A NEW AWARENESS IN THE SUSTAINABLE HOME

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SUMMARY

Som et oprørsk nødkald samler projektet *"A New Awareness In The Sustainable Home"* sig omkring den manglende menneskelighed i bæredygtig arkitektur. I et samfund med bæredygtige certificeringer og fortsat stigende krav til arkitekturens ydeevne, er den taktile og sansende dimension blevet glemt. Projektets hovedgreb udspringer i den menneskelige oplevelse af arkitekturen og en simplicitet som overrumpler alt støj. Med en lavpraktisk tilgang står projektet som forgænger for, at bæredygtighed og god arkitektur sagtens kan opnås med simple arkitektoniske midler – midler som i sin simplicitet formår at fortælle historien bag de initiativer, som faktisk gør en forskel.

Med en solid base af teorier fra Juhani Pallasmaa, Steven Holl og Christian Norberg-Schulz læner projektet sig op af en menneskelig indsigt tilegnet igennem en livstid. Teorierne er legemliggjort igennem case studies af de arkitektoniske mesterværker Villa Rotonda, The Suitcase House, Juvet Landscape Hotel og Snøhetta Reindeer Pavillion. Med konkrete eksempler på bæredygtighed med udgangspunkt den menneskelige oplevelse springer projektet ind den danske kontekst i Seest, Kolding.

Som et respektfuldt tiltag kontrasterer projektet sig i landskabet med en skarp cirkulær bebyggelse spredt fra ét centrum. Centrummets rolle i bebyggelsens udformning står som et strålende symbol på fællesskab og sammenhold. Fællesskabet placerer sig som et bælte omkring bebyggelsen, hvor små lommer tilbyder de behov, som er vægtet unødige i det enkelte hjem.

Det enkelte hjem er komprimeret ned til en størrelse, hvor almene boliger trives. Med et koncept der tager udgangspunkt i oplevelsen, er boligen inddelt i to atmosfærer. Den rumlige, livlige, lyse øvre etage, hvor vi spiser, griner og lever og den intime, omfavnende, mørkere nedre etage, hvor vi sover, hviler og oplader. De to etager er forbundet af et centralt skylight, som agerer som den eneste lyskilde i den nedre etage. Herved opnås rumlighed i sameksistens med adskillelse, lys i modspil til mørke, sval på samme tid som lun, ru i modsætning til blød. Mangfoldigheden står sammen som en oplysende fortælling og det at leve bæredygtigt. Imellem de to etager eksisterer de funktioner som er en del af det daglige liv, men på en ny og bredere måde. Ved at benytte store volumener, og bruger simple gardiner som et rumligt element, opnås en fleksibilitet som tager hensyn til de ændringer livet nu kommer ud for.

Som et styrkende element for samfundet udvides køkkenet i den øvre del om sommeren, med udgang til små oaser som forhaver ovenpå bæltet af fællesfunktioner. Ved at koncentrere livet på gaden, opnås et miljø som bibeholder de naturrige kvaliteter som centeret har, og naturen trækkes ind til alle boliger på trods af bebyggelsens densitet.

Den livlige gade forbinder sine cirkulære flow med skarpe boulevarder, der skærer sig igennem naturen. For at tilføre stedslighed og poesi i en samlet tanke, er midten af vejen prydet med en regnvandsopsamlende stribe, som alle fører ned mod det allestedsnærværende centrum.

Tilsammen står samfundet som et lysende glimt af håb. Et håb for en bæredygtighed som trives omkring den menneskelige oplevelse.

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PROLOGUE
NARRATIVE SUSTAINABILITY

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PLACE
KLØVKÆRGRUNDEN

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PROLOGUE
NARRATIVE SUSTAINABILITY

1.1 motivation

RESIMPLIFYING SUSTAINABILITY

All my life I have been an architect. Whether it has been with blocks and sand as a child, with pen and paper or even timber and brick, it has revolved around imagination and dreams. Dreams of a better world, and my contribution to this. Extending the dreams into the analogy of the world, the educational approach that fortifies architecture and engineering has enlightened my awareness of the composition in architecture. During the journey towards enlightenment I have stumbled upon numeral aspects within architecture, but my passion for a better world has always brought me by sustainability.

Since the term originated, it has been a worldwide collaborative agenda to make the world a better place. Even though there is this global agreement upon sustainability and that it is here to stay, it is a fact that there is still to many people that struggle to survive and lack both education and finances to even consider environmental issues at all. This constitutes an immersive inequality between the developed and developing countries. With the western advantageous economic position, we have to be the inspiration in the pursuit of sustainability. *(Sassi 2006: 6)*
With this responsibility, I feel it is necessary to scrutinise the current tendencies before making new.

In the path towards understanding sustainability, I have though stumbled upon some contradictions, that corresponds with my own perception of architecture. The perception has followed me through all times, but it is merely in the last couple of years, that I have gained

awareness on how I experience architecture, and where I find my self in a state of well-being. While most architects conduct a design process, with a loose attitude and a tendency to take liberations from the reality, the upbringing as an architect with insight into the engineerical world, has brought me to a place, where I can't ignore the present conditions.

"What is missing from architecture today are the potential transactions between body, imagination and environment."

(Bloomer & More 1977: 105)

What Bloomer describes is consistent with my own bodily experience of architecture. Architecture and beauty follows each individual with its own definition. A definition that is an extension of the being within the place.
With this realisation, one still operates within the realm of reality. Our imaginative dreams is transformed *" …in keeping with the instrumental rationality of our culture and the technological character of our society, an ocular centric metaphysics of presence" (Pallasmaa 2012: 19)*. This has lead to a world, where well-being is measured through rational values that describe temperature, pollution and intensity of light, and this is where I believe a mistake has been made. The mistake is not merely an assumption or theory, but is a derivative of what is branded as sustainable architecture today, seen through pilot project that can't give themselves the pride of well-being as they promised. (Bruunsgaard et al. 2011)

Venturing into the reign of sustainability, I believe that the term need to be re-simplified. Instead of focussing on the boundless criteria presented by the present sustainable certifications, the architecture will gain the sustainable features by returning to the way we perceive it. By letting the sensing and experience of architecture be the predominant design aspect we return to designing for the human and not for the rational society.

With the technological character of the society, the use of sustainability has become complex, and even the practitioners sometimes lacks understanding. This can only result in sustainability that is not friendly for use. While the approach is to automate the architecture and the sustainable initiatives, I believe that the narrative behind sustainability is removed. The sustainable features must be visible, and must be a part of the experience we have with the architecture - the narrative must be re-introduced to the sustainable design process.

This sustainable approach could be taken within all branches of architecture, but for me it seems clearest in the home. This is where we build our nest and need the well-being to recover for the world of tomorrow.
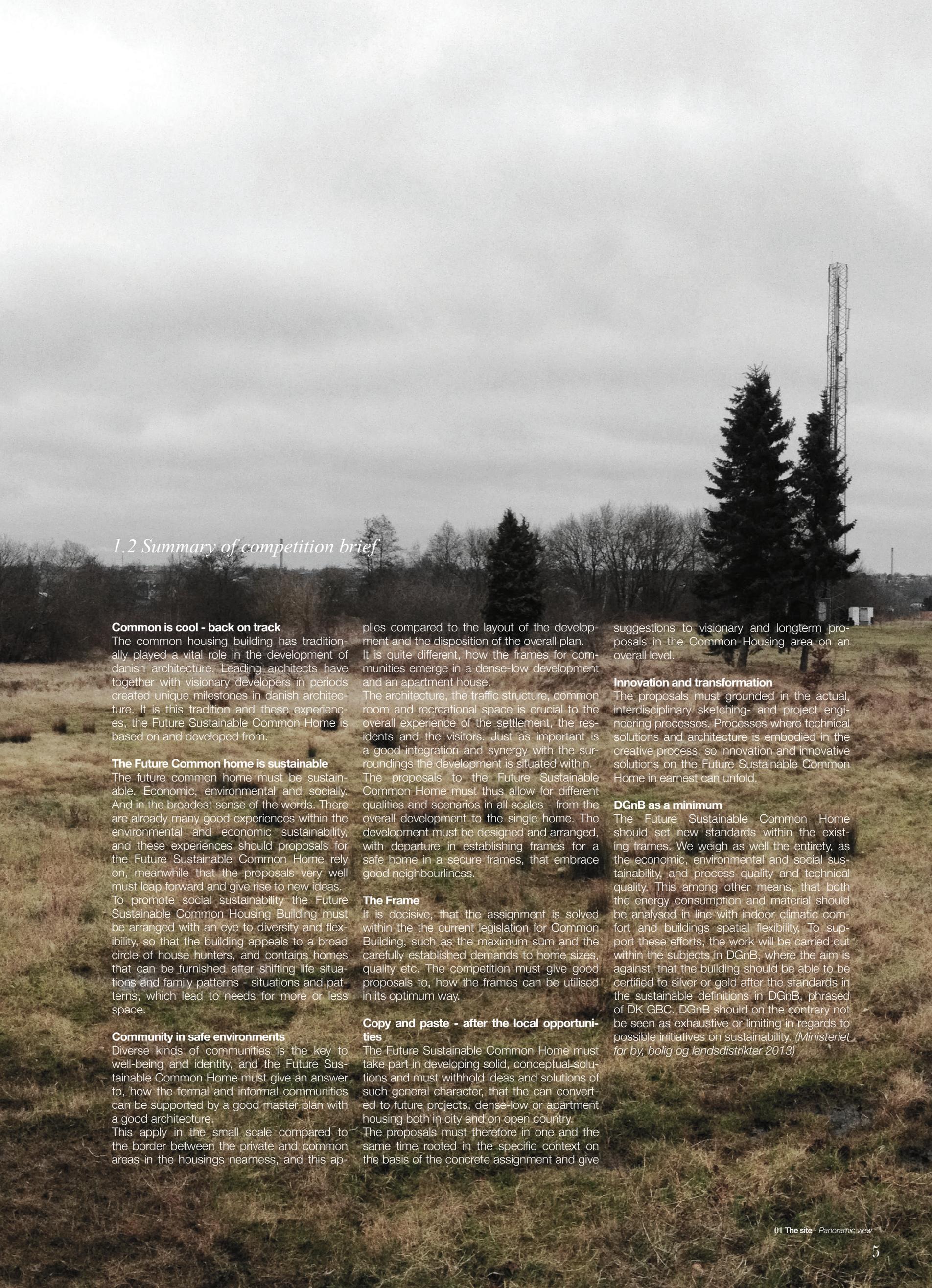
1.2 Summary of competition brief

Common is cool - back on track
The common housing building has traditionally played a vital role in the development of danish architecture. Leading architects have together with visionary developers in periods created unique milestones in danish architecture. It is this tradition and these experiences, the Future Sustainable Common Home is based on and developed from.

The Future Common home is sustainable
The future common home must be sustainable. Economic, environmental and socially. And in the broadest sense of the words. There are already many good experiences within the environmental and economic sustainability, and these experiences should proposals for the Future Sustainable Common Home rely on, meanwhile that the proposals very well must leap forward and give rise to new ideas. To promote social sustainability the Future Sustainable Common Housing Building must be arranged with an eye to diversity and flexibility, so that the building appeals to a broad circle of house hunters, and contains homes that can be furnished after shifting life situations and family patterns - situations and patterns, which lead to needs for more or less space.

Community in safe environments
Diverse kinds of communities is the key to well-being and identity, and the Future Sustainable Common Home must give an answer to, how the formal and informal communities can be supported by a good master plan with a good architecture.
This apply in the small scale compared to the border between the private and common areas in the housings nearness, and this ap-

plies compared to the layout of the development and the disposition of the overall plan.
It is quite different, how the frames for communities emerge in a dense-low development and an apartment house.
The architecture, the traffic structure, common room and recreational space is crucial to the overall experience of the settlement, the residents and the visitors. Just as important is a good integration and synergy with the surroundings the development is situated within. The proposals to the Future Sustainable Common Home must thus allow for different qualities and scenarios in all scales - from the overall development to the single home. The development must be designed and arranged, with departure in establishing frames for a safe home in a secure frames, that embrace good neighbourliness.

The Frame
It is decisive, that the assignment is solved within the the current legislation for Common Building, such as the maximum sum and the carefully established demands to home sizes, quality etc. The competition must give good proposals to, how the frames can be utilised in its optimum way.

Copy and paste - after the local opportunities
The Future Sustainable Common Home must take part in developing solid, conceptual solutions and must withhold ideas and solutions of such general character, that the can converted to future projects, dense-low or apartment housing both in city and on open country.
The proposals must therefore in one and the same time rooted in the specific context on the basis of the concrete assignment and give

suggestions to visionary and longterm proposals in the Common Housing area on an overall level.

Innovation and transformation
The proposals must grounded in the actual, interdisciplinary sketching- and project engineering processes. Processes where technical solutions and architecture is embodied in the creative process, so innovation and innovative solutions on the Future Sustainable Common Home in earnest can unfold.

DGnB as a minimum
The Future Sustainable Common Home should set new standards within the existing frames. We weigh as well the entirety, as the economic, environmental and social sustainability, and process quality and technical quality. This among other means, that both the energy consumption and material should be analysed in line with indoor climatic comfort and buildings spatial flexibility. To support these efforts, the work will be carried out within the subjects in DGnB, where the aim is against, that the building should be able to be certified to silver or gold after the standards in the sustainable definitions in DGnB, phrased of DK GBC. DGnB should on the contrary not be seen as exhaustive or limiting in regards to possible initiatives on sustainability. *(Ministeriet for by, bolig og landsdistrikter 2013)*

(1) The site - *Panoramic view*

1.3 Introduction

1.3.1 WHY COMMON HOUSING

We live in a world that is rapidly expanding. Populations exceed their expected growth, and are living way beyond the means of the earth. While this is the reality, the gravity of the conditions has not reached everyone. By looking at the ecological footprint, the current state of the world can be elaborated as the amount of land required to sustain the human activities. The theory exemplifies the conditions with 9,6 hectares of land required to sustain the average US lifestyle and 3-6 hectares of land to sustain the average European lifestyle. This direction will with a world population of 6 billion people require close to three more Earth-like planets to sustain the average lifestyle. And with 90 percent expected growth in population in the developing countries, the picture starts to seem much worse in the current evolution. *(Sassi 2006)*

While skeptics doubt the future lack of land and the consequence hereof, history has shown the horrifying future that lies in front of the human population without changes. Back in 400 AD the Polynesians settled on the Easter Island. During the next millennium they over-harvested the palm trees on the island, which were for food and to build boats and hunt. This resulted in famine and war, and by 1500 AD the Polynesians had died out. *(Bush 1997)*

The global population is expected to rise to 9 billion people within the century, and is to share 14,9 billion hectares of land. If we exclude ice, rock and desert from the landmass, we are left with 11,5 billon hectare of fertile land. Accounting for human-made degradation, we are left with 9,6 billion hectare of land, which leaves only 1,3 hectare of land per person. This number is numerous times smaller than the average current lifestyle, so the challenge is very real.

The issue calls for a new approach to the good life and how to live in a home. Instead of evolving towards a world, where everyone have everything we should evolve towards a world where we limit ourselves, and share what we need.
To accompany the issue, common housing is introduced. It exists with the intention of creating spaces for everyone. Spaces that people can afford, spaces that implies fellowship and sharing, but without loosing quality within the architectural frames. This way of living in itself revolts with the current path we are living on, where it is all about bigger and cheaper. With the limitation in common housing comes the opportunity to use the resources more efficient, and also the narrative about living dense and in harmony with each other. Because the frames of common housing exist with legislative frames, the ethnographic way of living is sustained within sustainability.

To approach the issue with realism, the project takes point of departure in the present competition about the future sustainable common home. Here the intention of limitation is encapsulated within the common housing, and the sustainability is measured with the present tools of DGNB. Thus the foundation for a project that emanates from real world conditions is laid.

As a personal quest, I believe that sustainability has been misunderstood, and one cannot blame anyone for that, because sustainability is a very multifarious subject. Just when reading the DGNB standard, a jungle of values and definitions appear. And with the societal craving of measuring and proving, most of the standard revolve around calculative conditions, and has a tendency to overlook the main character of obtaining the sustainability - the human. This is why, the project will take point of departure in how we experience, perceive and live in the architectural frames, and make sure that these frames encompass the sustainable initiatives within the architecture.

With the enormous world population, it is almost self-evident that there exist infinite compositions of lifestyle that affect the sustainability and the architecture. This calls for an elaboration of the users of the architecture, and also implies that flexibility is a feature that is essential for the future home.

1.3.2 OBJECTIVES

The primary task of the project is to design Future Sustainable Common Housing. But with the theory the project expands from concrete project, to a toolbox of understanding that study and elaborates the perception of well-being, and through this enforce means for encapsulating the sustainable initiatives within the architectural frames.

Preconditions
The common housing is based upon the current Danish competition brief, *"Fremtidens bæredygtige almene bolig"(Ministeriet for by, bolig og landsdistrikter 2013)* (See Appendix 08), that revolves around sustainable common housing, and from this evolve a proposal that fuse the sustainable narrative with the real perception of well-being.

1.4 Methodology

1.4.1 PHILOSOPHY OF SCIENCE

When entering the architectural process, we will immediately be challenged with a natural multiplicity and contradictory arguments. While some aspects of the architectural process can be analysed through logical approaches, and even confirmed by empirical measures, there will always be some artistic aspects, that no matter what will be an subjective, phenomenological elaboration.

This calls for an urgent balance between the emotional phenomenological and technical empiric. Even though there is no recipe on obtaining the epistemology that considers both sides, it is because architecture in its origin is a multidisciplinary profession. Vitruvius describes this in the dawn of the day as

"The architect should be equipped with knowledge of many branches of study and varied kinds of learning, for it is by his judgement that all work done by the other arts are put the test."

(Vitruvius 1960)

This brings the challenge that we today still try to solve.

"How do research and design relate to each other? What can research do for designers? Both activities produce knowledge, but of different kinds ... So, on the one hand, design is not a science in its own right, but draws on technical and scientific insights as well as artistic skill and ability. On the other hand design, although not a science, can be the object of systematic research"

(Gänshirt 2007:17)

To respond to the multiplicity, that constitutes this confusion, it is important to realise that architecture can only exist by having a holistic approach, because architecture is not only built form and specific space, but also atmospheres, ideas and sense of place. *(Norberg-Schulz 1965)*. This perspective is very coherent with the multiplicity and contradictions there exist within both sustainable and tactile architecture.

While this project is about emphasising the perception of the well-being within the home, an phenomenological philosophy will predominate.

To obtain the holistic approach the project will elaborate in an inductive, hermeneutic-analytical approach through theoretical abstraction. While architecture is best learned by doing it, the theoretical abstraction will stand as foundation for an abductive, phenomenological approach through case studies.

With the notion that architecture is a complex symphony of various initiatives, poetics and ideas, the method Analysing Architecture by Simon Unwin is utilised. By progressing through the different layers of the case study, one at a time, the thoughts, poetics and practice is elaborated with my own experience of the study through drawings, models and photo documentation.

The theoretical abstraction and the case studies, together with empirical research constitute the foundation for the design process of the project.

1.4.2 MANAGMENT FROM START TO END

The thesis is based on the experience gained through the education at AD:MT, which since day one has laid its foundation with a problem based learning *(PBL)* methodology. With this methodology as the foundation for the project, the integrated design process is utilised. The integrated design process is patently about integration. This integration is something, that the evolution of architecture needs, since we've evolved towards architecture that need to be without surprises - this means, that the days where we as architects just can cheat a little is over. Especially the sustainable branch of architecture needs interdisciplinary development to overcome the design problems, and to make architecture and engineering speak the same language, the integration, inter-

twining and fusing must be done in all design phases.

The integrated design process gives the tools to survey this task, and boils it down to five different steps:

Problem and Idea, Analysis and Programme, Sketching, Synthesis, Presentation.

The process is started with an Problem formulation where ideas and curiosities is formed. As the idea holds the boundaries for the process, it need to be filled with knowledge to work. This is done in the Analysis and Programming phase. Here knowledge is attained, and principles and conceptual visions is formed as a basis for the guidelines of the project. Through the Sketching this knowledge and these visions is fused together to architectural ideas, that then is integrated through several iterations of optimisation. Going on the synthesis makes sure that the ideas actually agrees with the project guidelines, which can make the project turn directions towards the newer knowledge if wanted. All these steps is accumulated in the final step the presentation, where the project is visualised and concretised. *(Knudstrup 2004)*

As this is, it is not something that is just invented. The intentions of integration has existed a long time, and the best known predecessor is Vitruvius, a Roman architect from the first century BC. He held the same opinion, that architecture is composed by three aspects, firmitas, utilitas and venustas, translated into solid, useful and beautiful. So with this common denominator, what has changed? We have. Architects has gone from master builders, a life long education, to a interdisciplinary profession, that need the tools to integrate initiatives, that for the master builder was life long experience.
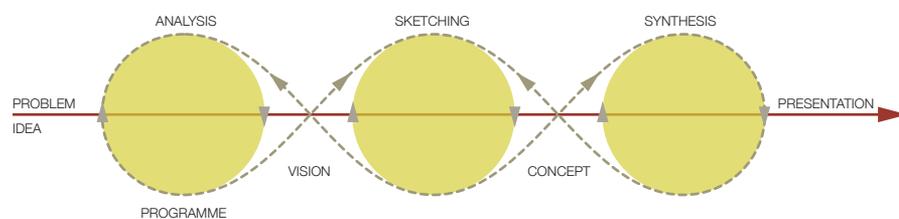
02 **IDP** - *The process of the Integrated Design Process*

	Tasks		Tools
Problem / idea	Project research		Hermaneutic » Literature » Websites Phenomenological » Supervision » Dialog » Sketching » Walks Production » Drawings » Adobe Creative Suite » Sketchup » Autodesk AutoCAD » Autodesk Revit » Autodesk Vasari
Analysis and programme	Research » realm - theory, site » rooms Analysis » Atmosphere » Flora and colours » Culture » Infrastructure » Climatic considerations » Theoretic deposition of perception of space Design parameters Room programme		
Sketching	Concept development + detailing » Sketching (plans, elevations, sections, details, perspectives) » Models » 3D models » Energy principles » Structural principles » Initial calculations		Sketching » hand drawing » Foam models » Material examples » Supervision Calculations » Spreadsheets » Velux Daylight Vizualiser » BE10 » BSim Production » Drawings » Adobe Creative Suite » Sketchup » Autodesk AutoCAD » Autodesk Revit » Autodesk 3D Studio Max » Itoo tools Forest Pack 4 » Vray 2.4
Synthesis	Project development + detailing » Sketching (plans, elevations, sections, details, perspectives) » Models » 3D models » exact calculations		
Presentation	Drawings Plans » Single unit 1:50 » Connected units 1:200 » Site 1:500 » Master plan 1:2000 Elevations » Single unit 1:50 » Connected units 1:200 » Site 1:500 Sections » Single unit 1:50 » Connected units 1:200 » Site 1:500 » Landscape 1:2000 Details » Single unit 1:10 » Connected units 1:10	Visualisations » Single units » Connected units » Interior » Interior details » Exterior » Exterior details » Bird view » Axonometric rendering Diagrams Final calculations Models » Detail model 1:20 » Single unit 1:100 » Context model 1:500	Sketching » hand drawing » Foam models » Material examples » Supervision Calculations » Spreadsheets » Velux Daylight Vizualiser » BE10 » BSim Production » Drawings » Adobe Creative Suite » Sketchup » Autodesk AutoCAD » Autodesk Revit » Autodesk 3D Studio Max » Itoo tools Forest Pack 4 » Vray 2.4

REALM
PERCEPTION WITH PERFORMANCE
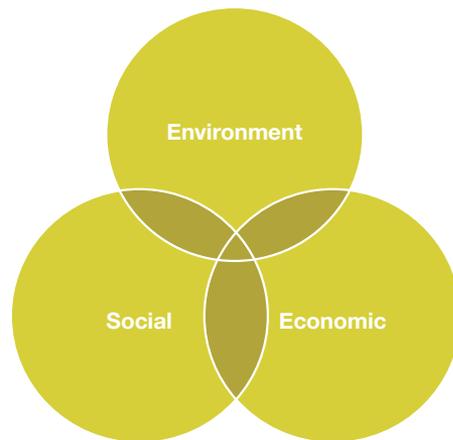
2.1 Sustainability

2.1.1 INTRODUCTION

To get a clear defining image of the term sustainability, and to establish an distinctive opinion on which buttons to push to obtain sustainability, an elaborative exposition on the theory revolving the subject, and the established certificate DGNB is compared. To dive down in the subject it is important to know where the term origins from, how we see it today and how it can contribute to make better homes.

2.1.2 HISTORICAL EPILOGUE

The times were good - in the 50's, 60's and 70's we just kept the roulette going, spending, polluting and like industrialisations progress being way to vast to actually also keep in track which marks the pace set on the environment, we did not do anything about it. This lead to the suddenly peculiar environmental hangover the world attained, when the Brundtland report in 1987 declared the first academic proof of the predicament the world was in. Up to the revelation hints were noticed, with the oil crisis in 1973 and 1979, and the nuclear disaster in Tjernobyl in 1986, but they did not thoroughly get the message through. With the environmental hangover the term sustainability was born, and the legacy to the future given.

"Humanity has the opportunity to make the evolution sustainable – to ensure that it accommodate the immediate needs without making compromises with the future genera–tions ability to ensure their needs"

(United Nations 1987)

With the definition of the agenda in future development, the definition was widely discussed. In 1992 the Rio-declaration defined sustainability with three aspects. *(DK-GBC 2013: 7)*

The *environmental sustainability* revolves around the energy efficiency, how much resources we use and how we use renewable resources to minimise the impact on environment and climate.

The *economic sustainability* aims at optimising the value of the building, and the costs of maintenance.

The *social sustainability* considers increasing values to the user, which includes making satisfactory conditions, in regards to well-being, indoor climate, flexibility, accessibility for all and safety and security.

2.1.3 FROM TERM TO METHOD

From the trinity of sustainability all seems logic and obvious, but with a society that mainly considers rationality and economy, the need for a measure of sustainability and the appliance hereof is necessary. This is what DGNB is starting to do. With origins in Germany, the certificate is now adopted into Denmark under the supervision from DK-GBC.

With the arrival of the certification, a formula on sustainability is presented. Composed on the basis of the trinity of sustainability, the certification adds technical aspects and process quality to the evaluation. The aspects is weighed equally with 22,5% except process quality that only attains 10%. Detached from the evaluation, but necessary to obtain one, is the assessment of the qualities of the area. Each aspect is divided into groups of criteria that then again is subdivided into sub criteria. *(DK-GBC 2013: 8)*

(See Appendix 12 page 15-17 for detailed description of the DGnB Criteria)

2.1.4 PROJECT SCOPE OF DGNB

By elaborating the DGNB certification method, the attained level in the project can be established. Even though a lot of the aspects are important for the certification, they demand a workload that goes beyond the values for the project. This derives sub aspects like LCA and LCC only to be conducted within the logical sense, and not the detailed analysis, simply because I do not have the necessary knowledge to execute the full analysis. With the awareness on the importance of economy, especially within common housing, the assurance of the criteria is found through experience attained at architectural offices. And while it could be done in collaboration with external party, the main agenda for the project lies within the social criteria group. This is where well-being is being defined, and what carries the basis criteria for the human perception of the space.

2.1.5 REEVALUATING THE PRESENT PROPENSITY

With the DGNB-certificate we find ourself in the midst of a new era of architecture. While describing itself to be a method, the extent of the certificate certainly ventures the process of architecture into a new empirical age, where data and calculation is inevitable because of the stress from the certificate. To withstand the weight of the certificate, and to ensure that we do not forget where we came from, one cannot resist to return to the origin of sustainability, and with original agenda in mind, learn from what has gone wrong until now.

During the start of the millennium a world wide action towards a more sustainable world was set. This was mainly done with the finger on the energy consumption, which should be lowered drastically within two decades. This doctrine produced a technological evolution, where the development of insulating and ventilating was pressured to its limit. This resulted in pilot projects, that were to set a new low in the consumption of energy within homes. With the insulation evolved to its limits, and ventilation integrated into the house, they held the means for reaching this goal.

The results of the pilot projects though produced some contrary results, that pin-pointed the place where the future projects can be improved. With the technological frames encapsulating the life of the home developed to its fully potential, they stumbled upon the notion that we as users possess individual ideals upon well-being. *(Bruunsgaard 2011)*

"In reality, most humans would put human survival before that of nature, and many would put human well-being before nature's survival" (Sassi 2006: 6)

And this is exactly what happened. We as humans possess our own identity and perception upon well-being. When we suddenly find ourself within architecture which has predefined a static term of well-being, we can accept it to some limits, but when it comes to our primeval intuition, we tend to use the homes in the way that satisfy our needs and survival.

What is described is diversity. The need for homes, that can adapt to the lives of the diverse human, calls for a flexibility.

"If sustainability is to be achieved the ethics and values that support it will be just as important as scientific and technological advance" (Parkin et al. 2004: 20)

What Parkin states, is that this flexibility need to take place within a more fundamental part of the home than adjusting the ventilation rate. Even though the technological progress can't be disregarded, the development need to seek the evolvement within the way we live.

"… sustainability is not an academic pursuit or even a professional activity: it is a way of life affecting everything an individual does." (Sassi 2006: 8)

As learned in the pilot projects, another important improvement is to inform, educate and communicate the users how to live in a sustainable home. *(Bruunsgaard 2011)* This is best understood with a small analogy. Getting a new TV today requires a massive insight into the usability of the product. This can be achieved with the bulky, often 300 page manual, but this is the first thing we throw behind us. We perceive, consume and learn - and do it by experience, and this has lead to the paramount search for the intuitive interface, that just tell the narrative behind the product.

"Sustainable architecture can help put into practice and even encourage a sustainable way of life" (Sassi 2006: 8)

With the notion that sustainability is a way of life, and that the architecture can encourage the sustainable way of living, we as architects has the challenge of improving the interface of the architecture, that tells the narrative behind sustainability. By realising that we use the architecture on behalf of how we perceive it, one must first understand how we as humans perceive, before attaining the task to create the boundaries that encompass the sustainable way of living.

2.2 Initiating problem

Sustainability is inevitable and it should be, but with the ocular centric optic the world has on architecture, the understanding of the initiatives that compose the sustainability is lost. This results in misunderstood shells of architecture that is optimised for the rationality of society, but not the sensitive perception of the human. By reintroducing this awareness into the sustainable process, the narrative of the sustainability can be understood once again.

How can architecture tell the narrative behind the sustainable way of living?

To make architecture tell the narrative, one must first gain the understanding of what constitutes the foundation for how we as humans perceive spaces, before attaining the means for creating spaces of well-being. As the well-being is embedded in the building regulations and DGNB certification as values in space, the project seek deeper well-being through the notion, that architecture that is considered beautiful is treated better and has more potential for adopting to the future. These stances awake the elaboration on the human perception of space and the beautiful architecture of happiness.

With the frames around the perception of the architecture elaborated, the project seeks sustainability, and especially the way to tell the narrative behind sustainability through the architecture and the sensitive perception hereof. Because the architectural envelope has evolved the technical aspect to the limit, and it still fails somewhat, the project seeks to introduce the flexibility to the architecture that is necessary to embrace the changes through life.

NARRATIVE SUSTAINABILITY

THOUGHT	SENSITIVE PERCEPTION	PRACTICE
JUHANI PALLASMAA STEVEN HOLL CHRISTIAN NORBERG SCHULZ	THE HUMAN PERCEPTION OF SPACE	CASE STUDY SNØHETTA REINDEER PAVILION
ALAIN DE BUTTON	WELL-BEING THE BEAUTIFUL ARCHITECTURE OF HAPPINESS	CASE STUDY PALLADIO VILLA ROTONDA
PAOLA SASSI	SUSTAINABLE INITIATIVES FLEXIBILITY	CASE STUDY SKODVIN & JENSEN JUVET HOTEL CASE STUDY GARY CHANG SUITCASE HOUSE

03 **Problem & method** - *the method from thought to practice*

2.3 The human perception

2.3.1 INTRODUCTION

The architecture of a house has a defining influence on our lives. It embraces. It inspires. It breathes the course of life, and we breath the life of the home. It witnesses sadness and happiness, love and sometimes detest. It watches the first steps, joyous laughter and the tranquillity of a night-time story. It witnesses arguments in the stressful daily life and the long yawns that follow. The home hold the frames for a multiplicity incomparable to anything else, and it is the finest task to create the foundation for a place where life thrives and blossoms.

A house is not a home. The home arrives with the life it inhabits, and from this the house grows, adjusts and adapts. As life takes place between human beings, it is merely logical to elaborate on the human perception of well-being.

One approach is to look for the answers in the common constitution of what we as humans find comfortable. The Danish building regulations constitute the basis for well-being through reducing, optimising and rationalising. Going through the rules, one cannot avoid feeling alienation towards the constitution of well-being, because it seems impossible to rationalise something irrational. Well-being as described with numbers of temperature, numbers of polluting particles in the air, numbers that equalise every wall and every window. Looking at admired homes like Jacobs House or Fallingwater by Frank Lloyd Wright, I am left confused. Confused with the obvious truth, that the houses break most of the rules in the regulations. This has lead to the interest in elaborating the way we actually perceive space.
Even though well-being is a hot topic within sustainability, it is often absorbed by the rationality of the society and the perplexity of globalisation. With this reason, I find the purest perception of well-being, and how humans sense space through the writings of numerous architectural phenomenologists. Juhani Pallasmaa, Steven Holl, Christian Norberg-Schulz and Peter Zumpthor all wander within the same agreement that architecture is so much more than numbers. As I feel that architecture possess a deep connection to my self, I find it most truthful to elaborate on theories that acknowledge the phenomenology of the human perception of space.

After visiting many architectural pieces, I have noticed that when I find something beautiful, it feels like a strong bond has been made between my mind and the architecture. This realisation has awoken a curiosity about what makes a building beautiful. While it is something that probably all architects have perpetuated, it is a personal journey that help expand my personal perception of what I find beautiful. With an education that wanders between the rationality of the engineer, and the dreams of the architect, I have ambivalent thoughts about beauty. I strongly believe that beauty is individual, but also recognise some patterns in what I find beautiful - like proportions that just seem to dwell in eternity. This is why the theories of beauty are elaborated through the phenomenological and hermeneutical approach.

The last aspect that has awoken my curiosity is the home itself. While we have homes in the entire world, they are very different. This is of course closely connected to the fact that cultures do affect the way we live. While being situated in the Northern part of the world, I have noticed that we share the definition of 'home'. The reason for this unity is in itself defining for creating new homes. While it is a question of many factors, I believe that we have, under all the layers of our being, a primeval way of feeling home, and with this reason; I find that the truth should be found in the primeval places in the north.
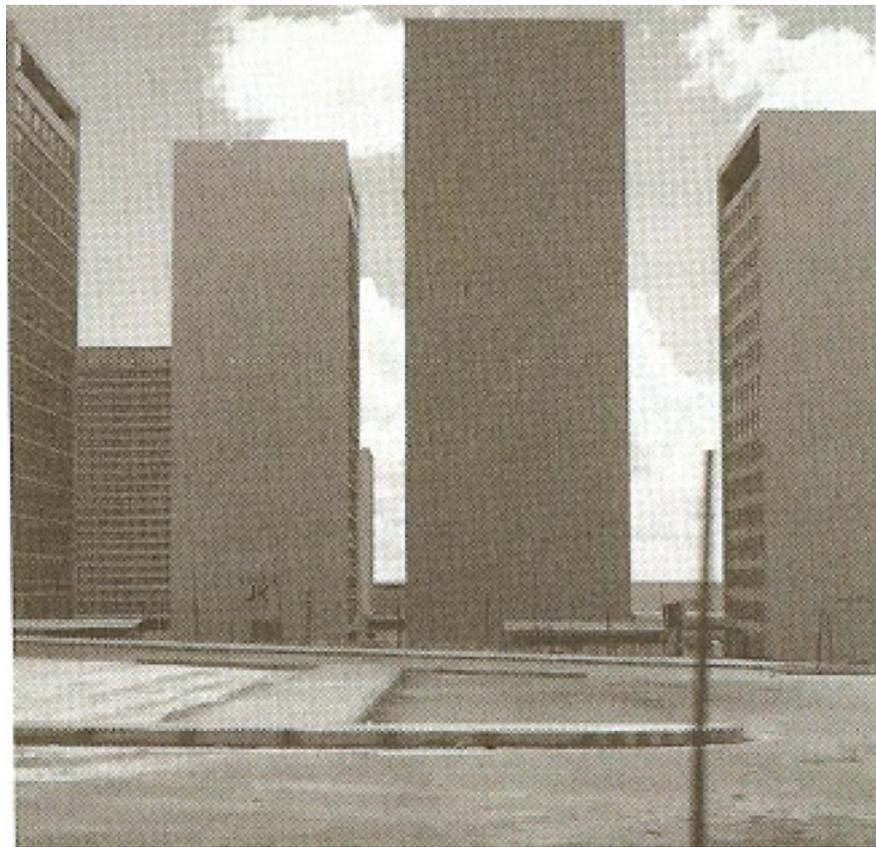
04 **The city of sensory perception** - *Peter Bruegel the Elder, Children's Games*

05 **The city of sensory deprivation** - *Commercial section of Brasilia*

2.3.2 THE SENSITIVE TOUCH OF THE WORLD

The ocular centric paradigm

Through time the way we perceive has changed, and by looking at the history the reason to this reveals itself. The sight, the vision and the visibility have always dominated the western culture. The Greeks believed that certainty was based on vision and visibility, and since the philosophy has followed to believe that truth comes from clear vision and light. The belief can be convincing through the words of Peter Sloterdijk *"… A good part of philosophical thinking is actually only eye reflex, eye dialectic, seeing-oneself-see." (Pallasmaa 2005: 15)*. This universal order of the senses was adopted in The Renaissance, where the vision was the highest down to the touch. This ocular centric paradigm has continued through all times, and the technological culture has scattered the senses even more. Vision and hearing is our basic senses, and the remaining is something that we only use when eating a meal or freezing.
There is one technological invention that has favoured the sight as the dominant truth of reality. The invention of printing letters and images obliterated the senses besides vision, and brought the way we describe perception today. But it has not always been like this. Before print, before the technological development hearing was the dominant sense. When theatres and legends was told from mouth to mouth, we experienced it different than today.

The retaliation to vision

Even though the sight has been the dominating sense through all times, the critique of the ocular centric tendency has been widely expressed. The derivative of the ocular centric society is described, in this way *"The dominance of the eye and the suppression of the other senses tend to push us into detachment, isolation and exteriority." (Pallasmaa 2005: 19)*. The universal truth starts to be questioned if it is a reality that has been invented, and not a reality that exist according to Philosopher René Descartes. While regarding vision, he acknowledges that the touch is *"more certain and less vulnerable to error than vision"* (Pallasmaa 2005: 19). Philosopher Jean-Paul Sartre follows the disagreement as he describes the focused vision as a 'medusa glance' that petrifies everything that it braces. He acknowledges that the focus on the vision has rendered space without the dimension of time, making it flat and static. Existential phenomenologist Merleau-Ponty joins with his description that *"my perception is not a sum of visual, tactile and audible givens: I perceive in a total way with my whole being: I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at ones"* (Pallasmaa 2005: 21). He accentuates that perception cannot be reduced to the sight, but is a totality of the senses experiences through the being and the body. The ocular centric manor of the society has further enhanced the fact that vision often lye. When we see something, we often confirm it with the touch, because it gives a truthful nearness to the non-bendable reality that is in front of us - a truth that is not present in the vision.
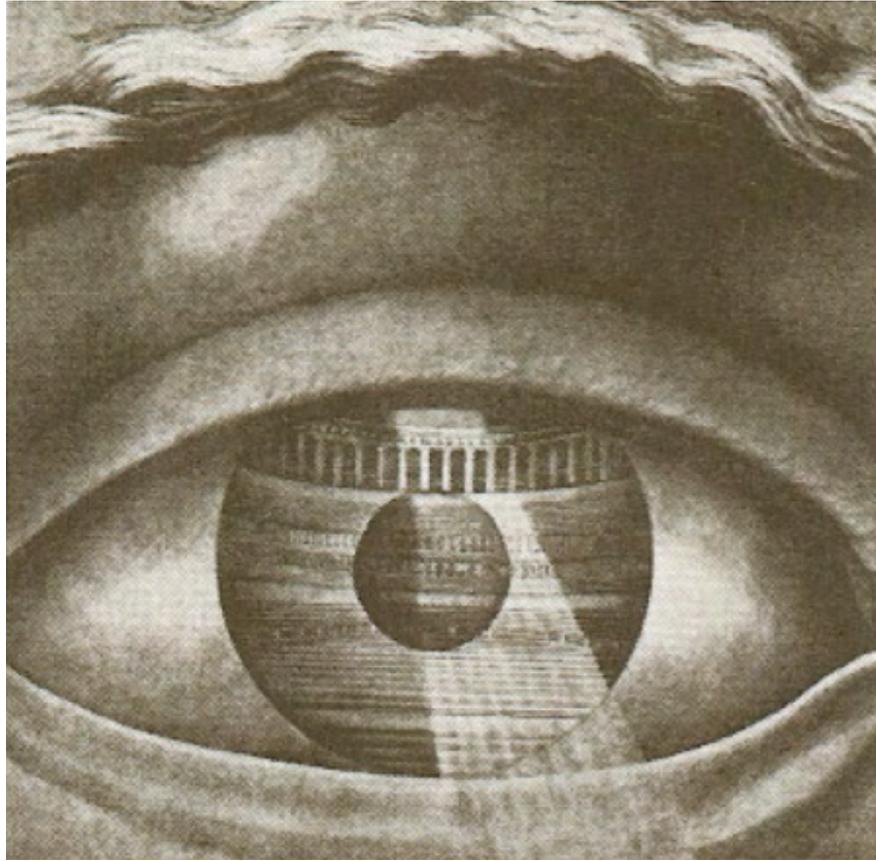
06 **Architecture as art form of the eye** - *Eye and Theatre Besancon*
07 **Ocular centric favorism of vision** - *Iluis Bunuel & Salvador Dali*

The affect on architecture

The endless multiplication of images has without doubt affected the architecture towards superficial imagery, suppressed from any tectonic logic and materiality, and while architecture is the mean through which we grasp the world, there is an endless amount of poisoning, flat architecture in the world. *"Instead of an existentially grounded plastic and spatial experience, architecture has adopted the psychological strategy of advertising and instant persuasion; buildings have turned into image products detached from existential depth and sincerity." (Pallasmaa 2005: 30)*. The importance of breaking loose from this tendency and understanding the perception is essential as *"vision separates us from the world whereas the other senses unite us with it."* (Pallasmaa 2005: 25). This accentuates that we need to reintroduce nearness to architecture, so we remove the distancing of the vision, and create frames in which we inseparably belong. Pallasmaa's points emphasise that the direction that the building regulations is taking is wrong. We do not find ourselves in a state of well-being in a space, where we cannot control or feel our surroundings, or in spaces that hermetically streamline everything into one universal ocular centric truth. The connection to the space is attained through the nearness of the interiority, and through the sensing of the architecture.

