

A place of retreat

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Preface

The master thesis “A place of Retreat” aims to strengthen the awareness of “a person being in the world” by enhancing his connection to nature and taking him out of the daily routine. As nature itself gives a ‘healing’ effect to the body through its multi-sensorial experiences, the design encourages a connection to the site at all time. There is also a search for raising awareness on how we treat our planet in order to urge a more sustainable existence.

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Background

During the last couple of years, I have been through several different, though connected, architectural, engineering and philosophical 'fields' of study.

I started with a background in construction engineering, which further led to architecture and design, and has resulted in a combination and balance of architecture and engineering. In addition, an Erasmus- semester abroad led me to an understanding of what the phenomenological understanding and quality means when experiencing an architectural space.

Due to frequent travelling and also reading literature written by architects Peter Zumthor, Juhani Pallasmaa, Christian Norberg-Schulz and Jørn Utzon, I became more conscious of what makes an individual's experience of 'being in the world'. I also reflected upon the connection between growing up in a place and the impact it has on an individual. Equally, as I grew up in Norway, I have a strong connection to nature as well as an urge to be close to it. Personally, I find it valuable to have the opportunity to go for walks in the forest whenever I wish.

By living in big cities, I got a notion of how easy it is to get lost in the daily routines and the additional stress that urban living and interaction can create. We can easily get lost in time and forget to appreciate what 'mother nature' has to offer. In line with Pallasmaa, I think



that nature offers a sense of reality and presence, as well as the many possibilities architecture offers for experiencing the world:

"A walk through a forest is invigorating and healing due to the constant interaction of all sense modalities; Bachelard speaks of 'the polyphony of the senses'. The eye collaborates with the body and other senses. One's sense of reality is strengthened and articulated by this constant interaction. Architecture is essentially an extension of nature into the man-made realm, providing the ground for perception and horizon of experiencing and understanding the world"

(Pallasmaa 1996,44)

In order to embrace the traditions of Norway and its landscape, I have aimed to design a place that will encourage a 'sense of being' through sensorial experience and its relationship to nature. As a result, I chose to design a place to retreat.

I translated the place of retreat into the design of a weekend home. In the cultural context of Norway, it can easily be seen as a second home that is visited by Norwegians either during weekends or during certain holidays. This habit of visiting a leisure home or the fact that Norwegians choose to go for walks from an early age, is something that I find healing. In many other places, we as modern citizens

manage to forget to appreciate what already is there, nature.

My curiosity for different fields of study, developed into a wish to reflect more upon human.

80% of the Norwegian population "escapes" at least once in a week into the nature. The closeness to nature is a matter of course and also embodied in the Norwegian culture. One of the most favorite Norwegian vacations goes to time spent in the nature within the weekend homes.

(kilde: <http://ut.no/artikkel/1.7173634>)

The first cottages in Norway developed originally from being a place regarding to work. Then from the 1960s, they began to change. The Norwegian view upon cottages went into a development of being a place to rest and escape the daily life, the stress and loudness from the urban life. In the 1990s, cottages transformed into being a weekend house one can stay in for a longer period. The demand for weekend houses is still rising, but now the weekend houses should be high-tech weekend homes within sustainable perspectives (NRK, 2013).

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Assignment description

In order to create the place to retreat, and make a design that encourages the Norwegian traditions of being in connection with nature, I have come to design a cluster of weekend homes.

These weekend homes will be located on a mountain called Blåfjellia, and will benefit and emerge from the slopes topology. The site is situated on the slope of a mountain hill facing to the south with a view to one of the most well-known and untouched landscapes in Norway, Rondane.

Rondane has inspired many due to its amazing appearance. It offers blue skies and clear starlight reflection upon the inland mountains. The landscape is enriched by its fauna and flora during the summer, and during the winter, it offers a magical blue-light appearance because of the reflection of the sky into the carpeted of snow. The site benefits also by a clear starlight and gives an amazing reflection by the moon. These factors have inspired many artists, and one of them was Harald Sohlberg who in 1913-14 made a famous oil painting that is called "Winter's night in Rondane".

Using the strong appearance of the site, I wish these weekend homes to enhance the love of a human for nature and be more aware of its daily routines. I wish to encourage individuals to reflect more upon life-style and be aware of the importance of thinking in a beneficial way of sustainability.

'The place of retreat' is supposed to serve anyone who needs to take a break from the daily life routines and who wishes to dwell, reflect or emerge by going back to a more primitive life. Television and internet will not be available in the weekend home as this is a place of dwelling and reflections. I seek to create a place of sensorial experience and the feeling of going back to the primitive or simple. Still, access to daily life facilities will be available, this being electricity, water and drain.



Photo above: famous painting "Winter's night in Rondane" by Harald Sohlberg
Photo below: Names of mountain peaks in Rondane.

Methodology

Methodology through Integrated Design Process (IDP) :

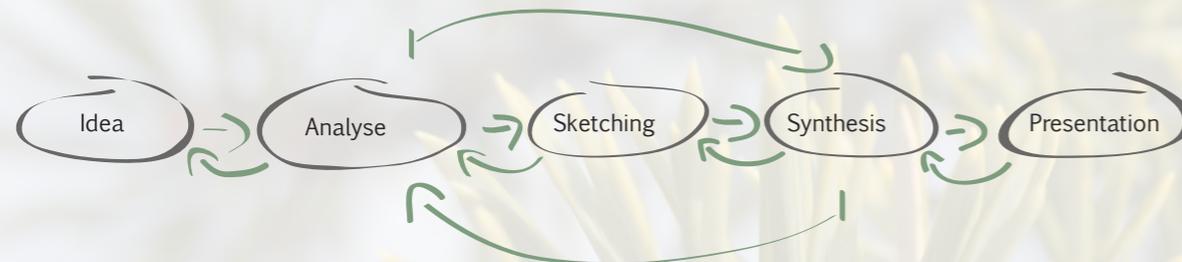


Illustration 1: IDP- method as introduced by Mary Ann Knudstrup

The master degree in Architecture and Design at the University of Aalborg has had a specific focus on teaching the Integrated Design Process (IDP).

The latter process is based on the method of Problem Based Learning (PBL), which is the University's main educational model. The Integrated Design Process is defined by Mary-Ann Knudstrup, and it offers the possibility for the designer to be aware and able to control many of the parameters as early as possible. The idea is to make a balance and an understanding of, the aesthetical, technical and functional facilities during the designing process. The method guides one through different stages, from how to develop a project idea to the last presentation.

The most input is to be found during the analysis stage. This is the program of the design idea. The sketching process takes the input further through brainstorming through sketching by hand and by using computer programs. The synthesis is about parameters, the concept and final adjustments in order for the presentation to be done. The method is used in this master thesis and it is applied through most parts of the process.

The whole project to be well development requires group work. As this master thesis is an individual work, the process will be limited in development of achievement of the whole idea, as the idea requires several stages of going back and forth through the different stages. This is something that I am fully aware of.

Theorising and contextualising the methodology

During the master project, most of time spent can be described by Donald Schön's contribution to the theory of practice and learning, as well as what Hans-Georg Gadamer describes as the hermeneutic spiral.

Schön was inspired by the theory of learning by doing or learning through active inquiry, that was thoroughly described by the great philosopher and education theorist John Dewey. Dewey believed that learning is the result of what the learner experiences with the consequence that the learner changes his or her way of acting. In order to learn something truly, a student has to see the link between her or his actions and the result, according to Dewey's constructivism, the educational theory that Dewey was the founder of. Schön emphasized continuous learning and the importance of reflecting on action during a student's or a professional's learning process. According to Schön (Schön, 1983) a true professional does not only draw on knowledge from teaching in school, but also from his or her experiences in the field. Such experiences can be drawn from mistakes and conversations with supervisors or with colleagues. In order to develop a project or to complete a master's project, we need to explore and learn from our own experiences.

As in my case, my background is in technical engineering, and during the last couple of years I have given value to a more phenomenological approach to architecture. I have participated in study trips where the purpose was to visit and experience several different designs. One of these was Zumthor's "thermal baths" which made a huge impact on me. I experienced a wish to design something similar one day.

The timeline of my experiences has given me curiosity and I have developed a tentative guideline to what kind of architecture I would appreciate to develop. Furthermore, the trips and the meetings with different people have given me a better understanding of the master program in Architecture and Design at Aalborg University.

Due to all this, the experience of learning and reflecting is infinite. During the process of doing a master thesis I have been gathering knowledge on how to develop a technical design which for instance gives both a sensorial experience and value to sustainability through 'Cradle to Cradle'.

Nevertheless, it is important to mention that the problem based learning (PBL) method is also in line with Dewey's way of thinking.

Gadamer's, a student of Heidegger, description of the hermeneutical circle refers to a specific working method. Hermeneutics is based on the belief that understanding is a process and that we keep evolving our understanding. According to Gadamer (Gadamer, 1975), a person's history and culture offer certain references and prejudices that are unavoidable. This means that an interpreter applies his or her prejudices when he or she interprets a text or a work. This also means that I as a student of architecture, and a former student of engineering, have applied the terms and the knowledge that I had acquired at an earlier stage. The academic traditions, as well as cultural, that I have been a part of, have had an impact on my understanding of this project.

Tectonical approach

“Tectonics is inherent to the name of the profession architect which is a contraction of the greek word archi that means master and the greek word tect that means builder and is related to the word tectonic”.

(Framton, 1995)“

“Tectonic becomes the art of joinings. “Art” here is to be understood as encompassing tekne, and therefore indicates tectonic as assemblage not only of building parts but also of objects, indeed of artworks in a narrower sense. With regard to the ancient understanding of the word, tectonic tends toward the construction or making of an artisanal or artistic product..”

(Framton, 1995, 4)

I believe that tectonic is an art, as Framton states “art of joining”. I believe this art is achieved by our experience of memory, research and knowledge as a human being.

“Every art form has it’s ontology as well as it’s characteristic field of expression, and limits are posed by it’s very essence, inner structure and materials. (...) The tectonic language of architecture, the inner logic of construction itself, expresses gravity and structure, the language of materials as well as processes of construction and details of joining units and materials to one another”.

(Pallasmaa,2009, 113)

When an architect forms his design, he should reflect upon the design topology, the form of his architecture and the atmosphere it is creating through the human experience. Through designing the architect should use memory as a tool of creation to achieve the experience of the space he wishes to design. When achieving a good tectonic design, the tale of detailing will be a big focus. With an awareness of the material choice, building volume and scale, tactility and sense of light. The detail will create an experience through the human body and can be achieved by careful use of the material due to both its poetical and construction properties.

“..architecture is a means of philosophising about the world and human existence through the embodied material act of constructing. Architecture develops existential and lived metaphors through space, structure, matter, gravity and light. (...) Also architecture is an artistic expression as far as it transcends its purely utilitarian, technical and rational realm, and turns into a metaphoric expression of the lived world and the human condition. “

(Pallasmaa, 2009, 115)

Sustainable Approach

As the project “A place of Retreat” has the aim to encourage a better connection to nature and create an appreciation of it, I want to take a sustainability approach. This will be achieved by rising an awareness of building materials we use through the process and the impact it has on the human body and its environment.

My sustainable way of thinking has been inspired by the sustainable approach called “Cradle to Cradle” which was introduced by the American designer and author William McDonough.

The ambition behind Cradle to Cradle (C2C), is to make sure that all materials will be included in a biological or a technical cycle. C2C considers materials as nutrients for new generations of either technical or biological products. The materials in the biological cycle are biologically decomposed, without polluting. Likewise, the materials in the technical cycle may be used in new industrial products.

Two different terms are being used when explaining recirculation; up cycling and down cycling. These terms explain whether the materials are being reused in products with lower quality or higher quality, after losing its integrity and purpose in the original product. Because of that, the products need to be designed in a way so that the different parts, either they are biological, technical or both, later on can be separated, to ensure both the technical and biological recycling.

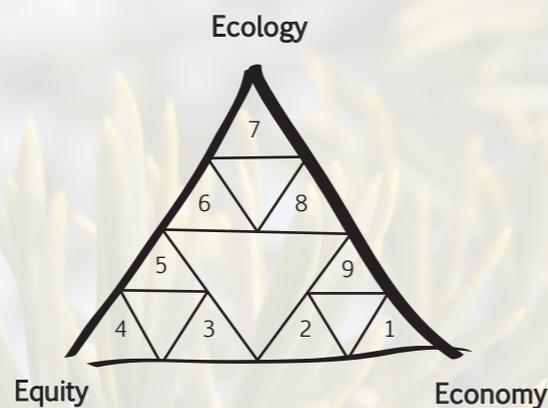


Illustration 2: C2C-model

Eco-efficiency is the first step in an eco-effective strategy, making sure that all production damages the environment as little as possible. This is done by ensuring that the mistakes made in the past are not repeated, and making sure that harmful chemicals, spills and energy consumption are minimized.

