data which can be processed into physical design solutions. In the P1-P2 phase we used the principle: „Typology Transfer" at the kick-start phase. This has been a very important term throughout my whole design process. Researching and experimenting with different typologies, both on an urban and building scale, provided me a lot of knowledge on how to use different forms, construction techniques and facade expressions.

The most important goals I have as an architect are to understand the definition of "space", to know how to translate different typologies and to explore new possibilities. Additionally, the field of Praxeology, as described in the lecture series on Research Methods, is just as important.
Praxeology is research method founded in the social sciences. It helped me find out how people live in their newly build environment and how design decisions result in certain ways of using space.
Between these two methodologies we can find the underlying contrast between intuition and ratio. Certain decisions made during the design process are intuitive, but studying at a technical university, the scientific use of methodologies and therefore a certain rationalisation helps to balance the design process. Therefore, the overall structure of this reflection report will be tested trough the relation between rational and intuitive thinking.
In practicing architecture, designers face a number of problems that they have to solve during the design process. In contrast to other sciences, there are no laws or formulas that can be applied and give immediate solutions to the problem. Van Dooren (2013) defines designing as:

"A complex, personal, creative and open-ended skill" (van Dooren, 2013)

The design process should be made explicit and is a process of learning by doing (van Dooren, 2013).
More specifically, designing is the combination of intuition, knowledge, experience and research (Van Dooren, 2013).

Chapter 1: Intuitive vs. Rational Thinking

In architecture, design and methodological research are strongly interwoven. Stephen Kieran describes in his journal of JAE (Journal of Architectural Education) the relationship between design- and research as essentially divergent, but complementary:

"Research brings design to our art... to move the art of architecture forward, however, we need to supplement intuition with science" (Groat. L. Wang, 2013, p. 21).

The difficulty for the designer is to find a balance between these two fields. New solutions and problems can be explored trough research and can be implemented in the design process. Designers hereby tend to employ 'generative reasoning'. Herbert Simon describes the designers device as: **"Courses of action aimed at changing existing situations into preferred ones"** (Groat. L. Wang, 2013).

Just as design **"Can alternatively be understood as both a rational problem-solving technique or intuitive aesthetic act",** research can be embodied in **"Multiple modes of inquiry''** (Groat. L. Wang, 2013).

Therefore, research and design are strongly interwoven and can almost not seen apart from each other. For many bachelor and master students studying in the field of architecture, it is important to get aware of this process of research and design and how to implement this in the design process by doing analytic research and study the history and context of specific topics.

Architectural research has been conducted throughout the history of architecture, describing the development of particular structural forms or building materials over the centuries that are a result of trial- and error experimentation, systematic observation and nowadays also sociobehavioral issues, design methods and energy conservations (Groat. L. Wang, 2013, p. 6) The main goal is to gain and provide a certain "body of knowledge", which can provide insight in several design problems and understand the tools behind the design process (Horvath, 2007). By using different types of research methodologies provides a stronger framework to reinforce arguments in a more authoritarian and accurate way (Lucas, 2016).

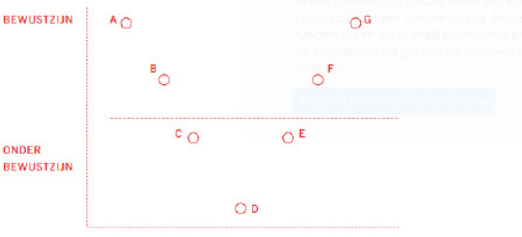
Qualitative research plays hereby a role, especially in the field of architecture, within the humanities based study of architecture (Lucas, 2016).

This process is an ongoing dialogue between ratio and intuition. Robin Groeneveld divides the process of intuitive thinking into 5 different phases (Groeneveld, 2006):

1. Formation of the design intuition
2. The dialogue
3. The integration
4. The realization
5 The development of the designer

These different phases can interfere witch each other or occur in a different order. For my reflection on my design process, I will use these five phases to describe the process from P0 until the P5 phase and in the end reflect upon my overall design process.

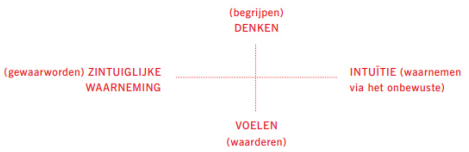
Figuur 3.1



A Inspiratie
B Openheid – bezig om gewoontedenkpatronen los te laten
C Contact met het onderbewuste – gewoontedenkpatronen min of meer losgelaten
D Intuïtieve moment – climax – synthetiserende moment
E Integratie tussen intuïtie en ratio (de intuïtieve rede)
F Reflecteren
G Concretiseren – het 'intuïtieve' product, dat kunnen concrete producten zijn, maar ook 'intuïtieve inzichten'.