Even though the ocular centric tendency has devoured the vision, it should not be neglected as one of the senses. *"However, the privileging of sight does not necessarily imply a rejection of the other senses, as the haptic sensibility, materiality and authoritative weight of Greek architecture prove; the eye invites and stimulates muscular and tactile sensations. The sense of sight may incorporate, and even reinforce, other sense modalities; the unconscious tactile ingredient in vision is particularly important and strongly present in historical architecture, but badly neglected in the architecture of our time." (Pallasmaa 2005: 26)*

Even famous architects like Le Corbusier, Mies van der Rohe and Walter Gropius was mainly concerned with the vision. With the stance *"Architecture is the masterly, correct and magnificent play of masses brought together in light" (Pallasmaa 2005: 27)*, Le Corbusier undeniably elevates the sight as the truth telling sense in architecture. Even though Mies van der Rohe and Walter Gropius shared this definition of architecture, they possessed enough intuition and skill to not forget the other senses.

While this was the reality then, the education of the architect has changed. Back in time, they were master builders with knowledge and craftsmanship, but contemporary architects is rooted in the academia. *"With the loss of tactility, measures and details crafted for the human body - and particularly for the hand - architectural structures become repulsively flat, sharp-edged, immaterial and unreal." (Pallasmaa 2005: 31)* The intuitiveness that Pallasmaa expresses is not embedded in the contemporary architects reality.

As we have lived through a time of neglected senses, we are starting to rediscover the foundation for the perception of space. Anthropologist Ashley Montagu expresses this as *"This growing awareness represents something of an overdue insurgency against the painful deprivation of sensory experience we have suffered in our technologized world" (Pallasmaa 2005: 37)*.

08 **Contemporary comfort house** - *Without understanding the human perception*

09 **A sensory experience** - *Villa Mairea Alvar Aalto*

2.3.3 THE PERCEPTUAL SYSTEM

To be able to compose the symphony that constitutes the human perception of space, it is necessary to partition the perception into separate sensory systems. With the inspiration in the categorisation of the sensory system by Psychologist James J. Gibson, the partition elaborates on the visual system, auditory system, taste-smell system, existential system and haptic system *(Pallasmaa 2005: 42)*. *"This separation and reduction fragments the innate complexity, comprehensiveness and plasticity of the perceptual system, reinforcing a sense of detachment and alienation."* (Pallasmaa 2005: 39) While all senses should be infused in the architecture, it is necessary to understand them separately before fusing them together. In this way, the sensory systems can be linked with the wished atmosphere, and let function and perception melt together in one united narrative.

The Visual System

The visual system is the organ of distance and separation. While this has been elevated as a disadvantage in the perception, it can still be utilised in places where this distance and separation is wanted. The visual system mainly utilises two approaches to see. The focused vision that is the distancing approach, and the unfocused peripheral vision that is the spatiality perceiving approach.

But the perception does not exist from the eye itself. *"The problems arise from the isolation of the eye outside its normal interaction with other sense modalities" (Pallasmaa 2005: 39)* If you remove the sound from a movie, it looses its place in the world. Pallasmaa suggests that vision needs to be in interaction with the other senses to attain a perception where we find ourselves in well-being.

The essential influence on the visual perception is light and the absence hereof. Light has always been both a precious and peculiar element in the North. Here the shadow is not a stranger, it is a daily companion, flickering side by side with the rays of light.
To achieve well-being it is essential to realise that the human psyche is a web of complex feelings that need the tranquillity that the shadow brings. The absence of the shadow is even used to produce the opposite of well-being *"An efficient method of mental torture is the use of a constantly high level of illumination that leaves no space for mental withdrawal or privacy; even the dark interiority of self is exposed and violated." (Pallasmaa 2005: 49)*.

The fact that the perception of well-being relies on darkness to withdraw from the world is repeated in all great architecture. *"In great architectural spaces, there is a constant, deep breathing of shadow and light; shadow inhales and illumination exhales light." (Pallasmaa 2005: 47)*.

The globalisation and digital imagery bombardment has maybe let us forget this important fact of well-being. The evidence is even present in the regular old pertinotsa log house from the late 19th century. *"The darkness and shadows of the Finnish peasants house create a sense of intimacy and silence; light turns into a precious gift." (Pallasmaa 2005: 57)*.

The two most important aspects of the visual system are that unfocused peripheral vision defines our spatial perception, and that the presence of the interplay between light and shadow is essential to the perception of well-being.

The Auditory System

Whereas sight has an isolating, distancing effect on the perception, sound is the contradictory sense to this. *"Sight isolates, whereas sound incorporates; vision is directional, whereas sound is omni-directional. The sense of sight implies exteriority; sound creates an experience of interiority. I regard an object, but sound approaches me; the eye reaches but the ear receives." (Pallasmaa 2005: 49)* What Pallasmaa describes is best elaborated with examples. Entering a cave, the most defining about the place, is the sudden change of the sound with the echo. Suddenly when the sounds change, the perception of the place drastically changes. Another example is the sound from leaves rattling in the wind. Suddenly wind becomes something that we feel directly and understand. As philosopher Walter Ong describes it *"The centring action of sound affects man's sense of cosmos." (Pallasmaa 2005: 49)*

Sound is also the bearer of the spatial perception. As the materials and the spatiality affect the reverb, we acknowledge and remember these differences in sound. *"Sight is the sense of the solitary observer, whereas hearing creates a sense of connection and solidarity; our look wanders lonesomely in the dark depths of a cathedral, but the sound of the organ makes us immediately experience our affinity with the space." (Pallasmaa 2005: 50)*

As sound is elevated as the predecessor for interiority, it must not be forgotten in the urban scape. Cities also have this pulsating sound that makes the human body directly connect to the places found within the city – a piazza full of mumble and laughter or the roaring engines from a boulevard. They each affect our understanding and perception of the places, which we are situated within. *"But our cities have lost their echo altogether. The wide, open spaces of contemporary streets do not return sound, and in the interiors of today's buildings echoes are absorbed and censored... Our ears have been blinded." (Pallasmaa 2005: 51)*. As Pallasmaa points out, we have had an evolution that has removed the interiority of the city. And when the sound is so important for perceiving the place, it should be a part of the city.

The most important about sound, is the realisation that it enhances our connection and relation to the place situated within. As sound has no direction, we have the natural perception of sound as something coming from the world we perceive, and not something controlled by the direction we perceive.

The Taste-Smell System

Even though the taste and smell of a building is something, we usually anno-tate negativity towards, it is probably one of the senses that we are least aware of that affects the perception of space the most. Tiny particles are able to trig-ger the human catalogue of more than 10.000 odours. As Pallasmaa states *"the nose makes the eyes remember" (Pallasmaa 2005: 54)* and this is something that everyone can relate to. Each home has its own smell. Each flower its own scent. As the smells most often relates to the life that enrols within the home, the frames surrounding the life can still strongly contribute to the perception of the space. The smell of wood carries indescribable warmth, as well as the smell of wet grass brings a freshness unnoticed by the other senses.

The most important about smell and taste, is that it contributes to our perception of a space. Whether the building should resemble a cold, warm, fresh or intimate atmosphere, the smell and taste strengthens the remembrance of the place and the feelings attached to the perception.

The Existential System

"The percept of the body and the image of the world turn into one single continu-ous existential experience; there is no body separate from its domicile in space, and there is no space unrelated to the unconscious image of the perceiving self." (Pallas-maa 2005: 40)
As experiences occur through our life, they are embedded in our existential system and stand as an individual bodily image that constitutes the perceptual system that defines each space. *"The body knows and remembers." (Pallasmaa 2005: 60)*
The existential system is the unconsciousness and with the understanding of the individuality and multiplicity of each unconsciousness, one begins to grasp the pur-pose of architecture. *"Architecture is essentially an extension of nature into the man-made realm, providing the ground for perception and the horizon of experiencing and understanding the world." (Pallasmaa 2005: 41)* This also rectifies the elabora-tion of the human perception of space itself, as architecture is an extension of the human unconsciousness of the world. The multiplicity of individualities and their own consciousness also strongly revolts with the tendency of streamlining every part of architecture. *"Homogenisation of space weakens the experience of being, and wipes away the sense of place."* (Pallasmaa 2005: 46).

As all architecture is a way to understand the world, we have to look back to the pri-meval development of buildings and space. Back then the unconsciousness of the architect was stripped from global impressions, and the functional need of survival was the pivotal point of departure. *"Primitive man used his body as the dimension-ing and proportioning system of his constructions." (Pallasmaa 2005: 60)*. Through time the body has always been used as the dimensioning predecessor. The simplic-ity of survival stressed architecture to develop from the body, and not from societal tendencies. This is rectified with the notion that almost all architecture has some primeval structure as inspiration, whether it is the igloo, Chinese Tolou societies or the dwelling of ants.

"Our sensations of comfort, protection and home are rooted in the primordial experi-ences of countless generations." (Pallasmaa 2005: 62) The perception of well-being is rooted in our evolutionary choices, which rectifies that the architecture that sustain life, and constitute the home, should be developed for the bodily experience.

While the world has many definitions of the perception of home, it is important to realise that it is the life that enrols within that makes a building a home. *"The experi-ence of home is structured by distinct activities - cooking, eating, socialising, read-ing, storing, sleeping, intimate acts - not by visual elements." (Pallasmaa 2005: 63)*
Even though the architectural frames do not carry the defining elements of a home, it *"… initiates, directs and organises behaviour and movement." (Pallasmaa 2005: 63)*.

The most important about the existential system is the realisation that each person and each life carries its own unconsciousness and thus a multiplicity of preferences in perception.
By allowing the frames to sustain this multiplicity and adjust to the bodily experi-ence that enrolls through the life, the architecture can enhance the well-being in the space.

The Haptic System

As we have moved towards an ocular centric society, the most important of the senses has been forgotten in most contemporary architecture. *"The eye is the organ of distance and separation, whereas touch is the sense of nearness, intimacy and affection, the eye surveys, controls and investigates, whereas touch approaches and caresses. During overpowering emotional experiences, we tend to close off the distancing sense of vision; we close the eyes when dreaming, listening to music, or caressing our beloved ones. Deep shadow and darkness are essential, because they dim the sharpness if vision, make depth and distance ambiguous, and invite unconscious peripheral vision and tactile fantasy." (Pallasmaa 2005: 46)* As Pallasmaa elaborates, touch is the sense that has the strongest connection to the moment, because the body has a primeval trust in what is just in front of you. As the peripheral vision is strengthened, so is the sense of touch.

The body experience the sense of touch through the skin. "*The skin reads the texture, weight, density and temperature of matter." (Pallasmaa 2005: 56)* The perception through the sense of touch is much more than just temperature. The perception is a totality of all attributes assigned to the surface, and the surface is a part of the realm that constitutes the perception. As a societal tendency the touch is only assigned the perception of temperature, and even this definition is understood in the wrong way. *"Our skin traces temperature spaces with unerring precision; the cool and invigorating shadow under a tree, or the caressing sphere of warmth in a spot of sun, turns into experience of space and place."* (Pallasmaa 2005: 58) The body experience the momentarily state of well-being not in a point in space, but in the connection between the whole surface of the body and the environment.

But as the human consciousness is ever present in the perception of a space, it is important to acknowledge that *"we behold, touch, listen and measure the world with our entire bodily existence, and the experiential world becomes organised and articulated around the center of the body." (Pallasmaa 2005: 64)* Pallasmaa describes the perception as a totality, and this cannot be broken down to measurable numbers. The extension of the perception of the human body is further supported by Cézannes statement that *"the landscape thinks itself in me, and I am its consciousness."* (Pallasmaa 2005: 66).

The most important about the haptic perception is that we experience on the surface of the skin. The touch is the mean of truth, and is essential for truly feeling a state of well-being. The touch extends to deeper connections in the surroundings that cannot be measured. It comes from the connection between the bodily consciousness and the world.

Relation and purpose

The elaboration on the perceptual system revolts with every single letter in the building regulations and even the newer sustainability certifications as DGnB. When constituting laws that rely on measures, we obtain homogeneity and flatness – a totality of which the anthropocentric bodily experience is not a part.

"The timeless task of architecture is to create embodied and lived existential metaphors that concretise and structure our being in the world. Architecture reflects, materialises and eternalises ideas and images of ideal life. " (Pallasmaa 2005: 71)

2.3.4 BEAUTY

Beauty is an abstract subject but nonetheless the elaboration follows in the steps of the embellishment of the human perception of space. Beauty is not a perceptive impression of idealism, it is like the existentialism of each individuals consciousness, a subject that relates to the life of each being. *"When experiencing a work of art, a curious exchange takes place; the work projects its aura, and we project our own emotion and precepts on the work."* (Pallasmaa 2005: 68) While beauty is deeply founded in the emotional consciousness, it is important to remember what our consciousness consists of. *"We have an innate capacity for remembering and imagining places. Perception, memory and imagination are in constant interaction; the domain of presence fuses into images of memory and fantasy."* (Pallasmaa 2005: 67) We experiences spaces with a full mind-set of memories and imaginations, which is founded in the being of the self, which means that beauty is a relative subject. While beauty is often related with merely a composition of visual elements, the complexity of beauty extends much deeper into the appreciation of life. *"... Determined efforts to scorn visual experience have always been matched by equally persistent attempts to mould the material world to graceful end"* (Botton 2006: 12) Instead of this idealism of beauty, one need to realise that *"it is architectures task to render vivid to us who we might ideally be."* (Botton 2006: 13) As the architecture is the materialisation of the human perception in the world, the feeling of affection and beauty is the reflection and understanding of the self in the world.

While we search for the beauty within architecture it is important to realise that even in the buildings by Geoffrey Bawa or Louis Kahn we can fall into a petty argument that ends in divorce. *"Architecture may well possess moral messages; it simply has no power to enforce them. It offers suggestions instead of making laws. It invites, rather than orders, us to emulate its spirit and cannot prevent its own abuse."* (Botton 2006: 20)

This recalls the remark of beauty by John Ruskin *"Buildings speak – and on topics which can readily be discerned. They speak of democracy or aristocracy, openness or arrogance, welcome or threat, a sympathy for the future or a hankering for the past."* (Botton 2006: 70)

As the building speak of more than a mere aesthetic fondness, beauty extends to relate to the particular way of life. *"The way the structure is promoting through its roof, door handles, window frames, staircase and furnishings. A feeling of beauty is a sign that we have come upon a material articulation of certain of our ideas of a good life."* (Botton 2006: 72)

During the last two centuries, beauty has been sought in different styles, from Classicism to Baroque to Industrialism. While each perhaps has been a little off grasping that beauty emancipate from each individual being, the history has shown good examples on this duality. In the Castle Ward, Strangford Lough, 1767, the husband was a Classicist and the wife keener for the Gothic style, the houses ended up with two facades, each resembling their respective style.

This simple example emphasises the individuality that comes with beauty, and rectifies that beauty cannot be idealised.

10 Castle ward front - *The husbands ideal of beauty is the classical facade*

11 Castle ward back - *The wifes ideal of beauty is the gothic facade*

Even though the beauty or the feeling of affection cannot be idealised, there seem to be some resemblance between the geometry of the beautiful architecture. *"Since the dynasties of ancient Egypt, measures of the human body were used in architecture. The anthropocentric tradition has been almost entirely forgotten in modern times." (Pallasmaa 2005: 38)*

These proportions obviously attain their power of attraction because of the comparison to the human body. By letting architecture originate in proportions that corresponds with the ones of the body, there is a primeval understanding of the spatiality, as Pallasmaa writes, *"The body knows and remembers." (Pallasmaa 2005: 60)*.

2.3.5 THE HOME

The home derives from the life that takes place within. But as the aspect of living change with the culture, the first thing to understand is the realm of the north.

The Nordic has always been different from the rest of the world. With its own interpretation of space, texture and tactility, it is important to survey what we need in the North and why this is - and this can best be found by comparing the state of the North to the contrasting South.

In the Nordic the light enlighten the world and all the things in it, with infinite moods, defined by nuances and forces that never seem to rest. This constitutes a world that is perceived as changing and unsteady. The understanding hereof comes when looking at the predecessor of spatial perception - the south.

In the south, the light seems static. Day after day, the light is the same, and this has led the south to develop the archetypal understanding of light. Here the shadow is sharp, and the contrast is vast. Light and shadow is segregated, leaving the canvas of light in the south to be easy to perceive.

In the north, we have the same laws, but manifested through a set of ever-changing moods. This creates a dynamic state of light that because of the endless expressions seems almost incomprehensible to human kind.

This dynamic multiplicity of light refutes ornamentation, because we already have the means for experiences present through the light. With a world that revolves around us, emanating raging moods, nuances and weather, it is primeval for us to search for the places that we find comprehensible within the landscape.

In the Nordic landscape the primeval place is found in the forest. In there the perception is painted with the endless continuation of skyrocketing trees that sway and creak in the never-resting forces and scatter the light into ever-changing moods. This intense environment makes one search for clues that point towards survival. With the sudden appearance of a path, one gets simplicity in the midst of the incomprehensible scene. To follow this path and on it search for comprehensible features in the landscape, gives us the urge to abandon the path, and search for a home - a place of shelter. While we have the tendency to believe that we comprehend the landscape by the valley, mountain or plain, it is first when a scale is introduced into the landscape that humans can identify the scale of the body to nature.

By tearing a hole in the endless web of nature, this scale appears in the primeval shape as a clearing. While presupposing a context within which it opens, the primeval perception has always been rooted in the surroundings, defined by boundaries, as a breathing hole in the landscape.

This constitutes the urge for a home in the Nordic; shelter from the ever-changing raging nature, and stresses the essentiality of considering the presupposed context within the place it is situated in. *(Norberg-Schulz 1996: 1-46).*

The need for shelter also implies the need for a place to be intimate. *"There is a strong identity between the naked skin and the sensation of home. The experience of home is essentially an experience of intimate warmth. " (Pallasmaa 2005: 58)*

Pallasmaa describes the feeling of home through the metaphor *"A sense of homecoming has never been stronger for me than when seeing a light in the window of my childhood house in a snow-covered landscape at dusk, the memory of the warm interior gently warming my frozen limbs. Home and the pleasure of skin turn into a singular sensation." (Pallasmaa 2005: 59)*

As the home is a place of intimacy, it is important to elaborate on the relation within the city. With the point of departure in case studies of homes from all of the world that people love and have affection towards, five aspects seem to be present in every case.

Human scale

To obtain a scale that the body can relate to, the height of the building cannot exceed four storeys. Storeys beyond this limit, makes the body identify with the whole building rather than the dwelling itself. *(Dalziel 2012: 36)*

Transitions

To introduce a home that is perceived as a pleasant place to stay, it is important to integrate transitions between the public and private. By having paths that turn and divide into a semi-private atmosphere, and introduce a transition between the path to the home, and the entrance, the perception of well-being, with both solitude and fellowship can be obtained. Transitions could be as simple as plateaus, stairs or even shift in the pavement *(Dalziel 2012: 38)*.

Circulation and interaction

To obtain the tranquillity of the home, and the life of the city, the home should have a less public area before entering the individual home. This area holds the potential of social interaction, and should be more than just a transition. *(Dalziel 2012: 39)*.

Light

With roots in the Nordic, and the fact that we search for the clearing within the web of our surroundings, the affinity to light affects our behaviour, and with the use of light and absence of light, the social interaction can be enhanced, because we gather around light, as we gather around the fireplace. *(Norberg-Schulz 1996, 1-46)*

Individualism

It is essential to introduce elements that allow identification and recognition of what is your home to enhance the sense of ownership, and still being able to see that the home is part of a community. *(Dalziel 2012: 38)*. It could be something as simple as your own color on your door.

2.4 The User

2.4.1 FLEXIBLE FRAMES

Five mutable factors
Where it is relatively simple to complete an overall energy calculation of the typical family, it is on the contrary much more difficult to define the impact that flexibility have on the performance of the home. The flexibility can not always be imbedded in the performance, as human, social and economic aspects affect the considerations on changing your house. These qualitative, softer values is a just as important factor in the judgement of the real sustainability, and it is therefore important to tune in on the motivations and needs that change throughout life, where the new common house must follow in its design.

The changing needs for a family can be reduced to five mutable factors throughout life:

Comfort, Privacy, Function, Demography and Lifestyle.

With the *comfort* lies the challenge to obtain a comfortable perception of the space. This is concretised by physical needs like fresh air, sufficient daylight, comfortable temperatures and the avoidance of extraneous noise entering the home. The full achievement is obtained with the more extraordinary needs, like the materiality, perceived temperature of a surface, evocative colours or spatiality.

When it comes to the *life* in the home, it is predominantly composed of soft and non-measurable needs, that change over time. This is emancipated with good accessibility or a free flow through the spatiality of the home, and contrasted with the ability to screen different rooms in some situations. Furthermore visual connections to the surroundings is significant, but with the openness comes the challenge of being able to cover and create safety, avoiding glimpses into the private parts of the home. In the home it is important to feel the life, also through sound, but do this and still be able to retract to an immersive space in the house.

The more *functional* needs encapsulate the boundaries for the daily life of a family, but also allows the home to host parties and have guest and at the same time offer a place for homework. The daily life should also work if a room is for hire during a period. The garden is an important extension of the heart of the home, and should hold the boundaries to furnish the outdoor space even though the seasons present changing conditions.

The *demographic* needs is present to all and could hold the challenges if a residents life changes, for example if the family expansion results in twins, if husband and wife is divorced, when the kids move away from home or if the physical conditions demand special care or layout in the home.

Finally the *lifestyle* plays an essential role in the flexibility in the home. Maybe the family is commuters, who mostly come home to eat and sleep, or on the contrary is working from home with the need of having meetings and use part of the house for outgoing purposes. Or it could be that the family is very environmental aware, or maybe the residents enjoy life as retired, thus being more home, but with less need of space. *(Kleis 2013)*

These mutable factors constantly change the conditions within which the sustainable home exists. But if we take the imaginable transformations and plot them into a time line, it is clear that they exist within different time ranges. Where the need for changing the temperature is within minutes, a lifestyle change like a job is within months and the family expansion is within years, and the retirement is within a lifetime. The difference gives the possibility to foresee the probability of the need in the future, which each can be reached with various different architectural means.
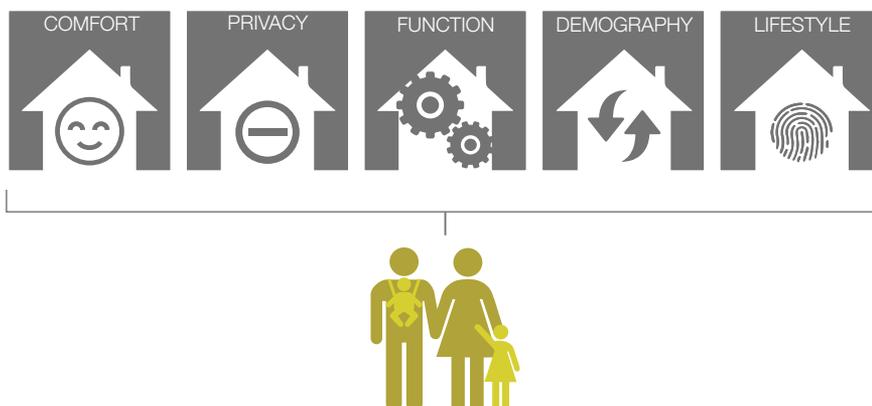
2.5 Case studies

Educated with the analogies of both the architectural and engineerical world, I have learned both from the empirical and phenomenological epistemologies, but what I have realized over time, is that the empirical calculative foundation has a tendency to limit the architecture in the design process, not saying it should be left out. And even though there is a vast array of tools available for visualizing ideas and architecture in the digital world, I have experienced, that the doing of architecture is an intuitive venture, which is fully utilized with the freedom that lies within the sketch.

"Architecture is an adventure that is best explored through the challenge of doing it."

(Unwin 2003)

Instead of trying to prove what cannot be measured, the experience embedded in existing architecture is extracted. This is done on the basis of the method by Simon Unwin, that elaborates numerous themes that break the superficial image of architecture into different pieces that can be understood, adapted and applied in new architecture.

The case studies is picked from three theme: beautiful houses, perceptive architecture and sustainable flexibility.
They each venture within the areas which is found inspirational and defining for the project.

2.5.1 VILLA ROTONDA
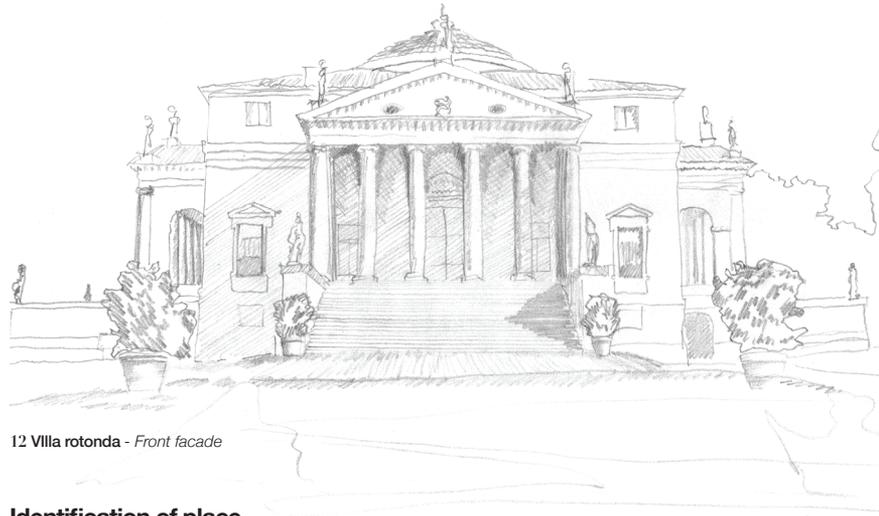
12 **VIlla rotonda** - *Front facade*

Identification of place

Villa Rotonda sits on top of a hill in the outskirts of Vicenza in northern Italy. As a lone giant, the buildings sits in its prime, overlooking the landscape with a particularly rich architecture. The building is composed from its surroundings, where all the beauty from the landscape is presented, limited or extended through different views. From the centralised plan, the human is the centre of the place situated within, and holds the opportunity to experience the world how Palladio thought it should be experienced. Raised from ground, the building praises the supra-human through the grandiose spaces and domes, and the sub-human world through the vaults beneath the building. In the heart of the house, the centre, a tall ascension end with two domes, perpetuating the importance of the centralised space. All other rooms follow the centre, and is based on the centre.
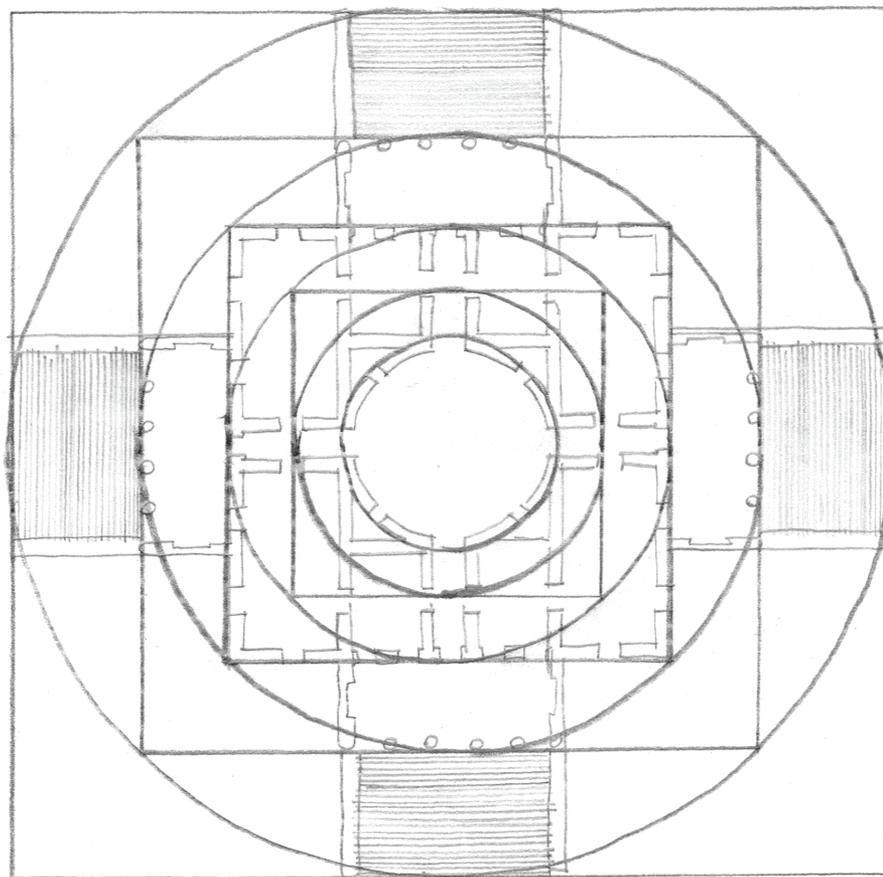
13 **VIlla rotonda** - *Plan drawing*

Basic elements of architecture

The house is raised on a symmetrical platform, accessible through four wide stairs, each against one of the four corners of the world. Orthogonal the boundary of the stairs is underlined with the grass areas in the corners between the stairs, defining a big square around the peripheral border. Each direction is defined by the gables top figure. At the top of the stairs the direction is defined by six tall columns, almost magnetising the body towards the centre. The roof of the house climax in a dome with a spear on top, pointing out the centralised organisation of the plan.
Each door, window and detail is revolving around the axis, which perpetuates the gravitational attraction towards the centre of the building.

Modifying elements of architecture

Revolving around the centre of the house, the scale, materials and light all contribute to enhance this feeling. The light gradually fades from the sharp sun to the swallowing darkness, before the small top dome reveals a beam of light in the centre of the building. To make the feeling more divine, the space is embellished with arching lines towards the top centre. The divine perception is supported with the grandiose space, that because of the domes, compose the sounds to reverberate. The scale of the space and the transitions towards it, strengthens the feeling through the small scale of the transition towards the grandiose scale of the centre space.
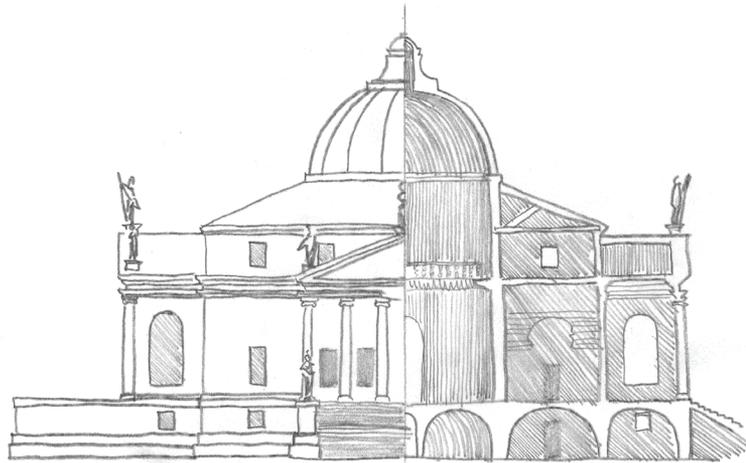
14 **VIlla rotonda** - *Elevation and section*

Ideal geometry

Analysing the plan and section, the drawings reveal an ideal of its own. Beginning to see the squares, circles and triangles in the composition, one cannot avoid to see, that placing a human in the centre of the house, defines the origin within all the compositions is derived from. This can be seen as geometry of being, but the shapes elevates themselves to a more divine ideal. The ideal geometry is believed to offer an attained 'perfection' as in the perfect square, circle and triangle. With the perfection comes a justifying rightness to the architecture and a calmness to the eye. With the use of the ideals, the ornamentation that could produce noise, fades away to the peripheral border, and lets the ideal geometry shine through. In this geometry, it is believed that beauty lies, and one cannot argue this, because most of the architectural pearls of the world, seems to utilise some sort of ideal relation, whether it is 1:2, 2:3 or the more complex Golden ratio 1:1.618.

2.5.2 SNØHETTA REINDEER PAVILION
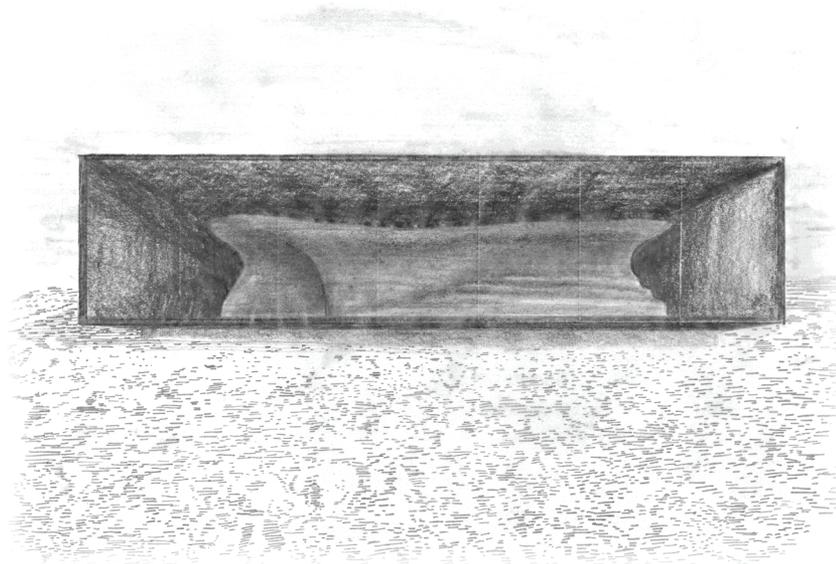
15 **Reindeer Pavillion** - *Front perspective*

Identification of place

Situated on the top of the mountains, the reindeer pavilion ventures to bring the nature down to a scale that is comprehensible for the human. With an understanding for the primeval need for shelter and safety, the pavilion presents the means for well-being in terms of perceiving nature in relation to the self. The pavilion both opens up to the natural scenery, while embracing the body, and this duality constitutes the boundaries that makes the pavilion successful to understanding the infinite raw nature.

The function of the pavilion is saturated through all details, and all ornamentation and noise is removed, to make the strength of the architecture have full effect.

But the frames of the architecture does not limit themselves to the walls of the building, but expands to the journey towards the architecture. The road to the pavilion is embellished with the stories and legends about the nature and embedded in heavy stone in the gravel pathway. At the top of the pathway the building gradually rises from the ground, and blocks the infinite view over the valley and mountains. By using the journey to construct anticipation, and using the architecture to communicate, first by blocking the view, and then when entering, revealing the view, the mind has prepared to the image, and thus better absorbs it.
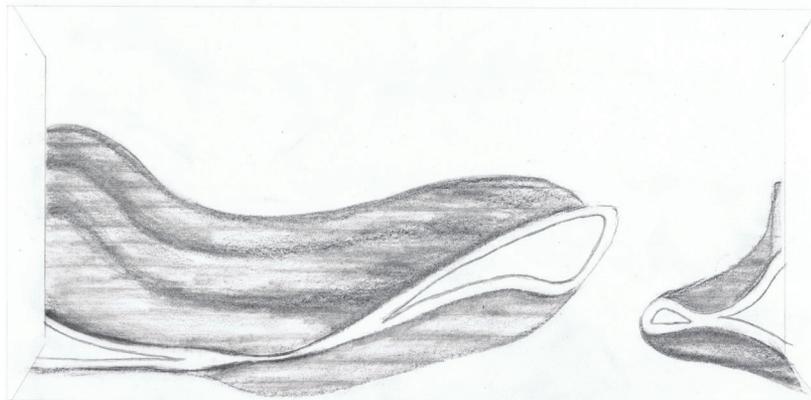
16 **Reindeer Pavillion** - *Plan drawing*

Basic elements of architecture

The pavilion consists of a sharp-edged box and an interior core, cutting up through the ground and air. The core emanates as a sweeping, soft, warm, almost human shape, that instantly is gentle to the eye, and attracts the human body in the otherwise harsh raw landscape. The outer box is clearly defined with the sharp edges and the cold grounded metal. To emphasise the precision of the outer box, the edges is tapered so it creates a line rather than a surface. The window is stripped from noise, and stands as a big glass surface in the room.

Modifying elements of architecture

The tactility we constantly use to perceive the places we are situated within, is well understood in the pavilion. The use of contrasts both in material, light, texture and temperature defines the well-being inside the pavilion, and intuitively gives the user direction on where to be situated. By using a warm material on the interior core, that both has immersive texture and a light appearance, and a shape that embraces and shelters, the human is instantly attracted to the cave inside the pavilion. By letting the frames around the interior core contrasting with sharp edges, cold materials and dark appearance, the boundaries, and thus the understanding of the space is very evident. The core is clearly secluded, but still protected by the outer box, that with its sharp appearance, frames the view, and give a scale that can be understood against the incomprehensible nature. The contrast to the window gives distance between shelter and the world, and in that sense is perceived as a place of well-being.
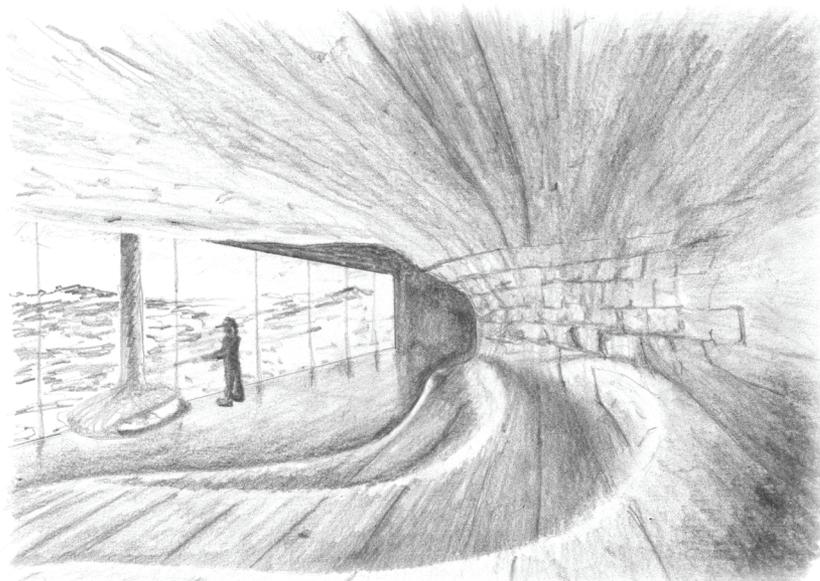
17 Reindeer Pavillion - *interior view of the wooden womb*

Elements doing more than one thing

The use of contrasts within all aspects underlines the womb from where we are in safety and can sit down and perceive the nature. Without the two elements that contrast each other, the pavilion would not work. They coexist simultaneously and work together to present the frames for well-being. The interesting aspect of the pavilion is the fact, that the well-being is extensively stronger with an element that is in total contrast to the well-being. This example eradicates the hermeneutic approach that todays architecture revolving homes have, and exemplifies that the well-being can be strengthened by having an element that is not very comfortable.

Architecture as making frames

The pavilion almost exemplifies the first place to be situated within, the womb - warm, embracing, safe, and thus also constitutes the means for framing the well-being. With the contrasts all senses participate to the perception of this well-being, the touch of the grains, the pleasant warm smell of the resin living in the wood, the absence of sound in the raging weather, the comforting sweeping motions of the logs. They all work together in framing the well-being that is necessary to comprehend the infinite scale of nature.

2.5.3 THE SUITCASE HOUSE

18 **Suitcase house** - *Front perspective*

Identification of place

Alongside the great wall of China, the landscape continues in a never-ending manner, and this identity of the place is adopted into the house. The infinity, uninterrupted flow of nature runs through the main floor of the house, uninterrupted by any walls or functions. The ceiling-high windows lets in the raw light without any sculpting or ornamentation. To accommodate the functional aspect of living, the house rethinks the static room into a multifunctional surface, that unseals the fundamentals of living: eating, sleeping, sociability, bathing, cooking, playing etc. The flexibility of the room allows an endless configuration of the spatial conception, reflected by the use of the building, without compromising the poetic idea behind the perception of nature. The main surface, from where the experience of the space and nature should take place, is elevated and emphasised by the closed box of functions underneath.