The three parameters economy, society and environment, and the relationship between those three, are used to evaluate the conventional sustainability, whereas for the C2C it is not sufficient as the focus is placed towards already gained results (Jørgensen and Lynsgaard, 2013).

According to the triangle of C2C, on previous page, one should consider:

- 1) Is the material of economic efficient?
- 2) Does it engage the economy of the society?
- 3) Is the product produced under fair social conditions?
- 4) Does the material improve the quality of life of all partners?
- 5) Does it improve security and health of all partners involved?
- 6) Is the material secure for all local and global societies, as well as ecology ?
- 7) Does the product improve the biodiversity?
- 8) *Are the resources utilized?*
- 9) *Is the use of the material utilized to its minimal? Are the materials used only for the necessary?*

(Jørgensen and Lynsgaard, 2013, 17)

Material	Fossil fuel energy (MJ/kg)	Fossil fuel energy (MJ/m ³)
Rough sawn timber	1.5	750
Steel	35	266000
Concrete	2	4800
Aluminium	435	1100000

Table 3.1: Fossil fuel required to produce four common building materials. Source: Ferguson et al 1996

Illustration 4: Fossil Fuel energy

Cradle to cradle is in line with my approach of choosing to engage with the Norwegian traditions. Due to my awareness of the healing impact natural materials have on our sensorial experience and the awareness of it being the top resource of the national materials in Norway, I have chosen the ‘Cradle to cradle’ approach by building in wood.

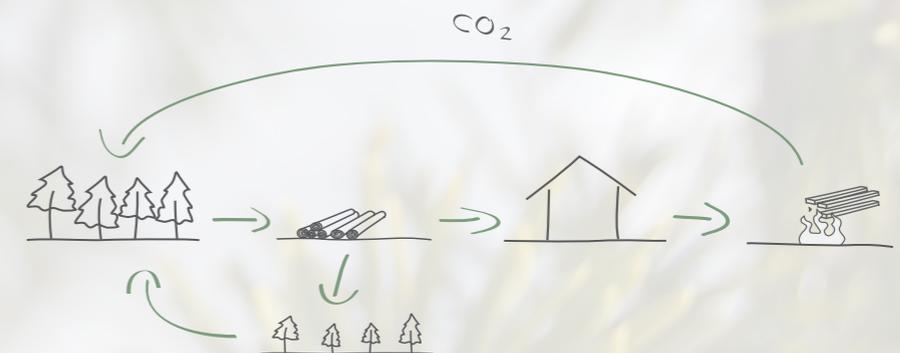


Illustration 3: The recycle process of wood as a material

Blåfjellia

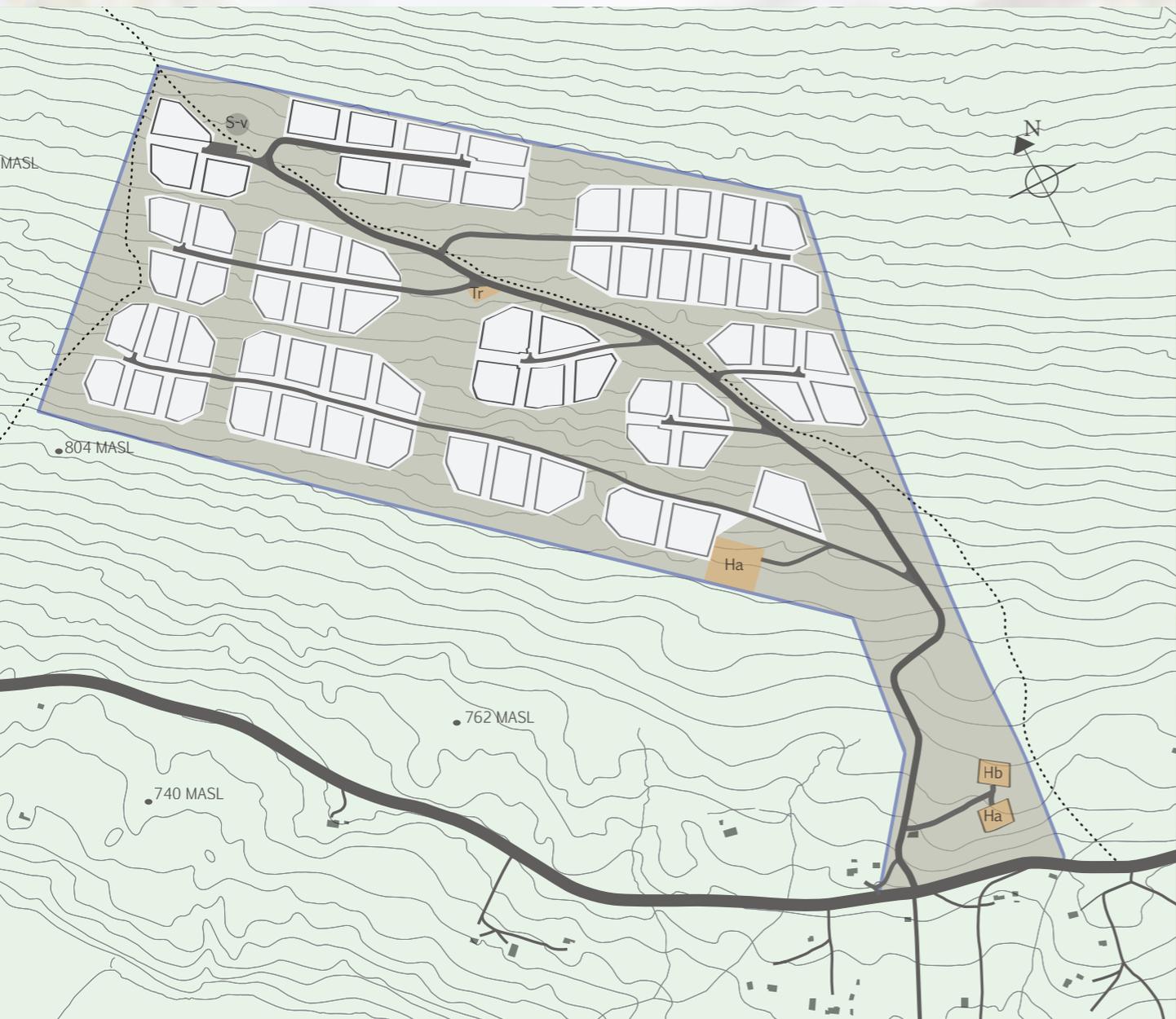


Illustration 5: Masterplan



Illustration 7: section of the topology

With an aim to design a place for retreat, which is situated in a context of the traditions and landscape trademarks of Norway, I contacted the Norwegian Tourist Union, which recommended me to have a look at Blåfjellia.

Blåfjellia is a well-developed building plan which is currently under the process of being realized. It consists of sixty-five weekend home plots, and it is situated at 800-900 MASL. The site is situated among the well-known, and untouched landscape of Norway, located in Sollia in Hedemark county. Due to the respect to the topology, its fauna and flora, the building plots have been chosen by tenderness.

Blåfjellia is located at the mountain hill facing south-west. The site benefits of one the view of one of the most well-known landmarks, being the view of Rondane.

The area is well known for its 'blue-skylight appearance' that reflects its topology and gives a magical experience during the winter. The starlight is bright and clear and the area tends to benefit of wonderful reflection of the moonlight.

The building plan area constitute 56300 sqKm. Average weekend plot constitute 370 sqm.

Access to Blåfjellia: Blåfjellia can be approached by car, bus or taxi from the train station in Atna. The road that leads to Blåfjellia is the national tourist road, Riksvei 27. One of the well-known touristic view-stops is just around the corner of Blåfjellia, and it is called "Sohlbergplassen" (Blåfjellia).

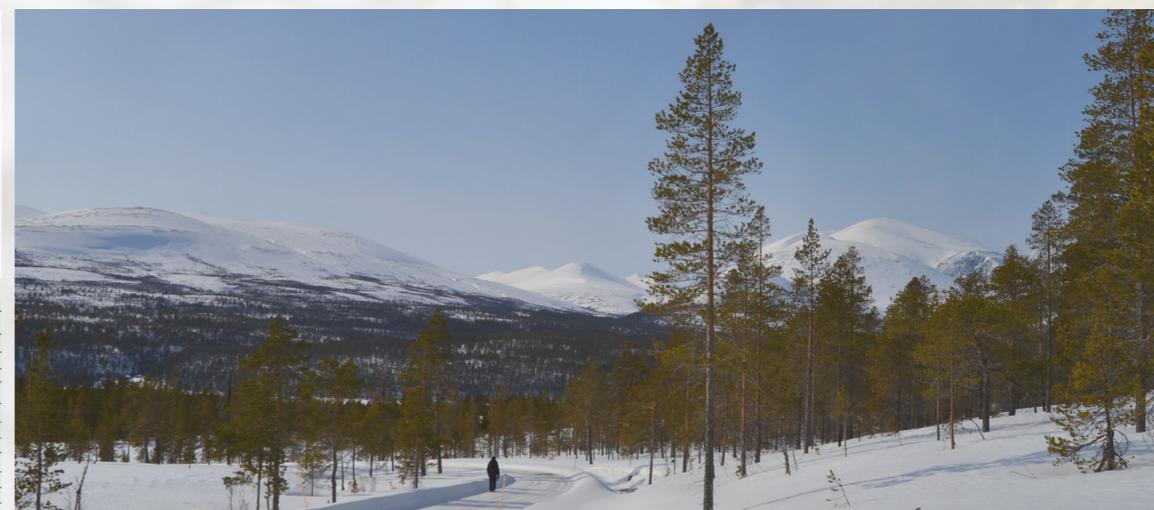
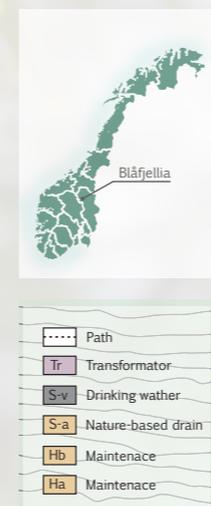
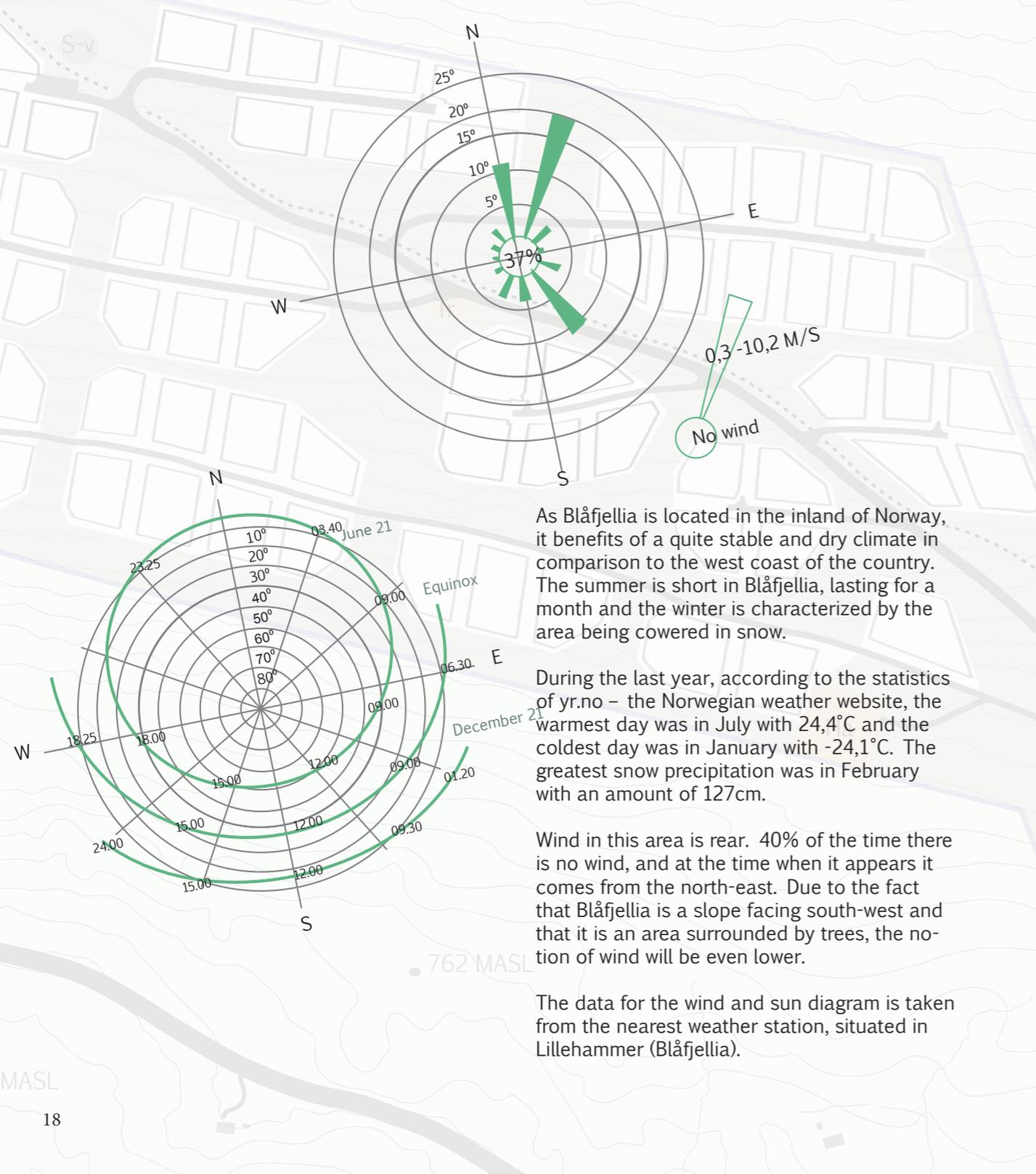


Illustration 6: Masterplan Details

Weather



As Blåfjellia is located in the inland of Norway, it benefits of a quite stable and dry climate in comparison to the west coast of the country. The summer is short in Blåfjellia, lasting for a month and the winter is characterized by the area being covered in snow.

