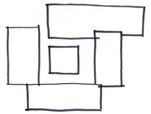

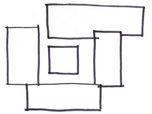

Juelsminde Holiday Resort

Aalborg University
Department of Architecture & Design

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4th Msc. Arch, May 2014

Bjarke Apollo-Andreasen & Sofie Maj Andersen

Abstract

This project is initiated by changes in the way people spend their holidays as well as an architectural proposal by Ginnerup Arkitekter A/S for Hedensted Kommune, concerning a holiday resort in Juelsminde. The project consists of a master plan and detailed design of 120 holiday homes and a bath complex. The project emphasizes tranquility, different experiences and the connection to the nature of Juelsminde. The project focuses on atmospheres inspired by the atmospheres found in the changing of the seasons.

TITLE PAGE

Main Supervisor
Peter Lind-Bonderup
plbo@create.aau.dk

Secondary Supervisor
Rasmus Lund Jensen
rlj@civil.aau.dk

Title
Juelsminde Holiday Resort

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Education
Aalborg University
The Faculty of Engineering & Science
Department of Architecture & Design

Group
Ma4 - Arch 13

Students
Bjarke Apollo-Andreasen
Bjarke.Apollo@gmail.com

Sofie Maj Andersen
Sman08@student.aau.dk

Contacts:

Christian Fog
Ginnerup Arkitekter
Senior Partner
cf@ginneruparkitekter.dk

Contents - Total

INTRODUCTION

Free-time is usually associated with recharging your batteries, doing nothing on a beach - preferably with a drink in hand - Is this still the preferred way of vacationing? What alternatives are there? And is this still the applicable definition of a “real” vacation?

The Danish holiday resort is an integral part of the Danish holiday tradition, attracting domestic and foreign vacationers alike. This is in spite of the fact that in this day and age, it has become common and affordable to travel the world, in the search for the perfect holiday location. Yet a substantial percentage of holiday goers flock to these resorts every year seeking a relaxing holiday in a Danish setting.[1]

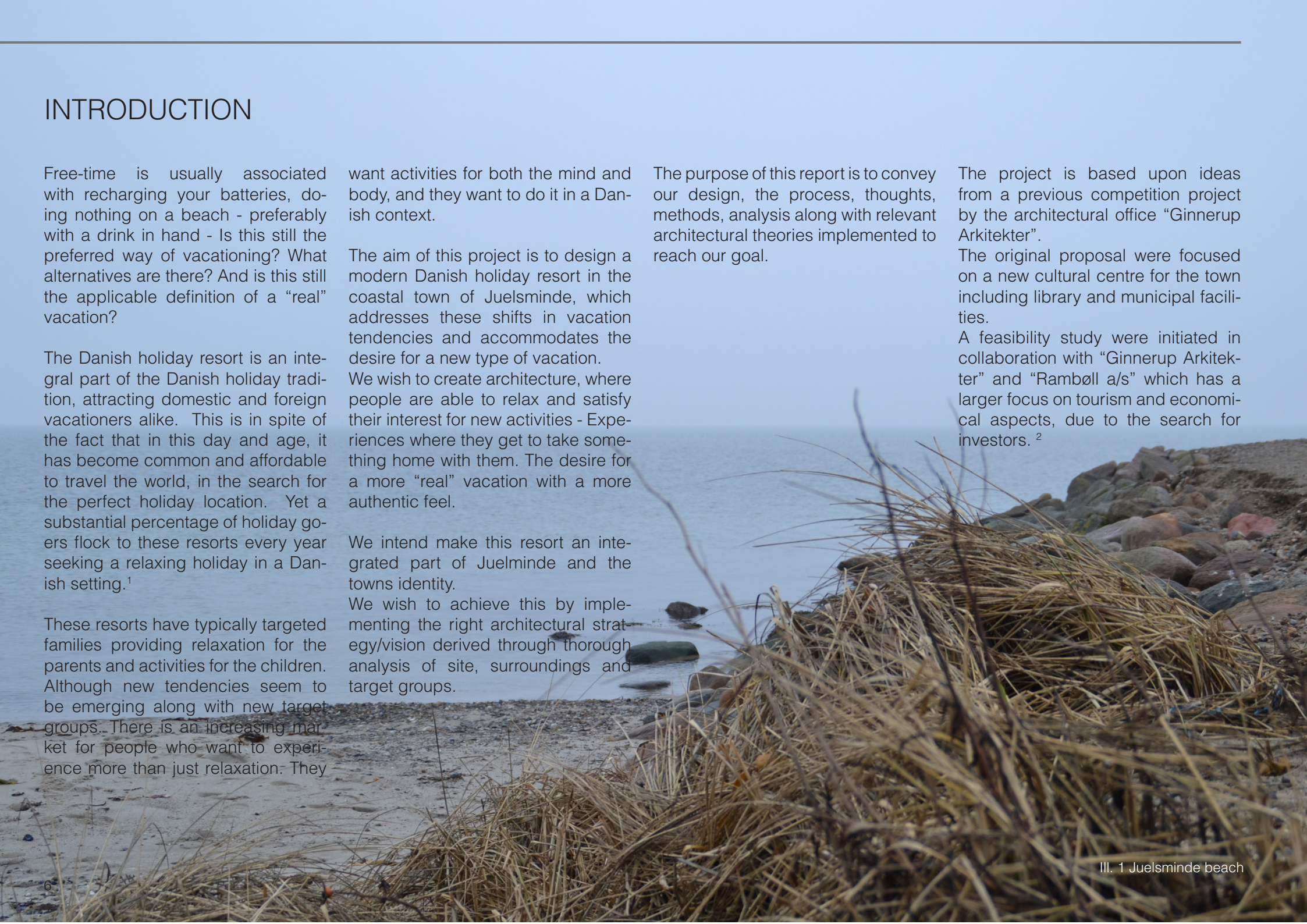
These resorts have typically targeted families providing relaxation for the parents and activities for the children. Although new tendencies seem to be emerging along with new target groups. There is an increasing market for people who want to experience more than just relaxation. They want activities for both the mind and body, and they want to do it in a Danish context.