Experimentation in the Design Process: Elise van Dooren (2014)

Figuur 3.2 De vier psychologische functies van Jung



Experimentation in the Design Process: Elise van Dooren (2014)

Chapter 2:

5 phases during design process by R. Groeneveld

R. Groeneveld formed a framework in order to describe intuition in the design process. The following five aspects will be described in depth below:

1. Formation of the design intuition.
The design process often starts with a ‚vague question' for which the designer has to come up with a tangible answer or solution. This is the first moment that intuition can be addressed and sensed in the design process. In this stage the designer has to develop a certain sensible relation with the design assignment and gain inspiration for the design process (Groeneveld, 2006).

2.The Dialogue
The designer must think about creative solutions that can end in a suitable product after being confronted with a 'vague' question. Therefore he/she has to continuously shift their way of thinking. Here the continuous interplay between ration and intuition takes place (Groeneveld, 2006). This results in a dialogue between these two fields of perspective that both have the same starting point, or intention but are mostly being expressed differently. Groeneveld however mentions that it is necessary to allow the intuition therefore in order to start the creative process (Groeneveld, 2006).

3. The Integration
The aim of the interplay between these two dimensions: the intuitive and the rational is to integrate several manifestations. This results in the fact that the designer needs to work towards finalization of the design process. This brings forth a dynamic design process, where both dimensions are alternatively active. At one point, both will integrate with each other, what Groeneveld calls: ‚the Intuitive moment'. At this moment, the intuition ensures that everything fits together precisely. As a result, the designer knows which direction he/she has to take in order to continue the design process. When this balance is achieved, the designer is able to come in contact with his or her intuitive source. Groeneveld mentions that in these moments the designer can feel a sense of unity (Groeneveld, 2006).

4. The realization
After the phase of integration, the designer has to convert the knowledge into practise in order to be able to realize the product. This is being perceived as the most difficult aspect of the design process. It is difficult to put in words what has been experienced during intuitive moment(s).
This is caused by the fact that the intuitive moment was caught in a certain time-frame

and is mostly active during this time. Secondly, because of the fact that the intuitive dimension is usually expressed in abstract images and forms instead of words. For this reason, designers use often the method of sketching, in order to convert these images into language (Groeneveld, 2006).

5. The development of the designer

The art of designing lies in the ability of the designer to control his or her intuitive moment during the design process. The more the designer is able to complete the process of realization , the more he or she will be able to improve and create the intuitive moment during the design process. Important is the reflection of the designer's development during the design process which is similar to intuition. This is because the result of intuition can only be used if the contents of its are incorporated and integrated into existing knowledge (Groeneveld, 2006).

In order to reflect upon the design process trough out this academic year, these five aspects of Groeneveld help categorise the dimensions of rational vs. intuitive thinking. This reflection will be done by describing the project by the different presentations, P0, P1, P2 and P3& P4. In addition I will discuss the title: 'Master of Science' and which research methodologies are important for the faculty of Architecture and The Built Environment.

P0.

The design process started with a ‚Vague question' from where each student had to come up with a tangible product: An Urban Masterplan, designed in a group of 4 students. The location of this design question is situated in the Western Harbour of Amsterdam: the Minervahaven, close to the central station and the well known Houthavens. At this point the very first stage of the intuition formation appeared: ‚Formation of the design intuition'. During the site visit I tried to gain inspiration and tried to emphasize with the design assignment.

Site research/ Site Visist

At the site visit everyone wandered around the area trying to mentally and physically map the environment. Every student was asked to create a pars-pro toto from their first impression of the site. This could be a photo or a sketch/ collage or any other form.

The image of the pars-pro toto is based on the industrial character of the environment and the absence of any natural elements like trees or a park. Therefore I tried to map certain ‚gravity' points of the area and I drew the main ‚feeling' of the area: the waterfront with boats and the grass alongside the quay (see figure..).

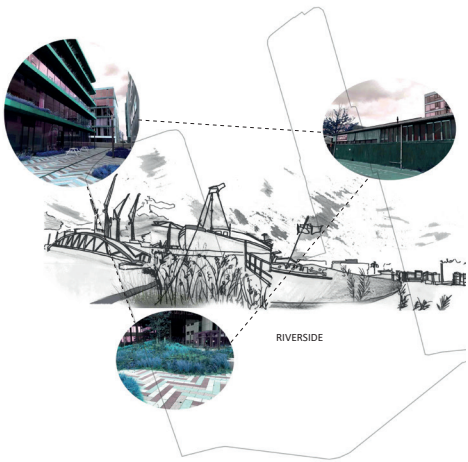
At this point there was no research done yet but certain aspects of the area became visible. There was a strong presence of wind and a lot of buildings were still under construction. This made the area feel like a sort of building site which wasn't finished at all. Also the lack of housing made it clear that there weren't a lot of people present at night time.