During the last year, according to the statistics of yr.no – the Norwegian weather website, the warmest day was in July with 24,4°C and the coldest day was in January with -24,1°C. The greatest snow precipitation was in February with an amount of 127cm.

Wind in this area is rear. 40% of the time there is no wind, and at the time when it appears it comes from the north-east. Due to the fact that Blåfjellia is a slope facing south-west and that it is an area surrounded by trees, the notion of wind will be even lower.

The data for the wind and sun diagram is taken from the nearest weather station, situated in Lillehammer (Blåfjellia).

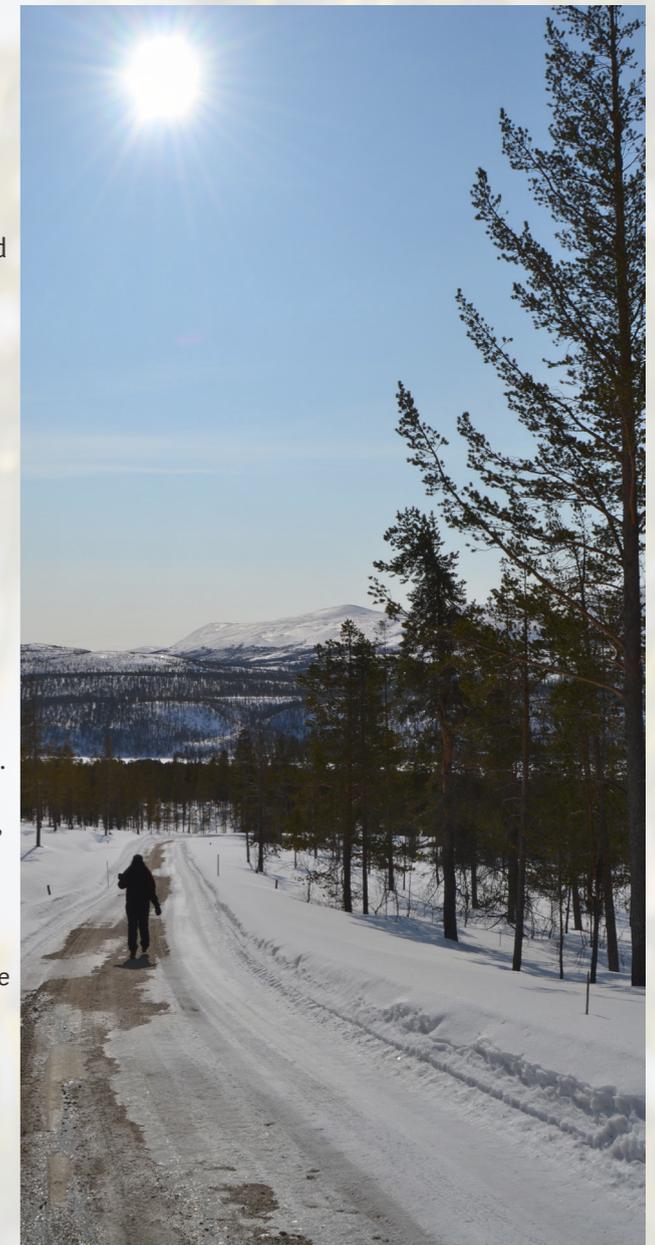
Activities

Blåfjellia is in general enriched and surrounded by adventures, every season gives some new opportunities.

Blåfjellia has a dry climate with poor soil. It is surrounded by pine forest, and it is said that especially during autumn the vegetation gives an extraordinary draft of colours. The area is also known for its beautiful skylight, and the mountain goes blue.

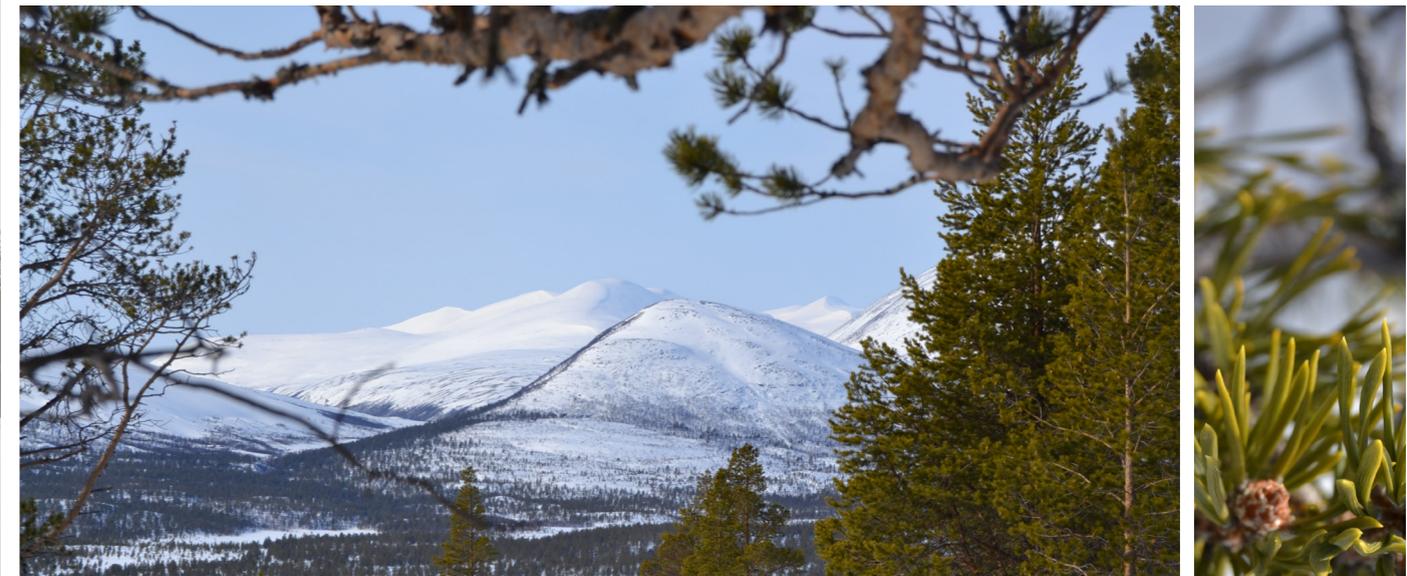
The area has quite a bit to offer. Rondane national park is right around the corner, which is developed with the aim to preserve the nature, and maintain the specific of its flora and fauna. Reindeer, wolverine, golden eagle, bear, deer and other wild birds enrich the area. During daytime, there is a great number of opportunities; one can go forest walking, hunting, fishing, or even canoeing and kayaking by the lake.

Blåfjellia is situated on the sunny side of the valley of Gravskehøgda mountain (1767 MASL). This is the highest peak in the commune. Blåfjellia is situated northwest from Atnasjøen. Riksvei 27, the national road, is situated between Atna and Blåfjellia. One can find Arctic char in Atna as well as trout in the surrounding waters (Blåfjellia).



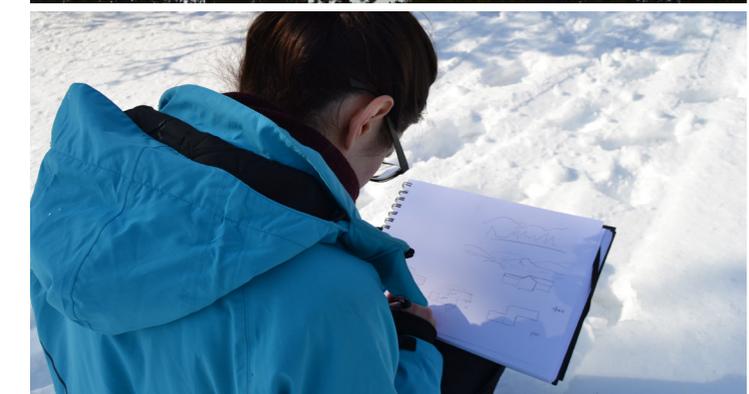
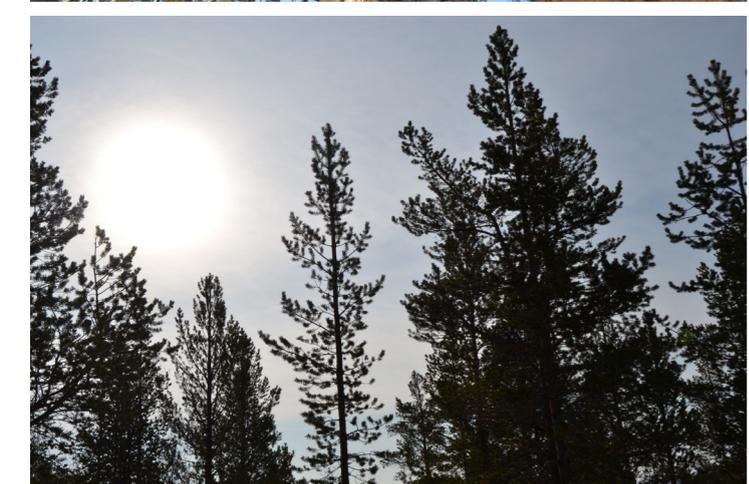
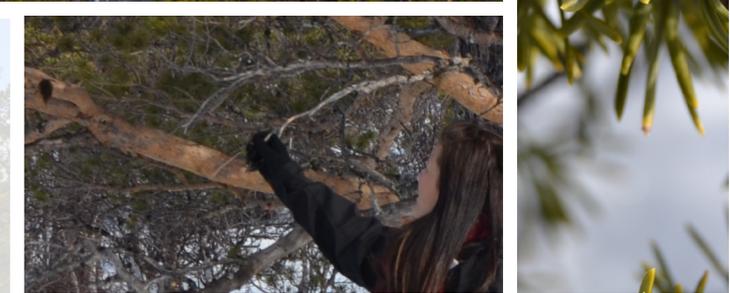


Atmosphere



In touch with the site:

To me, sensing and walking within the nature, has so many hidden depths and meanings. The sound and touch of different textures when taking each step further, the fresh breath into the lungs, the hearing that triggers the sight and the sites that makes you want to touch. And somehow, all of these senses together make you feel relaxed and full of joy.



The Norwegian way of Living

During the last few decades Norway has become noticed especially for two of its characteristics. The first is the closeness to its nature and the second is the Norwegian skill of building in wood.

The Norwegian landscape and fjords offer true sense of delicateness, a space of joy, rest and reflection. At any moment of spare time, the Norwegians take the opportunity to go out to interact within the nature. Norwegian take the landscape almost for granted, this lifestyle is embodied in the Norwegian culture. All the physical activities tend to be just around the corner, a few steps outside. One can take a walk into the landscape, go climbing upon the mountains, and even go sailing between the fjords. Sverre Fehn states in an interview:

“..in Norway, our relationship with nature is an active one, we escape into it as often as we can. You can't make contact with us unless you have been skiing!”

(Almaas, 2010, 42).

The skill of building in wood has developed from its Norwegian origins, going back to the primitive when fishermen used their skills to make a shelter. Norwegian landscape has rich resources in trees so it was natural to use it as a material in this project.

“..Sverre Fehn who would characterize the church as an inverted boat; an association that would appear to be supported by curious etymological connection in which the Latin word for ship, navis, is also commonly applied to principal volume of a church”

(Frampton, 1995, 249).