The aim of this project is to design a modern Danish holiday resort in the coastal town of Juelsminde, which addresses these shifts in vacation tendencies and accommodates the desire for a new type of vacation.
We wish to create architecture, where people are able to relax and satisfy their interest for new activities - Experiences where they get to take something home with them. The desire for a more “real” vacation with a more authentic feel.

We intend make this resort an integrated part of Juelminde and the towns identity.
We wish to achieve this by implementing the right architectural strategy/vision derived through thorough analysis of site, surroundings and target groups.

The purpose of this report is to convey our design, the process, thoughts, methods, analysis along with relevant architectural theories implemented to reach our goal.

The project is based upon ideas from a previous competition project by the architectural office “Ginnerup Arkitekter”.
The original proposal were focused on a new cultural centre for the town including library and municipal facilities.
A feasibility study were initiated in collaboration with “Ginnerup Arkitekter” and “Rambøll a/s” which has a larger focus on tourism and economical aspects, due to the search for investors. [2]



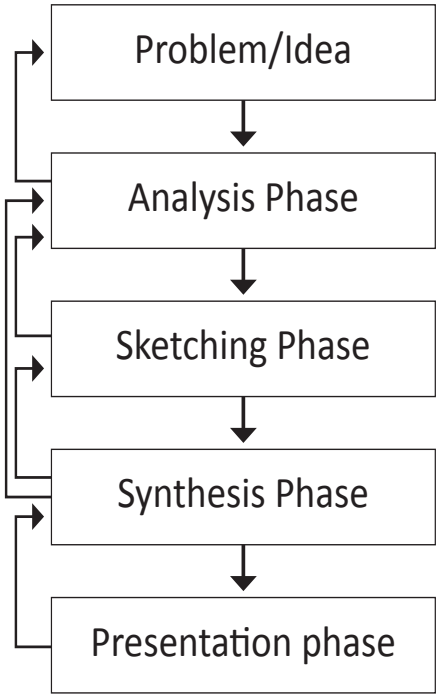
Ill. 1 Juelsminde beach

METHOD

For this project, we have chosen to work with the “The Integrated Design Process” (hereafter IDP).

The IDP is a work method, where an itterative process and early integration, of many different parameters, is key. The IDP is part of the “problem based learning”-model, which is taught at Aalborg university. In our case, the IDP is used in a project that mimics a work-situation where the goal is a solution to a larger problem.

“The integrated design methodology focuses on combining the architect’s artistic approach with strategically selected technical parameters from engineering right from the start of the design process” - *Knudstrup, 2010* [3]



Ill. 2 the IDP method

The problem/Idea

This is the main catalyst for the whole process. A problem or topic is stated and the project will focus on addressing this problem.