Historical Background

While still being confronted with this ‚Vague Question' at the beginning, the gain for inspiration continued. In the next phase I did literature research and research the area through the investigation of old maps of the area. The formation and development of the harbour area became visible in this way.

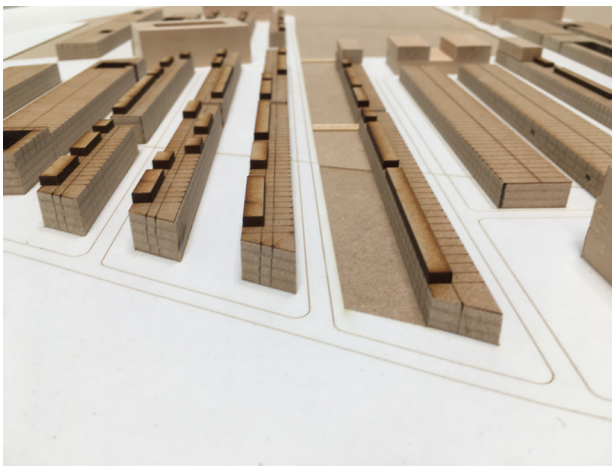
Plan Analysis

Besides the literature research we also had to implement an existing urban plan as typology transfer on our site: the Minerva-haven. We used the urban plan of Borneo Sporenburg by West8 architects to research and then implement on our site. This urban plan is characterized as a low-rise high-density area and consists of mainly row houses, alternated with large building blocks (icons).



Different design phases (p0-p5)

Different design phases (p0-p5)



Different design phases (p0-p5)

Chapter 2:

P0 Phase

Sketches/Model Making

As a group of 4 we had to come up with creative solutions for the design of the Urban Masterplan. The difficulty lied in the fact that the Masterplan of Borneo had a very fixed structure in terms of placement of the blocks/row houses. Therefore it was hard to find new creative solutions. We first tended to copy elements of the current superimpose in the new design. Luckily we were able to use our intuition to come up with new ideas. According to Groeneveld we were able at this stage to "Shift our way of thinking" which results in the second aspect that is described as: the dialogue is achieved. This resulted in the fact that a continuous interplay between intuition and ratio took place. This process was based on the previous site visit, the literature and the precedent research.

The interplay of both the intuitive and the rational had both the aim of the Integration of the several manifestations. This resulted in the fact that the intuitive moment took place while making several sketches and models that gave us a lot of inspiration during the process.

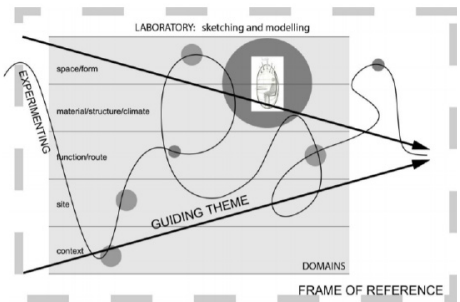
Sketches made sure that the information/ knowledge of each group member could be turned into practise. This was necessary in communicating their insights to the rest of the group and for integrating them into one product, the Urban Masterplan or what Groeneveld calls: "the Realization". Van Dooren calls this also designing with a certain Framework. The design process has it's own laboratory. Visual aspects such as sketching and modelling that are part of a certain ‚visual language', make sure that the physical counterpart of the mental process can be used as an extended tool and also being used for reflection. Experimenting is according to Schön: **"A process of questioning or in Schön's words (1985) a 'reflective dialogue' and 'conversation with the situation'** (Schön, 1985, p. 49). The designer is exploring and testing in experiments or moves with questions like: What if I do this?, What do I have to do to achieve this?, What is happening here?, Do I like this?, Does it fit in with what I want to achieve?, Which criteria are important in this situation? (Van Dooren, 2013, p. 60). Just as Groeneveld addresses, this results in a continuous interplay between ratio and intuition that in the end have to result in a suitable end-product.

"Lawson (2006) ascertains that being creative is not a matter of being novel and different. It is a matter of generating and testing alternatives, of transforming ideas, of using parallel lines of thought, and of accepting 'incomplete and possibly conflicting ideas coexisting, without attempting to resolve them too early in the process" (Van Dooren, 2013, p. 54). To be able to keep on going with this process of the dialogue between rational and intuitive ideas I used the sketching tool a lot during the overall process of my design. The most important aspect of sketching is letting go of all restrictions such as measurements or other rules' so a moment of release gives space for creative thoughts.