History of Architecture

The Norwegian architectural expression and also the Norwegian life or 'way of living' goes back in time when Norway started to develop as a country, and feeling a sense of hunger to express its national identity and strength. At this period, many European countries showed this through their architecture. In the best way to represent its nation, Norway started to seek for inspiration and many young architects were sent out in hope to return with some new influences and impressions. The result came within an impression of functionalism through inspiration from architects in the USA.

The architects at this point developed different understandings of functionalism, and they were divided in two groups. One consisted of only the Norwegian architect Knut Knutsen, and the other one being a group called PAGON.

PAGON was an architectural group which was developed through influence of the architectural movement called CIAM. The group was developed as a result of going into a more modernistic idea. The group consisted of architects such as Sverre Fehn, Arne Korsmo, Le Corbusier, Norber-Schulz, Jørn Utzon and some other visitors throughout the time.

Knutsen standing alone, based his architectural idea upon classical imperialism and inspiration through skyscrapers designed by Mies Van der Rohn. He sought rhythm and natural materials which would create harmony between the building and its landscape. Knutsen was

still open for influence from others and took inspiration from some of the PAGON members.

PAGON, with Arne Korsmo as the leader, had an idealistic idea of poetic architecture with elegance and expressed detailing by light, by applying colors, shapes and the choice of material. The group gave functionalism a 'cosy' expression.



Illustration 8: Knutson's holiday home

Knutson's own holiday home is where he really went back to the primitive thinking and let it influence its architecture. He created a shelter from the weather conditions, within a spatial design that creates access to warmth through light and its summer experience.

(Lund, 2008)



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(Frampton, 1995, 249).

National Building material

Timber is primarily a national material. Norway is known for its skills of building in timber and has also products distributed all over the world. The Norwegian sawmilling industry is engaged in research and education, having its own research institute, the Norwegian Institute of Wood Technology (Treindustrien).

The county Hedmark covers one tenth of Norway's land area with its 27.500km² whereas around half of the area is productive forest and the total forest area is 17.000km². This considered, Hedmark has about one-fifth of the forest resources in Norway. All loggings are done with advanced machines and it is made sure that the tree harvested are quickly replaced with new trees. One of three trees felled in Norway comes from Hedmark. In the 1900s, deforestation was a major problem both in Norway and worldwide. A systematic effort to rebuild the forest resources was therefore initiated, and since then, the timber volume in Hedmark forests has more than doubled (Miljøstatus).

Statistics from the period between 2008 and 2012 shows that 43,7% of the standing timber volume is spruce, and 31% is pine (Skogoglandskap).

Material Background

During the last decade, the timber construction has completely passed into being a modular of prefabrication; the old tectonic way of thinking with a non-modular prefabricated world is almost seen as belonging to another period of time. Central Europe and Scandinavia, which understandably includes Norway, are almost depended on wood as their main resource. With a battle against extreme weather conditions that damage trees, these countries have developed a method of nearly solid timber constructions.

The tectonics now are read through the complimentary layers of the frame of the construction. The goal is that the wall layers are supposed to complete each other, while each wall layer performs a function. For example, making the inner clothing (layer) being the stiffness of the design structure, the middle clothing (layer) providing the insulation and clouser of the frame, and the outer layer serves as a shelter upon the inner layers against the weather.

In order to understand the tectonics of timber, there has been done research and evaluation within the different properties and use of material. The most common use of modern timber structure is slabs. The slab is no longer used as a linear element but is built out of three or more layers that are glued together coming from sawn timber. The sawn timber consists mainly of low quality wood. By gluing the sawn timber together with 'cross worked interweaving', the slab gets good stiffness and high strength quality. By this technique, there is no limit to the timber construction, but one should be aware of transportation which gives some limits to the size of construction when bringing it to the site.

When it comes to the proportions of the slab, it is decided by the demanded load cases and stresses. The building method of slabs tectonics reminds in a way of a full size card board packaging. Thinking about the thermal properties, all timber design will give a low thermal balance and therefor it tends to hold the insulation concept.

(Deplazes, 2005)

Wood properties

The wood structure is composed of cells and vessels. They help the tree to function and get enough water and nutrients. There are several different type of cells varying from tree to tree. The different cell types behave differently and this determines the trees conduction, storage and support.



Pith is the center of the trunk. It is dry and does not provide any nutrition or water to the wood. The rays can be found at the cross section of the wood. Rays with contribution of color and growth rings give a guideness in knowing of wooden age and if the “trunk” or piece of wood had had any diseases. The pattern of the growth rings corresponds to the season and climate zone. The growth period of central Europe is from April and May to August and September. At the spring season, the pores get bigger with thin wall wood cells in order to transmit water and nutrients. While during the autumn period, the wood cells form into thick wall cells, which provide strength. The coat underneath the the bark, creates parts or layers with wood cells inside and bark outside.

(Deplazes, 2008)

Sapwood & Heartwood

Thermal conduction

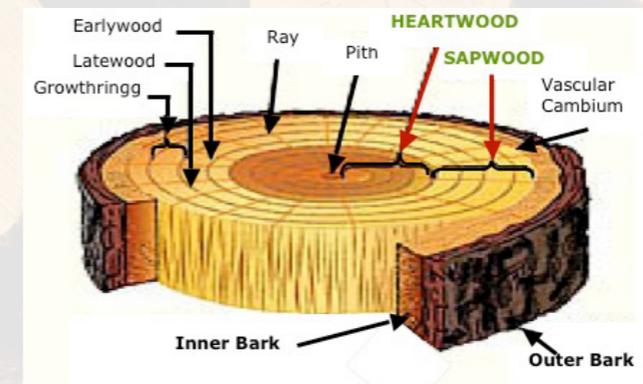


Illustration 9 : trunk

The area outside the growth rings is called Sapwood, which consists of the living wood cells. The layers inside of the trunk has mainly dead cells and it is called heartwood. The color of the trunk can sometimes be estimated by its heart- and softwood appearance. If not, one can look at the cross-section. The heartwood begins to shape with an age of 20 to 40 years. Once this happens, the sapwood overtakes with taking in nutrition and water and the heartwood becomes without any function. With time, as the heartwood ages, it gets darker in color and gets more strength (Deplazes, 2008, 83).

The isolation of the wood depends on its properties, which are defined by wooden density and moisture content, which also depends on its pore structure.

“The thermal conductivity of wood is around 0.13W/mk for softwood and 0.20 W/mK for hardwood; this compares with figures of 0,44W/mk for clay brick and 1,80W/mK for concrete. In comparison with steel or concrete, the thermal expansion of wood is so small that it is irrelevant in building.”

(Deplazes, 2008, 82)

Softwood



Illustration 10 : spruce

Timber can be divided in two groups, softwood and hardwood. Both appear in Norway, but softwood is in majority.

Softwood is basically characterized by having needle-like leaves. They consist of single cells called tracheids. These cells basically function as both support and wire for nutrition. The density and strength of softwood itself is low, but it grows fast and it can be felled down when it is thirty years. Softwood is poor in fire resistance. 60% of world trees are softwood, and 80% of all timber production comes from softwood.

Softwood tree examples are redwood, pine, spruce and yew.

(Deplazes, 2008)

Hardwood



Illustration 11 : maple

Hardwood is broad-leaved trees, which lose their leaves at the end of their seasoning. Hardwood characteristics is more complex than softwood characteristics. It has two type of cells, one supporting the structure called fibres, and the other being responsible for the nutrition, also called vessels. Opposite to softwood, hardwood grows slower. The density is high, but it takes over 100 years to mature. Hardwood is more expensive due to its maturity time and also transportation, as it is grown it most common in tropical areas. Hardwood is more fire resistant than softwood. Hardwood is denser than softwood, and has a delicate appearance. A lot of high-tech furniture is made from hardwood, so are decks and flooring -basically parts that need to be long lasting. Hardwood is more expensive than softwood. Hardwood trees examples are oak, maple, walnut and teak.

(Deplazes, 2008)

Building techniques

Log construction

Log construction is a very wide spread Scandinavian construction where bigger structures such as palaces, towers and churches might apply this type of construction. Predominantly in the mountainous area, the log construction knowledge has been handed down from generation to generation mostly by word of mouth. However, nowadays, many 'alien' adaptations of the structures have been made in order to reach the modern standards of living but the most traditional ways of building still belongs to a particular environment such as the mountain regions where specialists are erecting the buildings properly.

The most important aspect in developing a log structure is setting the allowance which has to be up to 25 mm for every level. Also, there is a multitude of cross sections for log walls – a range that goes from round logs to glued sandwich components. Nowadays, external cladding placed on a timber frame or timber studs often imitates the log structure. This is also determined by the requirements of today's methods of building in which insulation of the construction plays a major role (Kold, 2008, 51). This leads to layering the walls in order to include insulating material and other layers that perform independently (mostly prefabricated) such as:

- Thermal insulation
- Space for services
- Cladding or supporting framework
- Loadbearing construction

(Kold, 2008)

In fact, log construction has led to a new approach which integrates both architecture and construction in harmony, simply by developing and better understanding loadbearing and cladding functions as design potential. More attention given to, for example, corners, edges, joists, beams, that remain visible in the new approach brings a tectonic character to this type of construction.

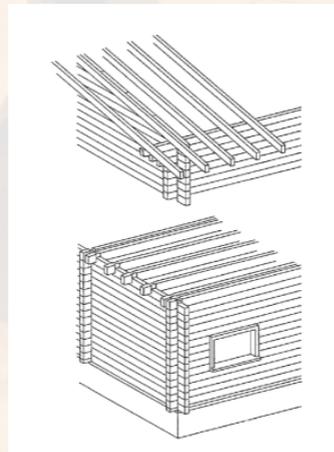


Illustration 12: log construction

Features of log construction (Kold, 2008, 52):

- "Highly skilled labour
- Careful selection of wood
- Artistic corner joints
- Rigid plan layout
- High timber consumption
- Setting allowance"

Timber frame construction

Timber frame construction is spread around Central and Eastern Europe, but also in Denmark, Netherlands, northern Germany and England. In northern countries, more specifically, "the frame is positioned on a regular grid and usually forms a rather closely spaced mesh of rectangles and squares" [SystemsInTimber-Engineering p. 54]. The development of timber frame construction has been determined by the lack of timber required for log construction. Furthermore, in timber frame construction hardwood species are used as somewhat shorter components. As a characteristic, the structures were built in such a way that the loadbearing structure remained visible but after the 19th century, it began the rendering of the facades to imitate stone and brickwork. Nowadays, timber frame construction include board materials and new wood-based products but also the methods of fabrication are more advantageous in terms of economy and construction. The vertical loads in timber frame construction are transferred through the contact between the faces of the timber elements thus making, this being a cheaper form of connection than by using steel parts of performed sheet metal. The frame mainly consists of a rigid framework with squared sections for both external and internal walls. The compressive forces are transferred by the wood joints, but not the tensile forces.

"(...)bottom plates and head binders are joined via halving joints, i.e. half of each member is cut away and then the two parts are overlapped. Studs, braces and rails are joined

exclusively with mortise and tenon joints, although oblique dado joints may be necessary for braces carrying heavier loads. To prevent movement at the joints, nails are now often used and, occasionally screws, close-tolerance bolts, or shear-plate/split-ring connectors." (Kold, 2008, 55)

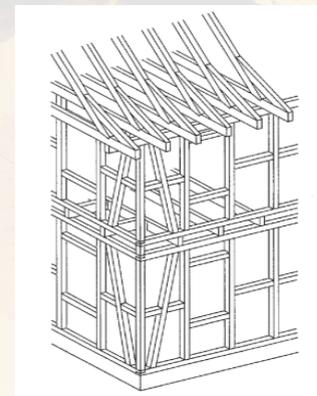


Illustration 13 : Timber-frame construction

Features of timber frame construction (Kold, 2008, 54):

- "The loadbearing framework can be clad on both sides, but traditionally it remains visible on the outside
- Storey-by-storey form of construction
- Primarily wood joints with mortise and tenon, oblique dado and halving joints
- Structural timbers have a larger and usually square cross-section
- Simple assembly and erection "

Balloon frame

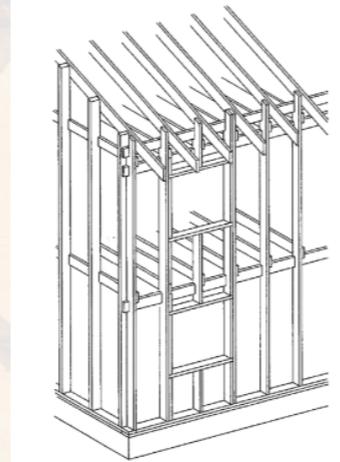


Illustration 14 : Balloonframe construction

The balloon frame has been developed as a further consequence of new technologies, materials and transportation means. Being developed in United States, the balloon frame had as a reason for its massive success the industrial mass production, steam powered of nails. “The balloon frame, a structure of timber ribs, consists of closely spaced timber studs which are stiffened by planks or boards nailed to them.” (Kold, 2008, 59)

There are two forms of construction. “Balloon frame in which the ribs of the wall continue over two or more storeys and the horizontal members form the top and bottom terminations. The joints for suspended floors are supported on a horizontal binder let into notches cut in the vertical studs” (Kold, 2008, 59).