Basic elements of architecture

Conceptually the house consists of a closed rectangular concrete box, that elevates the wooden top. In the wooden top, the floor is emphasised and extended by the big openings in every wall.
To expand the floor into nature, the wooden top is fragmented into the necessary supporting walls, with flexible window openings between, that obliterate the boundaries presented with the floor.
To brace the floating charisma, the wooden top cantilevers over the box beneath, making it seem raised from the human perception of nature from the ground to an almost divine position over the infinite landscape. By cantilevering the top, the conception of the big surface is evident from beneath, which strengthens the importance of this particular surface, and reveals the idea behind the house.
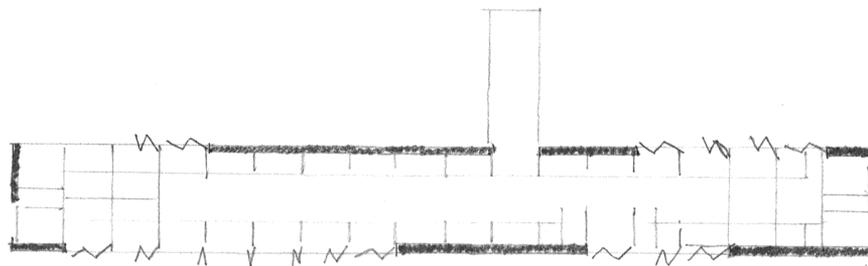
19 **Suitcase house** - *Plan drawing with flexible hatches marked in floor*

Modifying elements of architecture

The perception of every space is compared to the scale we comprehend, the human scale. With the idea of saturating the house with the infinity of the landscape, the scale becomes one of the most determining perceptive factors. This infinity is interpreted in the deep rectangular space, emphasised by the windows as continuous walls of light. With the continuation of the floor, the interpretation of the use of the house becomes very flexible. By abandoning the static walls of functions, and transforming them into openings in the surface, the room accommodates every aspect of living in one adaptive, flexible room. To support this flexibility, the textures of the room accentuates the longitudinal direction of the space, and at the same time clarifies the current use of the room when openings a fracture herein.
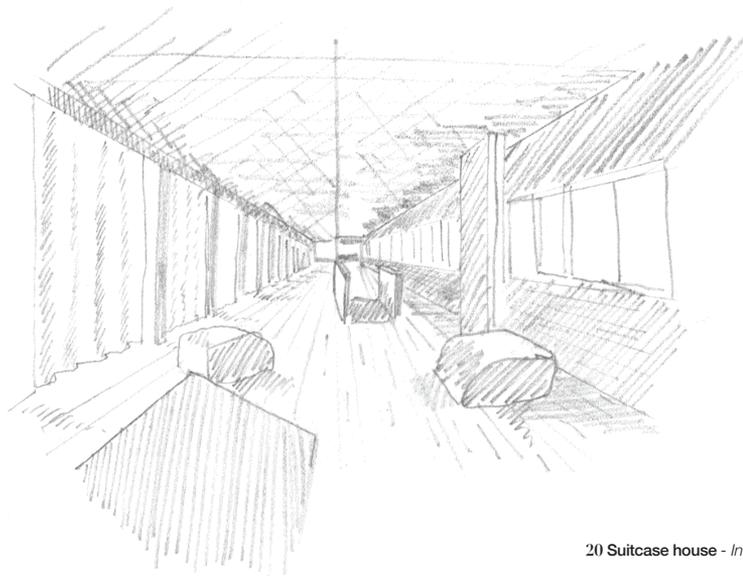
20 **Suitcase house** - *Interior view*

While the open room relates to nature and the flexible use, it also contrasts the more intimate functions of the house situated in the lower box. By making the big room bigger and lighter, and the lower box of functions enclosed and dark, the change in intimacy is very evident. This contrast is also reflected in the materials, where the top is of light wood and the lower box of grounded concrete.
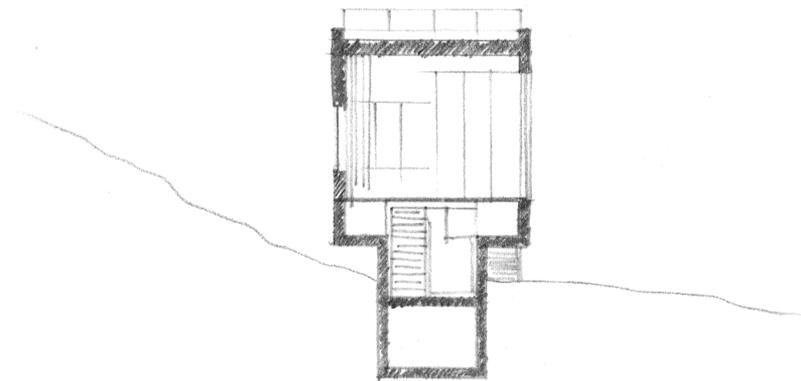
21 **Suitcase house** - *Short section with flexible floor*

Elements doing more than one thing

The floor of the house is reinvented to be more than a surface. By using the floor as the container of functions, the rooms gets new potentials. One of the sustainable features of the house, is that the functions situated right under the surface and opens into the big rooms utilise the big room, and avoids an unused waste of space, when not used. It also breaks with the present conception of rooms in the house. The fact that the user needs to interact with the surfaces, underlines the story of the flexibility and emphasises the potential of change within the house.

2.5.4 JUVET LANDSCAPE HOTEL
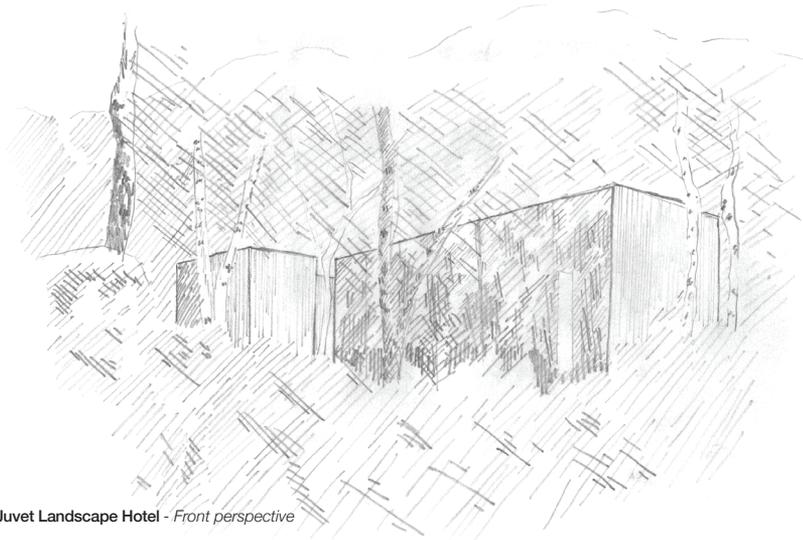
22 **Juvet Landscape Hotel** - *Front perspective*

Identification of place

Conceptually the hotel builds on the immersion of one self in relation to the spec-
tacular nature in the norwegian mountains and rivers. With the declining typography,
the small houses carefully put themselves in the forest floor, each framing their own
unique view. The placement in the landscape presupposes an already present con-
text, which makes the small houses evasively change layout according to the space
left behind between the trees. This gives each small house their own uniqueness,
where the spatial perception of the inside coexists with the ever-changing scenery
that it frames. Every inch of the architecture is present to brace the nature, thus the
expression of the houses maintain as very simple, clean and sharp in relation to the
diverse fertile, wild nature.
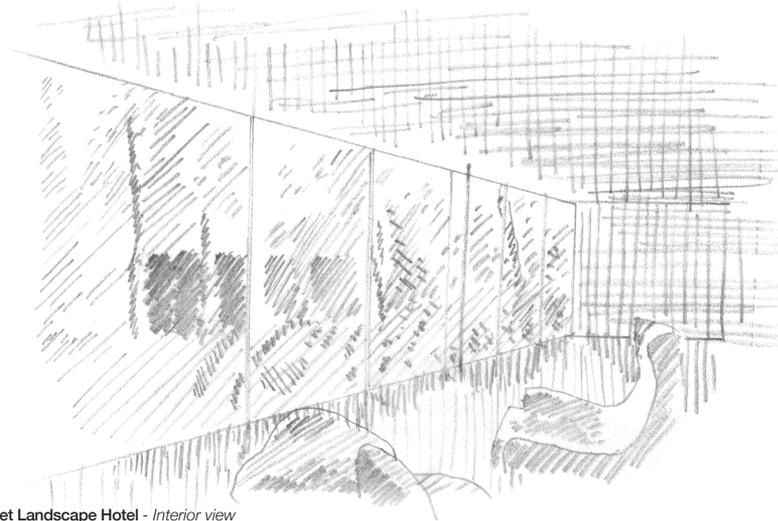
23 **Juvet Landscape Hotel** - *Interior view*

Basic elements of architecture

The small houses is basically evolved with the framing of a view. From this squared
view, the functions of living, sleeping, showering and eating is attached between the
trees ending in an orthogonal plan, where every function is kept to the essentials
with no waste of room. The floor slab is slightly raised from ground, both to minimise
impact on the nature around it, and also to allow light constructions. The geometry
consists of simple boxes that connects towards the view. The simple composition of
the small houses, make the house itself very easy to comprehend, which contrasts
the wilderness and incomprehensible nature.

Modifying elements of architecture

With the nature, that seems incomprehensible to the human, the small houses possess a scale that relates to the human. With spatial compositions that are just the necessity, the small houses embraces and creates the boundaries for start to understand the nature. This is supported in the textures, where simple, rational, wooden lamellas introduce calmness in the midst of the wilderness of the nature. To support the immersion of nature, the materials from inside is kept simple and dark, so that the light that enlightens the world is focussed on the nature and not the interior. With this reason, the rest of the house has almost no windows.
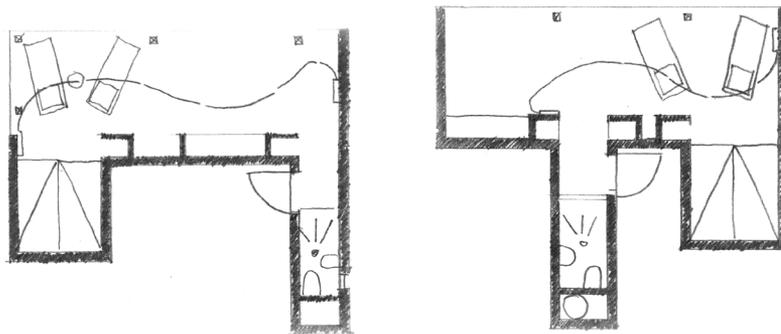
Elements doing more than one thing

With the small houses, the boundaries for understanding the nature is present. To nurture the fact, that we as humans need to retract and rest, the house features the ability to pull a curtain that sweeps in front of the window. Velvet red, the curtain stands as a soft, warm barrier that protects and provide safety, contrasting the rest of the dark, hard house. Almost like an airbag of humanity, the curtain embraces the human vulnerability, but not only in the sense of the perception. As a sustainable feature of flexibility, the curtain encloses the spaces where we retract to. With the notion, that we do retract, the space between the window and the curtain is left without insulation, simply because there is no reason to insulate something, when a flexible curtain can create the shelter needed. The curtain also presuppose the direct impact the use of the cabin has on the indoor environment, simply because it is in our nature to dress warmer when freezing. By letting the user physically pull the curtain, the understanding for the reasons to do so is much bigger, than if a ventilation unit just automatically regulated it.

By letting the space between the curtain and the window be without insulation, the space speaks with more than just the visual sense. With temperature changing when it is cold, and raising when it is warm, there is created a whole other level of both understanding of how the environment is, and our presence in it.

Architecture as making frames

One is liable to consider framing as something purely visual, but architecture is more than just making figurative compositions. The frame of architecture includes the spatiality, the third dimension of which the two is present in the picture-frame. The finest task of architecture is not the visual frame, but frame the life in it. In the small houses, the understanding for embracing frames to consider the house as homely, is present through the use of the soft curtain. And by letting the architecture contrast the warmth and softness of the curtain, the focus on the qualities the curtain brings is emphasised, in the finest way to accommodate and frame the life that happens after hours.

PLACE
KLØVKÆRGRUNDEN

3.1 Space, place and meaning

All existence happens in a place. Here phenomena is experienced towards the world that is present. Entering the place, one start to wonder what is place in the first place.

"It consists of people, of animals, of flowers, trees and forests, of stone, earth, wood and water, of towns, streets and houses, doors, windows and furniture. And it consists of sun, moon and stars, of drifting clouds, of night and day and changing seasons. But it also comprises more intangible phenomena such as feelings. This is what is "given", this is the "content" of our existence."

(Norberg-Schulz 1980: 6)

With the notion, that place is more than just a location, the understanding is best elaborated through the bodily experience. It also brushes the realisation that place is something that do not exist within four walls. Place is before walls and roof, emanating in its primeval shape as simple as a fire. *(Unwin 2003)*

In this section, the place of the project will be described by some characteristic notions about culture, typology, infrastructure and areas. To support the registrations, the place is experienced through the paragraph walking the landscape, where the immediate experience of the place is presented.

The experience of the place is supported with research on the climatic conditions, as they affect the sustainable initiatives and the place drastically.

25 **The site** - *panoramic view from the south-east corner*

3.2 Kløvkærgrunden

The competition area situated in Seest, near to Kolding in an area called Kløvkærgrunden, invites to architectural innovative proposals towards a new housing development. It is the basis, that the new buildings should be perceived as a assembled housing area with its own identity, that separates from the surrounding area of single-family houses.

The new homes is build app. 2 km from the city center of Kolding, where you find many cultural, business- and educational related offers and a trading life, that grows concurrently with the positive development in the city center. The nearness to an attractive landscape, the nature along Kolding Ådal and the coming Seest Fritidslandskab is part of making the area especially attractive to families with young children and to newcomers to Kolding.

The competition area is nationally known for the fireworks accident in Seest in 2004. To Kolding city and its residents in the area the site has an obvious importance, and there has been much attention towards the future of the site. The development will constitute a new beginning for the area, and it is of importance, how the connection, activities and community between the new development and its surroundings can enrich each other.

(Ministeriet for by, bolig og landsdistrikter 2013)

SOUTH

FARMING   CHURCH   FAMILY HOUSES   SITE   FAMILY HOUSES   KOLDING ÅDAL

NORTH
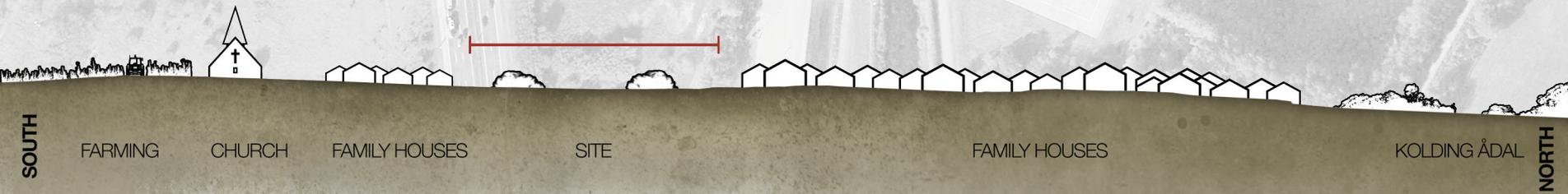
WEST   FARMING   HIGHWAY   WOODS   FAMILY HOUSES   SITE   EAST

26 **The place** - *Landscape plan 1:2000*

27 **Landscape sections** - *1:5000*

41

3.3 Culture
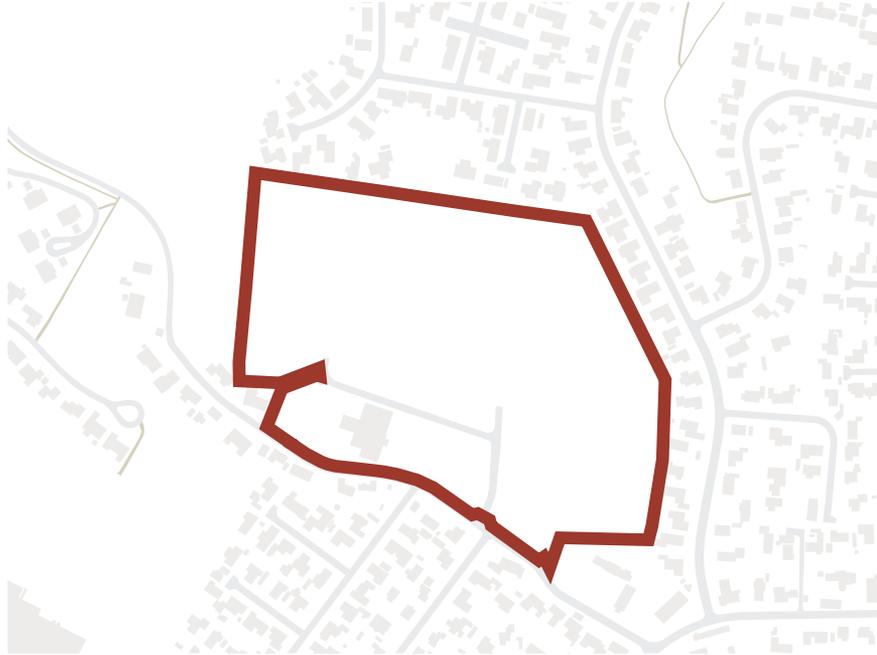
3.3.1 INTRODUCTION

Kløvkærgrunden is positioned in the hearth of the Danish primeval typology. With a location that features both the suburban city life, and attaches to the green belt cutting through Kolding, the site presents potentials with diversity and an area with both historical importance and identity. The site has a size of 92100 m².
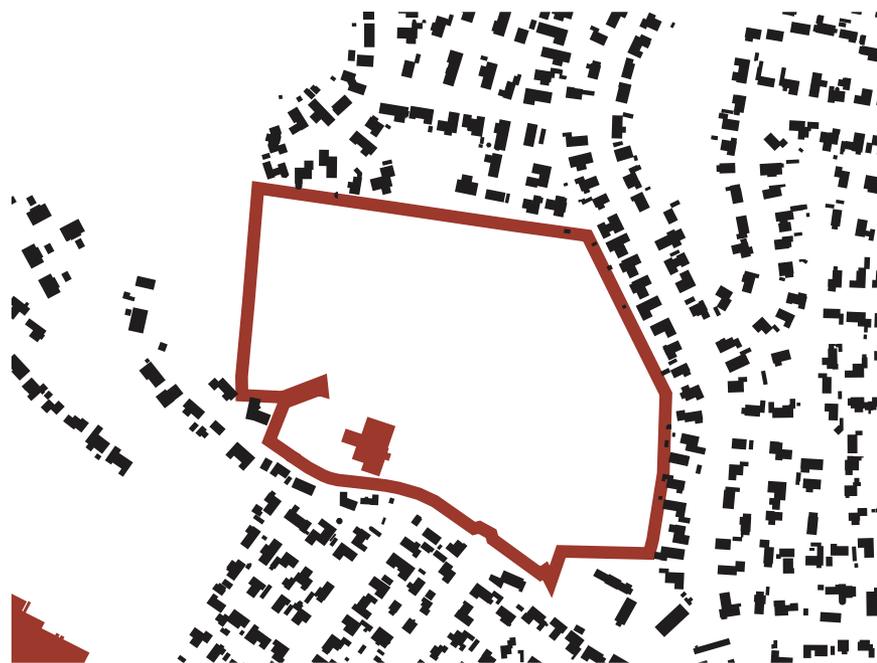
3.3.2 THE DANISH FAMILY HOUSE

From the illustration it is evident that the area is dominated by single family houses *(black)*. Only a few deviating industry buildings pop up in the south-west (red). The dominating typology also composes an area with many offers for all kinds of users. Users benefits from the close bus stops and schools, and a safe neighbourhood. The houses is a mixture of old and new, while most of the houses near to the site appear newly renovated in the aftermath of the fireworks accident in 2004.

3.3.3 INFRASTRUCTURE

Whilst being an area dominated by the danish single family house, the transportation and thus the infrastructure is mainly for cars *(black)*, though with the well-known sidewalk. Even though infrequent, some pathways (green) is found, mainly in the north-eastern area through a green hill, and to the west, where the paths lead through an area with shared housing.

In the competition it is a wish that there is created connections to Seest Fritidslandskab to the north-west, Kolding Ådal to the north, Kolding city centre to the north-east, sports area in Vonsild to the south-east and Nordic Synergy Park to south-west.

NATURE

FAMILY HOUSES

MIXED

KLØVKÆRGRUNDEN

INDUSTRY
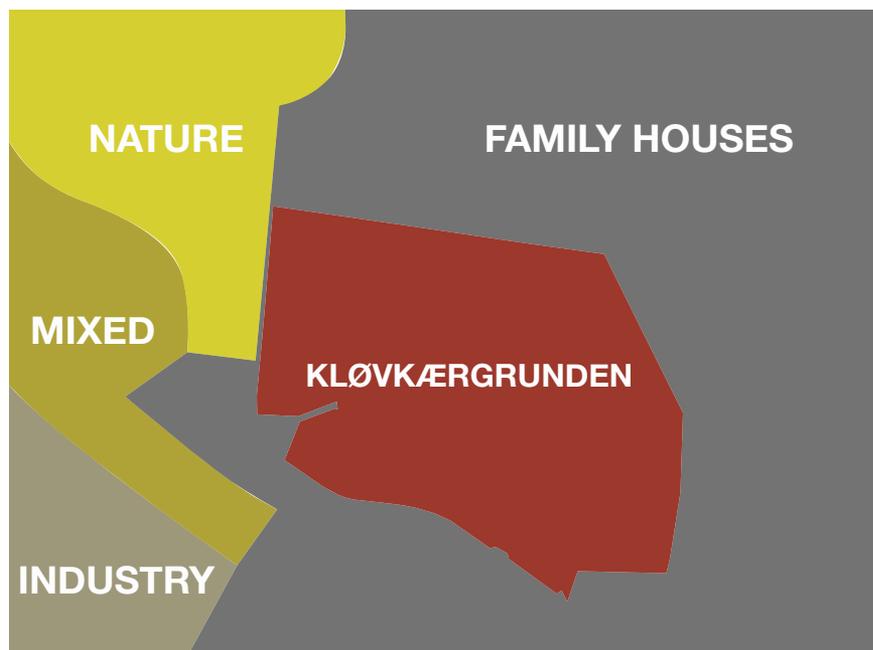
3.3.4 DISTRICTS

The typologies and infrastructure together with the green areas define districts in the area with different characteristics. The family houses is dominant, with the daily family life, and the well-known danish suburban context. The industry is on the edge of the city, located to the south-west, and defines the graduation between city and land. The mixed area consists of some businesses and also some shared housing, which puts the typology and use closer to the site, than the family houses. The nature expands down into the site, as an extension of Kolding Ådal, with the future development of a spare time landscape. The site itself is located right on the edge between the familiar city, and the exciting nature. The location gives opportunity to have the best from both world, with the safety from the family houses and the wildness of the natural landscape.

3.4 Walking the landscape

3.4.1 THE SUBURBS

Approaching the site, you are situated in the most literal suburban scape of the Danish tradition. House after house, with small, neat, manicured front yards, that all lead up to the front door of the house, only equalled with the driveway where the mandatory family van has its home. With the similar typology, and their aping from their neighbour, the area almost stands as a maze, where the only identification of the particular space is the small blue road name sign. This is of course a deviation of the human scale in the area, with no house being taller than two stories. Turning down on of the sweeping roads, the site suddenly stalls into openness, and burst open the scale from fine meshed to enormous. The immediate perception is the road, and then something besides and behind it. To the right, a wild plain expanding lower than the road emerges as the first and biggest place on the site. With a view that goes through the plain and continues towards the cityscape, the plain has a very airy and transparent perception.

28 **Approaching the site** - *Small scale and saddle roof*
29 **Similar family houses** - *The known front yard and drive way*
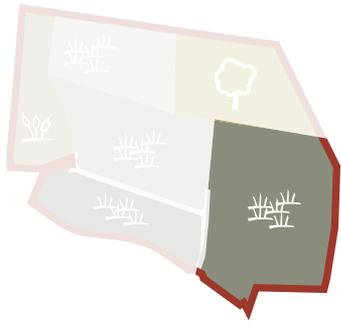
30 **The site** - *panoramic view of the full extent of the site*

31 **Entrance** - *the road entering the site*

32 **First Plateau** - *plateau to the right of the entrance*
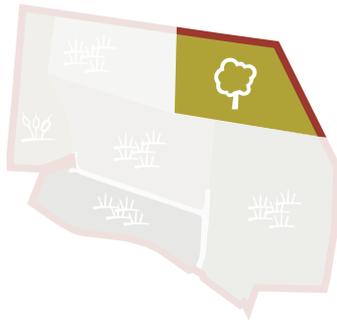
3.4.2 THE WOODS

Luring deep into the background of the plain to the right is the woods. The woods contrast the openness to the plains in the area, and stands as a unique element in the landscape with the wilderness of nature. The trees in the woods encircle a small plain hidden from the city and the site, and stands out as a very safe and private place. The woods is perceived as a boundary in the open, and introduces a sense of scale to the stretching plain.

33 **Road to the woods** - *the road splits down to the woods*
34 **Extend of the woods** - *the woods at the bottom of the first plateau*
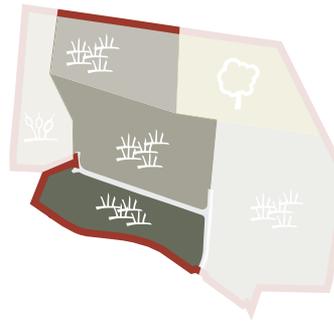
3.4.3 FROM WIDE PLAINS TO MISTY SWAMP

Through the site remnants from the past are shown in descending plateaus, each defining its own place. Accentuated by the sweeping road, the site is divided into the two top plateaus and the bottom plateaus. The left bottom of the site presents change in the scenery. From the wild grass the ground change to wetter, greener swamp. This change in scenery clearly presents the challenge in the slope, and the discharge of the rain water, but also gives the opportunity to obtain different atmospheres in the urban development.

35 **Plateaus** - *slope between two plateaus*

36 **Slope** - *further descending slope to next plateau*

37 **Bottom of site** - *second last plateau*
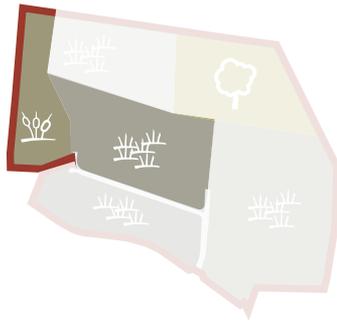
38 **Wet** - *change in greenery*

39 **Change** - *from wilderness to human made grass*

40 **Diversity** - *from wilderness to grass to rush*
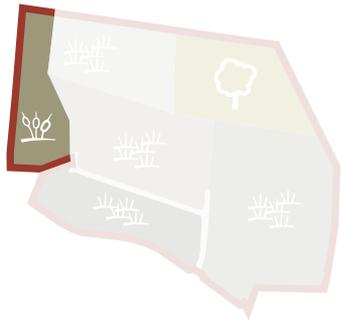
41 **Rush** - *the rush in the transition*
42 **Swamp** - *the svamp in the site*

3.5 Climatic Considerations

3.5.1 WIND

As the houses compose a fine-masked blanket spread over the landscape, suddenly a patch appears. The hole in the blanket creates a countersink in the scenery, and rips open the protective wind barrier. But the site carries clues on the conditions, with a peripheral boundary of trees, that shelter the open plateaus of the site. Even though the wind wanders ower the trees, the banks width is to big to maintain the shelter. This presents some holes in the barrier that lets the wind rain. To get a clue on the problematic areas in the site, the landscape is analysed with compuvtional power. The results show the plateaus to the left and right of the entrance, and the bottom plateau as very windy, and the road as a funnel for the wind. This can be avoided with the urban development and by using trees.
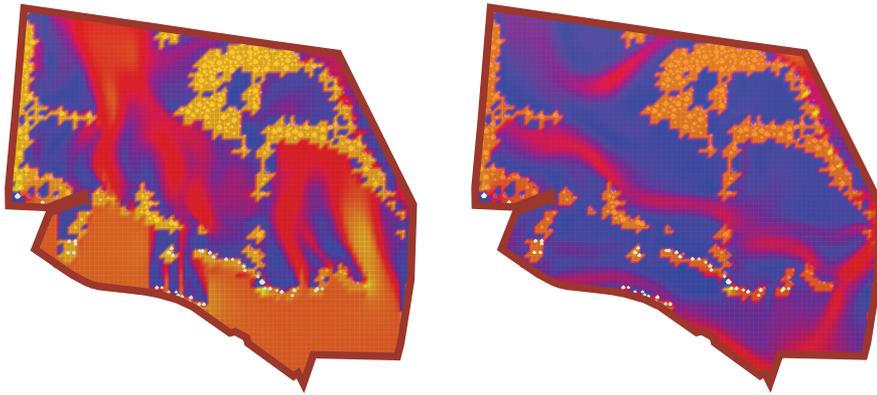
43 **Wind analysis** - *Shows areas with high wind speeds in red*
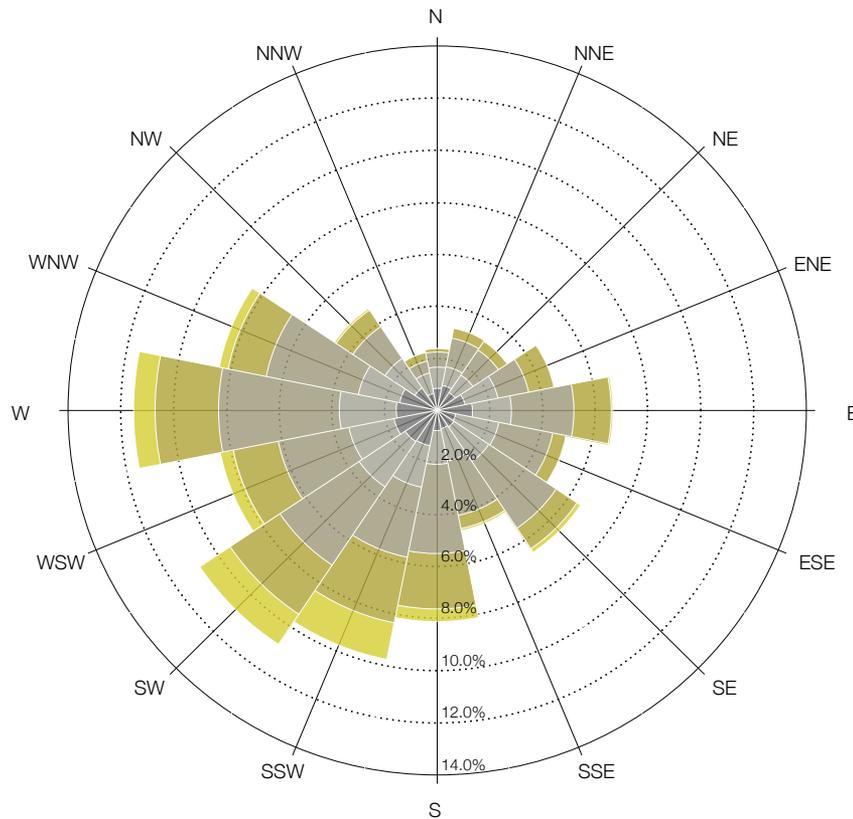
44 **Wind rose** - *average wind distribution in the area*

3.5.2 THE LIGHT

Light has in the Nordic context always been the frame of reference to our perception of the atmospheres. The understanding of light and its infinitive appearances has always been a subconscious matter of course. With a reality that shifts, changes and shatters in endless ways, the light of the Nordic is not easy to understand, and impossible to declare definitive.
This calls for an awareness, that both presents challenges and opportunities. Challenges of sufficient sunlight and the ever-changing position of the light both affect the performance and perception of the places that we inhabit. But it also presents the opportunity to maintain simplicity in the architecture, and harvest the multiplicity through the light.
The fact that the length of the day shifts throughout the seasons, perpetuates the importance of light. Simply because there is less of it, when we most need it.

Characteristic of Kløvkærgrunden is the descending landscape from South to North, where the long shadows from the low winter sun appears early. The dark of the place though holds the characteristic of overlook the lights from the city, glowing and creating scale in the pitch-dark night, and a safe feeling of not being alone. As the family area awakens in the morning, so does the light with glowing colours and shadowing scars of the surrounding context.

Winter

16:00   08:53

Equinox

18:42   06:09

Summer

21:00   03:43

Sun elevation

57°
34°
10°
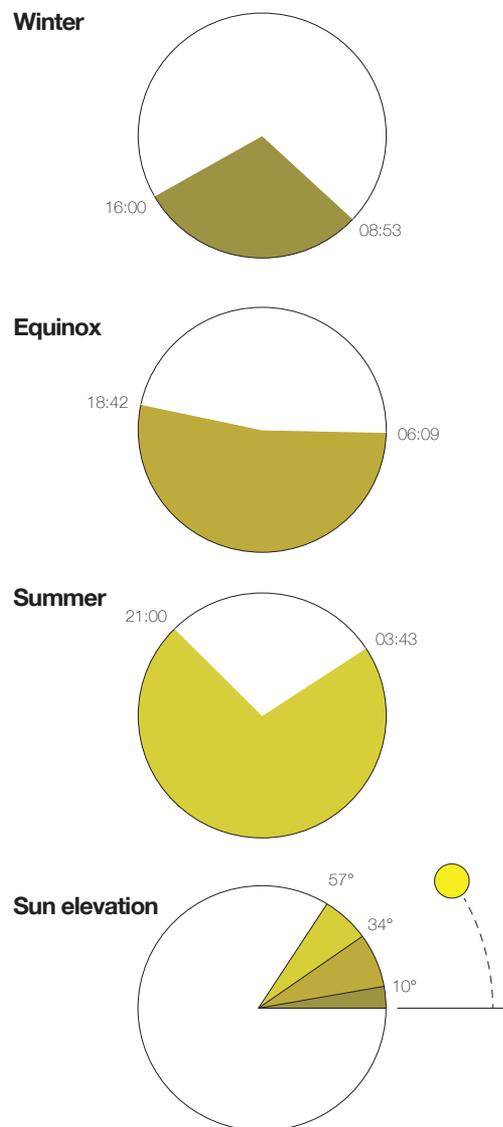
46 **Sun diagrams** - *sun hours and elevations during the year*
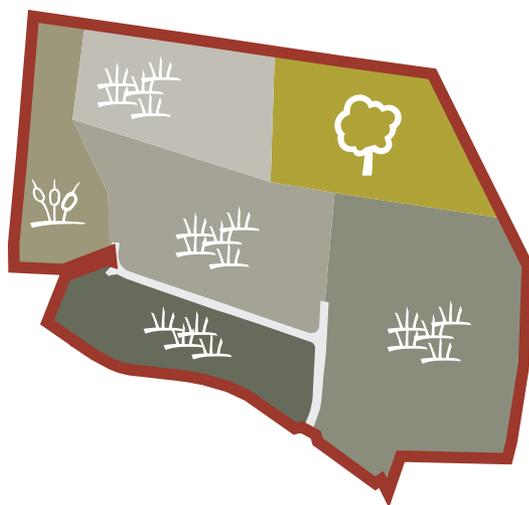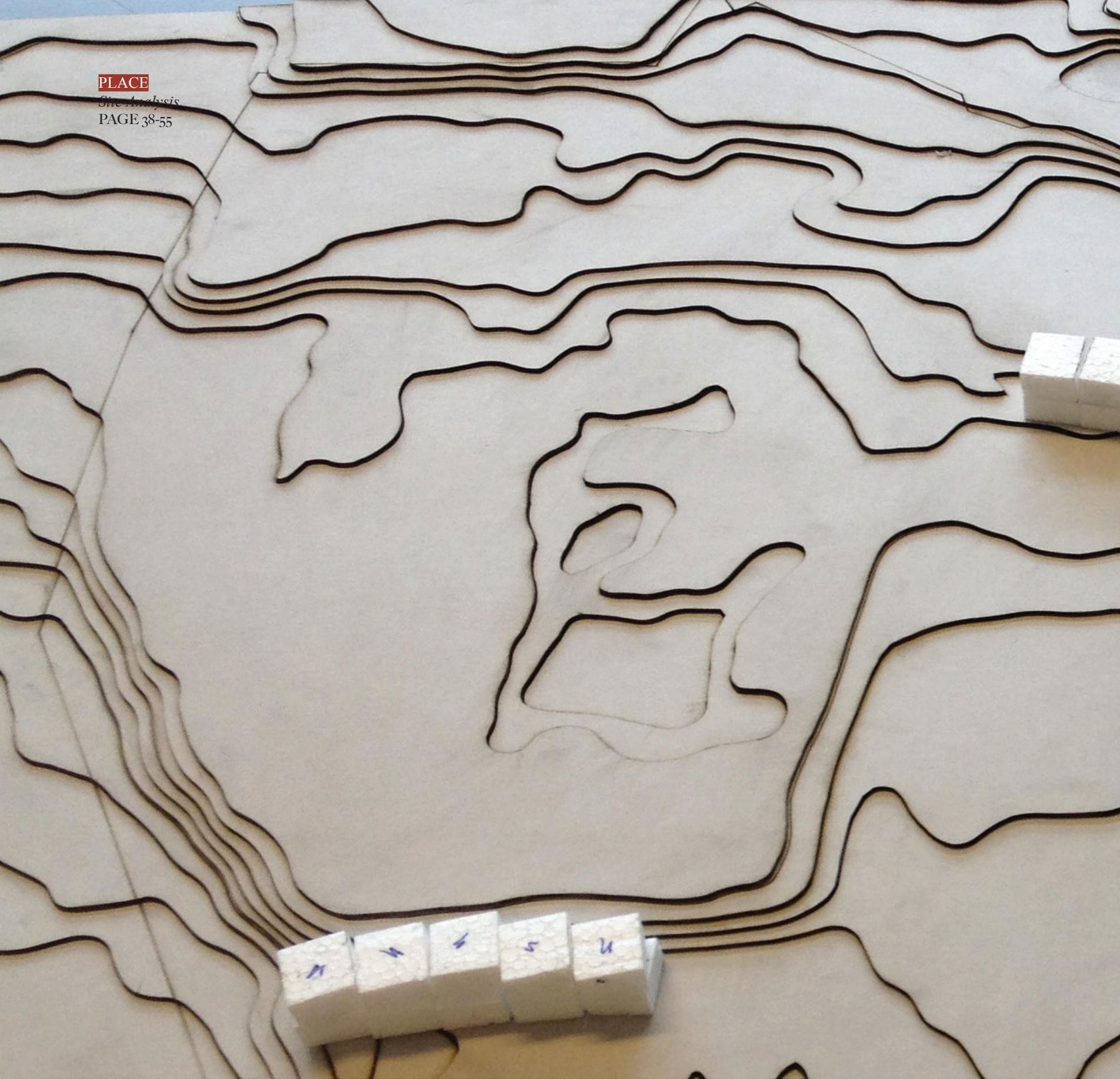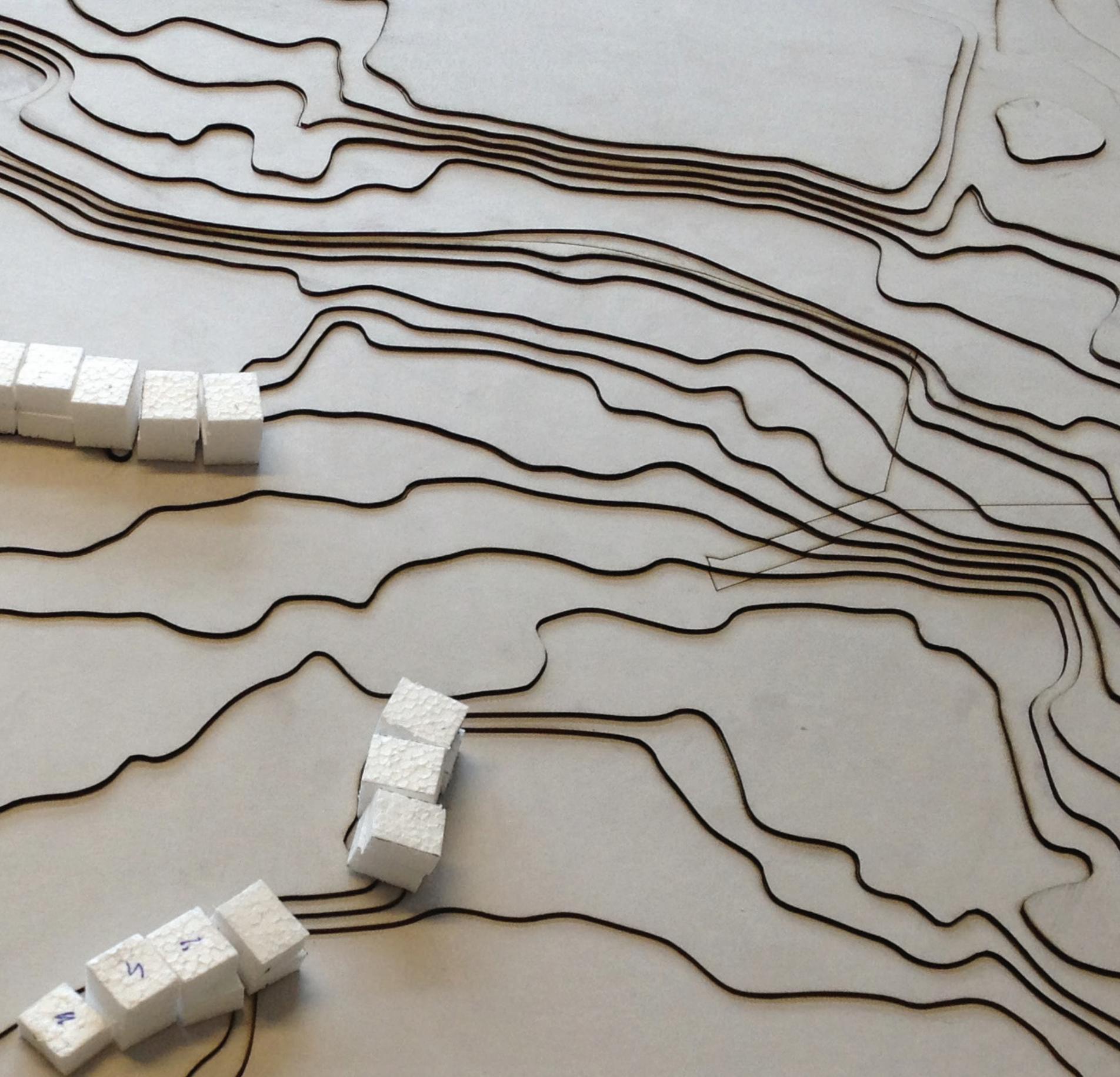
Kløvkærgrunden is scared from the life brought by the decay of the industry once present. With human made plateaus ranking down from south to north, an unusual potential is created.