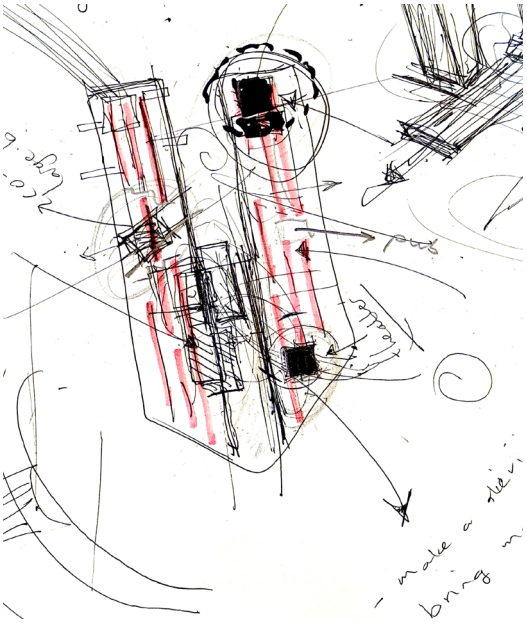
Model making was also a tool I used a lot during the design process. By modelling the project in different scales and materials a different way of reflecting is possible and makes sure the project can be seen from different perspectives/angles. Feeling for scale makes sure I could empathize myself with my own design in a better way. During the group phase we used the physical model immediately from the first week on.

We noticed it was easier to communicate ideas and made sure that everyone could show their ideas and make them understandable for the others. In the end the model making was ideal to communicate our ideas for the rest of the graduation group. Hereby the presentation of the group model and the first phase of the design was successfully done.

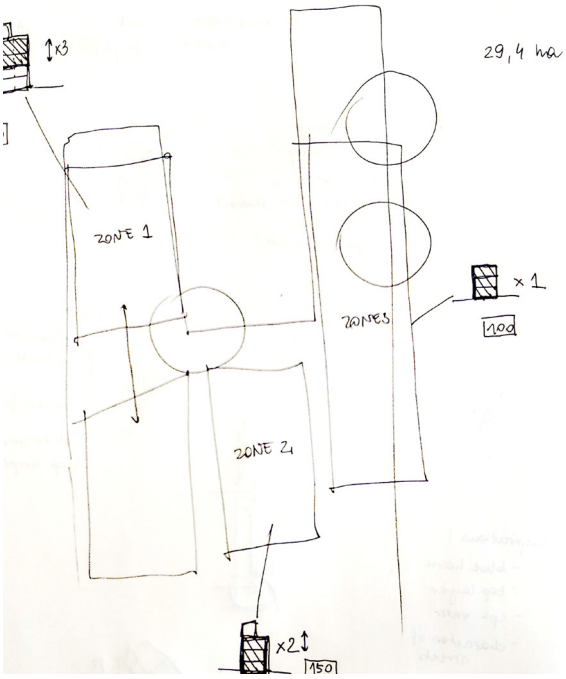
Aspect 5: the development of the designer defines according to Groeneveld the skills of using the intuitive moment more often in the design process. Therefore it is necessary to reflect on this process in order to learn from it. I think this reflection on the masterplan phase took place during the P1-P2 phase with me when starting formulating my own personal design visions about the project.



Different design phases (p0-p5)



Sketch of Masterplan (own illustration)



Sketch of Masterplan (own illustration)

Chapter 2:

P1 Phase

For this phase, aspect **1: ‚Formation of the design intuition' comes forward. We as students are being confronted with a vague question and we need to empathize with the design assignment and in the end come up with a suitable problem statement.**

Literature research

Problem Statement
For the p1 we were obliged to formulate our own goal for the research and design project which urgency had to be demonstrated and proven by ourselves. This made sure I had to think from different perspectives. I noticed that I constantly shifted from inspiration to rational (factual) thoughts in order to guide my intuitive or inspiration in a logical way. The research helped hereby to look into different fields of perspective. Although it was hard to do this process systematically, I think it helped a lot to talk to other people, read a lot of articles and books. In the end I was able to connect both my fascinations for a specific target group: Modern Families and the main graduation topic: Collective Living. The intuitive and rational dimensions shifted continuously between each other. Therefore aspect 2. The Diaglogue took place.