And the platform frame which has as the main characteristic the fact that it can be assembled in storey-high sections. Used mainly for one of two-storey houses, this flexible construction method allows for the use of standardized, prefabricated building elements.

The timber stud construction is another system which appeared inspired by the American successes and experiences. This building for became widespread in Europe together with the appearance of prefabricated panel construction which is now available on countries from Central Europe.

The timber stud construction has been developed starting from the timber frame construction. The bracing of the structure is the main difference: While the timber frame is stiffened by the inclusion of inclined braces, the timber stud construction has solid timber sheathing attached to the outside and the vertical load-bearing elements continue all through the full height of the construction (like in the case of the balloon frame).

“In timber stud construction the connections are achieved via direct contact between the timber members (compression), through nailing, through lap and halving joints, and in some cases by way of mortise and tenon joints. Today timber stud construction and balloon frame or platform frame construction have been superseded in Europe by panel construction due to its far superior quality.” (Kold, 2008, 61)

Features of timber stud construction (Kold, 2008, 61):

- “Low manufacturing depth, high labour input on the building site
- Building braced by planks or cladding
- Construction clad on both sides
- Slender, tall cross-sections
- Close spacing of uprights”

Panel construction

The main idea of panel construction lays in the idea of prefabrication technology and transportation possibilities and fast and efficient assembly. They are built in an indoor environment which provides optimum working conditions by the use of technology allowing for accurate fabrication. These structures are planned, manufactures, designed and erected storey by storey. In panel construction the loadbearing structure consists of several loadbearing ribs with squared sections and a sheathing which stabilizes the ribs. The vertical loads of the roof and suspended floors are carried by the individual straight vertical elements. The horizontal loads are, however, carried through the sheathing of the members with wood based products.

Spreaded all around America, Scandinavia and Canada, it is estimated that 90% of all detached storey houses are using this construction method. However, the external appearance does not resemble to the traditional idea of timber building. The façade is clad with solid timber or wood based products on which protection in the form of opaque treatments are applied.

“In panel construction, the main components are as follows:

Loadbearing ribs - Structural timber (solid timber, compound sections), strength grade C24 (Species: spruce, fir ;Moisture content: $12\% \pm 2\%$).To ensure good dimensional stability, the use of compound (solid) sections is recommended for panel construction.”

Stiffening wall and floor sheathing (3-ply core plywood; OSB, MDF, particleboard; gipsum fibreboard; veneer plywood)

Thermal insulation (mineral-fibre boards; cellulose fibres; wood fibreboards, diverse insulating materials)” (Kold, 2008, 64)

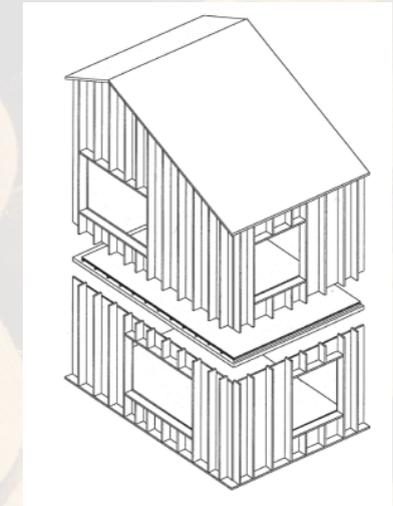


Illustration 15 : Panel construction

“The wall construction varies depending on the thermal performance requirements placed on the building envelope, and also depending on the specification for the inner lining and the wall construction on the outside. (...) The choice of the right wall construction is governed by the use of the building, the building physics and energy-related requirements, and the demands placed on the quality of the wall construction”. (Kold, 2008, 65)

The features of panel construction:

- “ Design freedoms
- Simple form of construction
- Repetitive details
- Loadbearing ribs of slender, standardized sections
- Building braced by sheathing
- Simple materials procurement
- Storey-by-storey assembly
- Connections achieved by direct contact and with mechanical fasteners
- Modular dimension 400-700 mm, preferably 625 mm,
- Construction clad both sides
- Short on site-time, different manufacturing depths possible” (Kold, 2008, 63)

Inspiring architecture

Jørn Utzon

Jørn Utzon finds himself as a very childish person who thinks with his heart, and finds his inspiration in nature. When designing he looks deep into the understanding of the site and tries to find the heart of the place, and then he imagines that the place is his own. What amazes me about Utzon's architecture is how he designs with geometry, ends up with a continued structure, and thereby succeeds in creating the needed atmosphere into the space.

Utzon believes that it is good to encourage people to wish for something and then it is the architect's job to make the dream come true. Curiosity has a great impact of the design and further living of the architecture. Utzon finds that geometry as a form can always find a pattern that is enriched and varied just as the forest that serves all different kind of trees, both in sort and scale. No tree is the same. Every new place is seen as a challenge and inspiration.

"Kyleberg taught me about awareness of nature, of the moment. I have drawn such great inspiration from nature, and it is from nature that I have extracted motives for my design".

(Utzon, 2006, 9)



Peter Zumthor

I believe that the tension between contrasts makes us appreciate and be aware of our senses. Visiting Zumthor's Thermal Baths in Switzerland left such an emotional impact on me. It made me aware of the stunning design one can create through carefully observation and awareness of detailing. The Baths created a notion of curiosity of exploring every bit of ones surroundings, while leaving a healing atmosphere on the body.

It amazed me how a little opening in a dark room just dragged so much warmth through its light from the outside, and followed by creating such comfortable emotion of tingling through the skin. The sound of the dripping water towards the rooms and halls resulted in an echo and offered some kind of a notion of the of the sound's appearance towards the space.

The biggest impression was when swimming from the inside to the outside area and having a meeting with the view upon the cold snowy mountains. I felt so tiny, but still so safe. It offered a feeling of spring, a warmth that arose towards the body.

Peter Zumthor uses the same kind of effect with the view towards the mountains when designing his vacation houses in Lies. He is still aware of the careful detailing and use of light. Of course, this is done in a calmer way of experiencing the contrasts. Being aware of this observation and having a goal of designing a place to retreat, I aim to take this experience further into my design.

Design process

Retreat

: movement away from a place or situation especially because it is dangerous, unpleasant.

: the act of changing your opinion or position on something because it is unpopular

: a place of privacy or safety

*Source: Merriam-Webster online dictionary
<http://www.merriam-webster.com/dictionary/retreat>*

Vision

The sense of the notion “retreat”:

For me the idea of retreat is a place of reflection. Reflection is an activity that could be done alone or in company of others. I believe an optimal solution for a retreat would be a notion of interaction between solitude and gathering. A reflection in solitude helps a human to find his place in the world, while a gathering group will challenge and influence new reflections through interaction.

Translating my understanding of retreat and reflection into design, I went back to the thinking of a primitive human. Gathering would be done by a fireplace and solitude be approached by climbing a tree. The tree emerges from the ground and opens up towards the sky. When you climb it - you can feel sheltered and still have a broken view to its surroundings.

I aimed to create a design that benefits from the terrain topology by merging with the hillside. By becoming a part of the landscape, the interior drags in the view, creating a special relationship between inside and outside. Equally, I aim to create tensions that leave an imprint on experience. The place of retreat is a place of relaxation through areas for gathering and solitude.

Concept

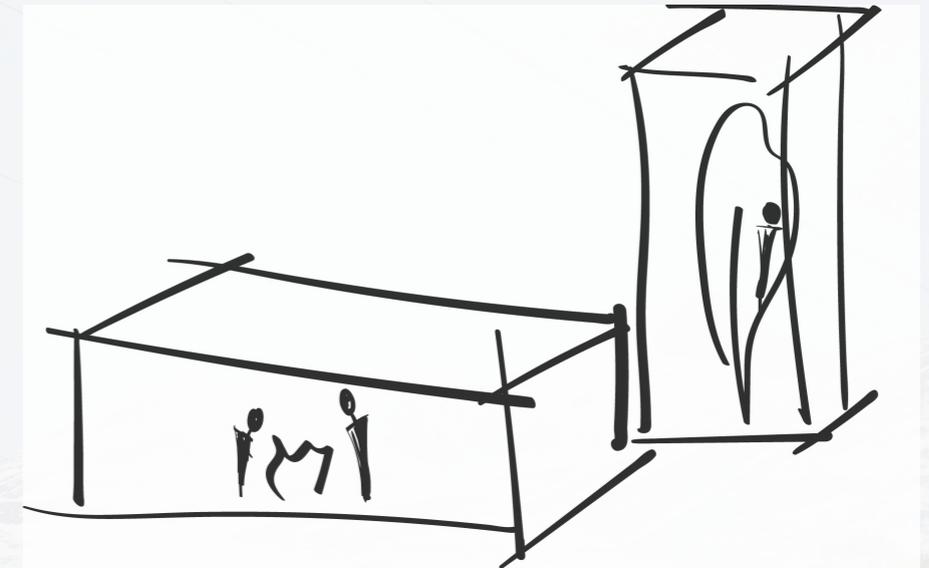


Illustration 16 : concept sketch

This master thesis wishes to approach the place of retreat in the sense of withdrawing oneself from an urban area into the nature. When I think about nature, it creates its own space of retreat. If staying in a retreat for a longer period of time, a human will have a need for shelter. My aim is to take my experience of walking on the site, the memory of the topology and the interaction with nature, and transform it into the experience of architecture by creating a shelter that emphasizes the idea of retreat from the world.

“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. It is not an isolated and self-sufficient artifact; it directs our attention and existential experience to wider horizons.”

(Pallasmaa, 2012, 44)

In order to understand and celebrate the topology, I will take the approach to the design of creating a horizontal volume, that symbolizes gravity, and a vertical volume that celebrates the trees and the connection between earth and sky.

Due to this thinking, my conceptual idea is that of a dwelling composed of two volumes: one horizontal emphasizing the place of gathering, and one vertical, symbolizing the place a solitude.

Masterplan



Illustration 17: Masterplan area

Masterplan

Before starting the design process of the unit, there was a need to choose an area.

With the awareness that I am design a cluster of six units, I made a reflection on which place of the site that would give the best interest to all of the units.

During this stage of the process, I had to ask explore:

- which spots benefit of having the best view
- is there a place of dominance that may offer a solution for the further development of the master plan
- how to gain the best through the site's topology

Having the best memory of area A and B, I choose to develop A.

According to Norberg- Shulz's work "Existence, Space and Architecture", a dwelling, a home can be seen as a human's center.

"The center represents what is known n contrast to the unknown and somehow frightening world around."
(Norberg-Schulz, 1971, 19)

A weekend home can be seen as a second center of the human existential space. As people in Norway tend to appreciate privacy, I chose the paths to a place of retreat to be slimmer as one approaches the spot of one's unit. As one gets closer to the entrance, the path begins to interact with wooden elements which can be seen to referring to the fact that one is getting closer to the entrance of this center, that is being built of wood.

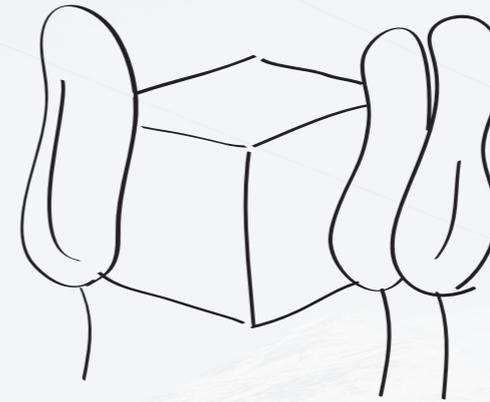


Illustration 18: merging of building and site

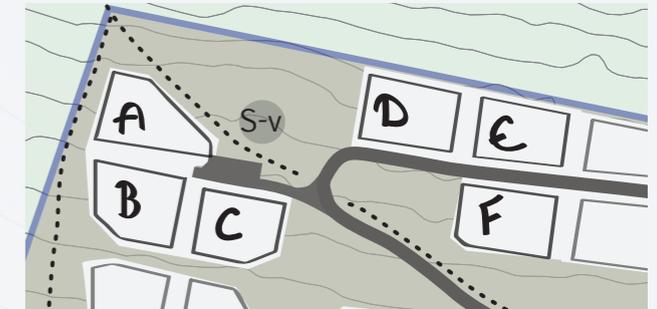


Illustration 19 : unit spots

Because of the aims, the unit that I have chosen to develop is on the basis of reflecting on which unit that would be the most difficult one to design, in order to achieve a notion of privacy.