The slope, from one plateau to the other, defines the edge, the tension field and the transition from one qualitative, identifying mark to the other. From windblown plain to protected forrest to misty svamp, each area is at the same time attached and detached from the bigger whole.

This presents the opportunity to infuse the site with buildings that feature their own identifying mark while belonging to the same common denominator, and encapsulates both the potential and character of place.

FRAMEWORK
GUIDELINES THROUGH THE PROCESS

4.1 Vision

Situated within the age of sustainability, the future sustainable common housing design aims to revolt with the current ocular centric world optic that is optimised for the rationality of the society. By making architecture that speaks through the tactile perception of the human, the design aims to introduce a new awareness that tells the narrative, from master plan to detail, of how to live sustainable, instead of just making misunderstood frames.

The common housing project will encapsulate the fundamental architecture through the identification of place, and rethink the frames that encircle the life in the home with flexibility that withstands the diversity and multifariousity of the changes in the human behavior and life.

Situated in the realm of the north, the projects expression and evolvement of the architecture will emanate in the Nordic and holistic approach, infused with simplicity and transcending coherence in all scales.

Love towards the buildings inhabited returns better care and longer life of the buildings, therefore the project search to perpetuate beauty within the domain of sustainability. The sustainability in the design is simple, comprehensible and most of all driven from the influences of the human.

4.2 Functional vision

Homes

To accommodate the adaptations of time, the homes is established on flexibility, that is developed to help the resident understand the narrative behind sustainability and the impact of behavior and life changes. The flexible frames revolve around enhancing the perception of the architecture through tactile development of spaces, surfaces, materials, light and sound.

Functionally the design is built on a zoning of the home that divides the absolute necessary from the comfortable functions. In this way the design can embody the flexibility around the functions with no compromise. To get coherence the design encapsulates the tranquility of the home and the fellowship of the community with transitions that graduates public from private.

Community

The solidarity in the community relies on safety and fellowship. By creating safe frames, that enhances sustainable strategies and the narrative behind it, the common agenda of living sustainable is found.

To enhance the fellowship, the community features a community hall, where common meetings, events and casual meetings occur. The community hall is light, transparent and stands as the heart of the community.

Surroundings

The surroundings are a continuation if the flexibility that constitutes the homes. The narrative behind the sustainable strategies should be transparent in the surroundings. The speed in the area should reflect the lives of bicycles and pedestrians, whilst containing the flexibility to coexist with cars. The narrative is evident among others evident in the preservation of the landscape, and the introduction of new-planted corridors, that both enhances the biodiversity, and creates spaces within the landscape.
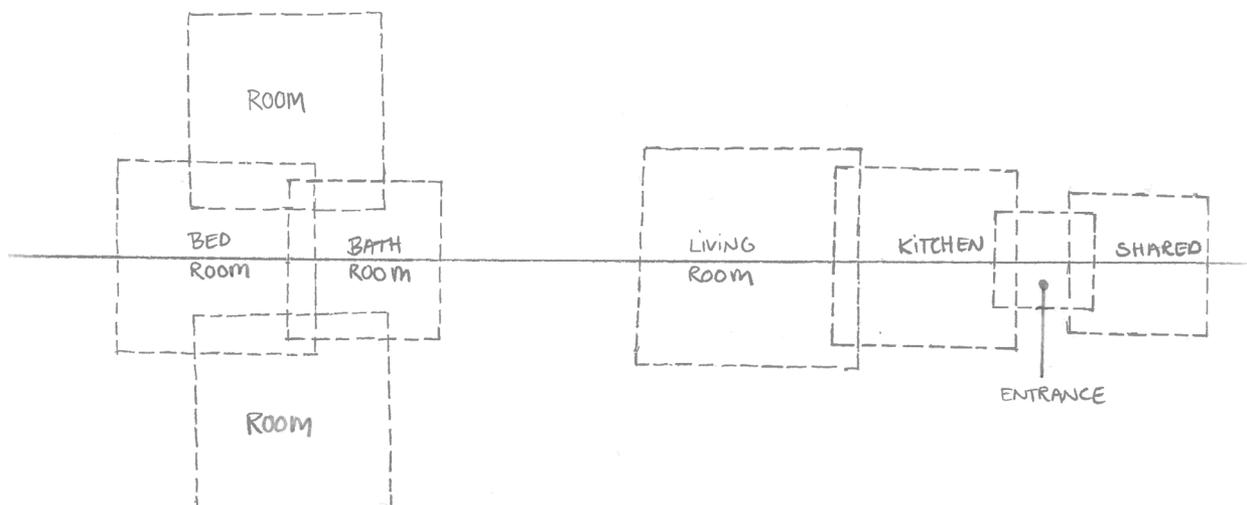
49 **Function diagram** - *the functions in the homes and their relations*

		Spatiality		Light				Thermal		Well-being		
		Size	min. room height	light level	color temperature	time of light	intensity of light	Activity level	Room Temperature compared to general operative temperature	Atmosphere	Functional needs	Attributes
		[m2]	[m]	[lux]	[-]	[Time]	[-]	[met]	[-]	[-]	[-]	[-]
35 pc.2-4+ rooms family homes	KITCHEN	12	2.7	500	Warm	Morning, evening	Bright	2.54	Cooler	Light Warm	Stove, Oven, Fridge, Dishwash-er, Sink, Storage, Surface	Fresh Air
	LIVING ROOM	20	2.7	500	Warm	Noon-evening	Mellow	1.2	General	Light Warm	Sitting area Eating area Living area	Flexibility
	BED-ROOM	16	2.7	200	Cold	Morning	Dim	0.92	Summer: Cooler Winter: Warmer	Summer: Dark, Cool Winter: Light, Warm	Bed Storage	Fresh Air Privacy
	BATH-ROOM	8	2.7	200	Warm	Morning, evening	Bright	1.29	General	Light Warm	Shower Sink Toilet Storage	Fresh Air Privacy
	EN-TRANCE	4	2.7	200	-	Morning, evening	Bright	2.1	General	Light Warm	Storage	-
	ROOM 1	15	2.7	200	Warm	Morning	Mellow	1.2	General	Light Warm	Bed Storage	Fresh Air Safety
	ROOM 2	15	2.7	200	Cold	Evening	Mellow	1.2	General	Light Warm	Bed Storage	Fresh Air Safety
	SHARED	8	2.7	200	Warm	Morning-evening	Mellow	1.2	General	Light Warm	Living area	-
APARTMENT AREA		98										
BUDGET		3525										
TOTAL		3430										
Common	CERE-MONIAL HALL	60	3	500	Warm	Morning-Evening	Bright	1.2	General	Light Warm	Seating Dining	Bright Open
	KITCHEN	20	3	500	Warm	Morning-Evening	Bright	2.54	Cooler	Light Warm	Appliances	Functional Open
	GUEST ROOMS	16	2.7	200	Warm	Evening	Mellow	1.2	General	Light Warm	Bed Storage	Fresh Air Privacy
	TOILET	6	2.7	200	Warm	Morning-Evening	Bright	1.29	General	Light Warm	Shower, Sink, Toilet	Fresh Air Privacy
BUDGET		75										
TOTAL		102										
TOTAL BUDGET		3525										
OVERALL TOTAL AREA		3532										

4.3 Design parameters

4.3.1 AESTHETICAL CONSIDERATIONS

The design is infused with simplicity in all aesthetically considerations. The development of the design and the aesthetically appearance will be to enhance the perception of well-being within the home. This is elaborated by balancing structure and components with materials and light, all working together towards create a space of well-being, that with in-depth details aesthetically support the technical initiatives and narrative in the project. Instead of following the tendency to make the same conditions at all places, the project seek to emphatise, support and strengthen the perception of the spaces and the well-being through the use of contrasts. To accommodate the concept of designing for the human, the proportions that corresponds with the geometry of the being or ideal geometry is the driving relation between scale and space.

While the project seeks architecture that encompass the sustainable narrative, the coherence between concept, detail and the means in between become the frame that holds the key to the human perception. This derives the importance of the perceptive qualities that materiality and spatiality possess in the search for sustainable architecture.

4.3.2 SUSTAINABLE CONSIDERATIONS

Optimise functionality

The functional use of the building encapsulates the impact on the environment. By working with flexible frames, that allow for altercation within the home, without further use of natural resources, the design will both be sustainable in the functional sense, and also in regards to the life cycle of the home. The implementation of the flexibility should involve the user, to increase the awareness the impact that the use of the building actually have on the sustainable way of living.

Optimise indoor well-being

With the vision of creating a home that is infused with the way we perceive the space, the thermal comfort also takes point of departure from this. By attaining the means by which the human body regulates the well-being, the project seeks to support and embrace these means, that for example includes working with the conductivity of the surfaces and minimising the humidity on warm days with hygroscopic materials. Furthermore the air quality should be pleasant together with the visual comfort. The frames around the architecture should be beautiful as a mean for obtaining the well-being, and with this said the project seeks to expand the understanding of indoor well-being to include the importance of the visual apparent perception.

Optimise energy consumption

To ensure that the design will meet the demands of energy in the building regulations for year 2020, the project will mainly be developed with passive strategies, that by cooling the building, reducing heat loss and utilise heat gains ensure low energy consumption. To make the resident understand the initiatives, their narrative will be developed evident through the architecture. If it is proven necessary, active strategies will be implemented, but with the task to tell the narrative behind it.

Optimisation of building envelope

The envelope of the building should reflect the flexibility that constitutes the homes. As a sustainable feature it should be light and the recycling and replacement of elements within the building envelope should be present. To ensure that the project is rentable, the envelope should reflect the economic agenda with the use of cheap, low-maintenance materials with a beautiful patina.

Volumetric and geometrical optimisation

The perception of the volume has a drastic influence on the way the architecture is understood and therefore used. With this the optimization of the volume and the geometry should be to support the sustainable initiatives that extend from the homes to the urban development. The perception of the volume also affects the perception of the flexibility, and therefore the volume is optimised to obtain a dynamic and open appearance. When the volume and geometry is optimised to the human perception, it can start to be optimised to reduce energy consumption.

Preservation of nature

To obtain a diverse area, with experiences that vary through the site, and to maintain the bio diversity in the area, the nature is to be preserved, while new planted areas adds further diversity and multiplicity to the area.

Improve community

The design will improve the community by making the frames for fellowship. By having shared areas and a common community hall the base for the community is laid. The community should include sustainable features that tell the narrative about sharing and living together, to both create safety and a background where people help each other.

4.3.3 TECHNICAL CONSIDERATIONS

Revolt with the DGNB indoor climate definition

The well-being is by the Danish Building Regulations and also the DGNB measured by values in space. Utilising materials that drastically change our perception of our well-being within the place, does probably not much for the value, that DGNB vouches as a good indoor climate. This grey zone, that has a huge impact of the perception of the well-being, is to be evolved through the design, and to support and critique both the design and the DGNB certificate, calculations that show the affect on the values will be integrated, not as a proof of the indoor climate, but as a foundation for the discussion about the current definition of well-being within the home.

Simple structure

While the structure is not the main objective of the design, it cannot be forgotten. The design will utilise spans and structures that is known to be stable. This is both to limit the project, and also a way to approach the assignment on creating cost-effective common housing. The main purpose of the structure will though be to support the narrative behind the sustainable initiatives, and support the perception of the space.

Daylight calculations

One of the main factors affect out well-being is light. Living in a place, where the conditions change drastically over year, the intake of light, and the values hereof is developed with Velux Daylight Visualiser. Beyond being capable of calculating the values that constitute the well-being in DGNB, it also has the ability to truthfully render the light conditions, and this is one of the strengths that can be utilised in the design.

Energy optimisation

It cannot be contradicted, that we need to optimise the energy consumption in the homes we dwell within. This is also an agenda of the project, but it needs to work closely together with developing details that actually let the user understand which initiatives is taken on this behalf, and also how they individually work. To optimise the energy, different strategies known through other project, and also through other experience will be implemented and tested. This will push the design as far down as possible, without compromising with the main objective to create a space of well-being.

IDEATION
FROM THOUGHT TO PRACTICE

5.1 Introduction

The course of the design process has been following the principles of the integrated design process. This has lead to the simultaneous development of both the big picture and the exquisite detail. Usually the integrated design process is synonymous with trying all choices available, and it usually leads to some fumbling with the direction of the project. With a set of well-defined visions for the project, the course of this design process has been following a very focused direction. By optimising the process and consequently and divagate digressions, the process has been true to the visions from start to the end.

During the process, different tools have been utilised to develop the project. Mainly sketching within plan, section, elevation and perspective has been the idea-making tool. The sketch is without limitations, the tool of instant reaction, and thus for me has been the fastest and most precise tool. With the notion that the sketch has the liberty of bending the true expressions and perception of space, the physical models has been used as a confirmation of the ideas with most potential, and a continuation to study the perception of the spatiality of the idea.

To emphasise the narrative of the project, the process is elaborated from the big picture down to the exquisite detail. The real development of the project has been very simultaneously, with both the big picture and the details developing alongside, affecting and improving each other, but the understanding of the project is best when getting the chapters of the project in order. To make the transition between the scales clear, following icon will be shown when going into the detail
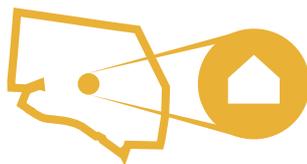
And the other way around look for this icon

With a project that wanders between the architecture and engineering one can easily be confused in the decision-making. With my revolting vision, the architectural narrative has always been the determining factor. Even though engineering sets demands it has never been the determining factor in the project. Making great architecture that respects engineering has been the saturated paramount of the project.

The next 25 pages tells the story of the process through the project.
To see what the fuss is about, turn to page 88.

5.2 The Big Picture

5.2.1 THE TRINITY OF PLACE

In the analysis of the place, three dominating atmospheres revealed themselves. The site is separated into three main identities – the forest, the plain and the swamp – each holding different identities and qualities. With the notion from the theoretical disposition of beauty, that we perceive beauty as an extension of our unconscious self, the idea of allowing different and diverse atmospheres blossom, corresponds with the theory.

Drawing the placement of the three identities, they all seem to revolve around a point at the site, a center, from where the all expand into their own wildness of nature.

5.2.2 TYPOGRAPHICAL FUSION

Being a site, that has a big span of levels, shifting through the man-made plateaus, the importance on the typography was clear. With an already present focus on the center between the trinity of place, the natural typography emphatises this place, as it is the lowest part of the site, situated with a small lake in the center. This furthermore emphatised the idea of a center in the project.

5.2.3 ETHNOGRAPHICAL STRATEGY

With the natural center appearing in the site, the strategy of the more ethnographic aspects of living is evaluated. When designing a common housing project, one of the main aspects is fellowship. To emphasise the narrative behind this fellowship, the concept of an omnipresent-shared center is a strong strategy. Revolving around a center embeds the story of sharing - and caring about the environment and about the neighbours. At the same time, the nearness that the center holds, introduces the opportunity to imply 'less mine' and 'more ours' in the project, which enhances the community.

5.2.4 ACCOMODATION

To accommodate the project size on the site, the strategies of Jan Gehl 'To assemble or dispurse' is utilised as an initial evaluation of the site size and the development. The exercise was conducted with a building-plot ratio of 40%. The assembled layout of the development has the advantage to create dense buildings that preserve the most possible nature. The dispersed layout lacks hierarchy. Even though there is obtained some interesting spatial experiences, the layout eliminates the preservation of the nature, and blurs the boundary between nature and building. Even though the common housing, and thus the project, is only taking up 4% of the building ratio, the full building percentage is the design stepping stone. In the early design phase, initial calculations also clearly favoured the assembled typology, simply because it has less building surface per floor area.

5.2.5 BENDING AROUND CENTER

Prolonging the idea of a center, the buildings respect the typographic lines and subtle touches down alongside nature. The idea was to preserve and respect the natural identities in the area, but instead the subtleness makes the narrative of the center to weak to perceive.

5.2.6 CONTEXTUAL FUSION

With a wish from the program to connect the project with different activities around in the city, the paths are introduced to intersect with the center. While connecting to the city and allowing a free flow through the site, the narrative of the center is further emphasised. This also visually introduces a hierarchy of the center in the site, and separates the different identities of the place.
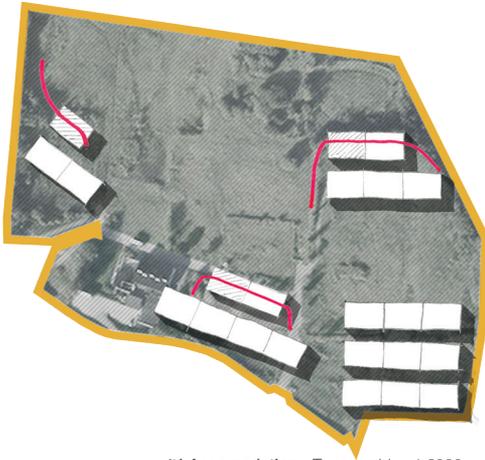
51 **Accomodation** - *To assemble - 1:6000*
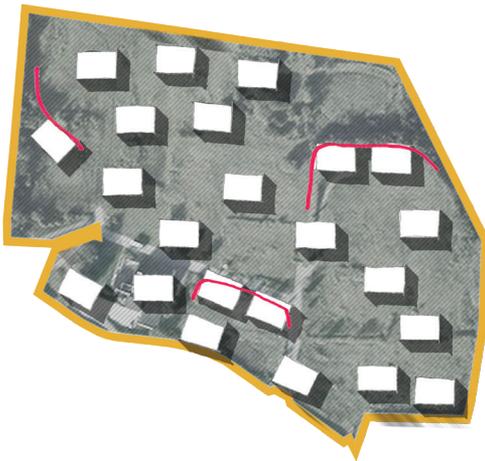
52 **Accomodation** - *To dispurse - 1:6000*
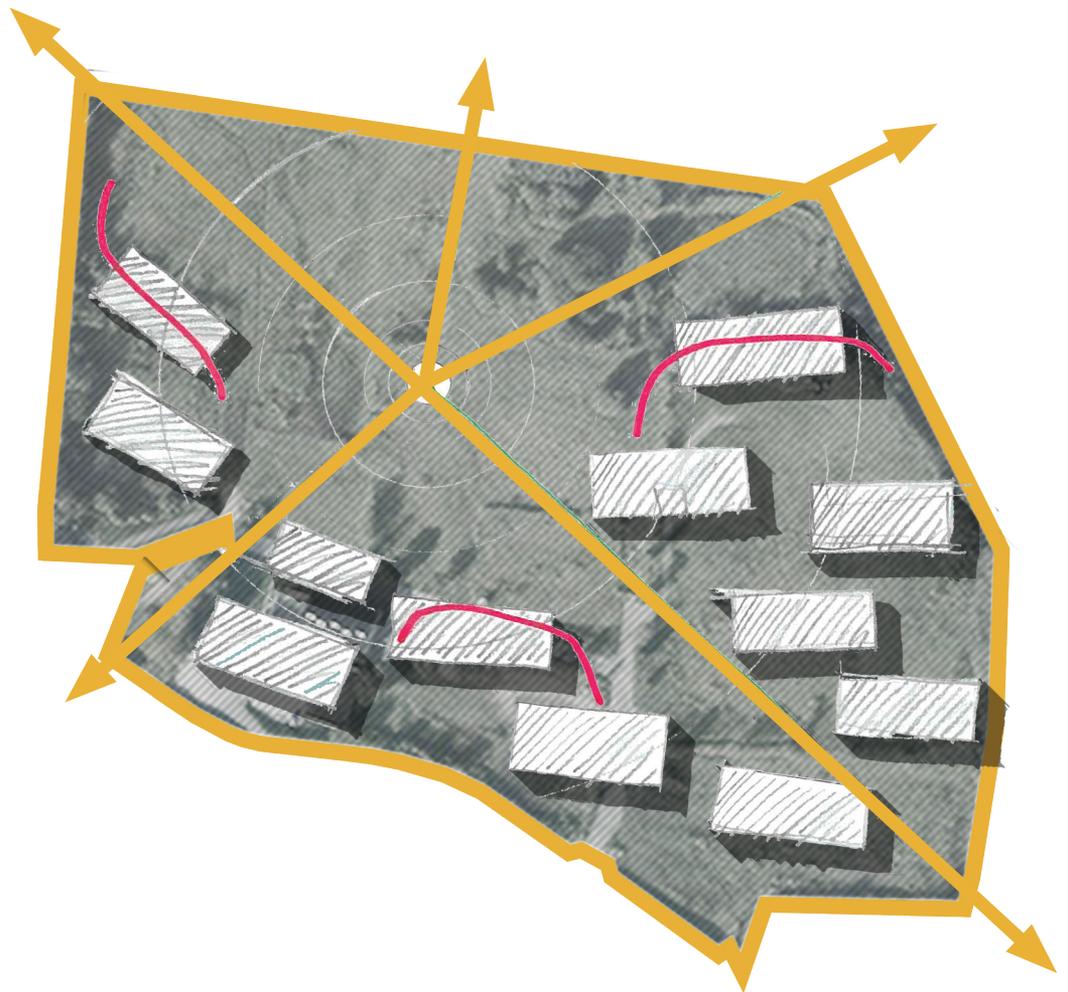
53 **Bending around the center** - *1:3000*
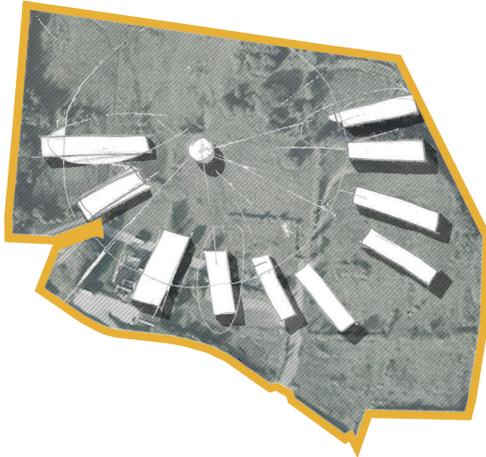
54 **Revolving around center** - *1:6000*
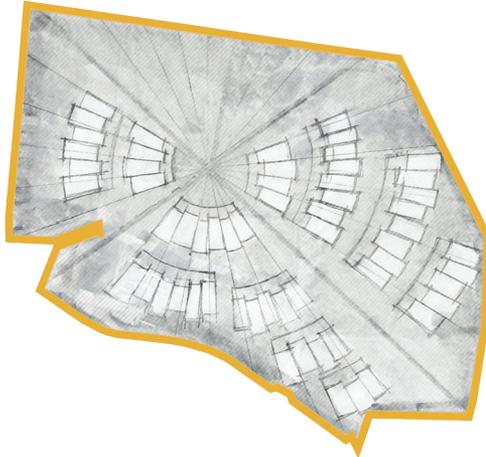
56 **Introducing the circle** - *1:6000*

58 **First proposal for masterplan** - *1:6000*

55 **Revolving around center** - *model picture*
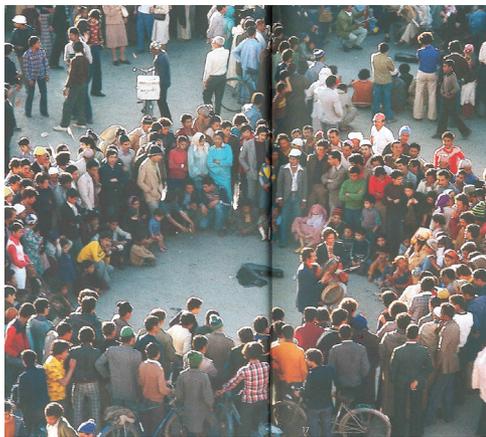
57 **Human instinct of fellowship**

59 **Sketch of community hall in center**

5.2.7 LETTING NATURE BE

To intensify the narrative of the center, another approach is taken. Instead of subtly touching the buildings down in the nature, the buildings emanate from the center clearly defined in the landscape. By letting the buildings cut through nature and keep the geometry tight, a contrast is created. In itself the contrast is much stronger in preserving nature, and the natural identities, because it so clearly defines what is man-made. Even though the narrative of the center is exponentially improved, the linear blocks create long unwanted stretches, that preclude the option of obtaining a human scale and the identification of the individual home.

Learning from the mistakes made through history, the mega cities eradicate any form of sensory experience and renders the city distant and inhuman, which also relates to the long stretches of facade.

5.2.8 INTRODUCING THE CIRCLE

To attain a development that has embedded the narrative of fellowship, the attention is turned to the human perception of fellowship. Diving into the research, one simple event reveals the way that we as humans intuitively arrange ourselves within fellowship. The street artist is the perfect example on how we instinctively arranges in a circle of viewers. That is just one example. Another is the well-known fire place, where we always sit in circles around the fire.

Inspired by these simple phenomenons, the development is translated into rings spreading from the center. Having the idea of a common house in the center, the rings presuppose to exist from a center, and when separating the apartments with a line from the center to the ring, the inclined trapezoid that is created tell the narrative of the circle even inside the apartments. Even though the energy consumption of the arched buildings is worse than the linear, the best performing typology, the block, is kept as the founding typology.

5.2.9 FROM THOUGHT TO PRACTICE

To attain a realistic layout of the development, both distances and building percentage is incorporated in the layout. The apartments are shifted to attain individuality within a bigger complex. The shifting though has the disadvantage to blur the narrative of the circle in the development, and the distances between the buildings is to big. The center is embellished with the common house, that stands as a symbol of fellowship, of a common agenda to live in a community where everyone thrives.
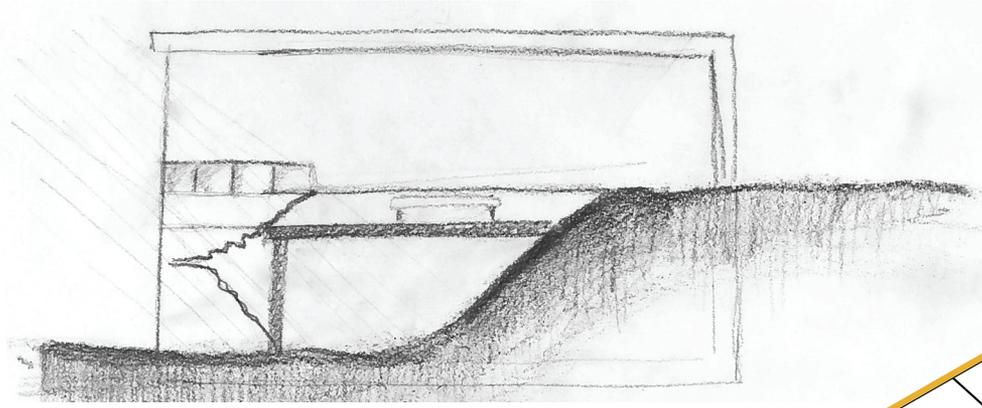
60 **Building into the slope** - *Section sketch*
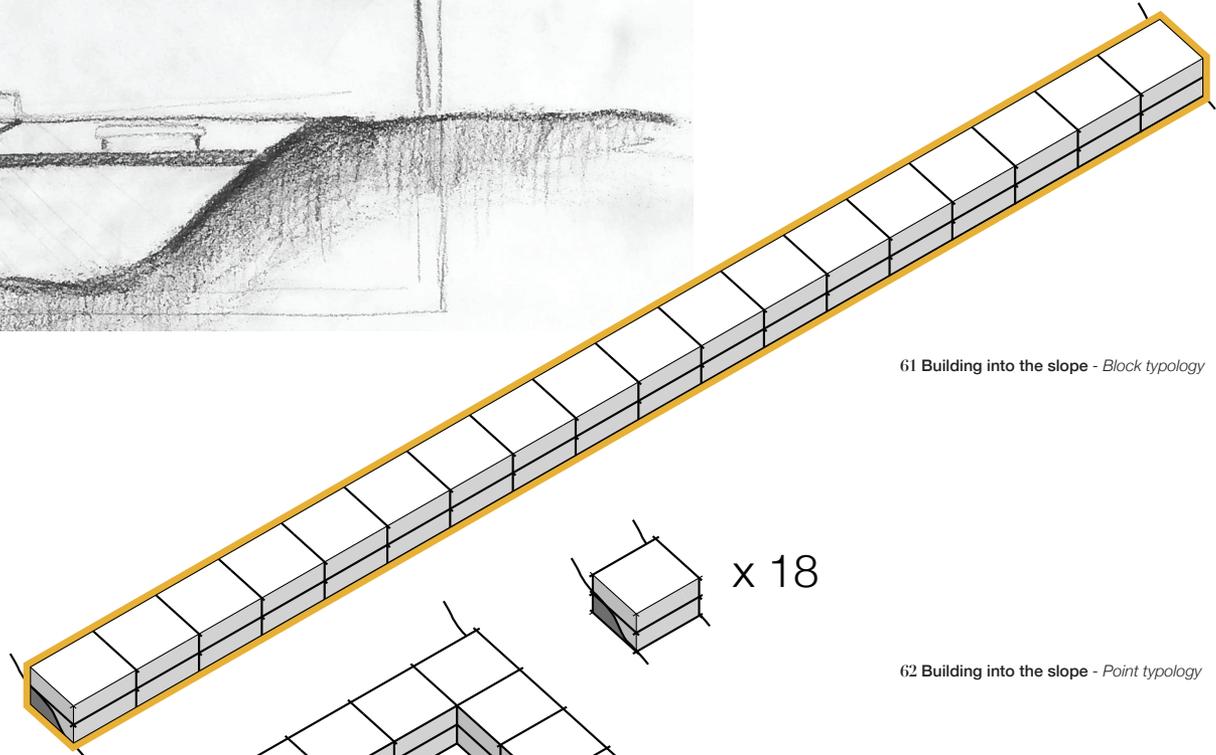
61 **Building into the slope** - *Block typology*

x 18
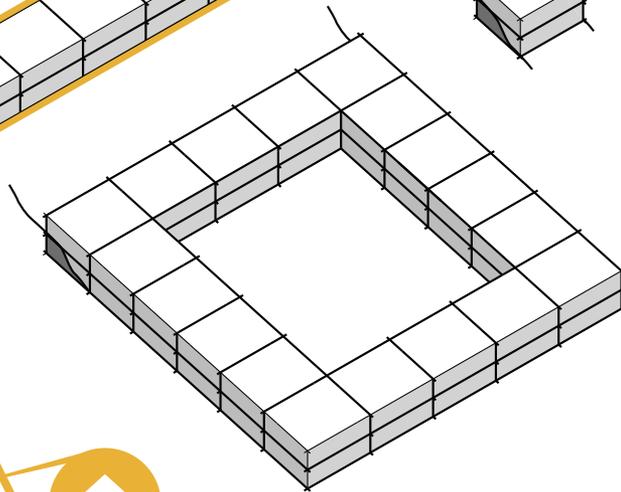
62 **Building into the slope** - *Point typology*

63 **Building into the slope** - *Square typology*

5.3 The Detail
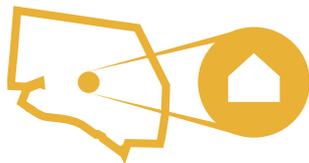
5.3.1 USING THE PRESENT QUALITIES

As the analysis of the site revealed, one of the prominent features of the place is the man-made plateaus. Drawing the section with the plateaus, the flat space is not a rare guest in the Danish landscape, but the transition between is. The slope defines and edge, a tension between two areas. Instead of avoiding the slopes, the architectural idea of building into the slope is born. Already as a preliminary functional idea, the home is separated into two parts, the living space and a more intimate space. Building into the slope embeds the narrative of having a part of the home that is embraced and protected by the slope and a part that appears open and light.

5.3.2 ENERGY-CONSERVING POTENTIAL

Building into the slope, leaves several walls exposed to the ground rather than the air. As an assumption this would affect the energy-conserving potential of the building. To test this, and to relate to different building structures, three different typologies' energy use and savings potential for building into the slope is tested – the point, the linear block and the square block. The high-rise would probably be the most energy-conserving typology, but as the local plan disclaims building over two stories, it is removed from consideration. The study reveals that the linear block is far superior in conserving energy, and also has the biggest potential to harvest the benefit from building into the slope *(See ill. 64)*. Because of this, the block is chosen as the utilised typology.
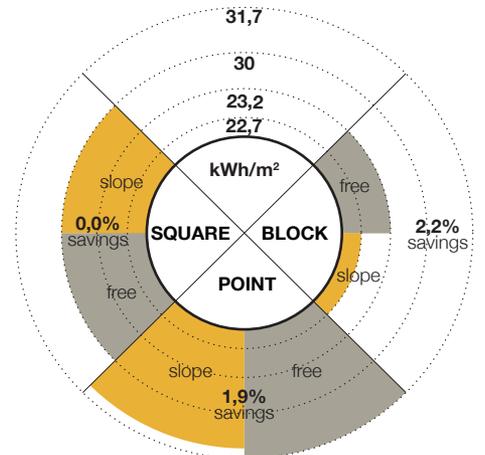
64 **Building into the slope** - *Energy use*
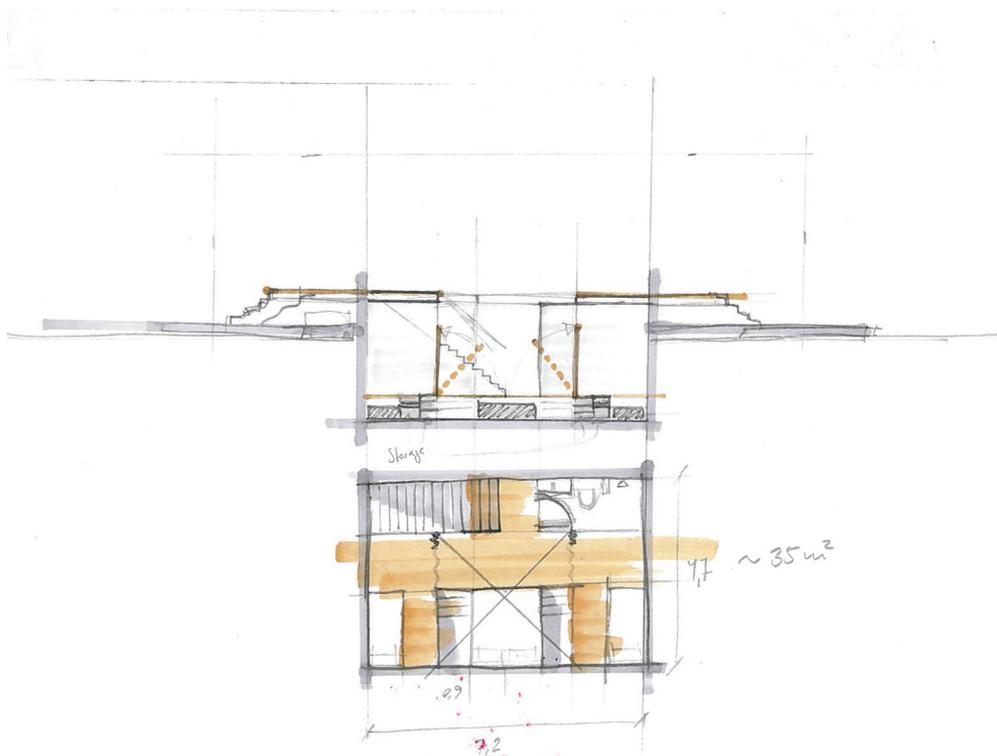
65 **The bare essentials** - *two atmospheres*
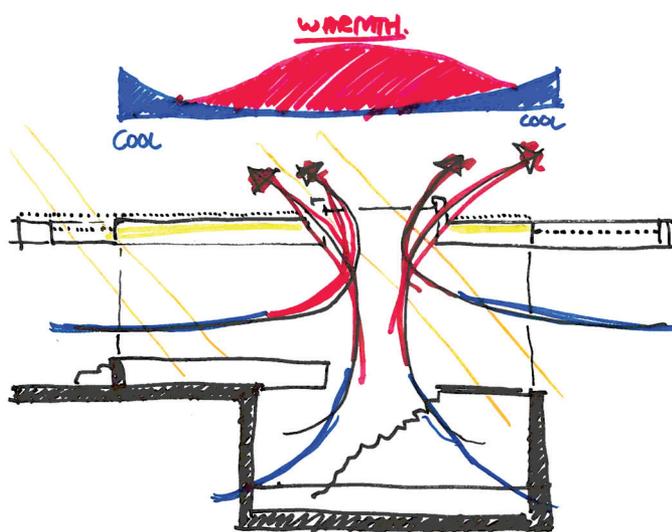
66 **The vertical potential** - *ventilation principle*
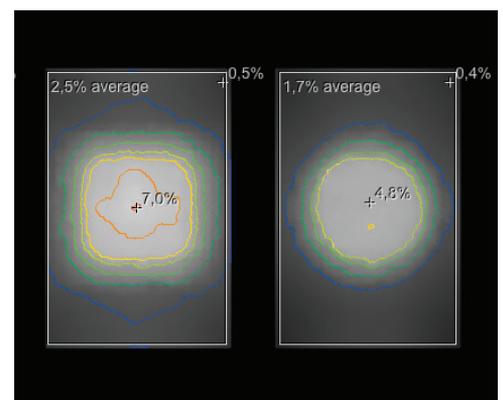
67 **Daylight calculation** - *with round and squared hole*

5.3.3 THE BARE ESSENTIALS

Realising from the theory that the tranquillity that the shadow brings is essential to feel in a state of well-being, the idea of having a light open part and a darker closed part of the home is extended. As a very evident narrative of sustainability, the idea is inspired by projects like La Cabanon by Le Corbusier. The project is infused with the idea to only make what is necessary. In the project the upper floor is for living, while the lower floor is a place of intimacy that is mainly used to sleep in. From the program, initially two sizes of homes was proposed, but to contain the flexibility that can expand and retract to different families and people, this is limited to one type of apartment, able to accommodate from one to four people. The idea of the essentials is extended to the kitchen also. Instead of everyone having big freezers and ovens, the kitchen features the essentials. Drawing inspiration from the old Danish 'Frysehuse', the common house features extra facilities for cooking and storing food. In a sustainable optic, this both activates the community and relates to the narrative of saving energy in fellowship.

5.3.4 THE NARRATIVE OF INTIMACY

Going into the idea of having a room that is darker, cooler and intimate, all the elements needed to collaborate on embedding the sustainable narrative in the way it is perceived. As light has a drastic impact on our perception of intimacy, the idea of the skylight was formed. By only having one big vertical connection that breathes light from a vertical plane, a new awareness upon the presence and the absence of light is introduced. As sound is the sense of intimacy, the horizontal skylight will also reveal the weather through sound, with rain drumming gently on the surface, caressing the idea of shelter below. The skylight also features the visual element of weather in a way not so often experienced - the stars painting a mural in the bedroom high ceilings, or snow softly covering the window, diffusing the light and the perception of the room. To test the actual light-level in the lower part of the home, initial calculation upon the daylight factor was executed, showing the skylight both ensures light, and the absence of other windows ensure the tranquillity of the shadow in the periphery of the room.

5.3.5 THE VERTICAL POTENTIAL

While the skylight introduces the vertical connection between two floors, it also features a technical ingenuity. As the bedroom is a place that has a lot of pollution load from the people sleeping during night, bigger volumes mean more air to mix the pollution with. By having this greater volume, the intimate part of the home, even though being a moderate size in floor area, still contain the load from four people. By introducing it as an vertical element, as the air heats up during night, is carries the pollution, thus sustaining the atmosphere of well-being for a longer time.
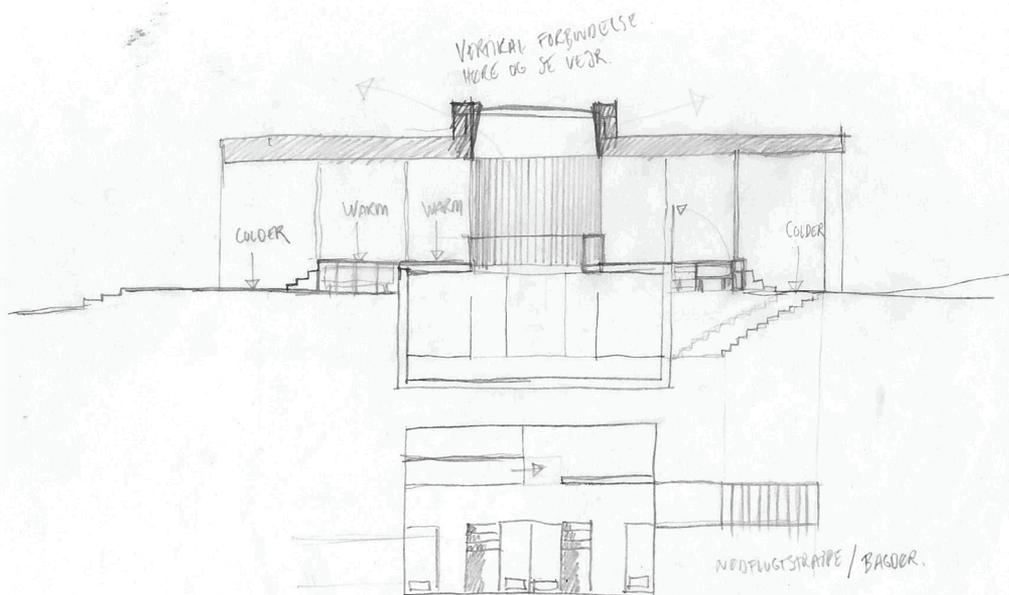
68 Plateaus defining spaces - *Section principle*
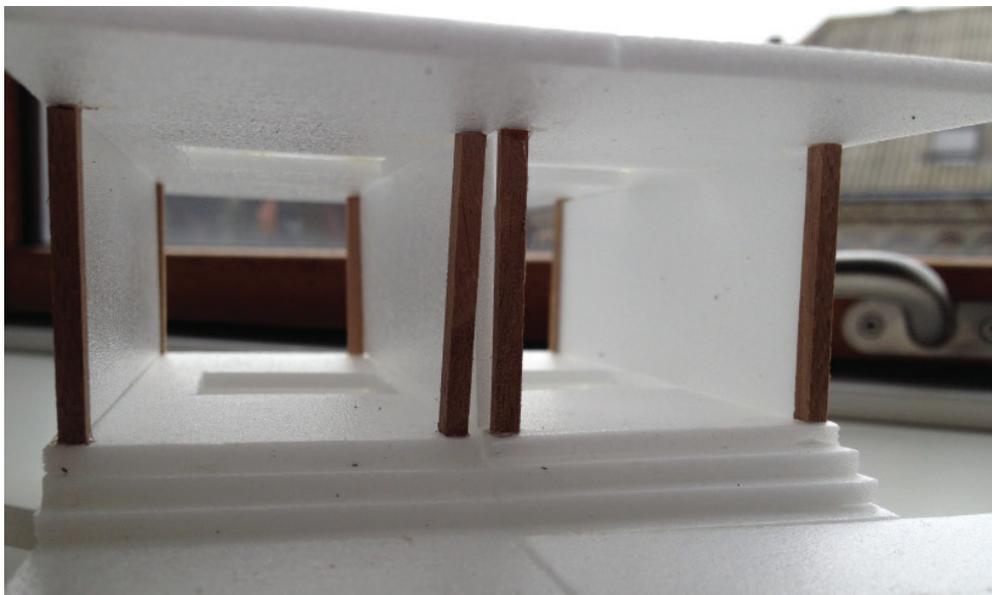
69 Plateaus defining spaces - *Model study of concept*

5.3.6 USING THE SPATIALITY OF PLATEAUS

The idea of two big rooms produces the potential of big volume. While this both has an influence on the spatial perception, it also affects the indoor climate. While the home is a fairly small size, overheating comes easily. The way to solve this is to expand the volume, while this will flatten the affect that the peak hours has on the indoor climate. To accommodate the spatial recognition of different rooms, the inspiration is taken from the site. With already visible plateaus forming in the landscape, they are scaled down to the individual home, introducing both separations and also transitions. Inspired from cities like New York and architectural masterpieces as Villa Rotunda, the potential of the plateau is vast. It both keeps the open identity wanted in the upper floor, while allowing the perceptive recognition of different spaces and at same time clearly defines transitions between the tranquillity of the home and the life of the public street.