The Analysis phase

This phase concerns the gathering of information and analysis thereof. Mappings are made, user-groups are defined, municipalities are contacted for information etc.
This process is a mix between gathering relevant information and analysing it with the problem in mind. - New angles of the problem might show themselves here and will therefore inform the problem/idea phase.

The sketching phase

The different information gathered before is now used when sketching and building models. Both engineering and architectural problems are considered in this phase and both are kept in mind when sketching.

Synthesis phase

Here the different information and sketching proposals should come together to a solution to the given problems.

Presentation phase

All relevant information concerning the proposed solution to the problem, should be mapped out and articulated in a fashion so that it is easily understandable. The presentation should show how the different solutions address the different problems, found throughout the initial phases.

It will be a challenge to incorporate it, when working within such a large scale project but we feel that the IDP is a beneficial method for a project of our size and complexity as well.
The IDP offers a logical relation between the phases and makes changes more easily managed.
It forces us, as architects, to face the consequences of changes and makes sure, that most difficulties are made apparent as early as possible.[4]

PROGRAM

Ill. 3 Juelsminde Beach

PROGRAM INTRODUCTION

This program is intended as an introduction to the project in general, as well as the potential and complexities which the project offers. The program will also include cases, themes and theories which will help define this project.

Due to the different parts of information in this program, the different sections should be read as individual pieces of information, relevant to the project.

JUELSMINDE - A SMALL HARBOUR TOWN

Juelsminde is a small harbour town located on the east coast of Jutland, in between Horsens Fjord and Vejle Fjord. It has a modest population of 3875 people, but has a large tourist-traffic during the summer months.[5]

The harbour was inaugurated in 1896, because a railroad was built between the larger city, Horsens, and Juelsminde.
The harbour soon generated life and a brickyard, a seaside hotel and smaller fishing structures and dwellings sprouted around the harbour. Slowly the town received more and more attention from the free-time sailors.

The main driver for the town had initially been fishing, but competitive boating and free-time sailing soon took over. Due to the inconsistency of the catch in these waters, the fishing industry has all but disappeared, leaving a visual and historical imprint on Juelsminde.

The town has a centre with a main street, which leads down to the marina. The marina is the trademark of the town and is buzzing with life during the summer month and feature fish stores, that are visited throughout the year, music festivals and harbour fairs. Apart from the fish stores, the marina and surrounding area is mostly deserted during the colder months, where the restaurants and camping site are closed as well.

The beach and surrounding paths along the water, the harbour, bird ponds and forests still retain their beauty during the winter months. But the scarcity of activity in the town makes it hard to motivate visitors to take a day-trip to Juelsminde.[6]

Juelsminde has a unique character and understanding how the town works, will be key to making anything work here. One needs to find out how and why it works, to be able to enhance the existing attraction which is already present. The proximity of nature, the tranquillity and joy of visiting a concentrated piece of Danish culture are but a few characteristics which will benefit the project greatly when incorporated.

Ill. 4 Juelsmide harbour during low season

Ill. 5. Juelsmide harbour during summer saeson

The site is currently a camping site spanning all the way down to the harbour.

Ill. 6 Juelsminde districts and site

SITE ANALYSIS

One of the things that make this project stand out is the fact that the resort will be placed in an active urban context. Whereas most resorts are placed outside of the cities, due to their size and property costs.
The site in Juelsminde has an immediate proximity to the busy (in certain periods) Juelsminde Harbour.

The initial context analysis takes its inspiration in the theories concerning paths, edges, districts, nodes and landmarks presented in “Image of the city” by Kevin Lynch. We will have a look at the context and how the resort will influence, and improve, the town.[7]

Presently, the site functions as a camping site; very private and closed off to the public – not much more than a closed off patch of grass. It functions as a border which separates the harbour and the beach.
If the intention is to create a space in which life can unfold, then this space should become an open district that connects, rather than separates.
Even though the area is fairly small, there are some very distinct edges, paths and districts near the site. From the low-dense feel of the town itself; To the more open harbour area and the summer house area with a strong relation to the water and nature.
The beach and paths neighbouring the harbour are very open and public whereas the existing camping site and the summer house areas are very private but spread out.

Compared to many other towns which contain more functions, paths and mass, Juelsminde has a very interesting structure, not found in many towns. The intersection and proximity of functions such as harbour, town, beach and forest are very distinct in Juelsminde.