I have chosen to design spot E, as it is one of the designs that are at top of the master plan and as it has the road and other units close on by.



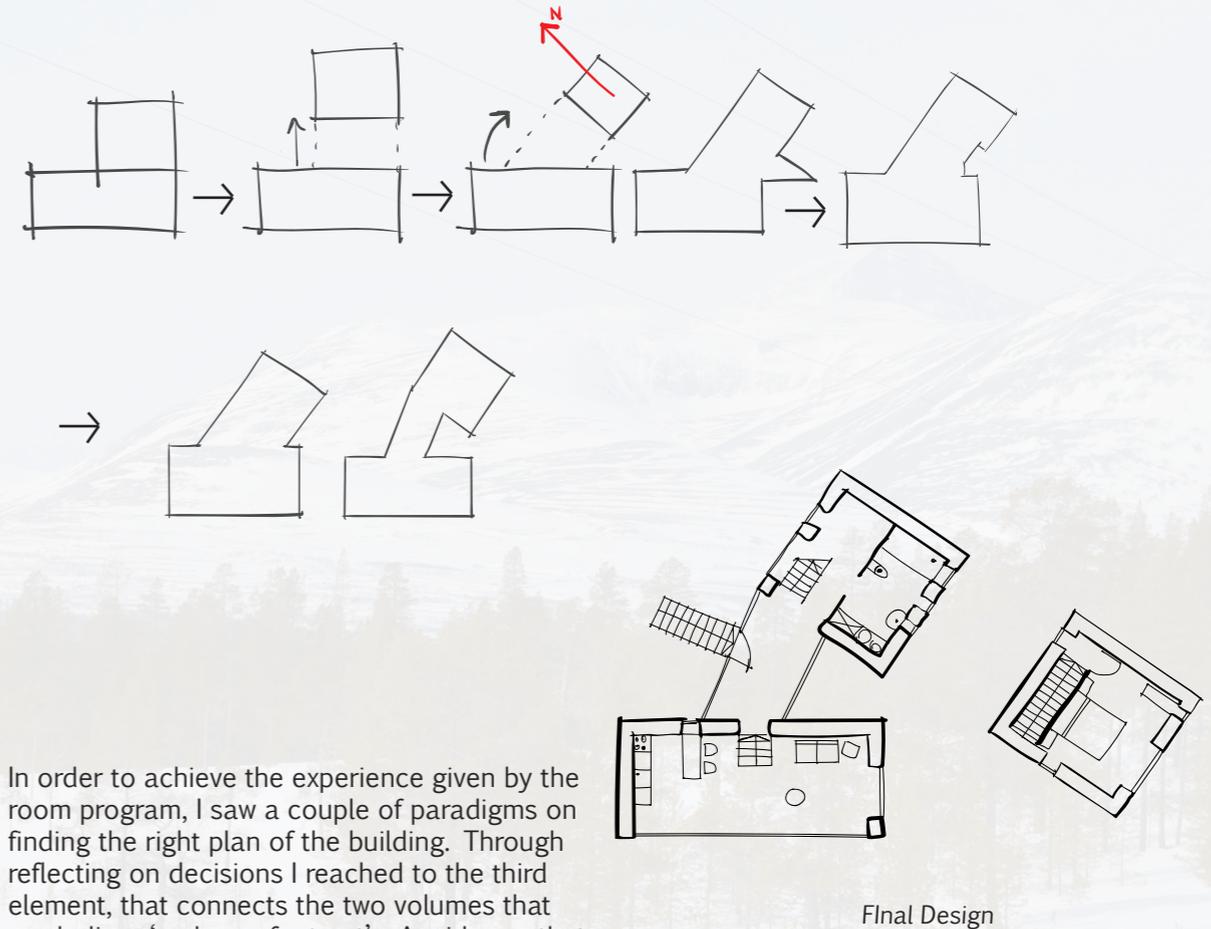
Illustration 20 : Masterplan model

Room program

Unit development

As my wish is to create a minimalist place of retreat, I have made a room program as used as a guide line of what experience every room is wished to achieve. With a wish to make the unit minimalistic, it will be designed for 1-2 users.

Room	Size	Experience	Intimacy	Quality of light
Fireplace	15-20 sqm	Gathering area Connection to the landscape - view to Rondane	**	***
Kitchen	10-12 sqm	- having a notion of morning sun - minimal	**	*****
Bathroom	12-15 sqm	Morning sun, connection to the topology "Being naked in the nature" notion of taking a bath in the nature	****	*****
Bedroom	18-20 sqm	Solitude Morning sun Connection to the trees	*****	**
Entrance - Hallway	10-12 sqm	Element between gathering and solitude	*	****



In order to achieve the experience given by the room program, I saw a couple of paradigms on finding the right plan of the building. Through reflecting on decisions I reached to the third element, that connects the two volumes that symbolizes 'a place of retreat': A mid area that is also making the entrance of the building - what I like to call a "bridge".

Every unit is placed in order to follow its spot's topology. The vertical volume is twisted - achieve the effect of the best morning sun during the winter, while the horizontal volume is following the angle of the slope.

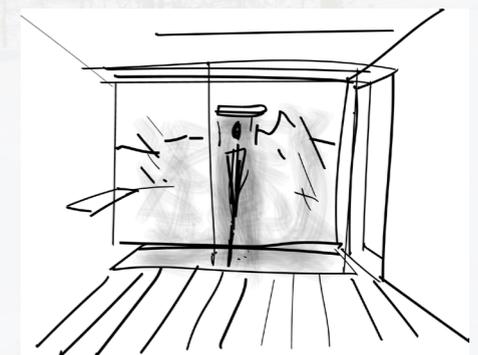
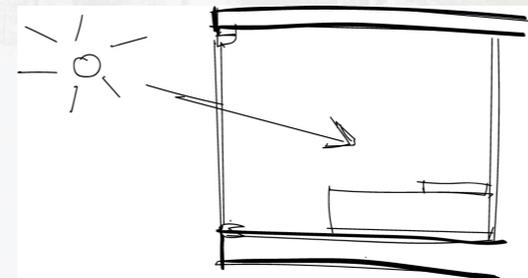
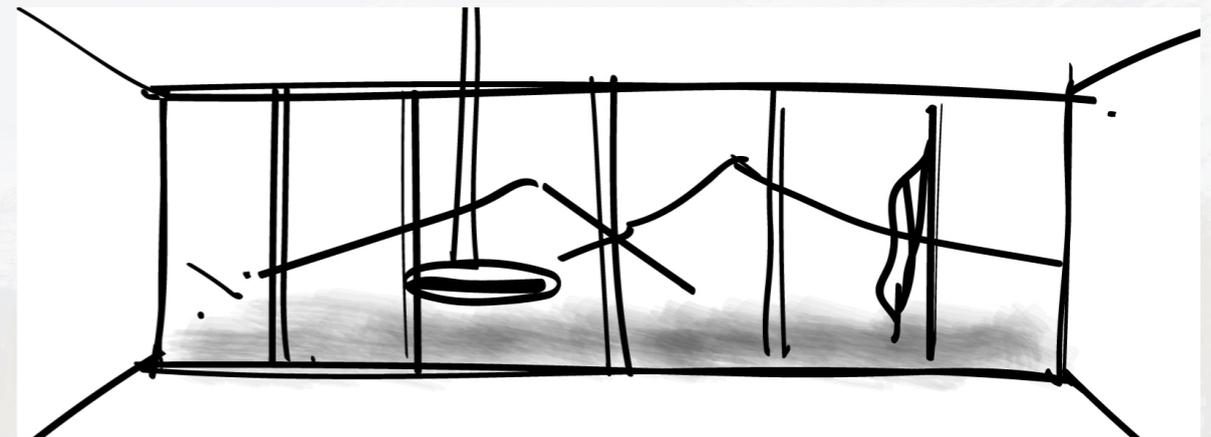
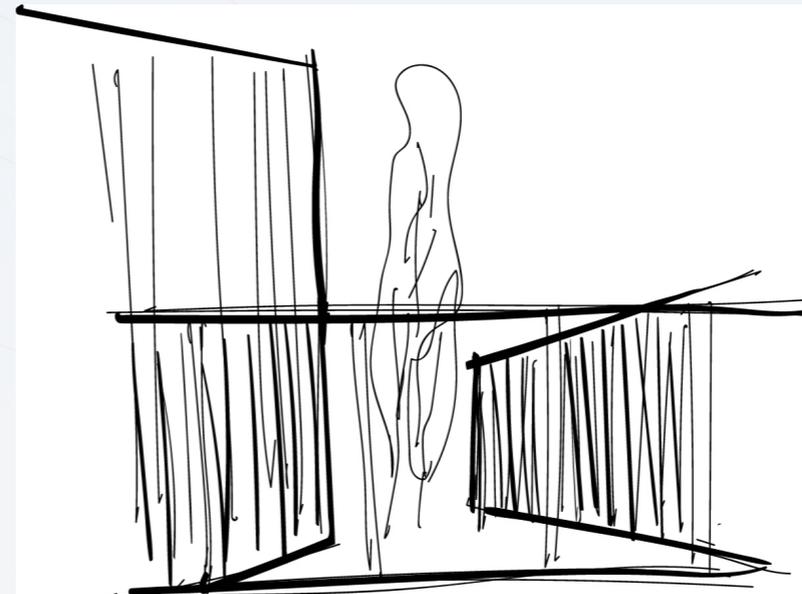
The vertical part of the building is twisted to face the trees and not the road -to get a sense of privacy.

The horizontal volume will face the road, the glazing will be reflecting in order to break the complete view into the building, but still one will get a notion of movement from the outside. The building is placed as much as possible in the height of the slope to get a better view and have a feeling of being the dominant one to the area.

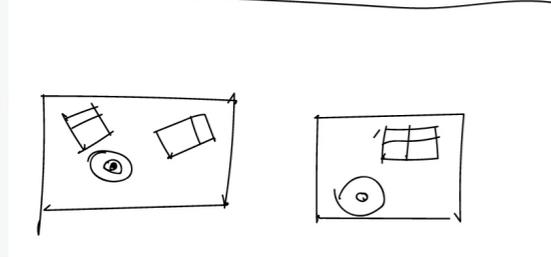
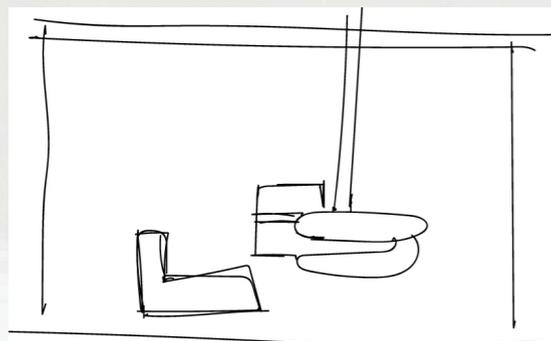
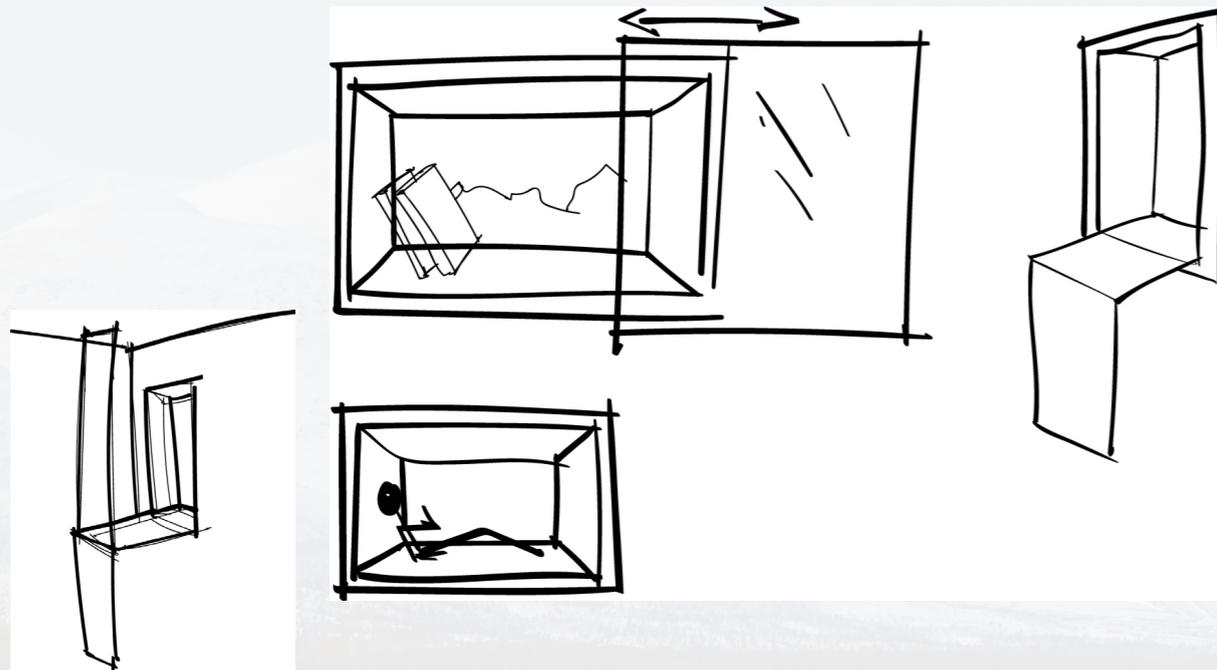
Final Design

Tale of the detail

A wide gravel path narrows denoting the passage from public to private realm. As she approaches the unit the path transforms into a mixture of wood and gravel. In front of her, a wooden staircase rises in a hallway of glass, the verticality of the staircase contrasts the horizontal volume of the building. Upon entering the dwelling she notices reflections of shimmering light across the building. She takes off her heavy woolen jacket and leather boots noticing a place for them under the staircase. As she continues to explore the dwelling she is met with an element of surprise as she find a cosy corner by a fireplace and large windows connecting the space with nature. Upon the shelf under the window she finds old books full of memories and experiences and starts reading by the fire. As the night goes by and the embers of the fire slowly burn out, she decides to retreat up the staircase through the vertical volume. She finds herself in a solitary space amongst the trees, a place for rest and reflection.