5.3.7 DEVELOPING SIMPLICITY

Starting with the idea of separating the functions into two spaces, the development took point of departure in arranging the more intimate functions in the lower part of the home, being bedrooms, bathroom, rooms and storage. In the upper part of the home, the functions with more dynamic living were placed, being kitchen, dining area and living area. Working with a skylight and two floors, the challenge was to introduce simplicity within a room with many different levels. Starting from a rectangular plan, transforming into a trapezoid following the urban circle. The plan take point of departure in going from public to private functions and the transition between these. This is reflected in the placement of the kitchen closest to the entrance, and the living area in the opposite end. To obtain a sense of interiority outside, the facades is imagined as glass walls, with the ability to fully open up to the outside. This give a free flow of life from inside to outside, and extends the size of the apartment in the warm days, while letting the smaller size embrace the residents in colder periods.

5.3.8 THE IMPACT OF GLASS

The impact from the big glass facades, was that initially they gave overheating. While the modern windows does not have the same problem with keeping heat in, they do keeping it out. To avoid the overheating in the kitchen and living area, different sizes of overhang was tested. This resulted in the suitable size that removed overheating without shading too much.
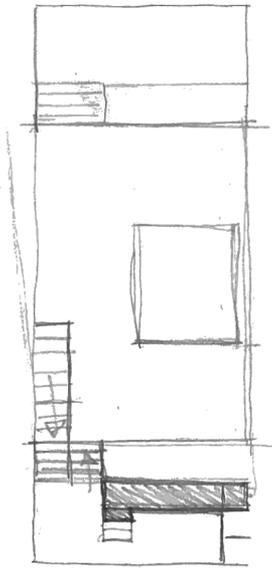
70 Plan development - *Kitchen and living as two zones*
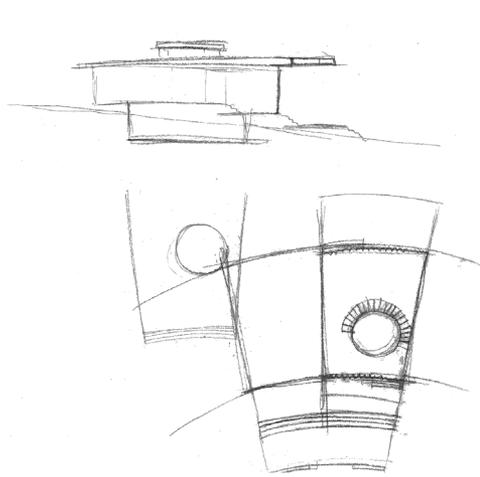
**73 Plan development** - *Introduction of the rings in masterplan*
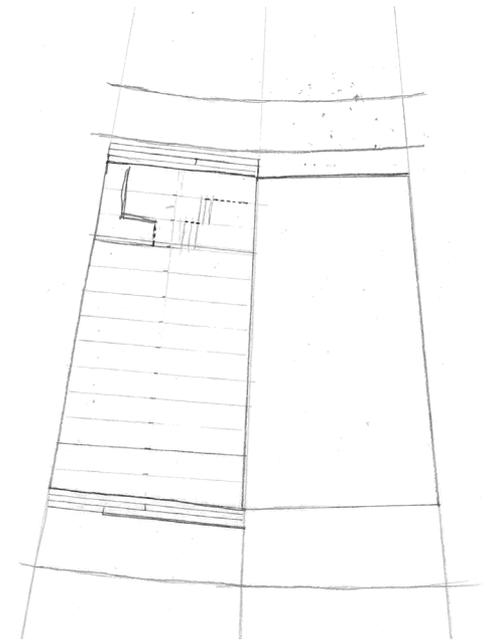
**76 Plan development** - *Simplifying the spaces*
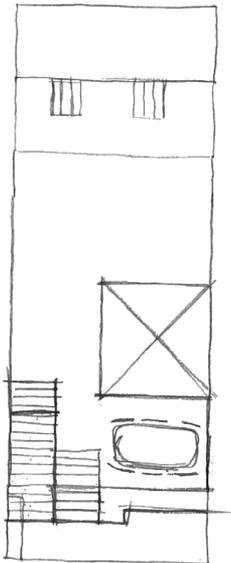
**71 Plan development** - *Dining area in relation to kitchen*
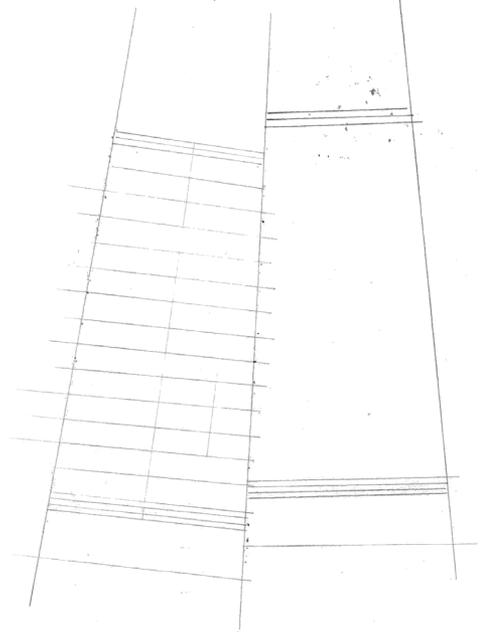
74 Plan development - *Introduction of a 900mm grid*
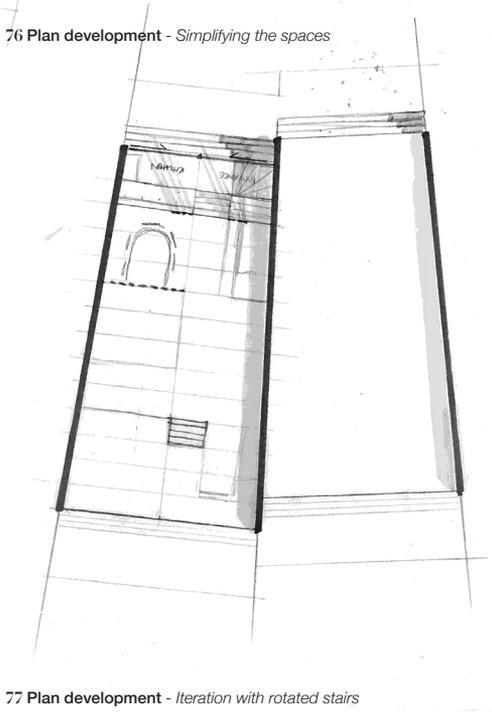
77 Plan development - *Iteration with rotated stairs*
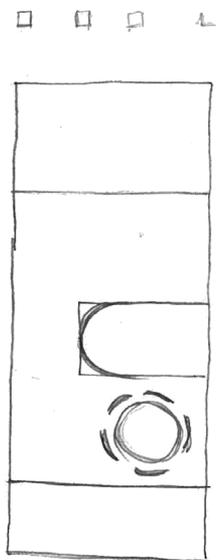
72 Plan development - *Iteration with soft corners*
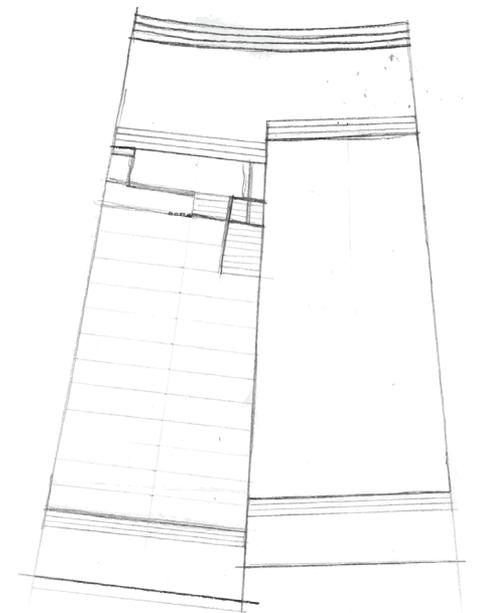
75 Plan development - *Extending plateaus to exterior*
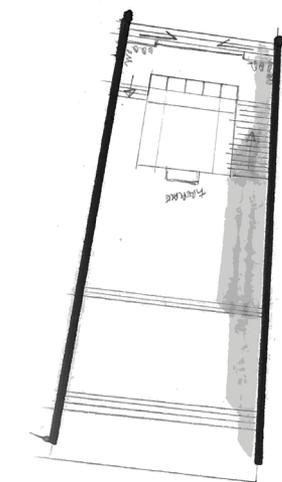
78 Plan development - *The skylight as central element*
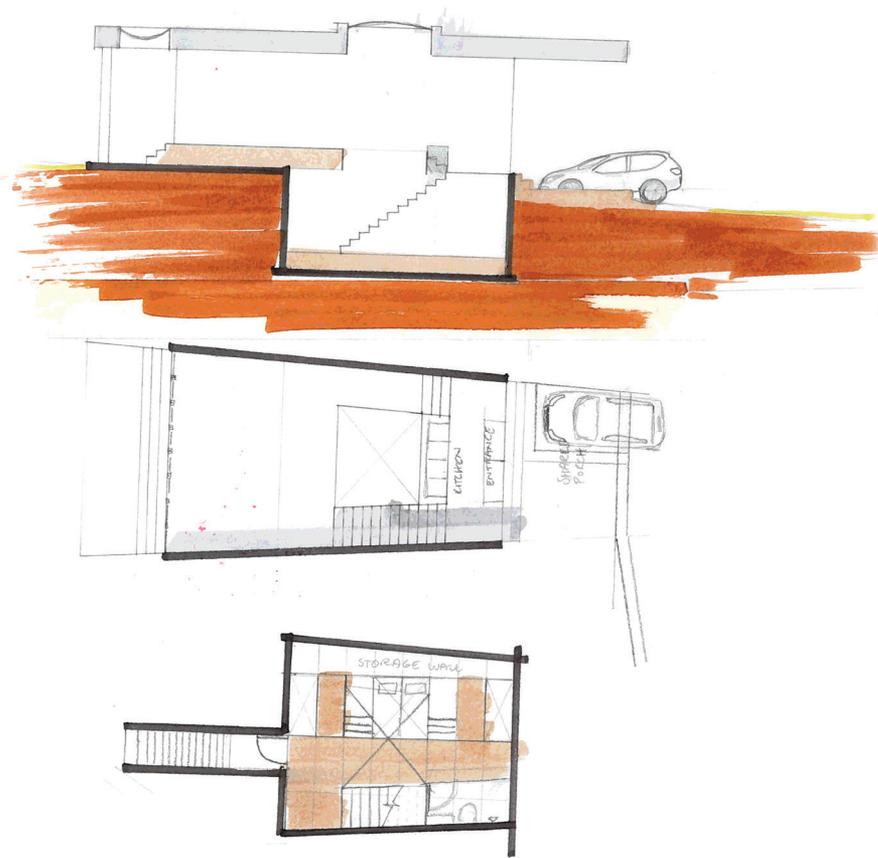
79 **Initial plan and section** - *the lower part become more basement than protected space*
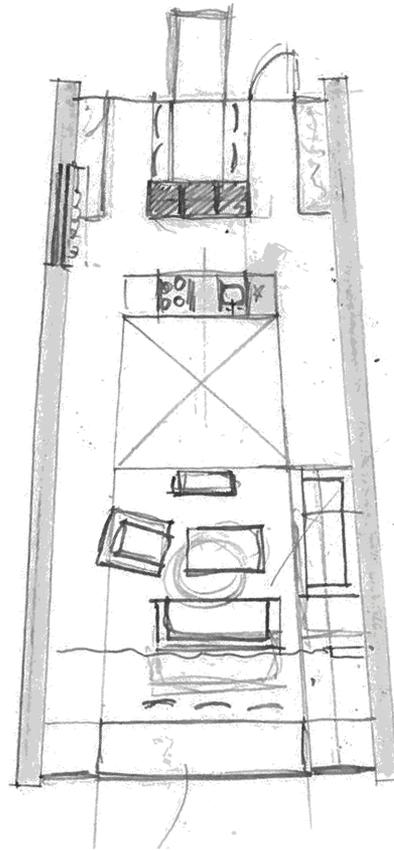
80 **Initial plan proposal** - *the skylight as the core and separation of functions*

5.3.9 ENHANCING THE PERCEPTION

From the theory, the derivative to the visual system was to enhance the spatial perception of a space, one should enhance the unfocused peripheral vision. By introducing the skylight in the center and work with how the vision is broken up and made unfocused, the spatial peripheral vision take over the spatial perception of the space. This is done with the placement of a lively function as the kitchen and with detailing of the side of the skylight as it cuts through the upper part of the home. By gently letting the living area elevate from the kitchen area, the space is defined as its own within the bigger space. This also allows the floor material to correspond with the activity level by having a colder material in the kitchen area and a warmer material in the living area. By centring the skylight as the core of the home, a strong narrative of the verticality in the space is emphasised, thus revealing evidence of the part of the home beneath the upper part of the home.
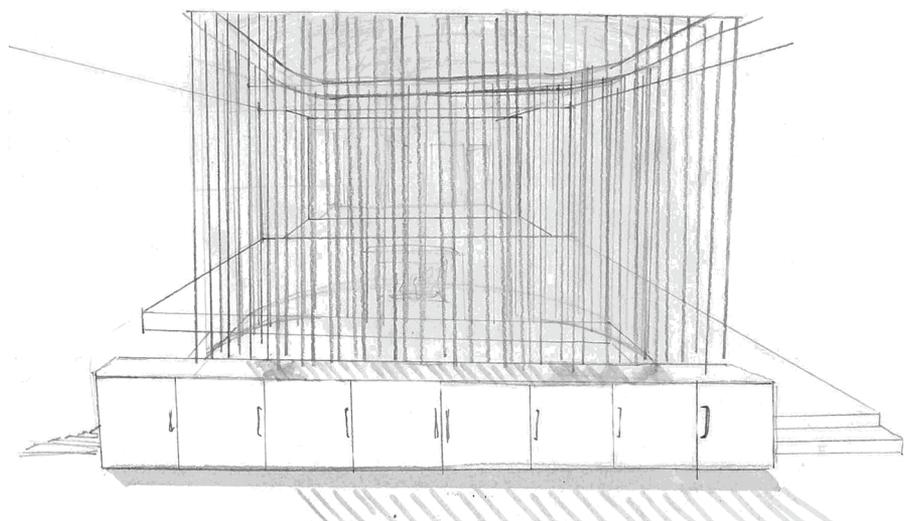
81 **Enhancing the perception** - *optimising the spatial perception in the room*
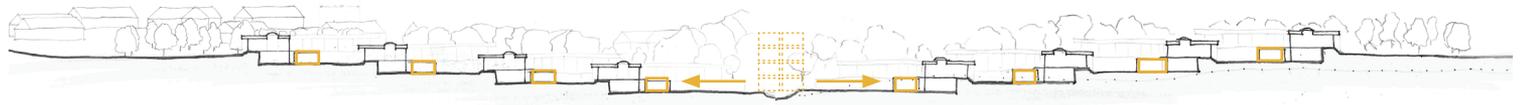
83 **Shifting the common functions** - *Obtains plateaus rather than holes*

85 **Choosing the right scale** - *Piazza Campidoglio*
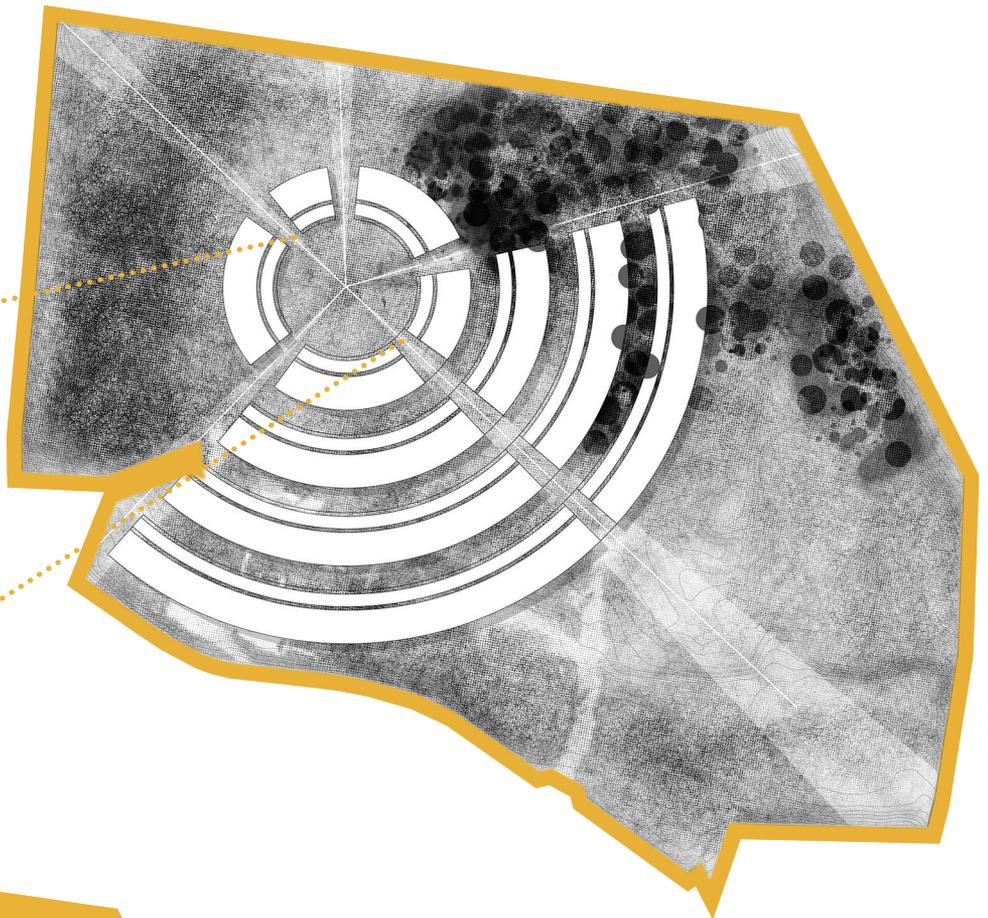
84 **Clarifying the circle** - *Denser and simpler*

5.4 The Big Picture

5.4.1 ENCLOSE WITHOUT DIGGING DOWN

During the process, the section revealed the lower part of the home with a disadvantage. Making something feeling enclosed. Intimate. Embracing. The balance is to obtain these feelings without feeling trapped, especially with only one skylight in the room. To avoid digging a hole for the lower part of the home, the urban concept was revised. By taking the centred common house, and shifting it out to attach to the lower part of the homes, the problem is solved it its simplest way. Now the landscape section reveals plateaus rather than holes. The shift eradicated the need of an expensive escape stairs in the lower part of the home, and simply allows the residents to exit to the ground level from both floors.

The shift also introduces a center for the whole site.

5.4.2 CLARIFYING THE CIRCLE

To ensure that the narrative is embedded in the conceptual layout of the development, the circle is clarified. And to create an area, which feature both nature and city, the density is intensified. By assembling the buildings closer to each other, they give the best conditions for a community and for fellowship. In the proposal the common housing is contained in the inner circle.

5.4.3 CHOOSING THE RIGHT SCALE

With all attention to the center of the project, the scale of it becomes crucial for the experience. During visits to numerous open spaces, one that strikes me as a particularly well-proportioned place is Piazza Campidoglio in Rome. With similar characteristics, paths spreading from the center and buildings surrounding it, the scale is directly adopted into the project.

86 **The life between the buildings** - *Hand sketch*

87 **The life at the center** - *Hand sketch*

5.4.4 ENHANCING THE CENTER

To enroll the interiority of the narrative into the exterior, the connections to the city is embellished with a rain-collecting stream down the center of the 'boulevards'. This is possible, because the typography already collect the water in the center of the master plan, and at the same time, the site slopes down towards the center. The water stream suddenly leaves the boulevards with a more-value that tells the narrative of a sustainable approach. Furthermore it introduces new sounds and visual elements that embellish the boulevards.

## 5.4.5 DIVERSITY WITHIN UNIFORMITY

Building homes for hundreds of people, it is logical that each person has individual preferences. By letting a uniform development intersect with the nature that holds various atmospheres, the development features multiplicity and flexibility within one community. Not as the moveable wall, but as the featuring of homes with access to different natural atmospheres; The cooling shadow from the trees in the forest, the misty morning fog on top of the buzzing swamp or the wide-reaching breathing plains with lots of space.
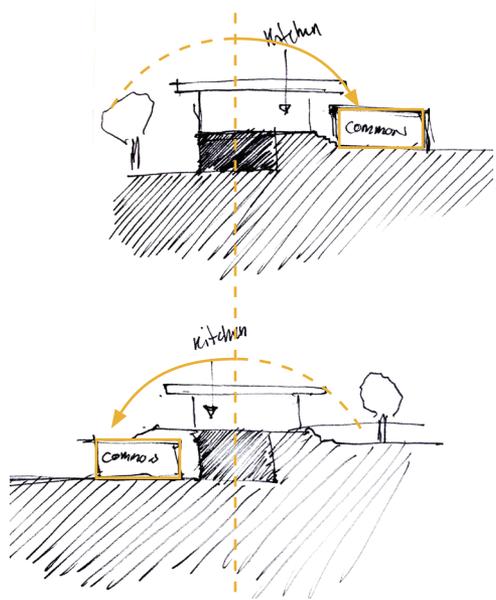
88 **Flipping common functions** - *Unifying qualities*

89 **Green belts and urban streets** - *Unifying qualities*

NATURE   CENTER   NATURE   STREET   NATURE   STREET
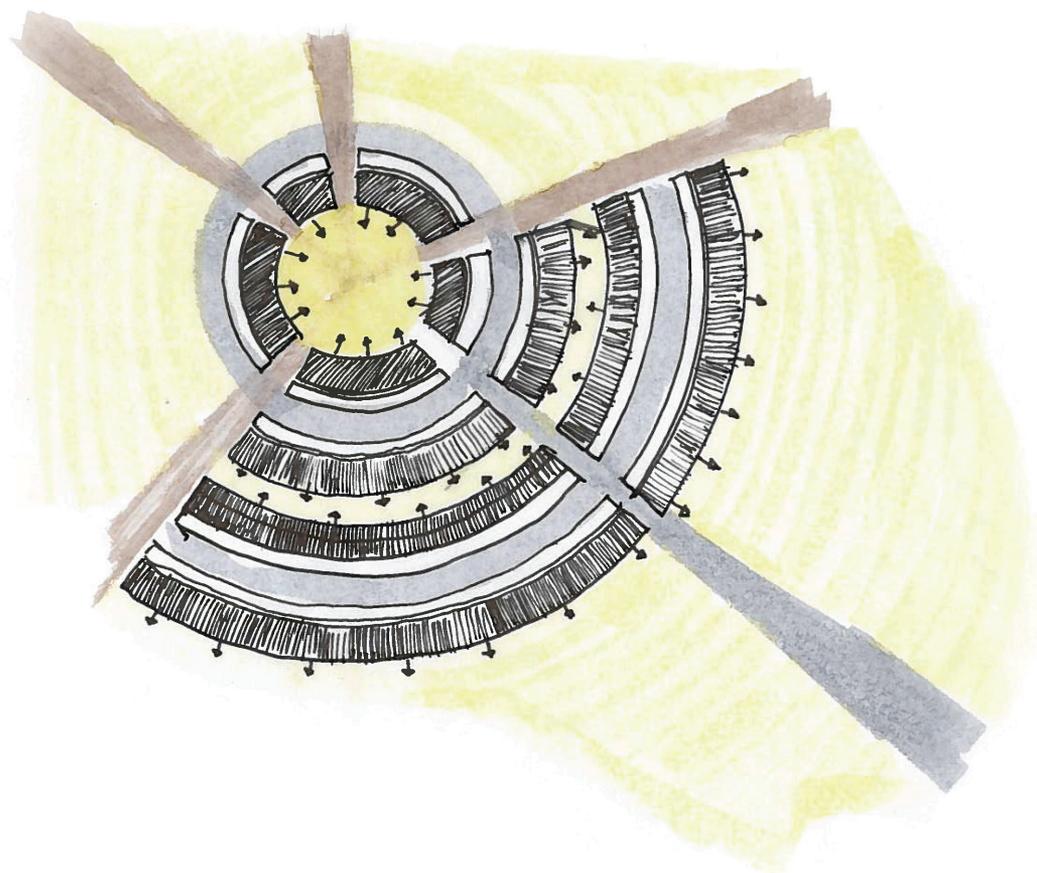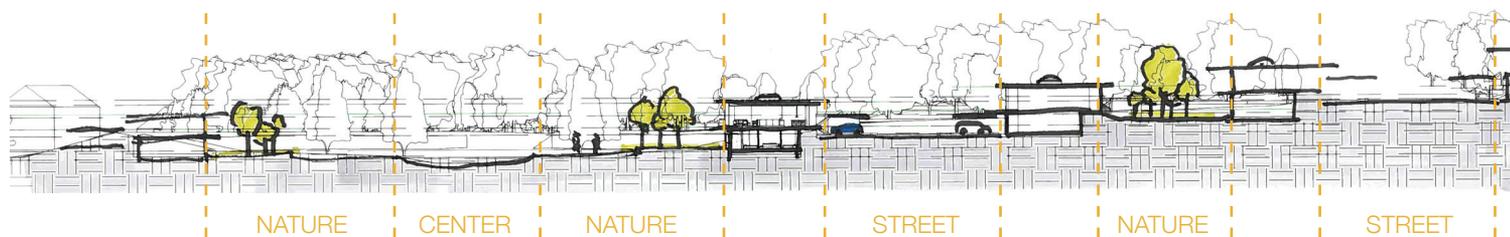
90 **Green belts and urban streets** - *Unifying qualities*

5.4.6 UNIFYING THE QUALITIES TO ALL BUILDINGS

With the center as the only green place in the project, and the spaces in between the buildings as streets, the project favour the inner circle as the only development with access to a green space. With the plateaus, the living area, which should be further away from street lies right next to the overlying street. To extend the qualities that the center has, and to create more life on each street, the common functions are flipped every second row. This introduces the opportunity to create more life, more community, more fellowship and to landscape belts that pulls nature in front of the living areas, creating a calming connecting to the nature and distance to the next row, without removing the density from the development.

73

91 **Vertical connection** - *lack of support (Rendering)*

92 **Vertical connection** - *Vertical element (Rendering)*

94 **Flexibility** - *The curtain (Rendering)*
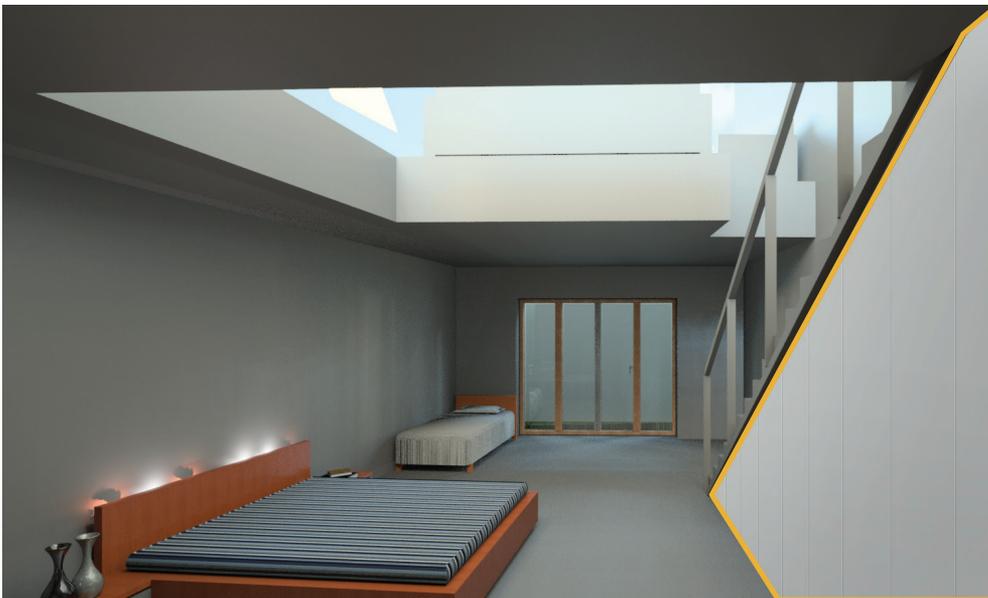
93 **Functional needs** - *Storage under the stairs (Rendering)*

95 **The curtain** - *Inspirational Case - Intended atmosphere of curtain*

5.5 The Detail
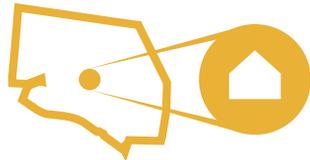
5.5.1 VERTICAL CONNECTION

After developing a principle for the plan layout in the lower part of the home, the more spatial and perceptual development was started. The first initial draft featured the skylight, but in a totally open way. The lack of support both seems unrealistic, and also uncomfortable. By introducing a vertical element that reaches from skylight to bottom, the two spaces are fused in the perceptual vertical space.

5.5.2 FUNCTIONAL NEEDS

As the apartments were flipped around the vertical skylight, so was the stairs. By doing this, it made sense to utilise the space under the stairs for storage. The need for storage, especially for the small family residents, is crucial to both make the everyday life work, but also to have one big space that can function without to much noise.

5.5.3 FLEXIBILITY WITHIN UNIFORMITY

Having a concept with only two enclosed rooms has both advantages and challenges. The advantage is that in small homes, the spatiality of bigger rooms is removing the risk of feeling claustrophobic. The big room also has the advantage of a more stable indoor climate, as there is more air in the big room, and thus the impact from heating or pollution takes longer time to affect the indoor climate. As the bedrooms has contradicting needs, of both wanting light and space in the morning, and intimacy and darkness in the evening, the extremely simple ingenuity, inspired from the Juvet Landscape Hotel, is introduced. The curtain as a room dividing element, works in every way to an advantage. The perception of the curtain relates directly to the need for feeling intimate. The sweeping motion of the curtain blurs the boundaries, and the lightness and motion in the fabric has an embracing, protecting quality. Exactly the lightness of the curtain also allows it to form very small spaces without feeling trapped, because the narrative of flexibility is so ever evident in the curtain. By having a feature that is in physical connection with both the body and mind, the curtain suddenly attains a highly sustainable property.
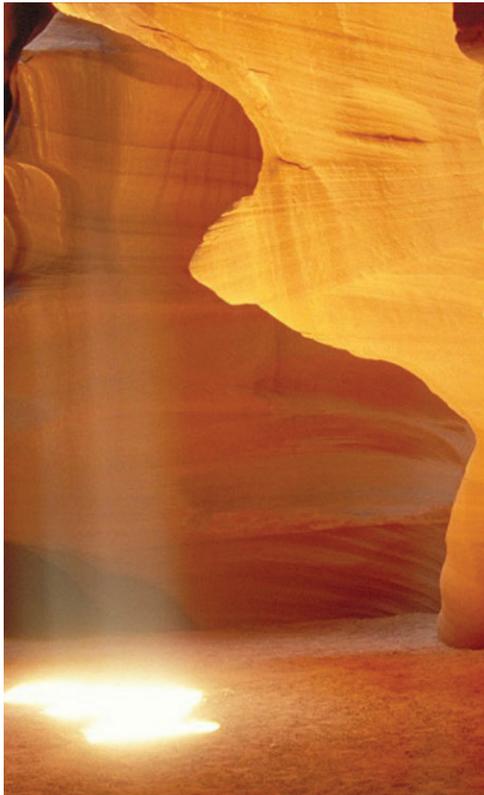
96 **The cave** - *Inspirational Case - Intimacy without feeling trapped*

97 **Access** - *Uninterupted access to the bathroom (Rendering)*

98 **Design** - *The cave adapted to the design (Rendering)*


99 **Model study** - *Studying the design initiative*

5.5.4 FEELING INTIMATE NOT TRAPPED

To emphasise the narrative of the skylight, the bedrooms of the home is kept without any further windows. To obtain a perception of intimacy a study of primeval places that holds the wanted intimacy was formed. The cave has always been a place of shelter, and often holds the intimacy to feel safe. Studying a cave with similar characteristics as the bedroom, the cave revealed how it ensured not feeling trapped. The light from above gives comfort of being embraced and protected, but the key to avoiding feeling captured is very subtle. By introducing the light from the outside to wander into the end of the cave, without revealing the opening, the intimacy is obtained without feeling trapped. This initiative is translated into the plan, by moving the bathroom in the front of the room. In this way, the bathroom gets access to fresh air while providing the spatial element to obtain the feeling of intimacy.
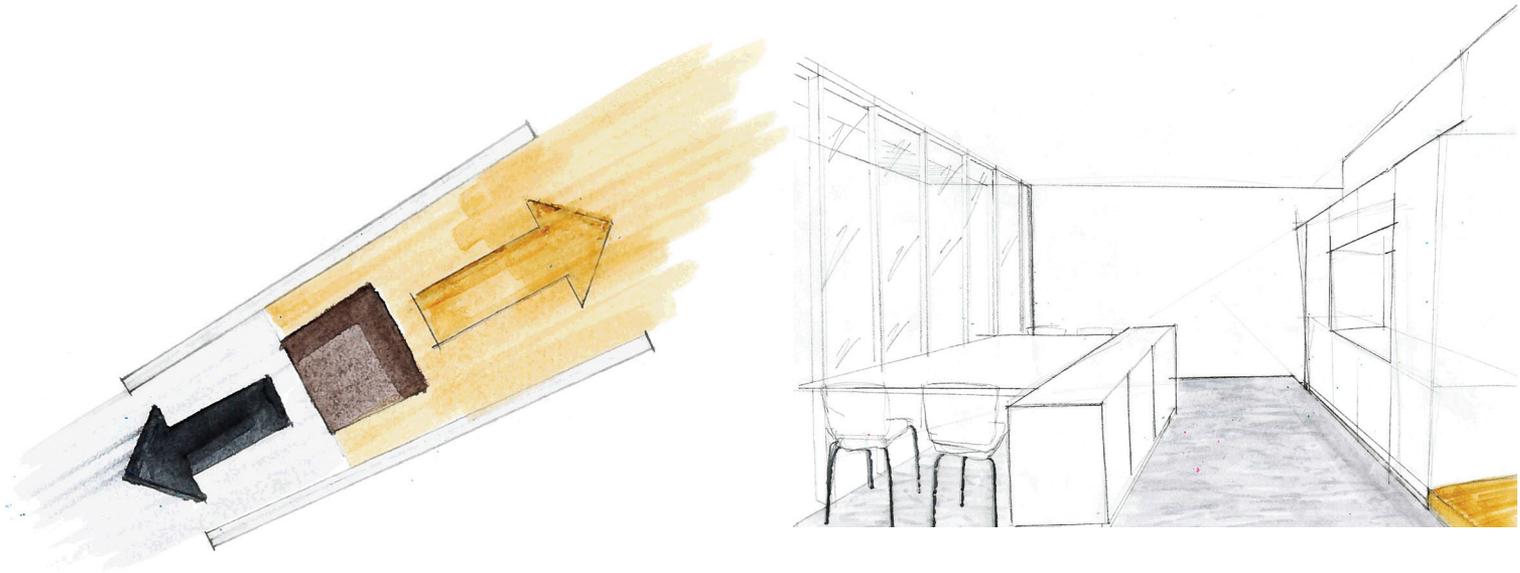
100 **Upper Part Concept** - *Ends opening up both ways*

101 **Upper Part Concept** - *Spatial sketch of imagined kitchen*
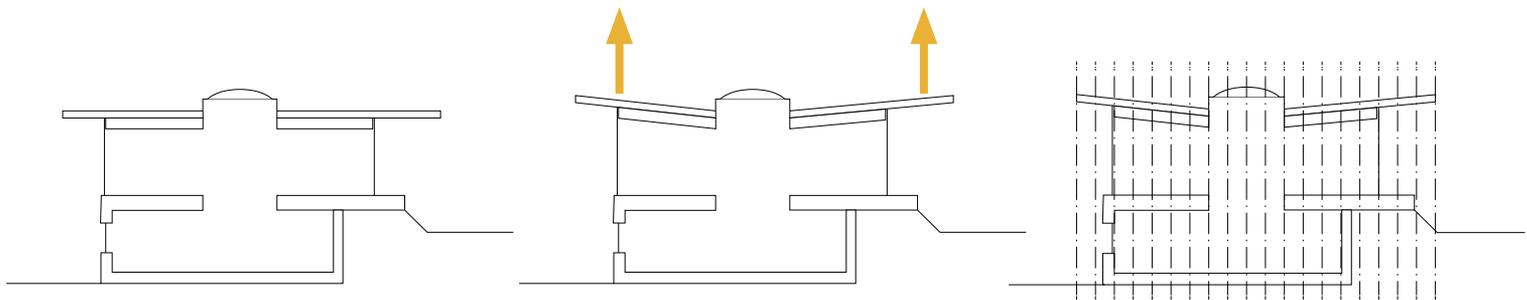
102 **Straight roof without narrative** - *Section*

103 **Inclined roof with narrative** - *Section*

104 **Removing visual noise** - *900 mm grid*

5.5.5 EMBEDDING THE NARRATIVE

To make the intention and narrative of the open upper part of the home, the roof is inclined towards the facade. By doing this, the architectural intention is embedded in the spatial perception of the room, and the feeling of openness strengthened. Furthermore the inclination away from the center highlights the different rooms on each side of the skylight core, and makes the spatial perception and experience much stronger and intense. By letting the lower part of the home with less windows, the upper part can utilise this and have floor to ceiling windows, to perpetuate the transition between interior and exterior.

5.5.6 REVEALING THE INTIMATE AREA

While the upper part of the home is very evident from the lower part of the home, it is not that evident the other way around. To emphasise this, the inclination of the roof suggests that the light is dragged down towards something, intensifying the perception of the center core.

5.5.7 REMOVING VISUAL NOISE

To make the interior speak together as one whole, a grid is introduced spreading from the center core. In this way, the closets and windows all align within the same grid, which gives a simple calmness to the sections and to the perception of the spaces. The grid also makes construction much easier, and thus the project less expensive to construct.
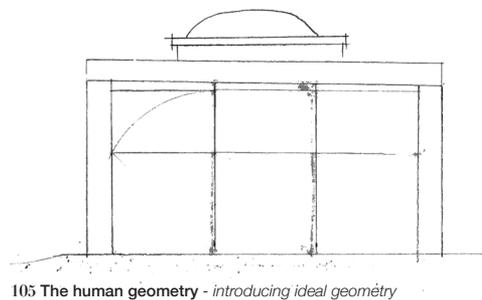
105 **The human geometry** - *introducing ideal geometry*
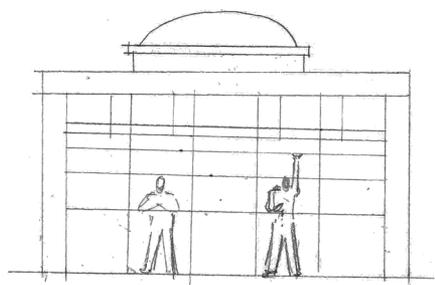
106 **The human geometry** - *Fusing ideal with the body with Le Modulor*
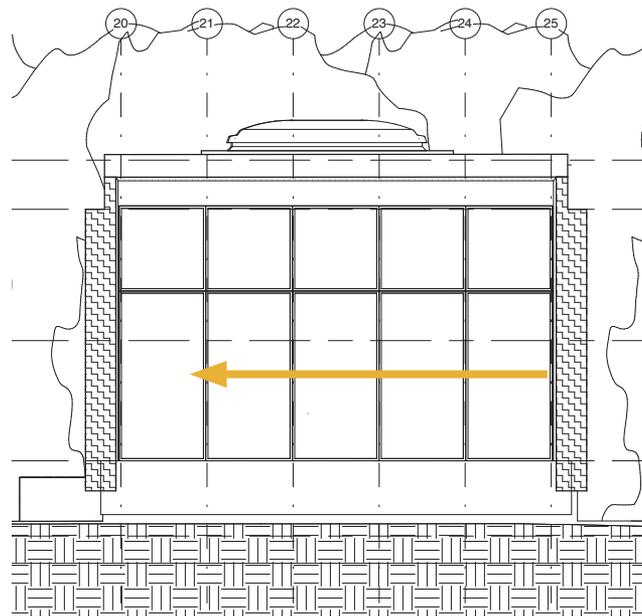
107 **Simple and human geometry** - *A foldable transparent facade*

5.5.8 MAKING THE ROOF SEEM LIGHT

To introduce the light appearance through all details of the upper floor, the challenge with a very insulating was logical. To solve this, the project utilises a submerged roof in the upper floor, so that the visual appearance of the roof seems light from outside. To make the scale of the roof smaller, and to enable the possibility to identification with ones home, the roof is sliced between each apartment. In this way, it is easy to recognise what is ones own roof.