Within the rational aspect I was inspired by all the books and articles that I have read and within the intuitive aspects I was inspired by my own experiences in growing up in a large family and how this affected our living environment. Additionally, the society is changing into a more and more sustainable one: we need to think about the concept of space and how we can share resources. Therefore we are all confronted with collectivity in a way.

Aspect 3: the integration, shows the moment where both dimensions of aspect one and two merge together. When I started to know my direction, it became easier and easier to integrate both fields: intuition and ratio. At the presentation of P1 I didn't completely succeed in integrating both fields into one clear problem statement yet, but this all evolved and developed during the P2 Phase. My problem statement at this stage was formulated as:

"How can problems such as loneliness and lack of suitable housing for middle income families be solved trough designing for communities?"

Defining the problem statement formed the basis for my drawings of the P1 presentation. These drawings mainly consisted out of sketches, used for aspect 4. Realization. After the P1 was positively assessed, I further continued to refine my problem statement and research questions. This resulted in moments of reflection, where I tried to identify with my own development as a designer: aspect 5. The Developement of the designer (Groeneveld, 2006).

Building 3D section (own illustration)

Manifesto P2 (own illustration)

Chapter 2:

P2 Phase

P2

The phase of the problem statement at P1 is followed by a new design assignment: the conceptual design. Therefore I had to empathize again with the design process: a conceptual design assignment. The research and information library that I gained formed a solid basis for inspiration. Aspect 1: „Formation of the design intuition". (Groenveld, 2006).

Literature research:

„Better together": communal living forms for the new urban middle income family required research towards future/ new living standards. Because less space and resources will be available in the future, I tried to conduct research on finding solutions in reducing living space and therefore provide communal facilities in the building. Communal living means also using a different market policy. My building is set up as a Cooperative. My biggest inspiration for this matter is the Kalkbreite Genossenschaft in Zurich. This concept is part of the book: **„Together: The New Architecture of the Collective"** and focusses on communal living projects where every resident needs to buy a ‚stock' in order to live there. If the person moves again, he will receive back his investment and moves on. The building also gives space for commercial activities that gain money for the building. This way, a more efficient way of living is achieved.

My target group is consisting of new middle income families that want to live in high urban living conditions, but couldn't find affordable and suitable housing and were forced to leave the city of Amsterdam. These families are consisting of single parents with children, patchwork families (2 parents with children from previous marriages) and nuclear families variating with one to three/ four children.

Plan analysis and Research Seminar

After choosing and defining our target group more precisely, the course Research Seminar as part of the Graduation Studio was held. The aim of this course was to gain experience in doing research on several projects and present them likewise. In a group of four to five students, a chosen housing project had to be analysed on four different scale levels:

Urban Community, Pedestrian Precinct, Cluster and Dwelling.

This strong division helped me a lot to structure the research and analysis and helped me come up with new creative ideas and solutions. At this point the two dimensions of rational and intuitive were shifting according to phase 2: The Dialogue.

Next to this we had to analyse four other reference projects that we had to choose ourselves. This way I choose four projects that were all focussing on my target group: urban families, or communal living. The projects I analysed were: Spreefeld in Berlin, The Zollhaus in Zurich (both collective building projects), Babel in Rotterdam and Justus van Effen complex also in Rotterdam. These last projects were mainly focussed on family housing. In order to analyse these projects optimally and compare them with each other it was important to choose specific topics to analyse according to my design questions. One example was the organisation of collective vs. private dwelling units in the building.

All of these reference projects were on first hand chosen by the fact that they represent collective living for families (rationally), but I also chose these projects by my own preference: intuition. My own preferences are based on my own experiences and taste. This emphasizes the shift between the two aspects within aspect 2.

Kickstart + Documentation

At the kickstart phase, the four reference projects that we have chosen have been analysed for the second time according to the four scales of the Research Seminars. Thereafter two of the reference projects were chosen to superimpose on our Masterplan. The goal of the kick-start was to make a first attempt of a design by ‚intuitively' place typologies on the site, while taking sizes and scale into account. Aspect 3. Integration and aspect 4. Realization had to occur quickly, because the kick-start period took only one week. I enjoyed this phase a lot, because there was a lot of freedom in making choices and letting the „intuitive moment happen." (Groeneveld, 2006).

Sketching

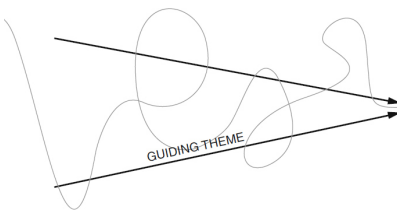
During the kick-start I used the method of sketching and Photoshop. Because of the short time, this method was used very roughly. According to Groeneveld, aspect 5, The development of the designer, should happen after the realisation, but due to the lack of time, I think this didn't happen at this point. Still, the kick-start has been one of the most interesting moments of my design development.