Interior



An exterior becoming an interior:

When designing the interior, I had to choose the wall that makes a window either become a place of sit, a shelf or a table. The material that is used is plywood.

A furniture of multi solutions.

The interior around the fireplace - a place to sit- can easily be added to become a sofa or an individual chair, or even a bed by unfolding the back support to be wrapping into the horizontal/lying position.

Structure

Due to the reflections on wood, in line with cradle to cradle, I have chosen the units' building design system to be a combination of sandwich panel wall construction and timber-frame work construction.

The building walls of the vertical and horizontal volume will be prefabricated solid walls that just need to be assembled at the site. This applies to the roof as well and the floor of the whole unit.

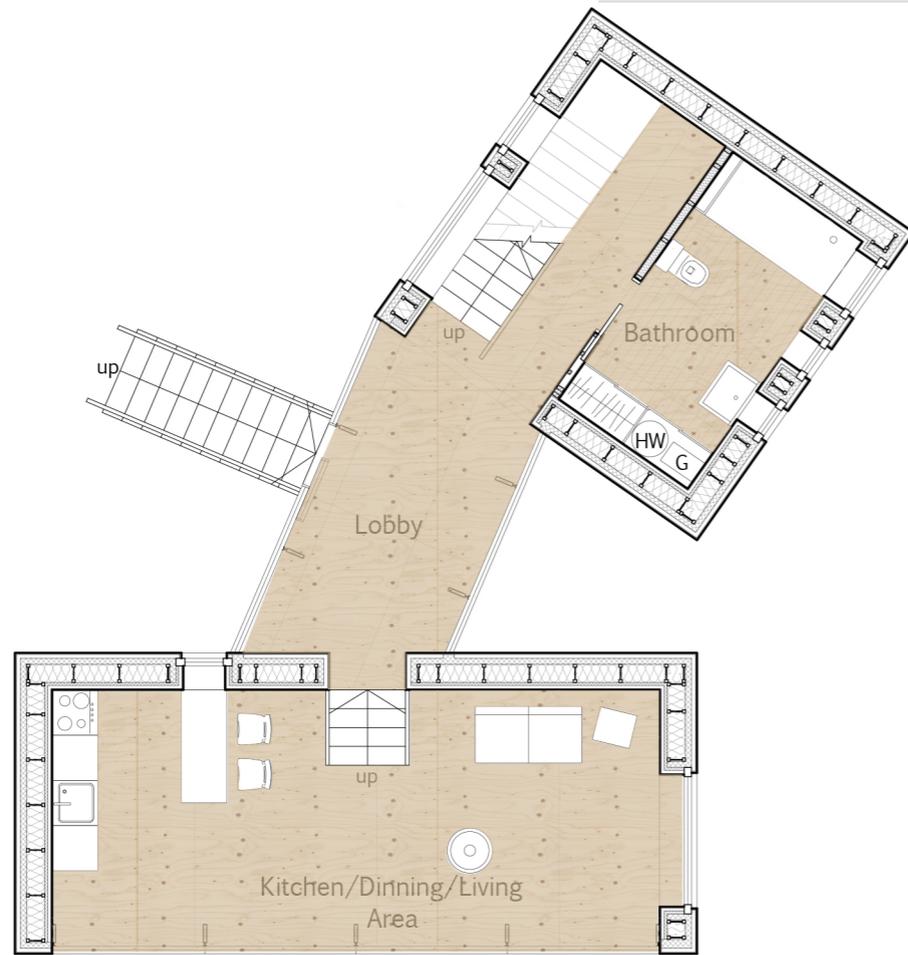
The transparent hallway, 'bridge' component of the building, will be done by timber frame construction. In order to find the dimension of the column that needs to be rigid against wind and snow load at the site, a calculation is made in Robot. The result of the columns size becomes 215 x 225 mm.

The whole construction will be lying on pillars, which has its fundament in the ground.