5.5.9 THE HUMAN GEOMETRY

To enhance the perception of well-being within the upper part of the home, the process for designing the big open facades was initially taken from the golden ratio. Instead of just using this ratio, the inspiration was taken in Le Corbusiers Le Modular system, that relates the golden ratio with the human geometry. By using these measurements, it was possible to introduce a grid that corresponded with the modular system of 113 cm, which is the height up to the waist. In the same way, the process resulted in a horizontal mullion at the height of 226 cm, which is the height when you stretch your arm in the air. By using these modules it was possible to make the expression of the facade seem simple and natural, and to make the best perception in relation to the human body.

5.5.10 BLURRING THE BOUNDARY BETWEEN IN AND OUT

To emphasise the narrative of the open upper part of the home, and to enhance the quality of the space, one wide folding door is introduced. By making it possible for the big open facades to actually open up, the room becomes much more flexible. Suddenly the room is 1,5 meter wider, and in direct relation to the street outside. By making a tempting way to open the building, the foundation for meeting the community becomes much bigger. The introduction of attractive outdoor areas prooved to be essential for the indoor climate. While the building regulations propose the same ventilation and load from people and equipment, that is not what really happens. If the area has attractive outdoor areas, people will go outside, they will barberque and most of all, they wont be as much in the homes. This quality was essential to assume a realistic indoor climate.
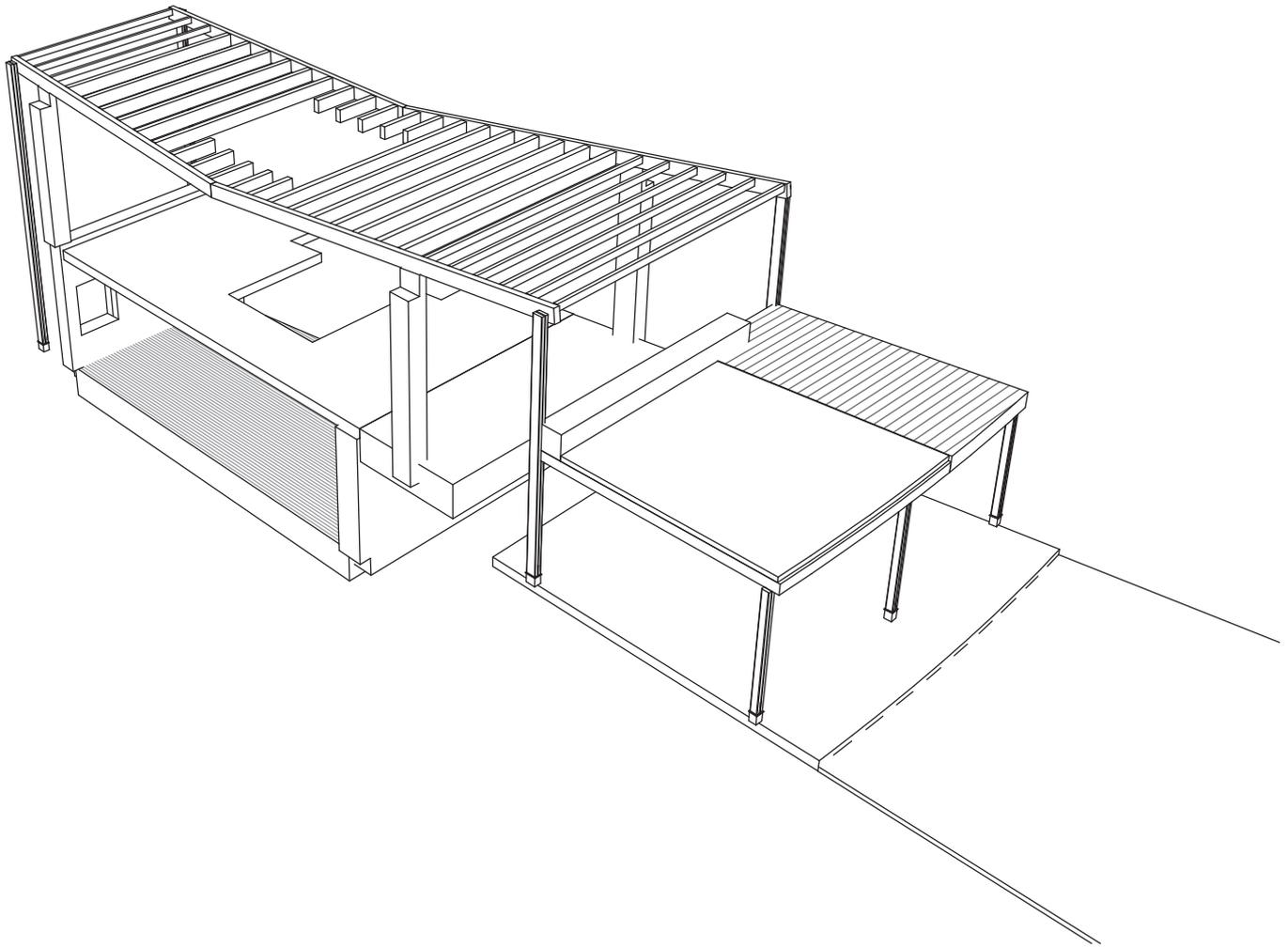
5.5.11 LONG TERM FLEXIBILITY

To make the concept behind the project flexible, and to enable it to adapt to the future use, the structure behind each home consists of a dense lower part, with concrete and brick walls against the center and the slope. As they ensure a good foundation for the upper part of the home, columns is introduced in each corner. By using the experience attained through time, the span was kept under the limit where the structure both becomes very large and very expensive. Between the homes is a light separation wall, that in the future can be torn down. In this way, two units can adapt into one big if needed.

5.5.12 FUTURE RESTAURATION

To consider that the life span of some building parts is shorter than others, the big open facades are kept without any structural elements. In this way, the windows can easily be changed in the future without the need to change the structure behind it. This is both convenient and less expensive in the future.

5.5.13 MORE-VALUE TO COMMON FUNCTIONS

To add more value to the common functions, a small stair is introduced to use it as a small front yard balcony. To introduce the life towards the street, small gardens are landscaped on top of the building. In this way the residents have a place where they meet with the neighbour. This also functions as an attractive outdoor space, which is essential to attract life to the street. This also introduces the smell of fresh grass within the city and presence of life on the street.

109 Shading - *Destroying the open perception*

110 Shading - *Curtains as active shading*

111 Shading - *Privacy with light*

AMAZING SHADOWS IN KITCHEN.

40% IN SUMMER

MOVES WITH WIND.
CONNECTION TO OUTSIDE!
SHELTERS SOUND. BAMBOO
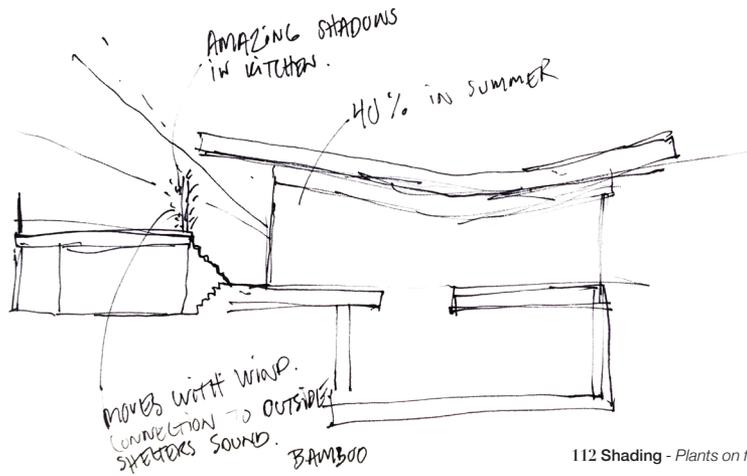
112 Shading - *Plants on front yard balcony*

113 Shading - *Plants on front yard balcony*

5.5.14 EMBEDDING A NARRATIVE IN SHADING

In the process it was assumed and confirmed by calculations, that even though the big open facades have the lightness that is wanted in the project, they produce overheating. To avoid this the roof cantilevers and shades the window. Even though the roof cantilevers 2,5m, it was not enough shading in the spring and fall. To enhance the perception of the place, the front yard gardens is planted with about 1,5m high shading plants. This gives a beautiful filtering of the light. The shading plants also embed the narrative of needing more shade during summer than winter, by bursting into bloom. The plants also reveal the weather with the leaves swaying in the wind.

5.5.15 PRIVACY WHEN NEEDED

To create an entrance, the curtain is reintroduced in the upper part of the home. By using it as a shading element in the open spaces, the residents attain a flexible home – both having the opportunity to be extrovert and introvert. While being a comfortable way to control the visual appearance of the room, the curtains also shade from the heat. Instead of just letting an automated ventilation system take care of things, the narrative behind the action of maintaining the indoor climate is embedded.

114 **Mirrors** - *Simple yet spacious*

5.5.16 USING MIRRORS

To utilise the upper part of the home in the best way, the wall away from the stairs is included as one big multifunctional storage unit. By using mirrors it was possible to create a perception of a much bigger and more spatial room – extra square meters that only exist within the perception. The process of developing the unit was simplified to at last end up contributing to the experience of the space.

115 **Mirrors** - *More disturbing than beneficial*

116 **Core expression** - *Frosted glass alienates the element*

117 **Core expression** - *To massive mullions disturb the lightness*

118 **Glass and curtains** - *The perfect mix between flexibility and light*

5.5.17 OPEN AND CLOSED

While the connection between the two stories often is a preference, it is necessary to consider the ability to do the opposite also. During the process different solutions were studied, both with different expressions and materials, but to simplify and still create a boundary, the solution was to add glass walls with blinds in front. This gives flexibility without making the experience worse when the openness is wanted. At the same time, the calculations showed that the skylight adds heating to the upper floor. To limit this in the hottest days, the curtains also limit the passive sun heat.

119 **Expression from bedroom** - *Simplicity*

120 **Back facade** - *The columns unites the facade into a calm expression*
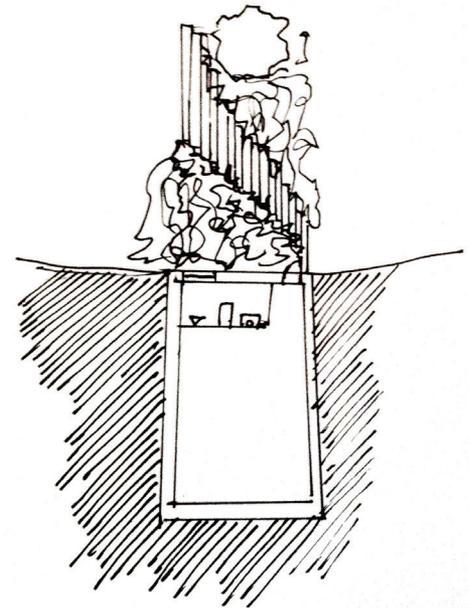
121 **Back yard** - *The tiles blend together with nature*


122 **Back yard** - *Inspirational Case - New york high line*

5.5.18 REUNITING THE BACK FACADE

With an expression towards the street that stands as coherent, simple and beautiful, the back needs some kind of finalisation to the expression. With the overhang from the living area window, supporting columns are introduced. While defining each home, they create an area in front of the lower part of the home that acts as an transition between private and public. The columns are repeated in the facade towards the street to create coherence between the two.

5.5.19 THE BACK YARD

To create a transition between the public centre and the lower part of the homes, a back yard with inspiration in The Highline in New York is introduced. The way that the tiles dissolve with the nature tells the narrative about the transition between the human made and the nature. By making the path diagonal from the door, distance and privacy to the bathroom window is created.
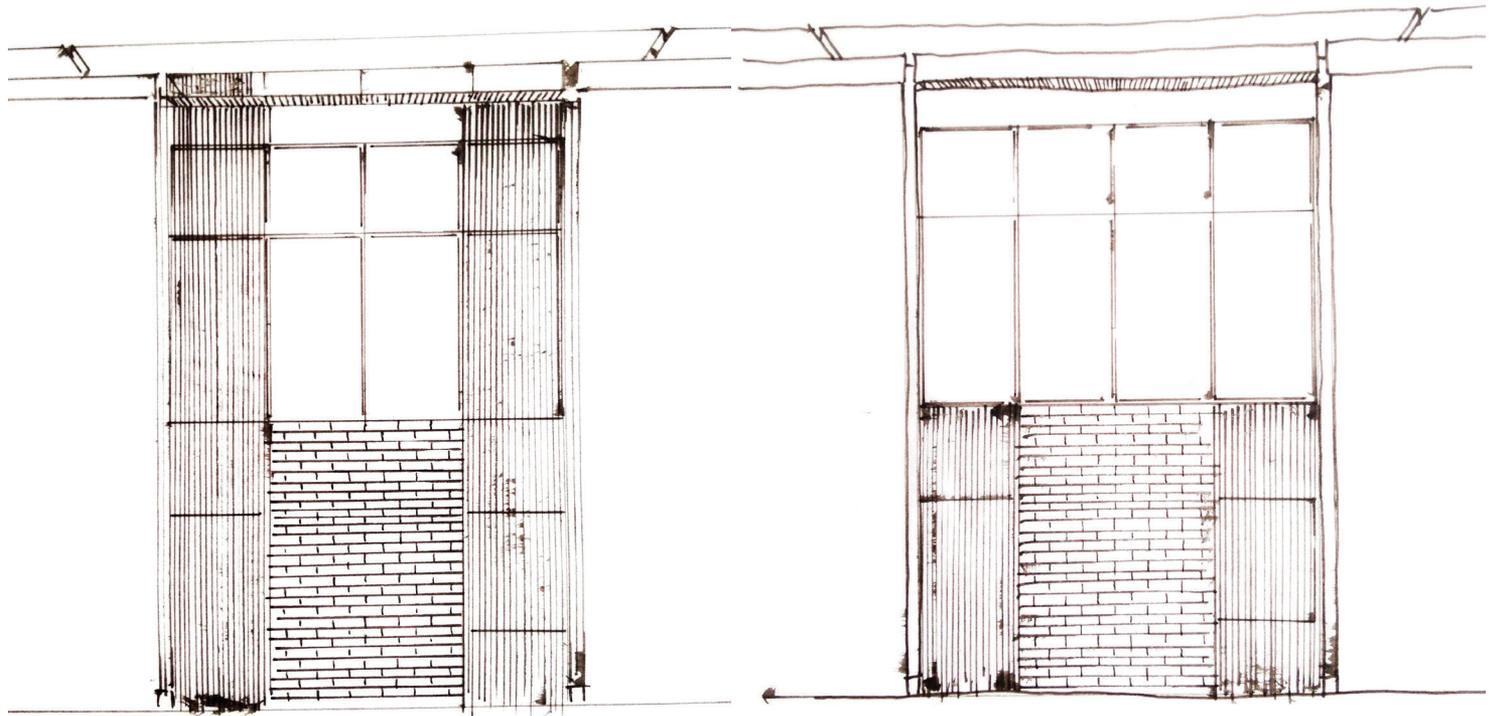
123 **Coherent shading** - *Blurs the narrative of two contrasting spaces*

124 **Coherent shading** - *Create a beautiful joint between materials*

5.5.20 COHERENT SHADING

The last stages of the indoor climate calculations revealed that the bathroom has overheating when rotating the building. To solve this challenge, wooden lamella is introduced in front of the window and door. Extending to the bottom of the big open facade, the collaborate in telling the narrative of having an open and a closed part of the home. The shading also give the opportunity to incorporate the intake and outlet from the ventilation.

250
HOURS

200
HOURS

150
HOURS

100
HOURS

75
HOURS

50
HOURS

25
HOURS

10
HOURS

#22 #23 #1 #2

#21 #3

#20 #4

#19 #5

#18 #6

#17 #7

#16 #8

#15 #9

#14 #13 #12 #11 #10

INDOOR CLIMATE
OPTIMISATION & IMPACT

THERMAL ZONE	HOURS ABOVE 27°C	26°C
KITCHENAREA		
LIVINGAREA		
INTIMATEAREA		
BATHROOM		
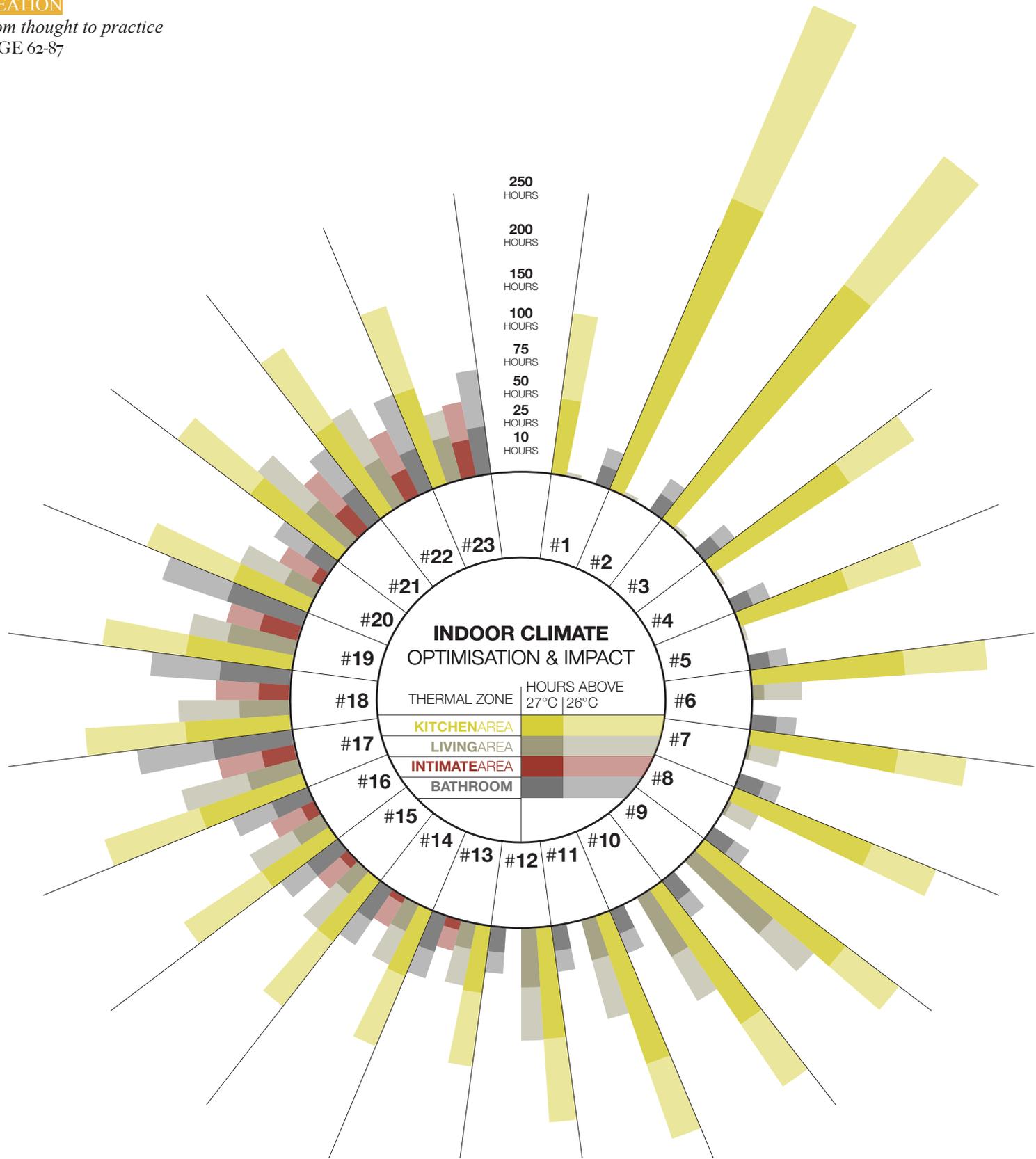
125 **Indoor climate** - *Process diagram*

5.6 Optimising the indoor climate

During the process of analyzing the indoor climate, the objective was to develop architectural details, that enhance the perceptual experience of well-being, while keeping within the regulations. Exactly the motivation to create architecture that originates from the bodily experience, should be the motivation for all architecture. Today sustainability limits itself to small windows and dreadful automated shading screens, all exposed without any relation to the human perception of well-being. This project tries to prove things wrong!

The diagrams is read as 23 steps going clockwise, that each contain the overheating results for the model with four thermal zones – the kitchen, the living area, the intimate area and the bathroom. Within each steps slice, the rooms are split into its own column. The signatures of the rooms and results is placed in the middle of the diagram. For details about the different steps see Appendix 06 BSim Process.

STEP 1

Action
Check model without windows

Thoughts
Already from the beginning the kitchen show overheating, which is what would be assumed. This is mainly because of the load from the equipment, that is all used in the evening.

STEP 2

Action
Introduction of kitchen window

Thoughts
As assumed overheating occurs when a big south facing window is introduced. The validity of the model is though showing itself, as there is only overheating from June to August.

STEP 3

Action
Introduction of common functions in front of kitchen window

Thoughts
As the results show, the shading has impact on the overheating days of the room.

STEP 4

Action
Introduction of interior curtains

Thoughts
With the window having such a big surface, the curtains really reduce the overheating. Even though this was anticipated, the impact was bigger than assumed.

STEP 5

Action
Introduction of overhang on kitchen window

Thoughts
As assumed the overhang is one of the best solutions for reducing overheating. As the overheating is close to the overheating in the check model, it will be more difficult to reduce overheating from now.

STEP 6

Action
Introduction of living room window

Thoughts
As the model crashed, the results was difficult to replicate, but the overheating still shows that even though the living room window is facing north, it still produces some overheating. As the living rooms thermal zone is next to the kitchen, the kitchen also rises in hours overheating.

STEP 7

Action
Introduction of living room curtains

Thoughts
As in the kitchen, the curtains also work. Even though it does not have the same effect, it will reduce greatly when rotating the building to match the other homes.

STEP 8

Action
Introduction of living room overhang

Thoughts
Because the window is against north, the overheating from the window comes from the low sun, which renders the overhang without impact. It will though have impact when rotating the model.

STEP 9

Action
Introduction of skylight

Thoughts
As the results show, the skylight adds overheating to the indoor climate. Being an essential element in the interior concept it is tried to improve the conditions rather than removing them.

STEP 10

Action
Lower G-value on skylight

Thoughts
To limit the passive sun heat from the skylight, the g-value is lowered on the glass. To use a realistic low limit, the lowest from Velux is used. This helps a lot just to switch glazing.

STEP 11

Action
Introduction of curtains around skylight

Thoughts
To improve the conditions with the skylight, interior curtains are added. Even though not helping a lot, it still reduces the overheating slightly.

STEP 12

Action
Mixing air between kitchen and living area

Thoughts
In reality the air would mix between the rooms. To simulate this in the best way, mixing is turned on between the living room and the kitchen. Suddenly the overheating gets transferred to the other rooms, and the overall performance of the building become better.

STEP 13

Action
Mixing air to the intimate area

Thoughts
As the intimate area is the stable room, mixing with its air drastically reduce the overheating. Having one big volume makes it possible to have big openings.

STEP 14

Action
Adjustment of kitchen ventilation

Thoughts
As the kitchen ventilation was set a little to high it was adjusted to a more realistic value.

STEP 15

Action
Adjusting the kitchen window curtain only to be active from 11-16

Thoughts
Even though it makes the overheating worse, it is more realistic to assume a smaller time where the curtains is used.

STEP 16

Action
Adjusting the living room window curtain only to be active from 11-16

Thoughts
Has the same affect as the other curtain.

STEP 17

Action
90 degree rotation.

Thoughts
Rotating the model shows some problems with overheating.

STEP 18

Action
180 degree rotation.

Thoughts
Rotating the model shows some problems with overheating.

STEP 19

Action
270 degree rotation.

Thoughts
Rotating the model shows some problems with overheating. One of the problems is overheating on the bathroom. Because it is relatively small, it easy overheats during usage. To avoid this shading in front of bathroom window is introduced.

STEP 20

Action
No rotation shading in front of bathroom and door

Thoughts
With the bathroom facing north, the impact of the shading does not affect the overheating very much.

STEP 21

Action
90 degree rotation shading in front of bathroom and door

Thoughts
Adding shading in front of bathroom really helps when rotating the building.

STEP 22

Action
180 degree rotation shading in front of bathroom and door

Thoughts
Again the shading proves its worth.

STEP 23

Action
270 degree rotation shading in front of bathroom and door

Thoughts
The shading is really reducing overheating facing south.

CONCLUSIVE THOUGHTS

The indoor climate of the design is conclusively reached without to much overheating. One of the final test was to change the floor to wood instead of concrete, and with almost no impact on the results it is only conclusive that the certifications does not take the perception into consideration.

50
kWh/m²

45
kWh/m²

40
kWh/m²

35
kWh/m²

30
kWh/m²

25
kWh/m²

20
kWh/m²

15
kWh/m²

#11   #1

#10   #2

ENERGY
OPTIMISATION & IMPACT

#9   #3

#8   #4

#7   #5

#6

126 **Energy** - *Process diagram*
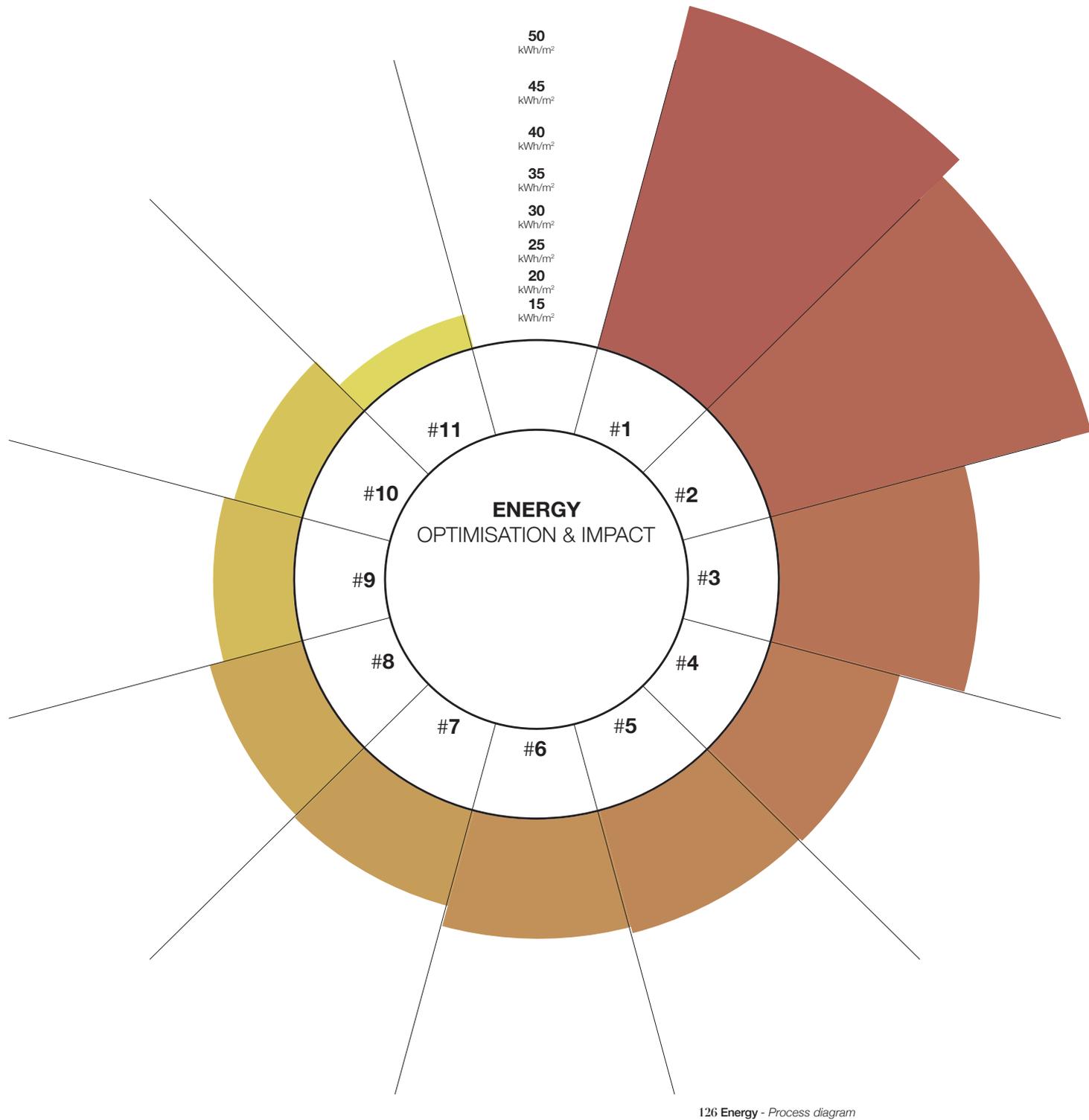
5.7 Optimising the energy consumption

During the process of analyzing the energy consumption, the objective was to develop architectural details, that enhance the perceptual experience of well-being, while keeping within the regulations. Optimising a building should be done while designing, not after. It should be done with the simplest solutions to enhance the understanding of the story behind the detail. By integrating the initiatives in the architecture from the beginning the energy consumption was easier to optimize for the 2020 building regulations, and doing this without any horrifying shading device, but with details that enhance the space – turning initiatives into an appreciated detail. For details about the different steps see Appendix 01 BE10 Process

Action
Check model with walls and windows

Thoughts
To have a comparable point of departure the energy consumption was made from a model with insulating walls and windows, but no initiatives to improve energy consumption.

STEP 2

Action
Introduction of curtains

Thoughts
Adding the curtains reduces the energy consumption. Mostly by limiting overheating in the building.

STEP 3

Action
Introduction of overhang against south

Thoughts
Adding the overhang really makes a different in the energy consumption. Removing some of the heat in summer, while still allowing passive heat gains during winter is the perfect combination.

STEP 4

Action
Lower G-value on windows

Thoughts
To reduce the passive heat gain through the big open facades a better glazing is introduced. This helps a lot and just proves how much can be done with glazing.

STEP 5

Action
Introduction of overhang against north

Thoughts
Having a little overheating against north, the overhang helps. It will though be much more evident when rotating the building.

STEP 6

Action
Photovoltaic Cells added

Thoughts
When having ventilation in a building, it is impossible to avoid using power. To counteract this consumption the photovoltaic cells are introduced. Around 10,5m^2 per home showed to be the amount, which could be utilized as a benefit.

STEP 7

Action
More natural ventilation in intimate area

Thoughts
By allowing natural ventilation in the intimate area of the home, the slightly overheating could be removed.

STEP 8

Action
Lower U-value against north

Thoughts
To optimize the energy consumption it is necessary to choose the right kind of glass. Against north it is important to insulate, so a glass with low u-value is chosen.

STEP 9

Action
Lower g-values in skylight

Thoughts
When the skylight is horizontal it brings a lot of passive heat. To limit this, the g-value is lowered on the skylight.

STEP 10

Action
Better u-value skylight

Thoughts
Hot air rises, thus the insulating capacities of the skylight is important. To loose the least heat the u-value on the skylight is lowered.

STEP 11

Action
Reduction of line loss

Thoughts
Making a building within the low energy spectrum requires more attention to the execution. Expecting the heat loss through joints to be minimized, the line loss values are lowered.

CONCLUSIVE THOUGHTS

Optimising the energy consumption is an exponential process. When making the frames, it is only possible to reduce to a certain point. After that, lowering the insulating capacity or making the walls thicker does not help. Because of this, the only wall which obtain a really low u-value is the wall against the soil from the slope. This is because the thickness of the wall is not visible. The introduction of curtains and overhangs is the predominant initiatives to reduce overheating.

If the energy was to be reduced further, the only initiative left to do is to change the design - smaller windows or thicker walls. As it was possible to reach 2020 demands with the final design, it is evaluated to meet the requirements from the program.
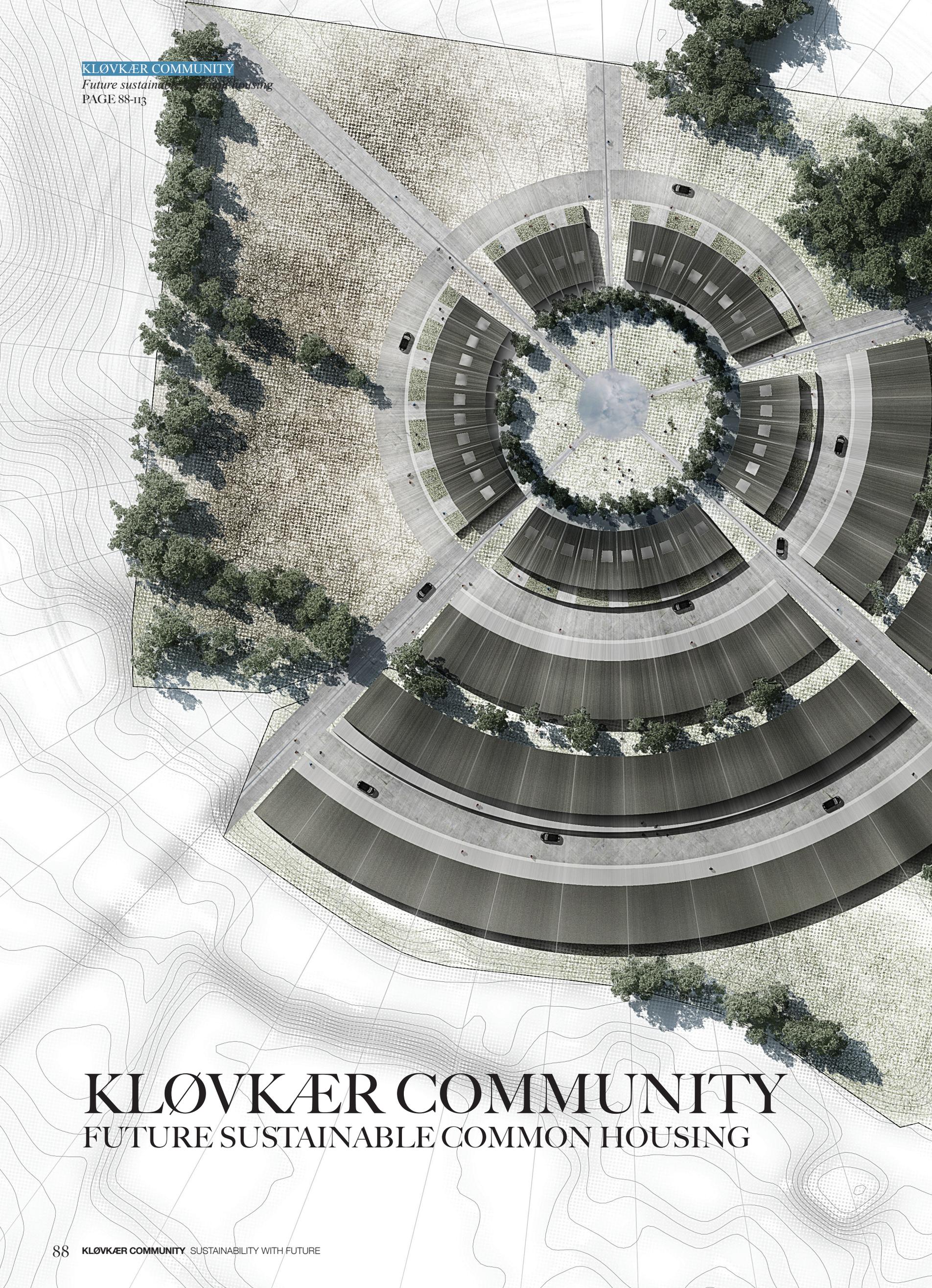
KLØVKÆR COMMUNITY
FUTURE SUSTAINABLE COMMON HOUSING
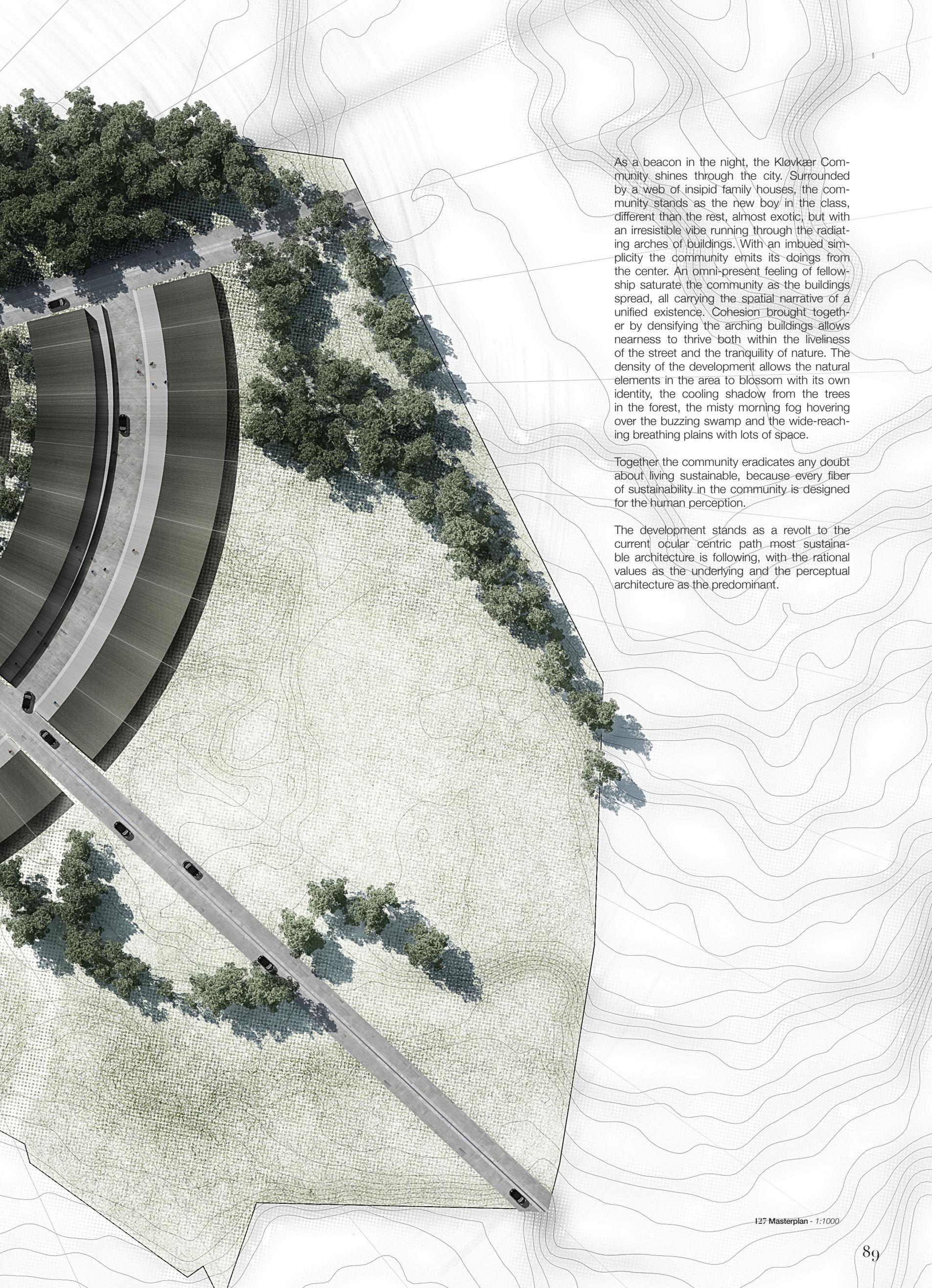
As a beacon in the night, the Kløvkær Community shines through the city. Surrounded by a web of insipid family houses, the community stands as the new boy in the class, different than the rest, almost exotic, but with an irresistible vibe running through the radiating arches of buildings. With an imbued simplicity the community emits its doings from the center. An omni-present feeling of fellowship saturate the community as the buildings spread, all carrying the spatial narrative of a unified existence. Cohesion brought together by densifying the arching buildings allows nearness to thrive both within the liveliness of the street and the tranquility of nature. The density of the development allows the natural elements in the area to blossom with its own identity, the cooling shadow from the trees in the forest, the misty morning fog hovering over the buzzing swamp and the wide-reaching breathing plains with lots of space.

Together the community eradicates any doubt about living sustainable, because every fiber of sustainability in the community is designed for the human perception.

The development stands as a revolt to the current ocular centric path most sustainable architecture is following, with the rational values as the underlying and the perceptual architecture as the predominant.

127 Masterplan - 1:1000

A CIRCULAR SOCIETY
A PLACE WITH LIFE AND TRANQUILITY

In between the community's circularity, the boulevards cut through the buildings. As a celebration of the place, the middle of the boulevard capture the running rain water in a sharp line down to the omni-present center. To shelter the openness of the homes, the common functions constitute an embellished belt of life. Life under the belt, where cloth is washed, food is cooked and guests is staying and life over the belt, where each home expands into a little oasis in the midst of the busy street. As a calm rhythm the columns supporting the front yard belt create an arcade that constitute a transition between the public space and the private home.

To introduce warmth in the expression the front yard belt is encircled with slender wooden railing, that both age beautifully and emphasizes the narrative of a circular society. The end walls is built in solid brick, both as a tribute to the old brick factories in the site, and also as to support the narrative of a building that is going to be there for at least the next century.