Literature and picture collection

While the design slowly developed into a coherent concept, I had to rationalize the wishes and needs of my target group. In order to understand them throughout, trying to emphasize intuitively with the target group was not enough at this point.
Therefore I tried to conduct research and translate these wishes into design aspects. A good example of this was the ‚Play- ratio' by Lia Karsten who researched the connection between distance and age in order to determine boundaries where children can safely play according to their age. This resulted in the fact that sight lines were very important in order to provide supervision by parents. Also I did in depth interviews with residents of a collective building in Amsterdam: The Nautillus. This gave insight in how I should place the communal spaces in my design and how people use these spaces after the building process.

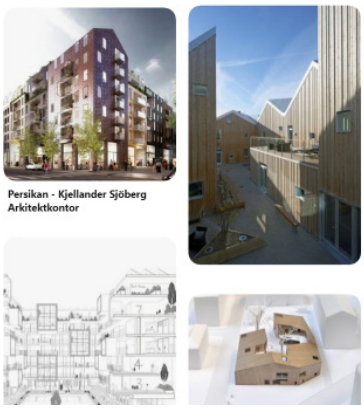
A second aspect that I used was collecting pictures of reference projects. Creating a library is an essential part in the field of designing and provides the designer a frame of reference (Van Dooren, 2013). All knowledge can be stored in the environment, books or a visual library. These references, (I used Pinterest often), provide patterns, diagrams, rules of thumb and solutions that can be used during the design process (Van Dooren, 2013).

I tried to categorize my reference projects that I often chose intuitively but followed a certain overall guiding theme. Elise van Dooren states that using a guiding theme or qualities not only gives the design its character and identity in the complex and open design process,it also helps in making choices (Van Dooren, 2013).



Guiding Theme, Elise van Dooren (2013) p. 62)

For me this guiding theme is Collective Living in a highly urban environment. The reference projects that I chose were automatically and intuitively related to this topic and reflected my own preferences and taste for my design.



Pinterest Board (own illustration)

During our VR course of the Dutch Housing studio, aspect 3 and 4 started to occur. At the time I started using the VR, aspect 3. Integration by Groeneveld was achieved. At this point I could physically engage with the environment in 3D and make choices that I wouldn't see otherwise. The VR experience gave me insight in how to design collective spaces from eye-level. Because spaces became imaginable, it became less difficult to test design interventions. The intuitive moment at this point was achieved. From this moment I knew which direction I had to take in order to ‚shape' my buildings outlines and the general concept. In other words, the phase of Realization already started. Using the method VR means that the abstract images, formed by intuition and rational knowledge already merged into one particular language.

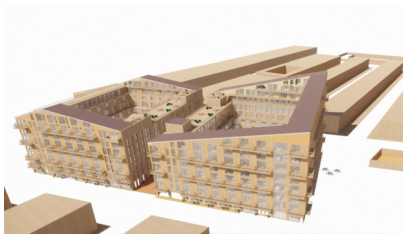
After having experienced the intuitive moment in VR, the process of Realization had already started in a certain way. This process continued during the method of Sketching. In addition to the hand drawings that have been made, it became more and more essential to draw on the computer in order to be able to make better and precise choices in the design. At this point the conceptual design shifted towards a more defined design based on a solid frame.

The method of Sketching was used to convert the ‚abstract images' that resulted from the phase of Integration into a suitable language for the P2 presentation. In addition to this, the method of Model Making was used to test prototypes of building outlines and shapes. In other words: the knowledge from the intuitive moment was not only turned into practise in 2D, but also in 3D. This resulted in a more optimized language. At this point, my P2 phase was successfully completed. The P2 report reflects aspect 5. The development of the designer. All the conducted research methods together with the conceptual design are described in this report and gain insight in how I shifted from research towards design.

P3 & P4

The last part of my graduation project could be described according to aspect 4. Realization. In this phase I mainly focussed on converting all the ‚abstract images' into a visual language: the final P4 design.
At the start of the p3 phase I used the method of model making a lot to test design choices and scale. This method shifted at a certain point towards working in 3D on the computer because the design became more and more detailed.

Model prototypes (own illustration)



3D model (own illustration)

The P3 presentation was a moment to see if the project was 'on track'. All the basic drawings needed to be shown. The feedback resulted in refining the design and to improve my graphical language. This was important in order to finalize and reshape my drawings for the P4 presentation.