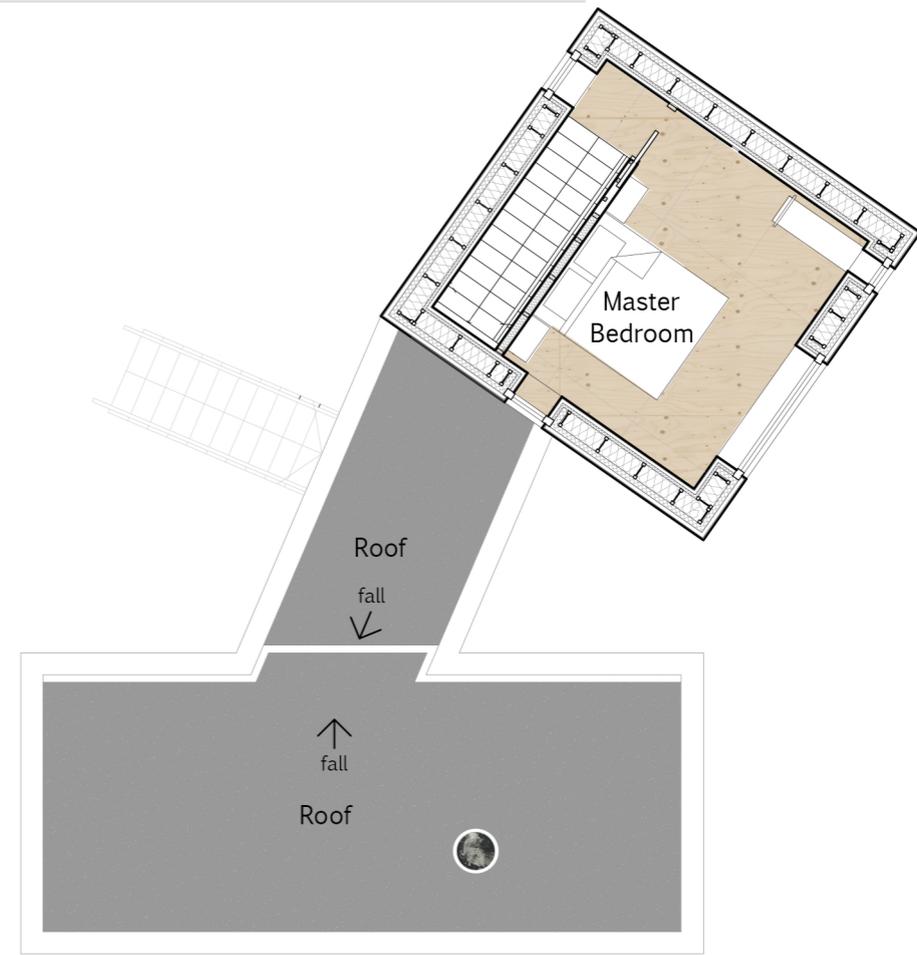
Presentation







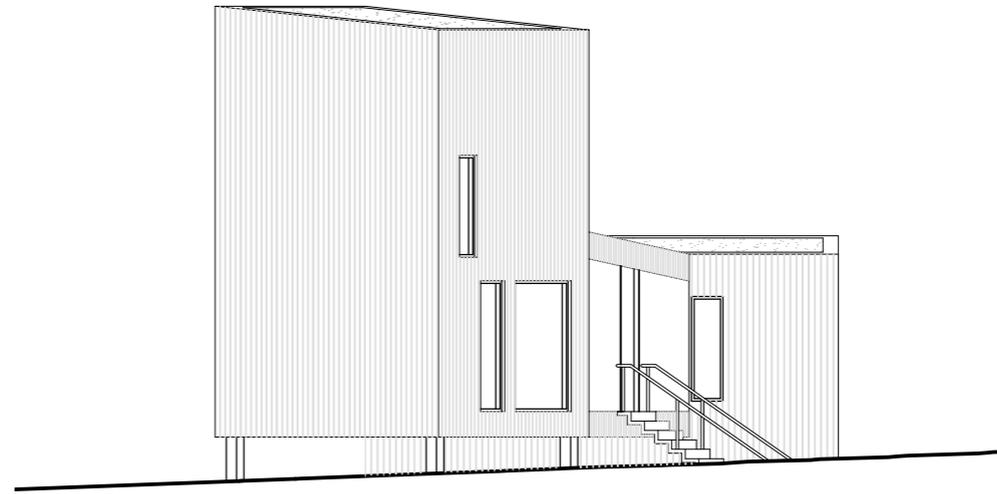
Ground floor
scale 1:100



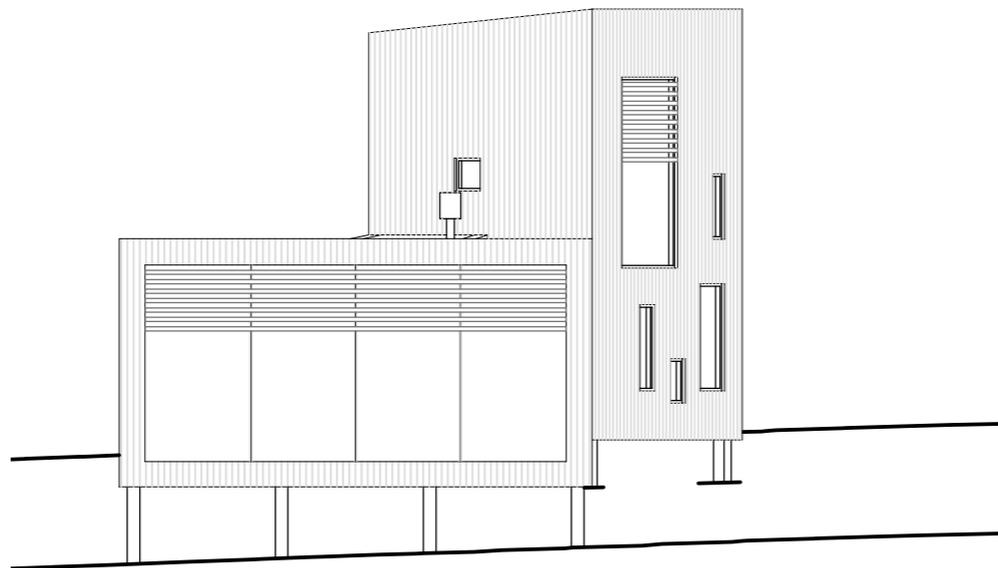
1. floor
scale 1:100



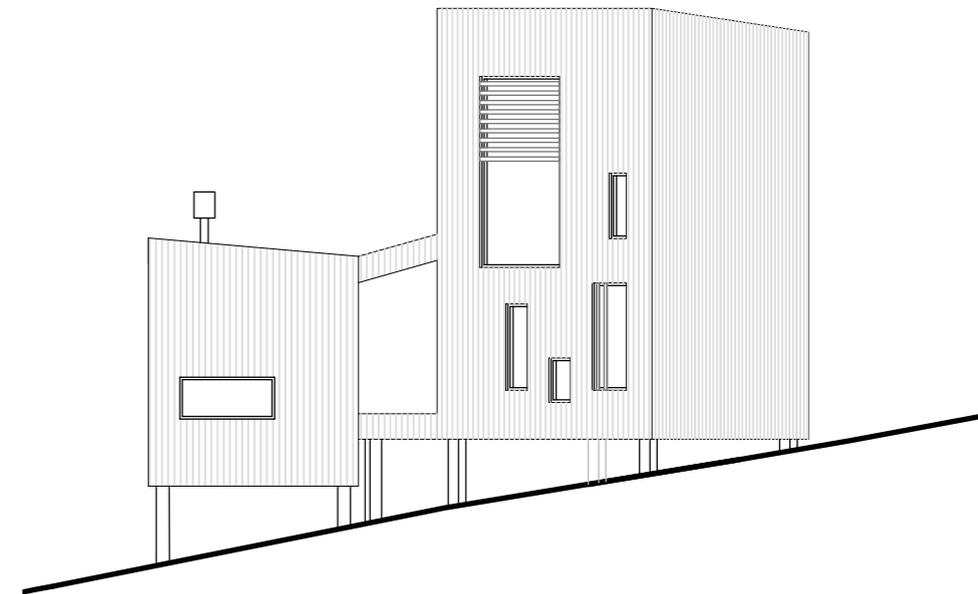
North west facade



North east facade



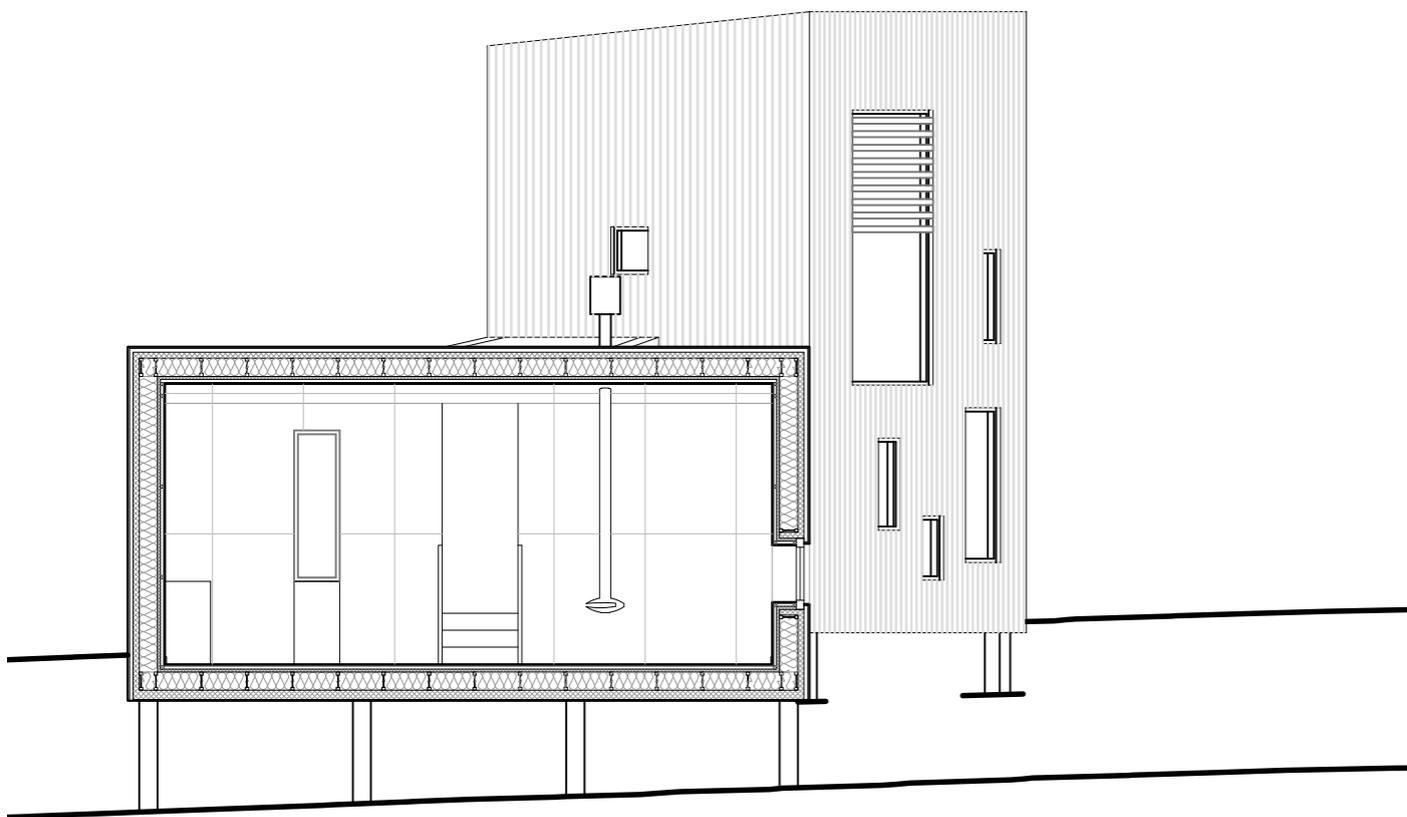
South west facade



South east facade



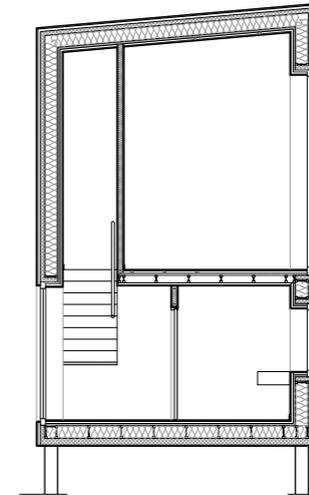
Masterplan 1:1000



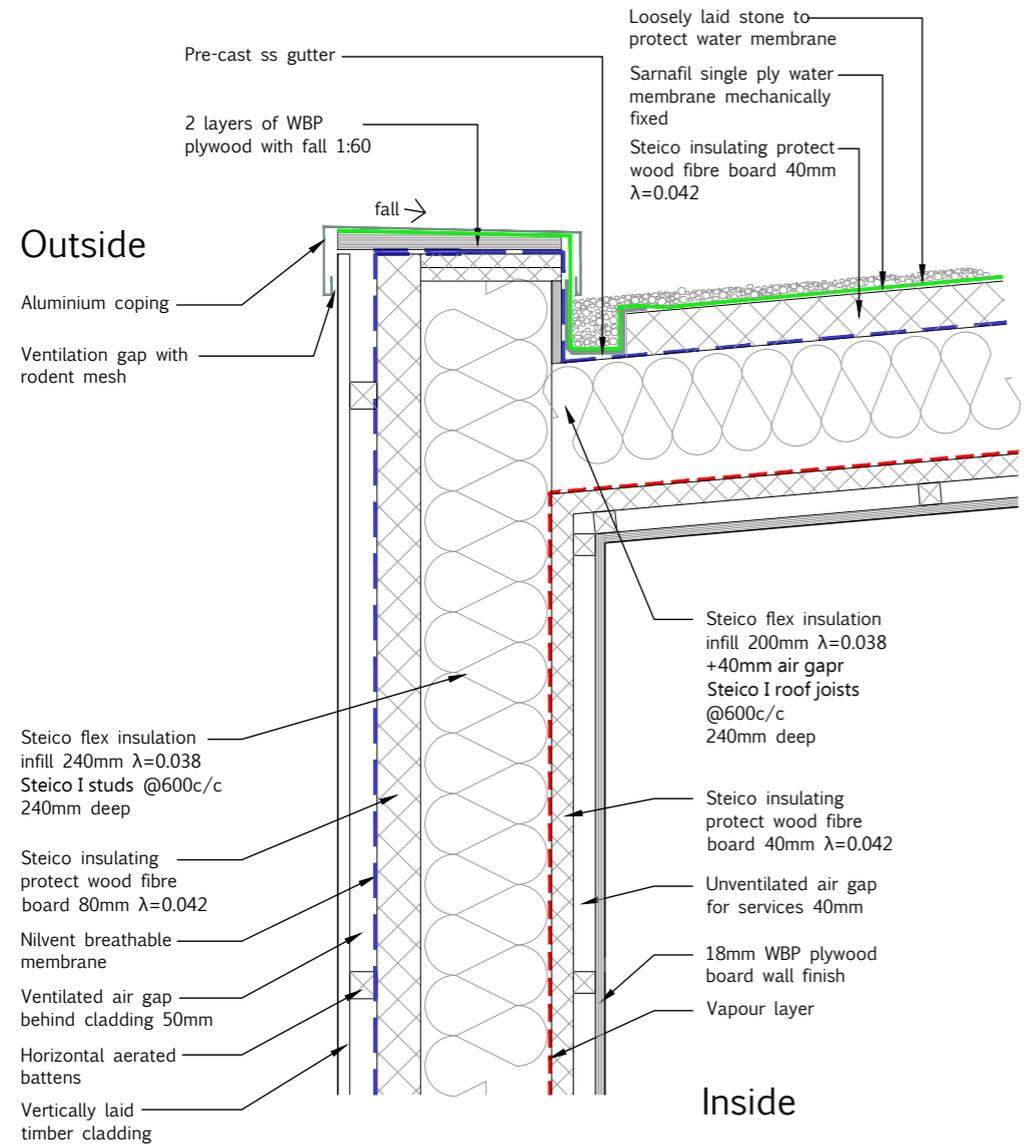
South section



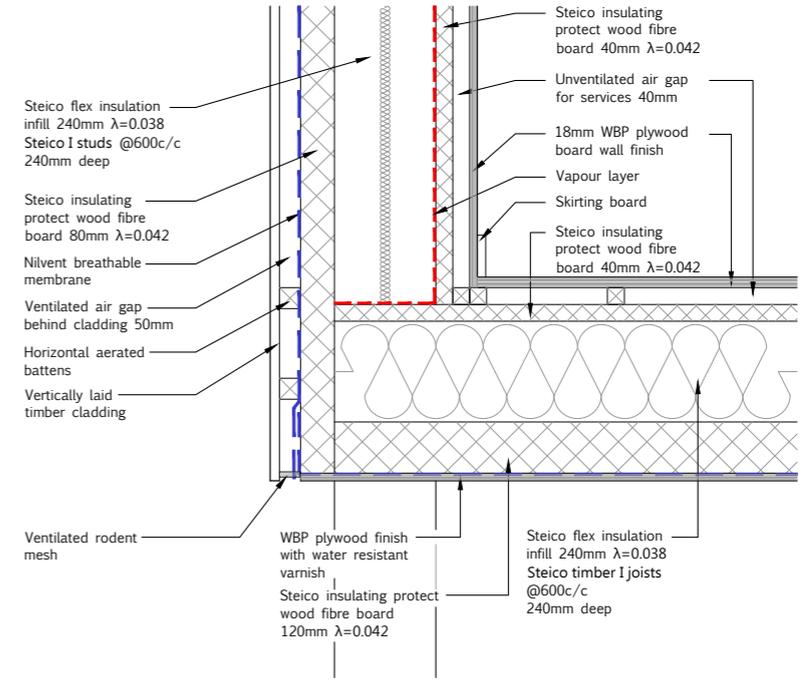
North west section



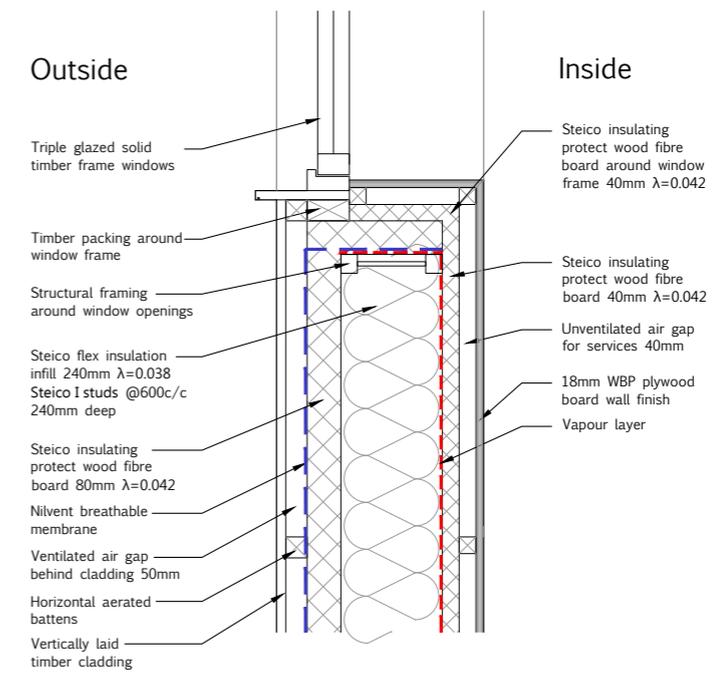
West section



Roof-wall detail



Floor-wall detail



Wall detail

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