128 Exterior visualisation

LIVING
AND BREATHING

Under the green front yard belt, the car can be parked in close relation to the entrance. One step after another, the ascent to the plateau raises a soothing tranquility. With an exhaling comfort the light glass facade passes to the side, gently caressed by the soft sweeping curtain behind the window. As the door opens, the curtains sway in the fresh breeze, and in a translucent way shelters and at the same time reveals the space. The kitchen area is saturated with air, light and life, and the open appearance of the spaces creates an inspiring coherence. The wooden floor clearly narrate that the living space is a space within the big room and with embracing warmth the space speaks a relaxing language. In the hours where the stove is on, and the kids is running around, the wide overview over the whole dwelling corresponds with the safety wanted by a family. After a dinner party, the dirty dishes is simply brought to the common kitchen, where there is space to deal with a situation beyond the daily life, and if the guests need to stay, the community simply offer one of the shared guesthouses. On a hot day, the facade towards the street is simply opened up, and a free flow to the outdoor and the front yards creates an irresistible desire to go out and enjoy the air and the community.
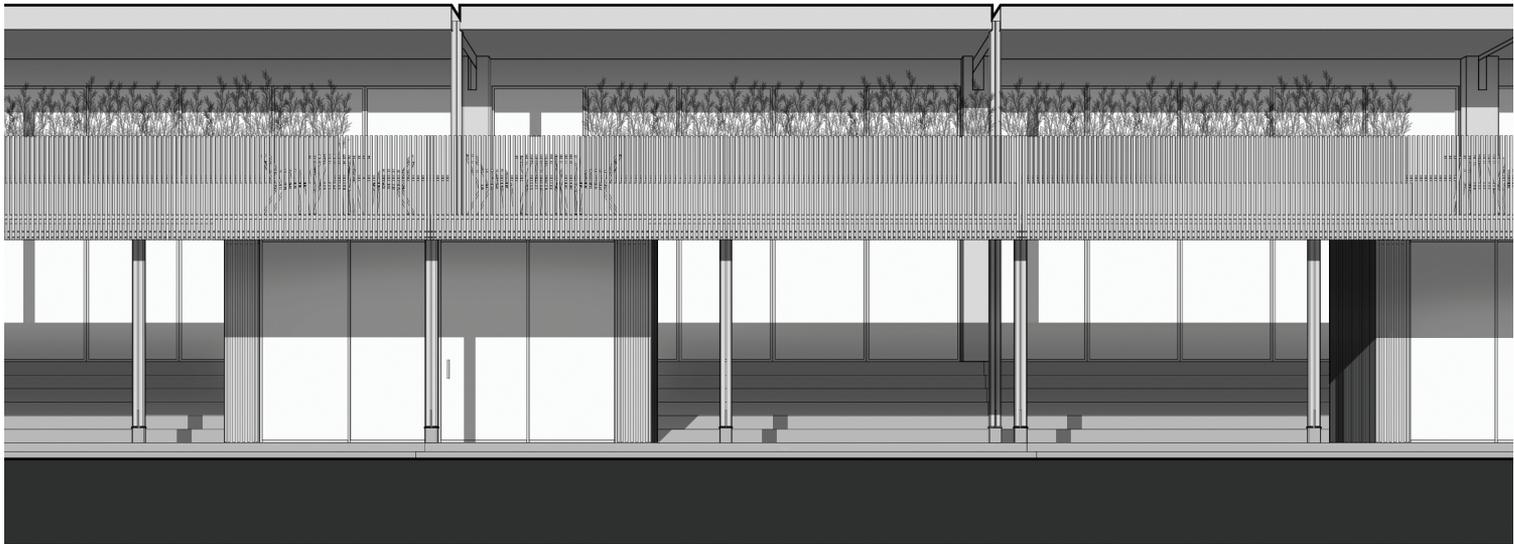
129 **E01** - *Street elevation - 1:100*

RESIDENTIAL	
PLAN 01 Living area and Kitchen	41,5 m²
PLAN 00 Intimate area and storage	39,3 m²
PLAN 00 Bathroom	4,3 m²
Netto	85,1 m²
Gross	104 m²

SHARED	
PLAN 01 Common functions	8 m²
PLAN 01 Outdoor Storage	1 m²
Netto	9 m²
Gross	10 m²

EACH UNIT IS	AND HAS	THERE IS	WHICH TAKES UP	THAT ACCOMODATES
114m²	**1**	**38**	**4332m²**	**152**
	P-LOT	UNITS		PEOPLE

18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

SKYLIGHT
4000

ROOF
3345

ROOF COMMON FUNCTIONS
1600

PLAN 01
0

PLAN 01 COMMON FUNCTIONS!
-1000

PLAN 00
-3000

FOUNDATION
-4200
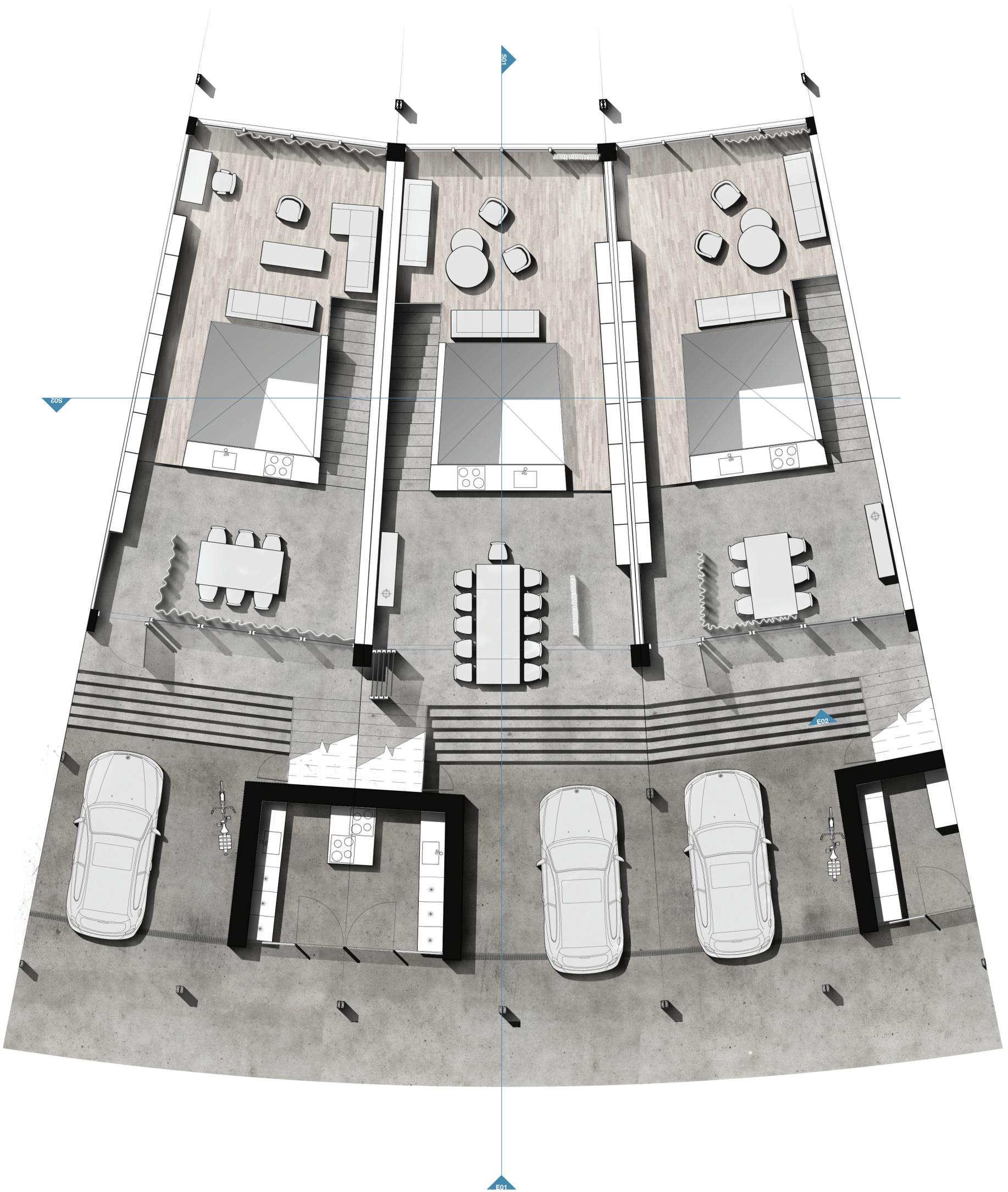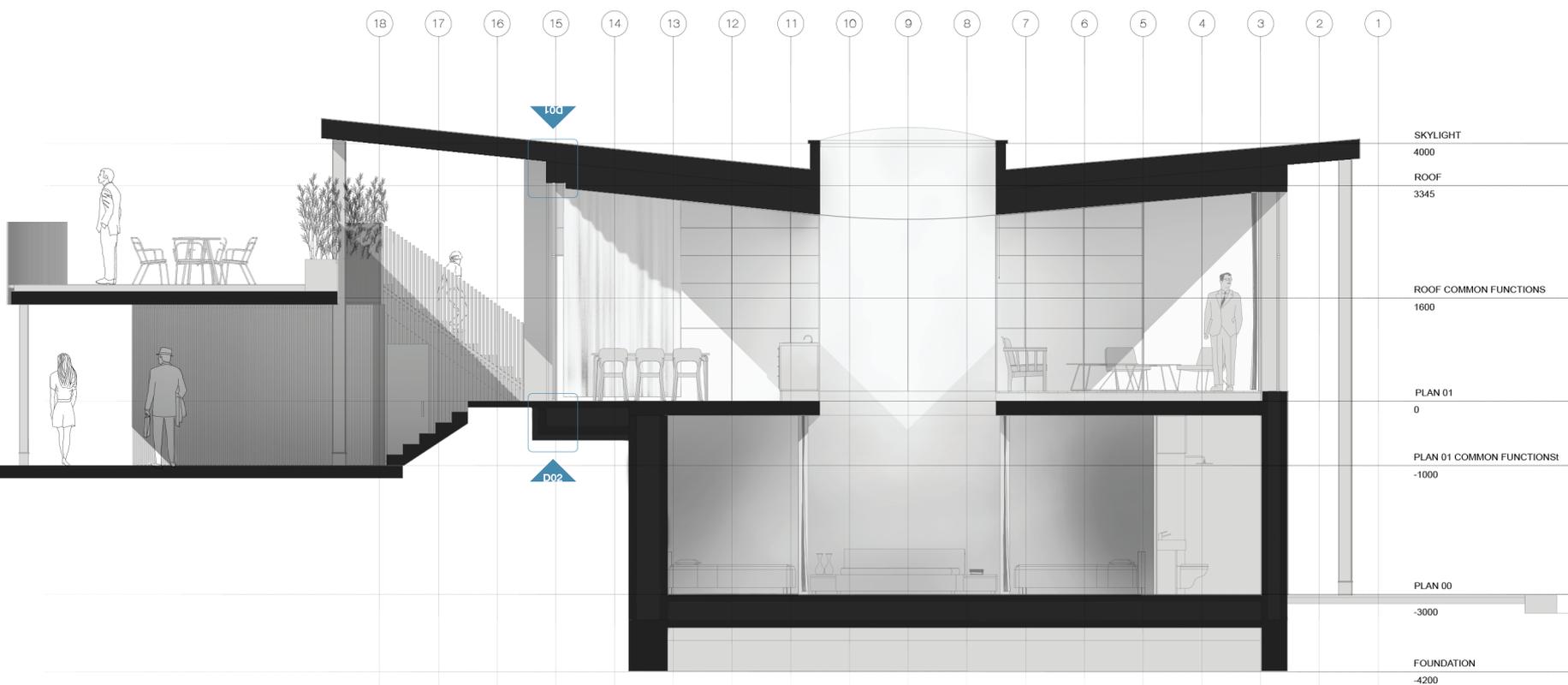
1·31 **S01** - *longitudinal section through home - 1:100*

Living takes place through two aspects – We experience and share with each other, and we retract by ourselves to process and rest. This narrative is embedded in the architecture through the use of two spacious rooms. The upper part of the home is the space where life enrolls. The kitchen is ebullient and a place with energy. To enrich the community with the life from the kitchen, direct access to a front yard is situated on top of the common functions. This belt of greenery transcends from the privacy of the home to being in a fellowship where people meet. To infuse individuality within a unity, the front yards is embellished with a hedge towards the kitchen, both as a place where the residents can plant their own identity, and also as shade for the kitchen.

A skylight separates the kitchen from the living room, and the separation of the two zones is further emphasised by inclining the roof towards the façade. This opens the upper floor and infuses a transparency in the place of life. A fundamental part of living sustainable is to live on less space.
Living on less space usually equals small rooms, which often proves to be inflexible and with a tendency of claustrophobia. To obtain intimacy within a spacious room, the lower part of the home is enlightened by only one skylight. Pulling down light in the center of the room, the periphery darkens and allows intimacy without feeling uncomfortable.

132 Exterior visualisation of front yards and the street

ASPHALT ROOFING

**INSULATION** 250mm
TRANSVERSE BEAM

INSULATION 150mm

VENTILATION INLET
VAPOUR BARRIER
INSULATION 75mm
PLASTERBOARDS 2x12mm

CURTAIN
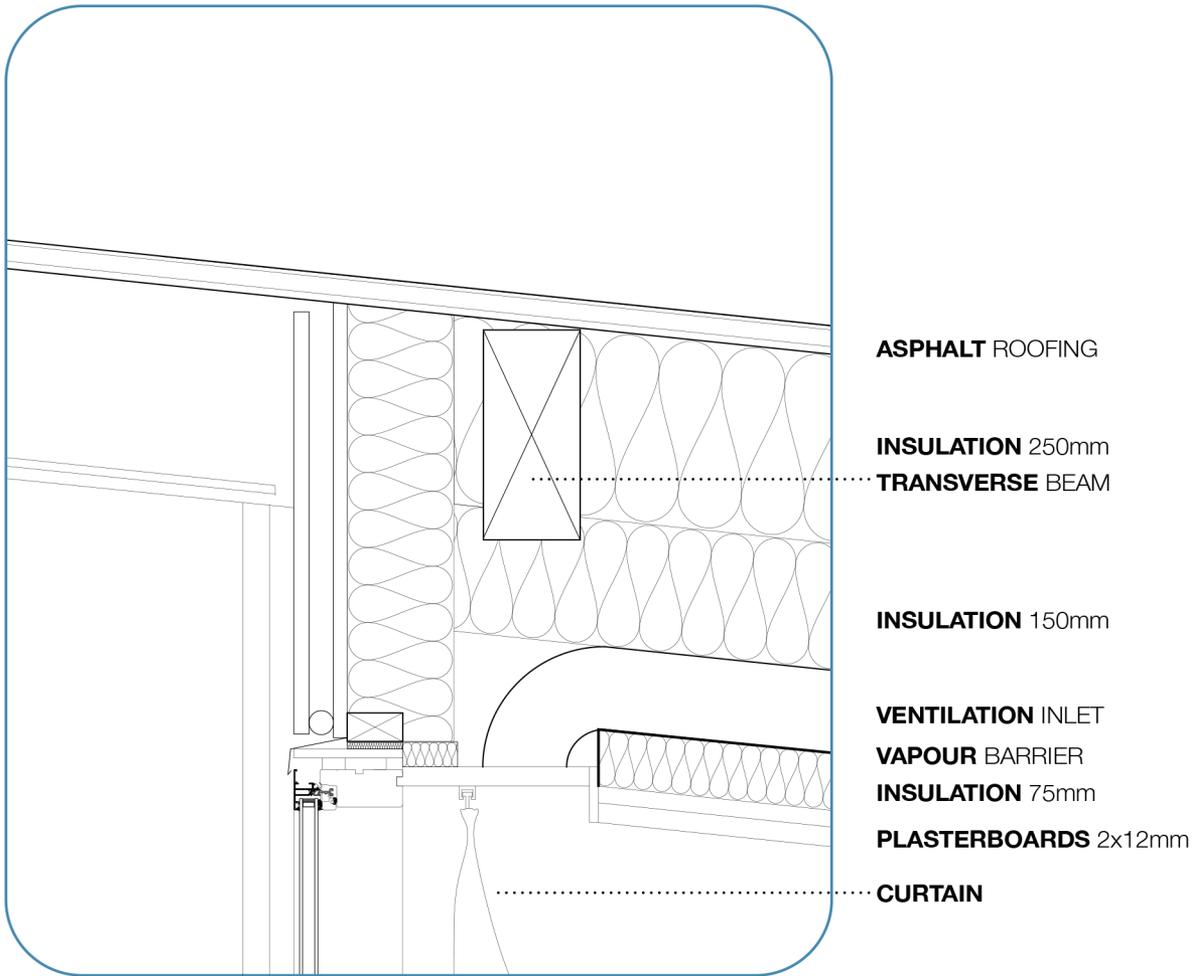
133 **D01** - *Detail of the joint between the glass facade and the ceiling - 1:10*

OUTSIDE   **INSIDE**

FLOOR HEAT   **CONCRETE** 120mm
ARMOUR

LECA NUTS 200mm

INSULATION 250mm

INSULATION 150mm

EARTH
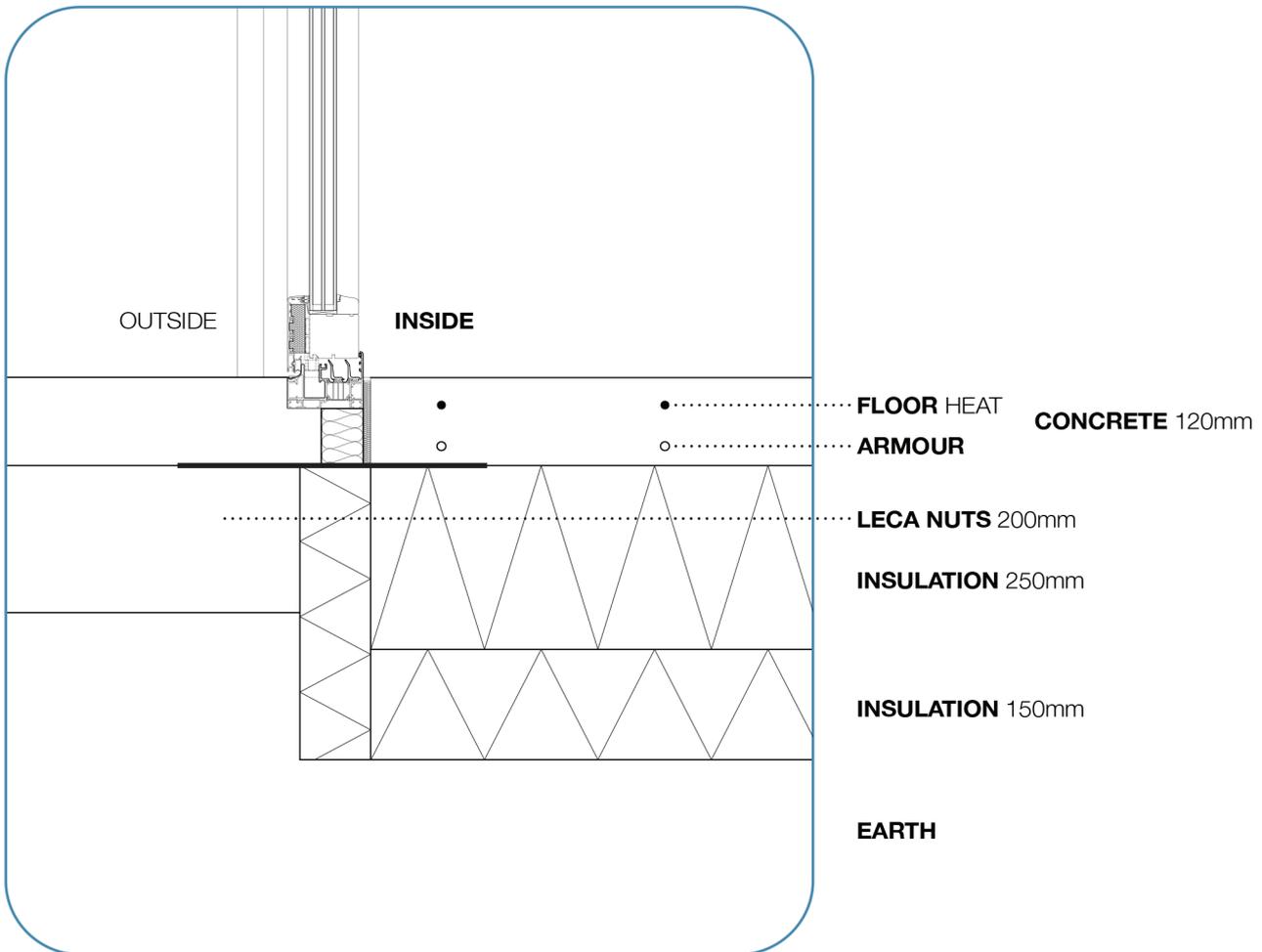
134 **D02** - *Detail of the joint between the foldable door and the floor - 1:10*
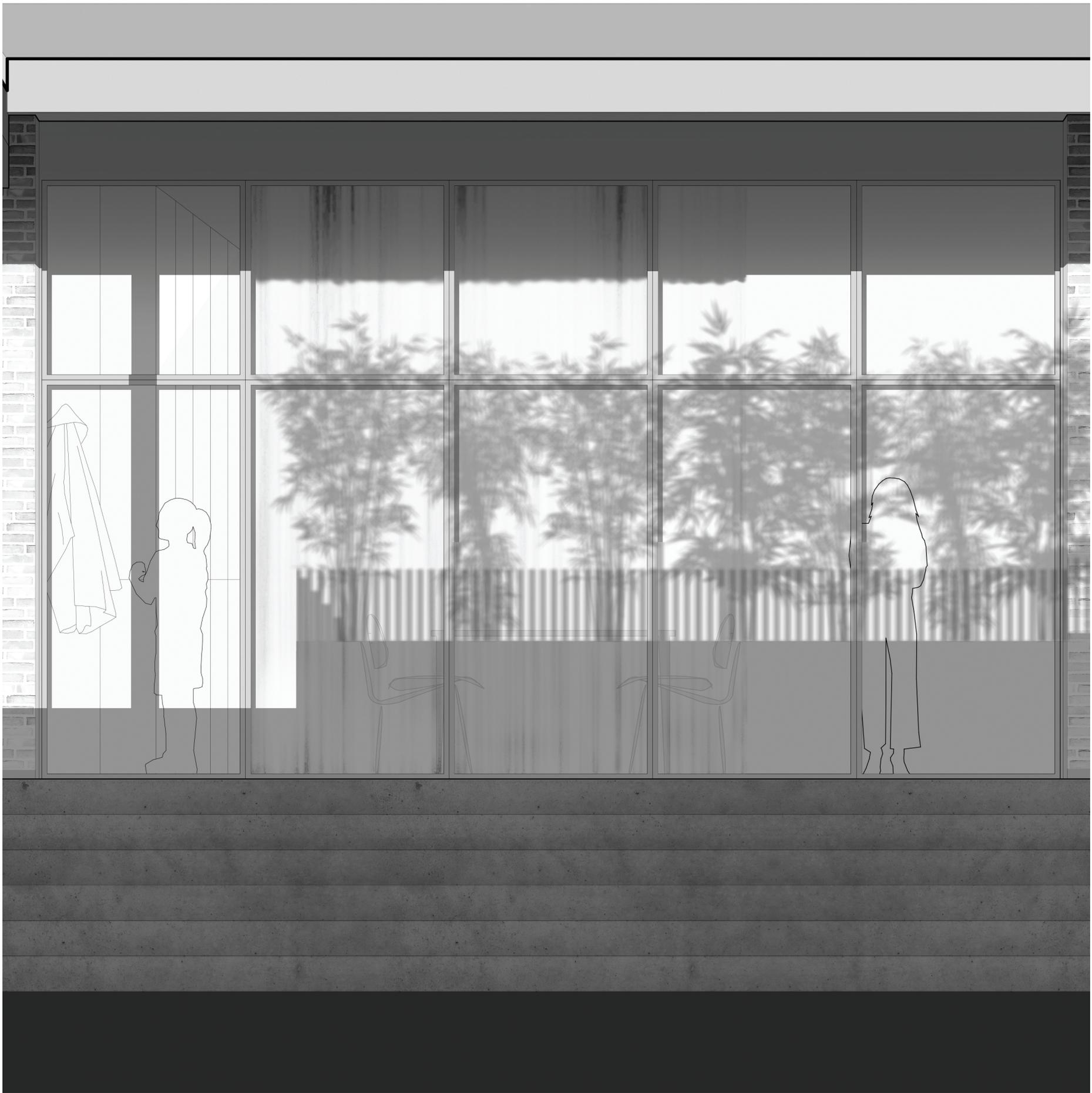
THE KITCHEN
LIGHT, LIFE AND TRANSPARENCY

Early morning the kitchen flickers with a sensual dance between light and shadow. Filtered through the hedges on the front yards, the light reveals the motion in the leafes and imprints a deep impression on the surfaces of the kitchen. The concrete floor adapts to the weather, in winter warm and soft and in summer cool and fresh. As the sun brightens and the heat slowly sneak through the day, the kitchen facade simply opens up, allowing fresh air to flow and the space to expand into the front yard and the street. And because the common functions and front yards shade the kitchen window, the wind is also sheltered, so the facade can be opened without papers flying around.

Standing in the doorframe, the body remembers. With a design that emanates in the human geometry, the mullions adapt the big facade to something understandable for the body and mind. The ceiling subtle rises towards the light and clearly defines a direction in the space. The countertop is arranged towards the core skylight of the home. With a free view to the motion of the sky, and the comforting blue skylight, making food becomes a joy.

The big white translucent curtain defines the entrance that when wanted, shelter the space while still having a light and open atmosphere.

THE LIVING AREA
SPACE TO LIVE

The open atmosphere welcomes the light, flushing through the big glass facade and the skylight. The grain of the wood speaks to the tactile touch of a bare foot, and connects the body firmly with the ground. A little after noon, the light slowly dances over the couch, reaching to the floor, grabbing the table and gently fades away. The reflections in the glass around the skylight core, reflects both the space in front and behind. This blend of spaces tricks the sight, and instantly the peripheral recognition of the space appears. As the space unfold to the body, the motion by the ascending roof firmly opens the space against the window. As the eyes wander through the room, they perceive the spa-ciousness brought by the big mirror. The floor and roof magically prolongs in the mirror, and the spatiality of the room expands. The big, white, sweeping curtain gently sways with the motion in the room and embraces the space in a light and open way.

In the background the kitchen appears and extends all the way to the front yards, bringing the whole floor together in one coherent experience.

137 Interior visualisation of living area

THE NARRATIVE
## OF INTIMACY AND TRANQUILITY

The concrete floor in the kitchen continues in a displaced course down the stairs to the intimate area of the home. Here the bathroom lies in direct access without intruding on the bedrooms and rooms. With a slight elevation, the floor adapts to a place of intimacy with its warm wooden grains. Perceived as one big room, only penetrated by the core skylight, a spacious feeling is attained. As shadow slowly engulf the body and mind towards the periphery of the room, the tactile senses is intensified, and the mind and body can relax.

Now and then the mornings are saturated with the calm drumming of rain on the skylight, and on winter mornings, a soft blanket of snow diffuses the light. By only having the skylight in the room, the narrative of both light and the appreciation of shadow are intensified.

The stair course extends into the back yard door that is shaded by wooden lamella. Supported by the solid brick wall, the lower part of the home expresses privacy and solidity. Going outside the pavement suddenly stars to blend together with the nature, to strengthen the narrative of the border between building and natural element. To create distance to the bathroom window, the pavement diagonals away from the window almost weaving the back yards together with each other.

The end of the back yards is embellished with a poplar rotunda that clearly defines the circle from which the whole complex emanates. The trees create a transition from the semi-private back yards, to a public green space that everyone can enjoy. The omni-present center of the community is concluded with a natural lake, which both collects the rainwater and celebrates the natural typography of the place.

138 **E03** - *Center elevation - 1:100*

139 **P02** - *Bedroom and rooms - 1:100*
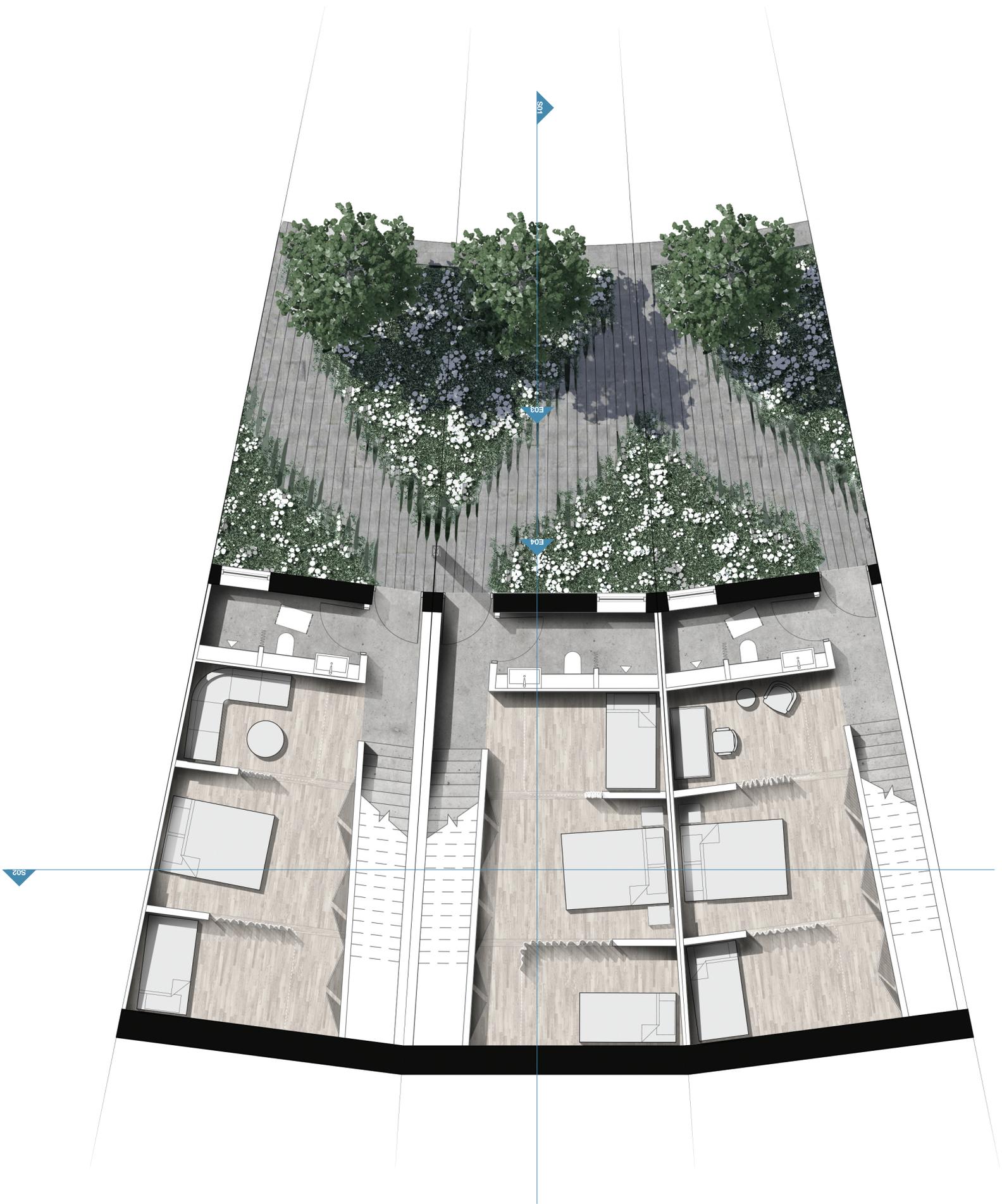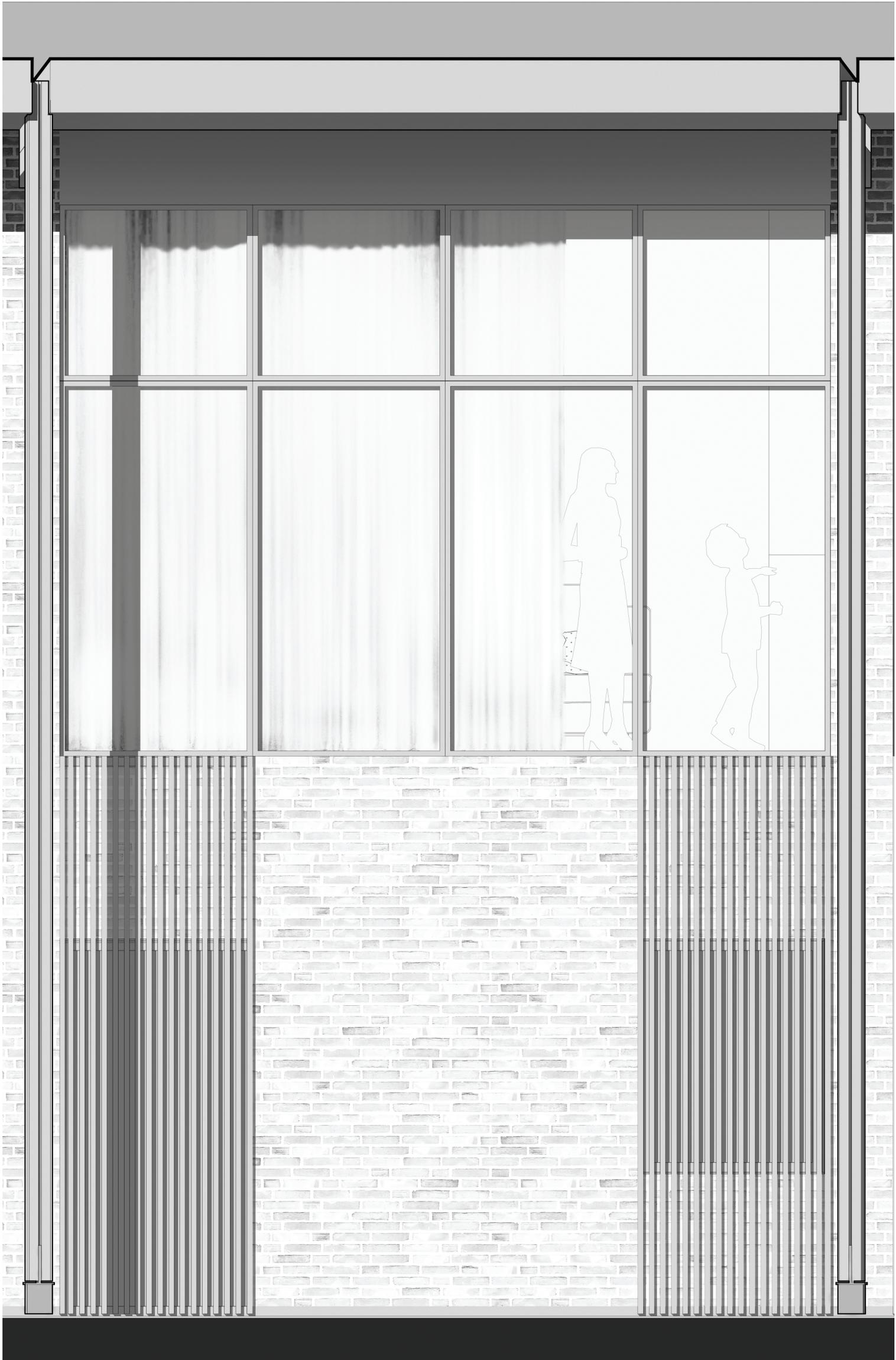
140 **E04** - *Facade against the center - 1:25*

141 Exterior visualisation of back yards and rutonda

INNATE TACTILITY
FLEXIBILITY AND SPACE

142 Interior visualisation of intimate area

The spacious appearance of the intimate area gives air and unity within the home. To introduce flexibility and the ability to adapt to different situations, the curtain is introduced as a spatial separating element. As the darkness falls the shadow sedate the sight. With a slight fumble in the darkness the curtain is a gentle barrier – perceptually very evident, but with an embracing tactile property.

As the curtain is pulled to the side, the area defined within the boundaries of the curtain seizes the hallway in front of the storage under the stairs. Because the curtain is a soft barrier, it does not implicate the escape ways, and the possibility to create rooms that utilise the space is heightened.

To support the definition of the rooms within the big room, the floor changes direction. As the sight is sedated by the shadow, the bare foot detects the change of grains in the wood and become aware of the narrative behind the smaller rooms.

143 Interior visualisation of the embracing curtain

THE SKYLIGHT
A COHERENT CONNECTION

With the skylight as the only source of daylight, it attains a predominant role in the spatial perception. With closed walls around the room, the double height ties the upper and lower part of the home together. With an innate force the skylight acts as the center of the home, a symbol of the diversity between different atmospheres, all unified under one coherent roof. The glass around the core extends the perception of the skylight with reflections and perpetuates the motion in the sky.

As the skylight has an incomparable value to the perception of the home, it also ensures daylight through all days and all weather. The horizontal appearance drags the light down and spreads the blue tones from the sky. With the open and light appearance of the upper part of the home, the skylight ensures a light and open atmosphere even with the curtains pulled in front of the windows. To see more details about the daylight level see Appendix 07.

SKYLIGHT
4000

ROOF
3345

ROOF COMMON FUNCTIONS
1600

PLAN 01
0

PLAN 01 COMMON FUNCTIONS
-1000

PLAN 00
-3000

FOUNDATION
-4200
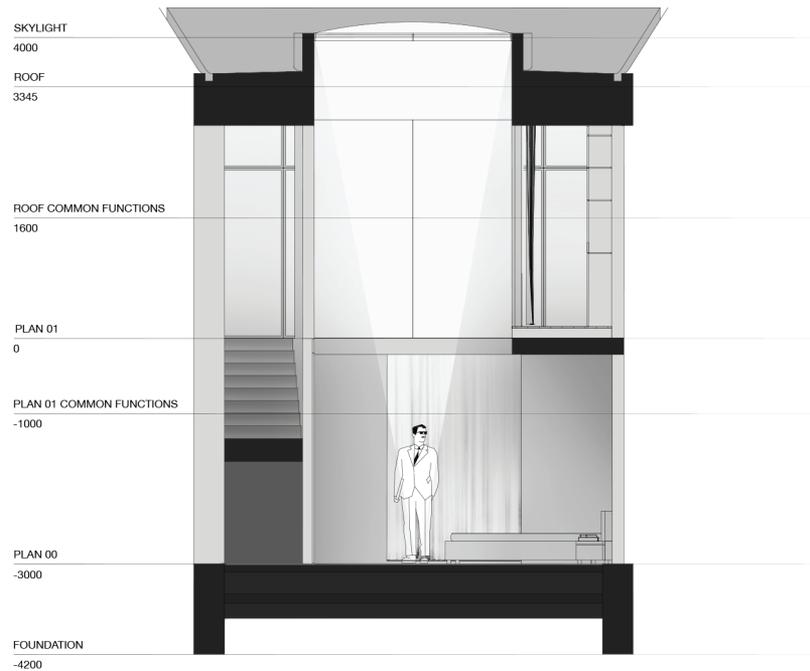
144 **S02** - *transverse section through home - 1:100*

12,00% — Very light
10,00%
9,00%
7,50%
6,00%
4,50% — Min. working light
3,00%
1,00% — Dark
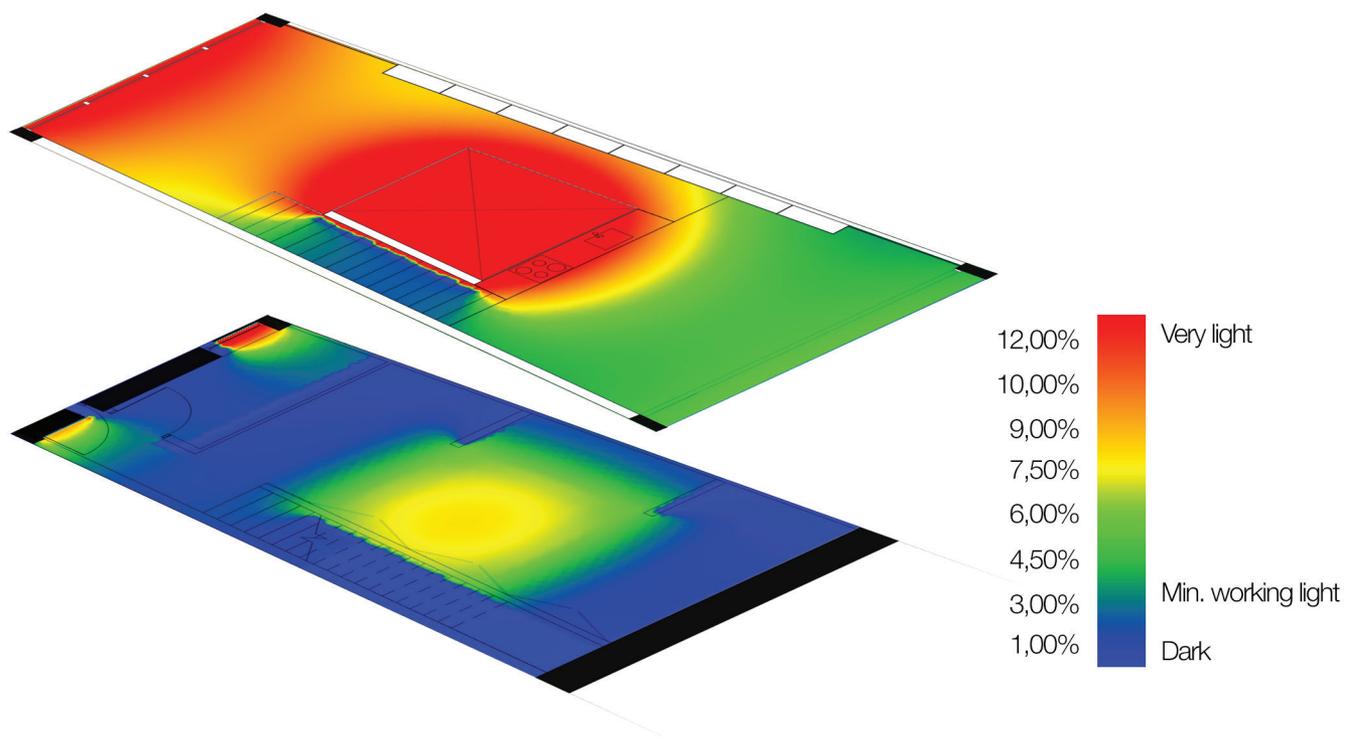
145 **Daylight** - *Analysis from Daylight Visualiser 2*
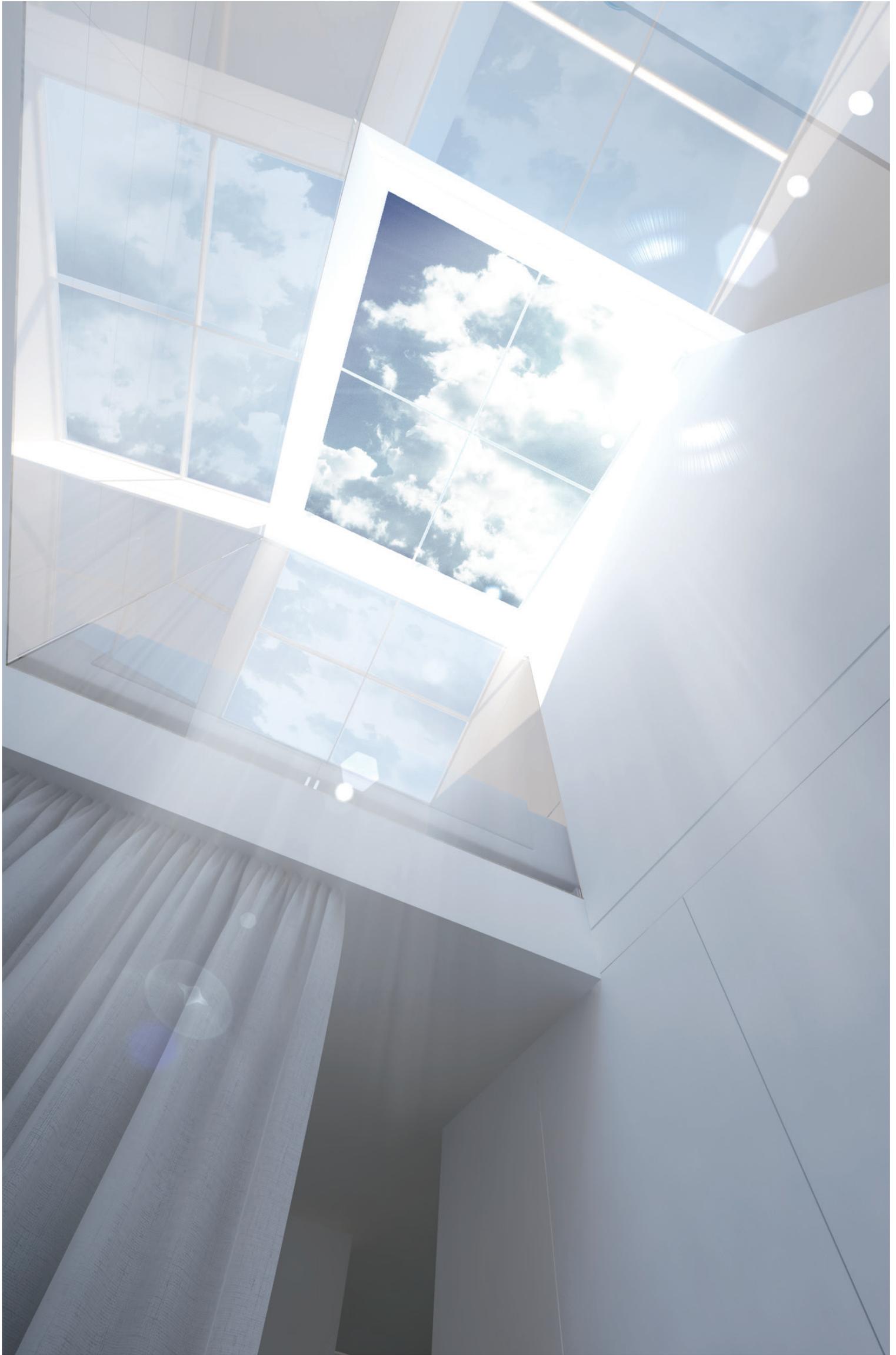
146 Interior visualisation of skylight

THE SKYLIGHT

As the center of every home it enlightens the home with the pleasant light from the blue sky.