Eventually a reflection has been made for the design project: ,**Better Together! Collective living for the new middle income family in Amsterdam.** With this residential complex building I contribute to the Amsterdam of the Future. A design which tries to give an answer to the problems of increasing urbanisation and decrease of available living space and resources. In this reflection the different research methods that I have used are being described and connected to the overall design process. The five methods of Groeneveld forms a foundation in order to reflect upon the intuitive and the rational thinking behind the design process and gave me insight in my own development as a designer. This reflection helped me to become more aware of the intuitive moments that take place in a creative process and how to improve these in other design projects.

Chapter 3:

Conclusion

The title MSc of Science reflects the scientific part of doing research at the faculty of Architecture and the Built Environment. After finishing (hopefully) this master track I will be skilled in architectural knowledge. This implies that I gained a certain level of knowledge and experience in fields of doing architectural research.

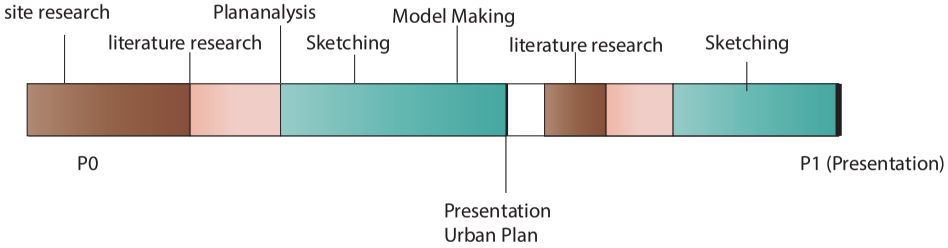
The overall position of the TU Delft is reflected mostly in this scientific part and therefore also at our faculty of Architecture. Most of the courses include doing research and reflecting on design projects. Adopting an academic attitude is one of the major aspects in the field of designing and is essential for gaining the title Master of Science.

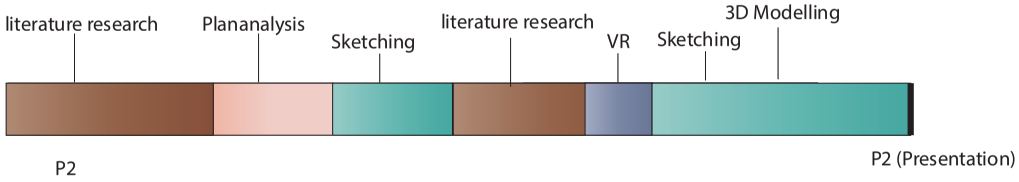
By describing the five aspects of intuition of Groeneveld, I tried to make a connection between the conducted research and my own intuitive moments during the design process. If a project is mainly based on facts and figures (conducted research), it is more likely that the ‚framework' of the conducted research can be further generalized by others. This is only limited by the intuitive thinking, because the design is made by the designer itself. Therefore it is important to compare and relate the rational side of designing with the intuitive side. By describing the five aspects of Groeneveld, I tried to give insight in the important relation between these two aspects. In the figure below is described which different research methods I have used during the design process. Because the P0 and P1 phases were shorter, more research has been conducted during the P2 phase. In the P3 and P4 phase I have used the least amount of research methods. During this period I mainly tried to improve the language of my end products that are retrieved from the previous phases.

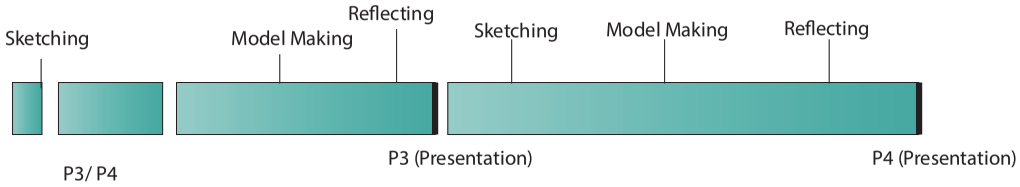
The figure illustrates that the phases P0-P2 started with solving a ‚vague question' that needed to be translated into a solid product (aspect 1. Formation of the design intuition). The overall design period resulted in a continuous interplay between ratio and intuition. Some of the provided events, like the kickstart, provided more difficulty in using intuition because of the copy and pasting of reference projects, while sketching and making models gave more freedom in this sense. In my opinion this has to do with time. Gaining inspiration

from the conducted research was important to come up with creative solutions and allowing intuiton in the process. This was needed for the assignments after each phase to let aspect 3. The Dialogue take place. After knowing which direction I had to take I was able to connect aspect 1 and 2 together 3. Integration. Aspect 4. Realization mainly occured at the moment of each presentation. The knowledge gained from the research had been translated into tangible products, so in each phase the 5 aspects of Groeneveld were present, somethimes in a different order.

The time table shows that the five aspects of R. Groeneveld can be linked to chosen research methods and cause a continous interplay between ratio and intuition. Overall an attempt has been made to reflect upon the methodolocial sides of rational methods vs. intuitve throughout the overall design process. According to Groeneveld the biggest challenge for designer is to make intuitive moments part of an awareness process. At this stage, aspect 5. The Development of the designer takes place. During the process of adopting an academic attitude and completion of the design process this fifth aspect took place in the development of myself as a designer.


site research
literature research
Plananalysis
Sketching
Model Making
literature research
Sketching
P0
P1 (Presentation)
Presentation
Urban Plan


literature research
Plananalysis
Sketching
literature research
VR
Sketching
3D Modelling
P2
P2 (Presentation)


Sketching
Model Making
Reflecting
Sketching
Model Making
Reflecting
P3/ P4
P3 (Presentation)
P4 (Presentation)

Chapter 4

5 Questions by TU Delft

II. The relationship between your graduation topic, the studio topic, your master track and your master program.

My Graduation Studio is the Dutch Housing Studio: Between Standard and Ideals, of the master track Architecture. The central question that is being asked in this studio is formulated as follows: "How do we want to live in the future and what kind of buildings do we need to make that possible?" With my topic: Collective Living solutions for the New Middle Income families in Amsterdam I try to tackle the problem of affordability and lack of suitable housing for this specific target group. My overall theme: collective living tackles a wider problem: migration and overpopulation in larger cities, which causes less available living space for residents. By providing a complex that accommodates different types of families I give an answer to the central question of this studio on how we want to live in the future. By doing this, all the specific scales (from urban to dwelling and 1:5 details) are incorporated.

III. Elaboration on research method and approach chosen by the student in relation to the graduation studio methodical line of inquiry, reflecting thereby upon the scientific relevance of the work.

The schedule of the Dutch Housing studio is very strict and provides a sequential series of presentation moments and research requirements. The P2 research report is a good example of this. In this report different literature studies and plan analysis are concluded. After the P2 I was able to choose my own research methods: literature research, praxeology and practical methods like sketching or 3d modelling.

IV. Elaboration on the relationship between the graduation project and the wider social, professional and scientific framework, touching upon the transferability of the project results.

My reference projects that I used for analysis are situated in Germany, Austria and Switzerland. These collective complexes already provide solutions to tackle the problem of affordability and sharing resources. My building complex can be seen in a wider context as a continuation of these complexes. As our society is growing into a participation society, my design project and research results can be of use for other

V. Discuss (i) the ethical issues and dilemmas you may have encountered in doing the research, (ii) elaborating the design and (iii) potential applications of the results in practice.

One ethical issue can be financials. Because my building is set up as a Cooperative, residents need to 'invest' in the building. Different types of families are living in this complex, but tend to have different incomes or wishes to use collective facilities. Therefore they can feel disconnected or more connected to this matter.

Secondly, privacy can be an issue because of the decision of places collective spaces alongside private dwelling units. Despite the fact that research has been conducted on the specific wishes and needs of the target group the conducted interviews show that it is difficult to incorporate and fully comprehend the needs of individuals. We as designers tend to think of people in 'generalizing ways', but in the end every single resident has unique wishes and desires of their living space and context.

Finally, the design and the concept tries to attempt as much as interaction between the residents as possible, the success of the concept lies in the willingness of the inhabitants to participate in the building and the context. As designers we can try to facilitate social cohesion, but we can not force this upon future residents. If residents tend to choose for more privacy instead of showing willingness to share resources/ spaces, the value of communal living will not be realized. Therefore we need to always take this matter into account and leave a certain level of interpretation of the design to their future residents.

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Img. 1 http://besems.eu/2017/12/10/justus-van-effen-kwartier-rotterdam/justus-van-effen-04/

Imag 2. https://phoenix.blverlag.ch/spangen-rotterdam/

Img. 3 https://www.homestolove.co.nz/real-homes/home-tours/inside-stylish-shipping-container-home

Img. 4 https://www.niklausspoerri.ch/mehr-als-wohnen

Img 5 - 8. https://www.dezeen.com/2016/01/12/aurelie-monet-kasisi-family-house-renovation-geneva-built-in-plywood-storage/

Img 9 https://dac.dk/en/knowledgebase/architecture/mehr-als-wohnen/

Img 10 https://www.architekturmuseum.de/ausstellungen/keine-angst-vor-partizipation-wohnen-heute/

Img 11 https://www.archdaily.com/922980/is-cross-laminated-timber-clt-the-concrete-of-the-future