THE ROOF

Expanding from the skylight, the roof shades the big open facades with a slender and light expression.

THE STRUCTURE

To obtain flexibility in the future, the structure spans in the whole dwellings length, creating one big free space.

THE SUB ROOF

To ensure a light expression, the roof is lowered within the climate screen, acting as insulation and piping space.

THE LIGHT WALLS

Between the homes, the full spanning structure allows the walls to be light without columns for more flexibility.

THE FUNCTIONAL WALL

To consider storage, the area to the hallways is double booked with a wall of storage.

THE OPEN FACADES

The big open facades introduces a lightness and opens up to the context in one flowing experience.

THE CARRYING WALLS

Concrete with brick cladding acts as the carrying structure of the roof, and allows renovation without structural interference.

THE FRONT YARDS

Front yards is embellishing the periphery of the buildings, creating an attractive transition between public and private.

THE CORE

The skylight drags light down through the glass core and spreads a gentle gleam through the two floors.

THE COMMON FUNCTIONS

Shared common functions as a transition between public and private, and to enhance the life between the buildings.

THE BACK YARDS

As a transition between public and private and to enhance privacy in the bathroom the back yards pulsates.

THE PLATEAU

To allow openness to the street the plateau transitions to the privacy of the home.

THE ROTUNDA

As a celebration of the fellowship and community, poplar trees sketch a clearly defined circle in the center of the site.
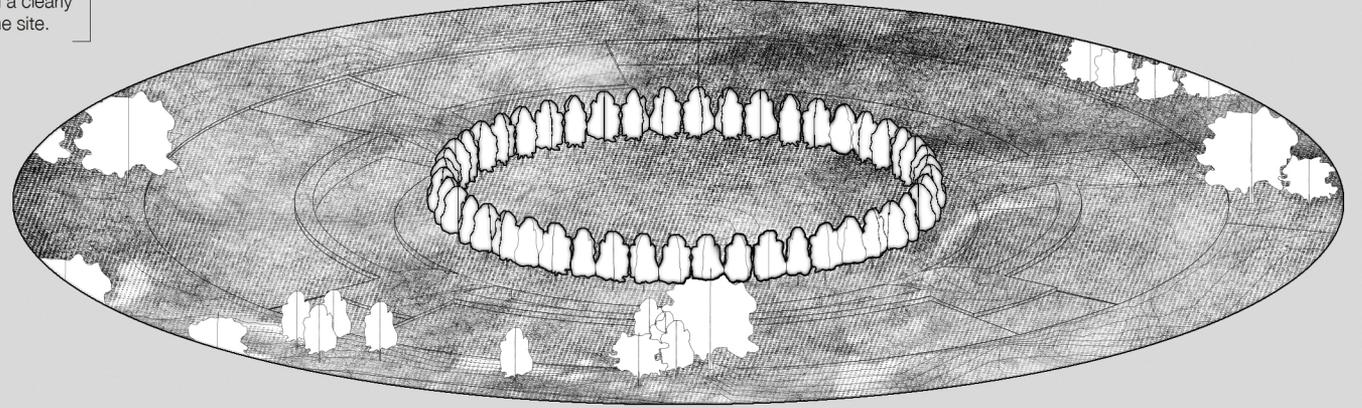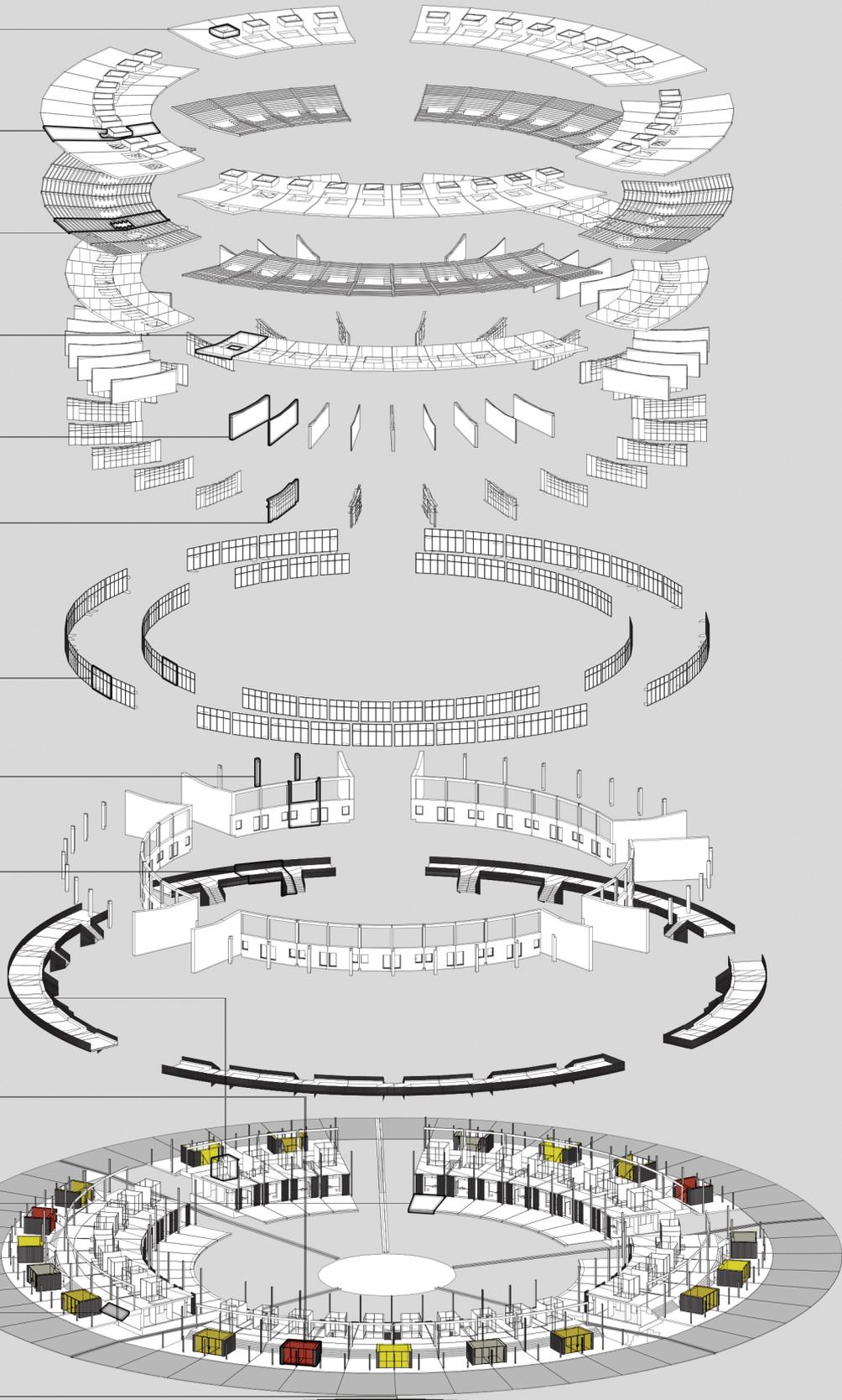
- shared kitchen
- shared cloth washing
- shared multirooms
- shared guesthouses

147 *North elevation - 1:500*


148 *South elevation - 1:500*

149 *East elevation - 1:500*

150 *West elevation - 1:500*

INDOOR CLIMATE
AND ENERGY PERFORMANCE
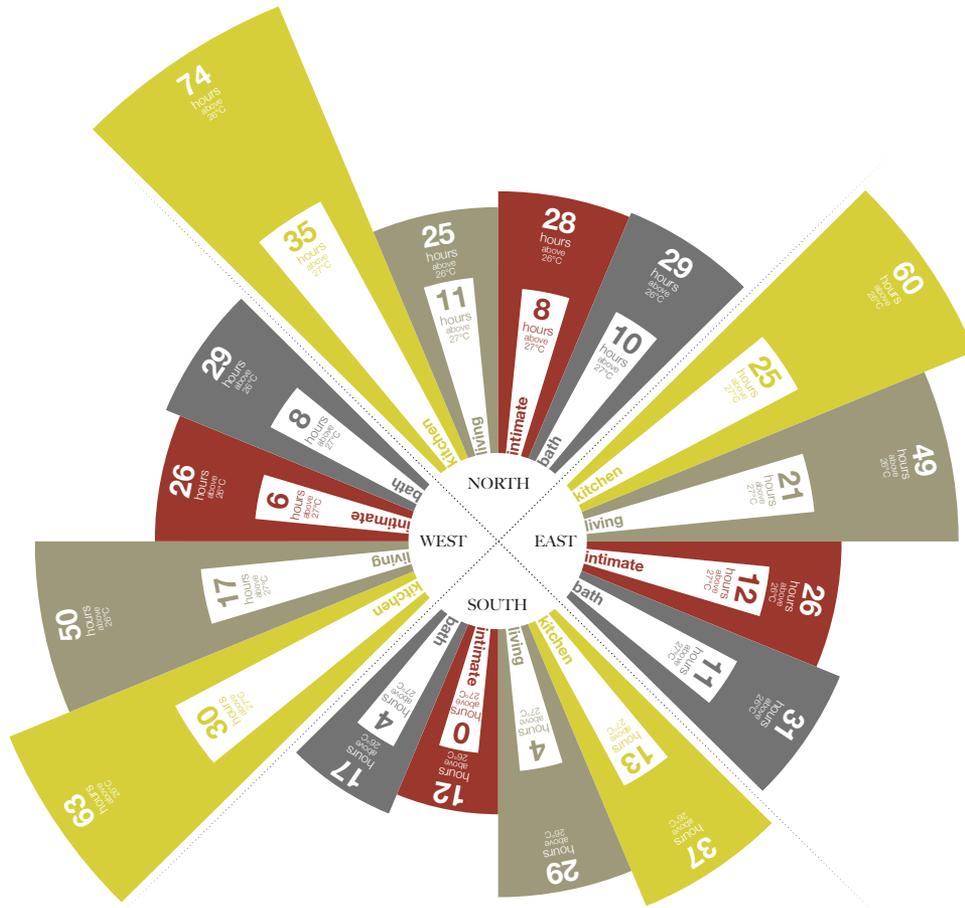
151 Calculated overheating - *Yearly hours of overheating towards the four orientations*

The indoor climate is one of the most important aspects in the search for well-being. As a sustainable approach the well-being has been ensured through the understand of the human perception. The outcome from the theory and the case studies, was that sustainability is something far different than the homogenized proposals described as certified today.

Even though it is not only the temperature, air and light that needs to be tamed, the basic demands are still requirement that must not be forgotten. In the project they have been the guidance, but not the predominant denominator. This has resulted in a project that is mainly designed for the well-being, but at the same time detects the area where the design needed solutions to solve the indoor climate or the energy consumption.

By constantly updating the calculations revolving these more rational values, it was possible to decide which direction to take parallel to the design progress. The final results though presuppose one alteration in the calculative background. In a shifting climate, the behavior and needs change during the year. On this background it is assumed, that when the design provides attractive outdoor areas, the residents will be more outside in summer, this the load from people and appliances drop slightly in summer months. As the behavior is

impossible to predict, an assumption on 20% drop in indoor presence is taken. For details on the BSim process see Appendix 06.

The fact that the behavior is impossible to predict also strongly indicates, that the calculations only support the basis for the standard family. Different behavior would conclude different results – which could be both good and bad. But as an indicator, the results very clearly draw a line in the sand, which in the final solution is on the right side. With results that mainly exist within the legislative frames, the project is approved as a place with good indoor climate. And with the foundation in the human perception, the project excels in well-being.

For detailed report on indoor climate analysis see Appendix 03.

The results show minor overheating. With two big facades of glass and one skylight this is not surprising. But with the skylight the possibility of venting even when not home, without the fear of safety, the ventilation during the hot days will not be the problem. Also if it really is hot, it is logical to assume that people would be outside. One of the great advantages of having two big rooms is that the impact on the bad stuff takes longer time to take affect. This also made it possible to have slower ventilation. To see detailed calculations on the ventilation rate see Appendix 04.

The air quality is steadily kept within the limit, and it is clearly that the air mixes together at all times. This creates a more stable indoor climate that would not exist if the home were separated into smaller rooms.

The top temperatures on a hot day are following the outdoor temperature, thus not exceeding the temperature very much. This shows, that the home is well functioning and the air freely renews itself even in the peak hours.

The energy consumption is tamed with less evident approaches. While the overhang and curtains is a way to avoid overheating in the spaces, the energy consumption is more concerned with what happens during the cold months. Because of this the initiatives is balanced between putting a jacket onto the building, but within being able to release this heat again. The ventilation uses some power, even with the high efficiencies today. To counteract this electricity usage, solar panels are installed at the roof, and only 10m^2 of approximately 50% of the roof is needed. The result is kept within the low energy 2020 standard. To see details on the energy calculation, see Appendix 02. To see details on the products utilised in the project see Appendix 05.

850 PPM
800 PPM
750 PPM
700 PPM
650 PPM
600 PPM
550 PPM
500 PPM
450 PPM
400 PPM
350 PPM

01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 24:00

KITCHEN
INTIMATEAREA
LIVINGAREA
BATHROOM
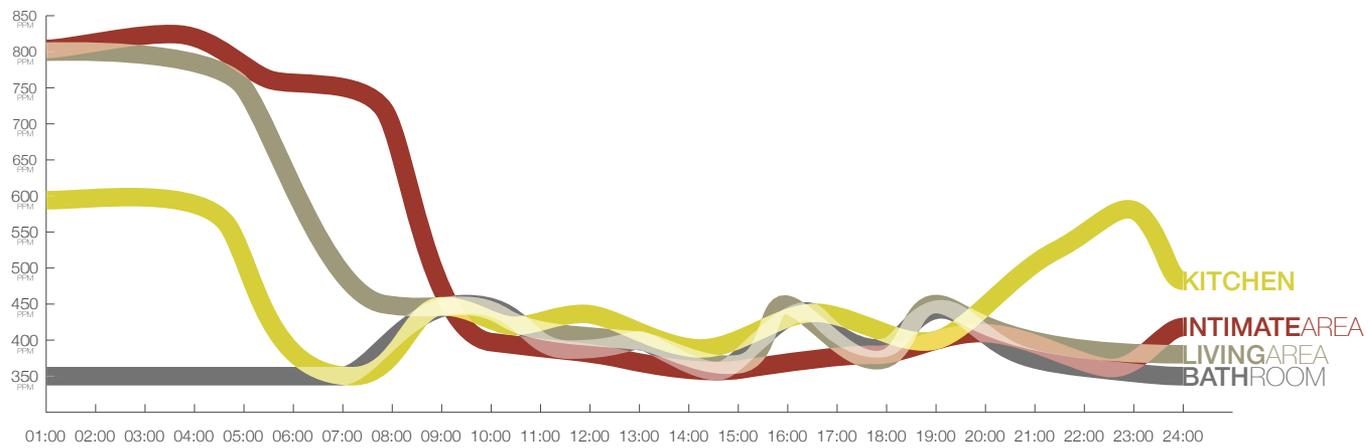
152 **Calculated air quality** - *Daily levels of the air quality*

25℃
24℃
23℃
22℃
21℃
20℃
19℃
18℃
17℃
16℃
15℃

01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 24:00

KITCHEN
BATHROOM
LIVINGAREA
INTIMATEAREA
EXTERNAL
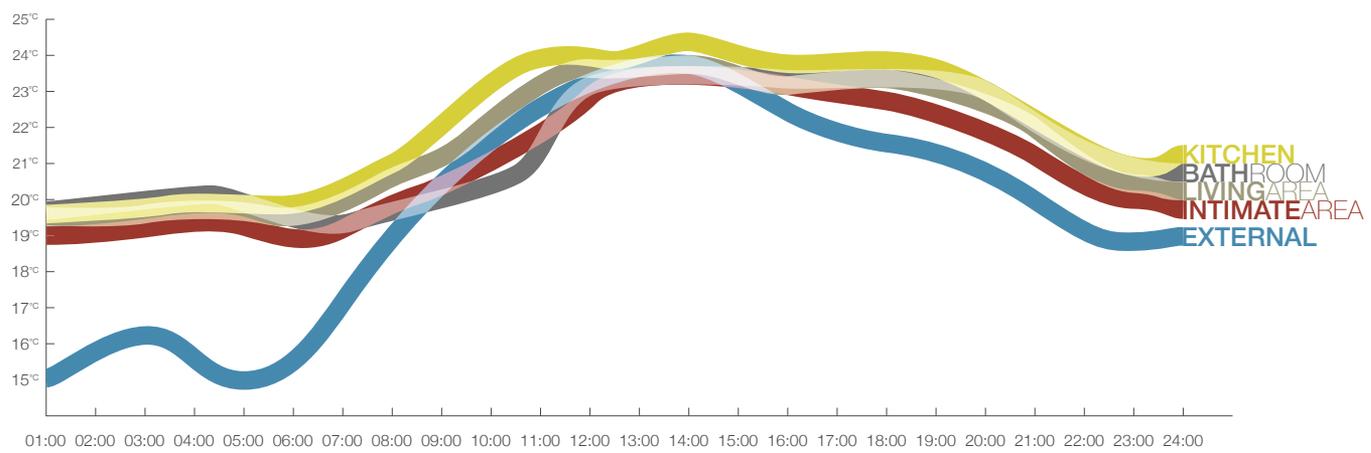
153 **Calculated top temperatures** - *Daily temperatures on a hot day*

EACH HOME USE

19 $\frac{kWh}{m^2\ year}$ .1

AND IS WITHIN
2020
BUILDING
REGULATIONS

EACH HOME USE	WHEREOF	AND	VENTILATION & PUMPS USE	THAT IS DEDUCTED WITH SOLAR CELL PRODUCTION OF
31 $\frac{kWh}{m^2\ year}$ .8	17 $\frac{kWh}{m^2\ year}$ .2	14 $\frac{kWh}{m^2\ year}$ .6	6 $\frac{kWh}{m^2\ year}$ .4	6 $\frac{kWh}{m^2\ year}$ .4
IN HEATING	IS ROOM HEATING	IS HOT WATER	IN ELECTRICITY	IN ELECTRICITY

EPILOGUE
A JOURNEY TOWARDS UNDERSTANDING

7.1 Conclusion

There is no doubt that architecture is one of the strongest translations of the way of life. Identification and relation of the human body and mind is perpetuated through architecture, and this importance reflects an ever-present responsibility. Anticipating eyes stare bewildered at each other looking for answers. One after another gripping after an indisputable meaning in the quick sand of the rational society. In between a fat agreement on which architecture makes a better world, the lucky few give in to the fact that architecture cannot be measured. Surely architecture is built on measures, but it originates from a feeling. A feeling so deeply connected with the mind of the architect that not even an army of computers could even begin to solve the mystery behind it - and this is in my opinion what is the ever-present foundation in good architecture, and even though it often dispute the demands from the sustainable certifications, it always feel more sustainable than everything else.

Exactly the fact that I, even with an engineerical background, finds beauty in architecture that breaks the rules, just support the theory that when experiencing anything it emanates from ones consciousness, a thousand memories, all melted together. This individualistic dimension of architecture is doomed to crash with certifications that pull the same rules over the head of architecture. Even though the sustainable certifications claim to just being the fulfilment of the building regulations, I see a big difference. Where the building regulations just manage to thrive with architecture, because it makes rules for the absolutely mini-

mum, the sustainable certifications aim too high. It consequently decides something that is absolutely individual, and when that happens, the relevance of the certification can be questioned.

With this said I cannot find anything wrong with sustainability. Sustainability is the New Year promised diet of architecture. It motivates, it drives, it innovates and it should. The world need to become a better place, but better can only come in the aftermath of worse. We need to allow mistakes, because it is from mistakes we learn. If we just agree on a secret formula of ideal architecture, the innovation will stop, and the world will remain without getting any better.
With this motivation the project has departured against what feels right to me.
Designing a home cross a boundary within architecture, where flaws and insufficiencies become very personal and very evident. The home is the sanctuary where life harmonises with tranquillity, and if the frames are speaking the language you speak there is no better place to be or no other place that feels so right.

Instead of departing from the legislation and the certifications, the foundation for the project has been laid with a thorough insight into the way we as humans perceive. From this humane approach the concept of the project has been laid, and the challenge of the integrated design process has then been to always choose the initiative that improves the perception of well-being without breaking the

law. Actually the agenda has been to obtain a home that eradicates the current tendency of distrust in the sustainable home as we imagine it - boxy, uncomfortable and unreasonable to control.

Especially the fact that sustainable homes has evolved into high tech centres that lack the ability to adjust to the conditions that life now and then present, without producing physical or psychic discomfort, has fuelled the lust to obtain what most fail to.
This has only been possible by integrating engineering with architecture. Invent, calculate, analyse and optimise has been a dogma that existed within all decisions, from grand scale to doorknob.

By always weighing the performance of an idea against the intuitivism and narrative behind it, it has been possible to discard solutions that didn't sympathise with the human perception. This has pressured the project to a place where the solution is the right solution in its simplest shape.

An example is the introduction of the curtain. By utilising the curtain in relation to all the perceptual systems, instead of just blend shading, the narrative of using it has been returned tenfold. To elaborate the curtain is introduced as a spatial element. Working as a separation between functions, it has this magical intimacy embedded in every fibre. It both separates and embraces. It reveals the motion around it, and it drastically affect the sound in the room. It blurs boundaries yet heightens the aware-

ness of its existence. If the curtain was applied in front of a normal window these qualities would be lost, and the narrative behind its ingenuity disappear.

The simplicity in the curtain exactly nails the problem with sustainability. Because within obtaining the sustainable certificates, the curtain only exists as the f,c factor - active shading in front of a window. While this is also an advantage in the project it is probably one of the least evident advantages to it. The sustainable initiative needs to be set in relation to the way we feel and experience, not only to the impact on the energy consumption.
By making architecture to the inhabitants and not the certifications, the project in itself becomes sustainable. Sustainable in the way, that beauty was elaborated in the theory, where beauty is something that exists in its own individual way in every being. Sustainable because it considers individuality, adaptivity and most of all human beings.

In the project the functionality is founded on the idea of making the essentials smaller to give space to the places, where we actually live. To make the narrative behind this decision transparent in the architecture, only two spaces are defined. One darker, smaller space, with room for the essential need of sleeping and one big, light space, with room for eating, living and breathing. To support this narrative, the big light space can adapt to the conditions that we are faced with in Denmark. In winter the home can adapt to an embracing space with the use of the big curtains.

In summer where everything expands and blossoms, so can the home. By allowing one whole facade open up to the life in the street and with access to the small front yards on top of the common function, the small home can contain the need of air and space.

To obtain a community with safety and fellowship, the concept of the homes introduces the street. By assembling the buildings close to each other and face the shared common functions towards the life of the street, the foundation for meeting and living with the neighbours is at its best. By adding the front yards on top of the common functions, as a green belt surrounding the homes, the public is connected with the private.

The preservation of nature has in the project been clearest by assembling the buildings and making them a contrast to the nature. In this way, bigger parts of the site are still preserved as it is today, and the three predominant identities, forest, plain and swamp is sustained. By letting the development connect to the city with sharply defined boulevards, the awareness on the nature is kept in all scales.

From the initial competition brief the tender describes the aim for the project to set new standards within the existing frames, and this is exactly what the project has done. Every little design decision is infused with the intention of creating a better place. Even though it breaks some of the tendencies seen in sustainable buildings it is designed with flexibility and diversity, without loosing the unity, and stands as a revolt towards the rationalistic architecture of sustainability. Stands to rewind to a better world, a world built for the bodily experience.

7.2 Reflection

As a perpetuated wish to make the world a better place, departing in a project that evolved around the present sustainability, gave the opportunity to evolve my personal view on both architecture and sustainability with a certain realism.

As an initial thought the project revolved around the same issue that the building regulations and sustainable certifications defined well-being in disagreement with how we as human perceive well-being. From the start the solution revolved around proving that this inconsistency existed with even more detailed calculations. As this would have involved complex HVAC simulations, it would have made the project less sustainable in the end. This was realised by studying how we as humans perceive. Gradually, but very defining, the understanding of the complexity behind the human perception, eradicated the initial thought to evolve sustainability with even more calculations. The equations that supposedly give the magic number in regards of well-being never has a factor that incorporates complex feelings like love, lust or desire. This simple fact just stultify our present belief that comfortability can be put into an equation. As Anthropologist Ashley Montagu states *"This growing awareness represents something of an overdue insurgency against the painful deprivation of sensory experience we have suffered in our technologized world"* (Pallasmaa 2005: 37).

During the process, the coexistence between sustainability and tectonic has revived itself. Because what sustainability is trying to do, is to make great architecture, and that is the same agenda as tectonic. Where the tectonic fuses a poetic idea into details that all speak the same language, so should sustainability. If the sustainability concentrated a little more on creating coherence and speaking the same language instead of making the cheapest or the most optimised solution, it would make much more sense for the layman.

Integration between the rational and the experience

But as we have attained through time, it is far from everyone who would do the right thing, and that is why the building regulations exist. As Pallasmaa states *"The percept of the body and the image of the world turn into one single continuous existential experience; there is no body separate from its domicile in space, and there is no space unrelated to the unconscious image of the perceiving self."* (Pallasmaa 2005: 40) the building regulations understand that the total experience of architecture is based from our own unconsciousness. This is why they need to define a rationalistic denominator, and fulfilling these demands with a predominant focus on the human perception has been the task of the integrated design process.

As the process relies on higher workload in the start of the project, to avoid incoherence in the end, it has been worth the while in the project.
By using time and energy in the start of the project to define the framework for the project, and decide which tools to explore the challenges with, the process has been smoother. This probably also associates with the fact that the mind constantly process the thoughts in the unconsciousness. It generally always made sure that when making a design alteration to create a better place, that the calculative background was updated, so the design avoided breaking the building regulations.

Moving from thought to practice

As the process borderlines a buzzword, it is more a general thought, and does not necessary imply how to move from theory to practice. This has in the project been clearest by defining the framework, and pick some architectural cases that solved the challenge stated. In this way, it has been possible to get some concrete solutions and guidelines for solving the problem in the project.
The method for analysing the cases takes point of departure in the experience. Instead of pulling a subject over the head of the case, the method by Simon Unwin is acknowledging that architecture speaks. And as architecture is different, so is the language it speaks. In this way it has been possible to discard unnecessary information in the project, and only

extract the specific language in the specific case. The cases has presented the project with inspiration and solutions that in my view are genius and solves some of the challenges that was found in the framework of the project.

The project scope of DGnB

As the competition brief *"Fremtidens Bære-dygtige Almene Boliger" (See Appendix 08 for details)* originates with the wish of existence within the DGnB certification, the preliminary challenge of understanding the certification was formed. The small folder "Miniguide til DGNB" is full of hope. Hope of a better world, and the first couple of pages actually makes you sympathise with the certification. Five pages later the hope dies. A bombardment of terms like ozone deterioration, life time costs or optimal administration and service deprive the anticipation and drive behind any idea, leaving an exhausted feeling behind. Because of this, the decision to delimit the project from some of the apparently sustainable criteria was taken. Among other the biggest delimitation was the economy. With little experience in economic costs in architecture, beyond common sense, the width of the subject would have limited the outcome in the remaining criteria. This has lead to a project that probably would go through a diet before it was build, but in regards of developing my architectural signature is has been immensely beneficial.

The extent of the certifications has outplayed the archetypal architect. Where it was possible to create a sketch on a napkin and build from that, todays sustainable architecture is based on proof. Today it is not enough to trust the architect, and the economy, indoor climate and environmental impact must be precisely proved before the buildings can pass through the eye of the big sustainable needle. As this calls for multiple professions and collaboration beyond what everyone know will really exist, the picture of the sustainable certifications start to draw itself. With so many rules, wrongs, does and don'ts a recipe has been brew. A universal truth about what a sustainable building looks like, and that is immensely wrong in every possible way. Then we can just as well start to patent all building, and intensify the legislative nonsense that already buzz around the profession as it is. This recipe precludes mistakes, but as all history has shown progress comes from mistakes. So even though the agenda of the sustainable certifications is genuine, it has got hold in the wrong places.

The rational background

But as the certifications overcomplicate sustainability, there is some of the criteria that is necessary to create spaces that is liveable and appreciated. Three of the criteria, which also appears in the building regulations, has been pivotal in the calculative background of the project.

The first of the criteria is the overheating. As our perception of well-being follows the temperature closely, it was important to ensure that the project was within the limits of acceptable overheating. To do this the analytical tool BSim was utilised. The precision of the program is only exceeded by its useless modelling interface. Without any option of transferring models from another program, the modelling phase takes long time. And without a WYSIWYG *(what you see is what you get)* interface, as almost all programs possess today, it takes several tries before the order of modelling steps is right. Because of this, it is not possible to make quick iterations when evaluating the indoor climate. This complexity has slowed the process somewhat down, and probably limited the number of iterations in the design. The overly complex appearance in the tool is contradicted in its disability to make calculations on complex shapes. The possibility of getting an error is very frequent. As the project takes point of departure in both a trapezoidal plan shape and ascending roofs, the actual geometry proved itself to be impossible to model. This lead to an approximation of the building geometry, which undeniably created deviations from the values if build.

Another predominant aspect of analysing the indoor climate is the behaviour of the inhabitants. As the analysis is based on calculations made every ten minutes, the precision of the behaviour becomes crucial. But every inch of living is formed within our own conception,

"The way the structure is promoting through its roof, door handles, window frames, staircase and furnishings. A feeling of beauty is a sign that we have come upon a material articulation of certain of our ideas of a good life." *(Botton 2006: 72)* which has a hold in a contradiction in the calculation. It is impossible to define the behaviour of people, because every person is its own. To accommodate this reality the project has mainly been developed with initiatives that can be controlled actively and initiatives that embed the narrative of what it is doing. The example of the curtain is probably the best. While it is very underestimated, the curtain actually embeds the narrative of optimising the indoor climate. It both separates functions, limits passive heat gains, muffles noise and reveals ventilation by swaying in the air. There is hardly any other building element that has the same amount of qualities to it, than the curtain.

The second criteria from the building regulations is the air quality. As we perceive smell, detects moisture and feels oxygen the stabilisation of the air quality was essential to obtain a comfortable environment. This problem was solved in a very simple way. By making the volumes as big as possible, the peak hours was distributed to more air. This allowed a lot of people in a small floor area without to much ventilation. If the rooms were smaller, the problem areas would probably have been easy to find, but the initiatives to avoid the issues would be very evident in the design. By utilising this fundamental initiative, the air is controlled in the simplest way. To accom-

modate that some days are hotter than other, one of the important facts was to being able to air out enough. With the big folding door the venting could not have better conditions. Though the same issue with the tools precision in analysing the indoor climate exist with the air quality. The reflection in general over the indoor climate is that BSim is too complex to be a benefit in the process. If the tools interface and compatibility with other programs was improved the work flow could be changed immensely.

While it is easy to point out these flaws, programs that has precision while being intuitive exist. Calculating the daylight in Velux Daylight Visualizer is compatible with most 3D programs, and the work flow is very fast. Because of this the daylight calculations has been a design tool through the whole process from initial idea to final result. In this way, it was possible to quickly create numerous iterations on the size of the skylight and the shape of the hole in the concrete slab.

The third criteria is the energy balance. Since BE10 has started to become quite simple, it was possible to follow the energy balance during the process. This gave a smooth process to obtaining the energy balance.

Moving towards architecture, and especially within sustainable architecture, the tools need to be developed to sustain the rapid development a process is under. If one of the links is too slow it will simply be forgotten or neglected. So for a more coherent design, the tools need to be further developed.

The sustainable paradigm

The discussion about what sustainability is, will probably never end. But as in the discussion about what architecture is, it is the disagreements that push the limits of architecture, pushing it to new dimensions. This epoch-making paradox is limited because the certifications decide too much. While the world is greedy and hypnotised by money, I can see why the certifications blossom. Because who wouldn't want a proof of good architecture, even before it is build. Hearing the words seems wrong, and we should try to accept that some things are supposed to exist - even if it is not the best solution. Maybe we learn something from the mistake.

A personal quest

As a personal quest the term sustainability isn't even necessary. My biggest accomplishment is to contribute to a better world. In all its simplicity, that is what drives me. That sustainability share the matter of honour is a coincidence, but also an acknowledgment that making the world a better place is a global matter.

The educational background as an engineer has enlightened my architectural spine. It has given me the tools to invent new ingenuities that both holds the poetic beauty of architecture and the thoughtful insight into realism. At the end of a long educative progress, i've ended up with other views than I thought I

would. As a believer in technological progress, i predicted myself to evolve new high-tech solutions. But after five years i've realised that good architecture often is the simplest. This realisation only comes in the aftermath of understanding the complex architecture, and i've attained that making something simple is far more difficult than the other way around. While the rest of the world is in a hurry in the other direction, i strongly believe that sustainability is necessary. It stands as a thundering reminder of doing the right thing.

The simplistic doctrine is the reason that the project is about designing a home. An office is always controlled by very certain rules and the sustainability is very well defined within offices. In a museum you can just break the rules and call it art *(hint opera house in Oslo)* not that there is anything wrong with that. It is exactly an example on the notion that breaking the rules can create something fantastic. But in the home, the rules are not yet fully established within sustainability, and because everyone lives in their own home, everyone can relate and discuss architecture that sustains the frames around life. Because the functionality in the home is essential to get at daily life that works, it seemed as a bigger challenge to introduce poetics in the home, especially within the realm of sustainability. This has been a healthy choice, because the people that participated in the discussion about the project, often didn't come from an architectural background. This has introduced some realism in the project, that probably would have been less evident in a museum or etc.

The human well-being

In the aftermath of being fortunate to listen to a lecture by Juhani Pallasmaa, my curiosity of the human perception was immensely awaken. This lead to the focus in the project, to create frames that understand how we as humans perceive. What became clearer for me through the theoretical disposition was that the human perception really disagrees with the high-tech solutions available today - not necessarily because of the high-tech, but because the high-tech usually is controlled by automatisation. This has lead to a project, that is utilising the simplest initiatives. Initiatives simple enough to embed and carry the narrative behind their doing. The field of friction in the scientific theoretical directions, a phenomenologically based theory and empirical calculations has been solved by letting the experience behind the solution decide what was best. By judging the solutions with the rational values, it has been possible to discard the solutions with worst performance.

The finalising reflection

This leads me to the conclusive thoughts upon the sustainable certifications. With the notion that architecture originates from a feeling, the justification of good architecture cannot be given by pure empirical objectivity. We need to forget the numbers, and trust the skills of the intuitive architect and engineer. If the architecture has this indescribable feeling that cannot really be translated into words, then it should get the sustainable stamp - not if it has the right values, because when it comes down to the penny, we as humans do not feel numbers. And the humans will always be the true judges of architecture. In all its simplicity.

ILLUSTRATIONS

1   Photo by Morten Brændstrup Kristensen
2   Illustration by Morten Brændstup Kristensen
3   Illustration by Morten Brændstup Kristensen
4   http://uploads7.wikipaintings.org/images/pieter-bruegel-the-elder/children-s-games-1560.jpg
5   Photo by Juhani Pallasmaa *(Pallasmaa 2012: 43 ill. 12)*
6   Photo by Juhani Pallasmaa *(Pallasmaa 2012: 18 ill. 1)*
7   Photo by Juhani Pallasmaa *(Pallasmaa 2012: 18 ill. 2)*
8   http://goo.gl/RmOKOm
9   http://ideasgn.com/wp-content/uploads/2013/05/Villa-Mairea-by-Alvar-Aalto-024.jpg
10   http://upload.wikimedia.org/wikipedia/commons/1/18/Castle_Ward_House,_June_2011_*(02)*.JPG
11   http://upload.wikimedia.org/wikipedia/commons/0/08/Castle_Ward_House,_June_2011_*(07)*.JPG
12   Sketch by Morten Brændstrup Kristensen
13   Sketch by Morten Brændstrup Kristensen
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46   Illustration by Morten Brændstrup Kristensen
47   http://foundwalls.com/wp-content/uploads/2013/06/Sunset-forest-grass-warm-sun.jpg
48   Photo by Morten Brændstrup Kristensen
49   Sketch by Morten Brændstrup Kristensen
50   Illustration by Morten Brændstrup Kristensen
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56   Illustration by Morten Brændstrup Kristensen
57   Photo from unpublished book. Curtisy of Claus Bonderup
58   Illustration by Morten Brændstrup Kristensen
59   Sketch by Morten Brændstrup Kristensen
60   Sketch by Morten Brændstrup Kristensen
61   Illustration by Morten Brændstrup Kristensen
62   Illustration by Morten Brændstrup Kristensen
63   Illustration by Morten Brændstrup Kristensen
64   Illustration by Morten Brændstrup Kristensen
65   Sketch by Morten Brændstrup Kristensen

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APPENDIX (CD)

In the appendix everything that was used in the project is included. While this is an informative library, it is presented roughly in the way it is used. The spreadsheets included has been an essential part of the calculations. While different spreadsheets is in the appendix, one big spreadsheet that collects all information was utilised.

01 - BE10 process
02 - BE10 results
03 - BSim results
04 - Ventilation calculations
05 - Product information
06 - Bsim process
07 - Daylight calculations
08 - Competition brief
09 - Digital version of report
10 - Digital version of illustrations
11 - Sketchbook
12 - Initial program

The sustainable paradigm is here. Attended by certifications and building regulations, rules and wrongs, does and don'ts are claimed in manifold – but in the midst of the rationality, the unconsciousness notice a missing piece in the present sustainable direction – the human has been forgotten.

This project reintroduces the human perception in a phenomenological exposition, where life becomes sustainable. Revolving around Common Housing, an ebullient community is created, with space for both fellowship and privacy.

The architecture possesses a strong expression that carves through the natural landscape, all emitting from one singular Omni-present centre. A centre that is saturated in all corners of the community. A centre that introduces a new awareness in the sustainable home.