The site is in a very critical spot in the town. It neighbours and influences many different areas and functions. The connection with the context is important and has to be worked with carefully. Keeping this in mind, We want the resort to have a positive effect on its surroundings. We want to show the quality of providing many different experiences within a modest framework. The architecture should not overpower, but compliment the existing architecture and what it stands for.

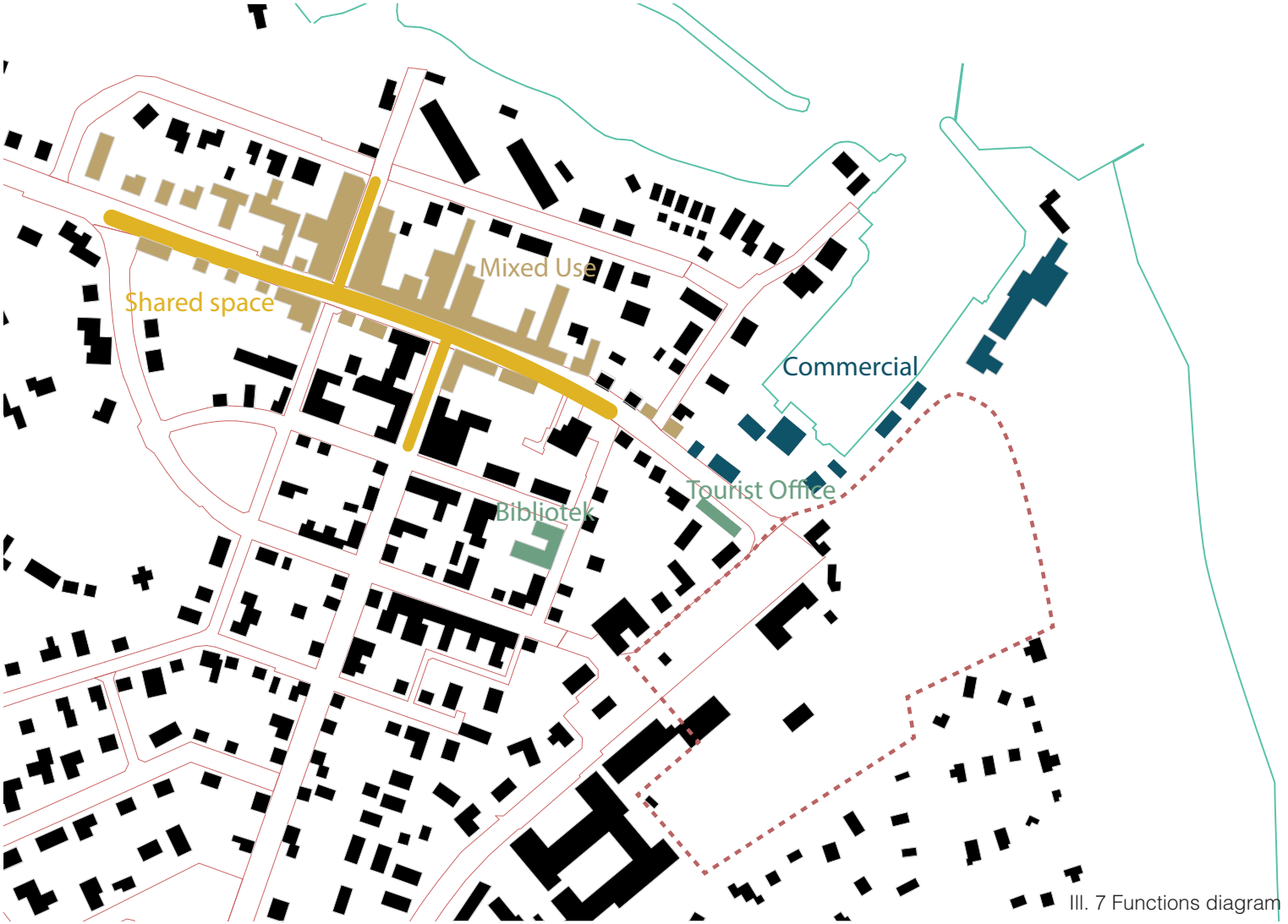
“Good architecture always makes its lesser neighbours look better than they used to” (Juhani palasmaa, New Nordic,[8])

Borders and transitions between states will have a large impact on our project - in large scale, as well as small. The Borders will help tie the resort together with the existing fabric of Juelsminde and especially the nature. This will assist in stimulating curiosity and senses, of both ocal ihabitants as well as visitors.

MAPPINGS

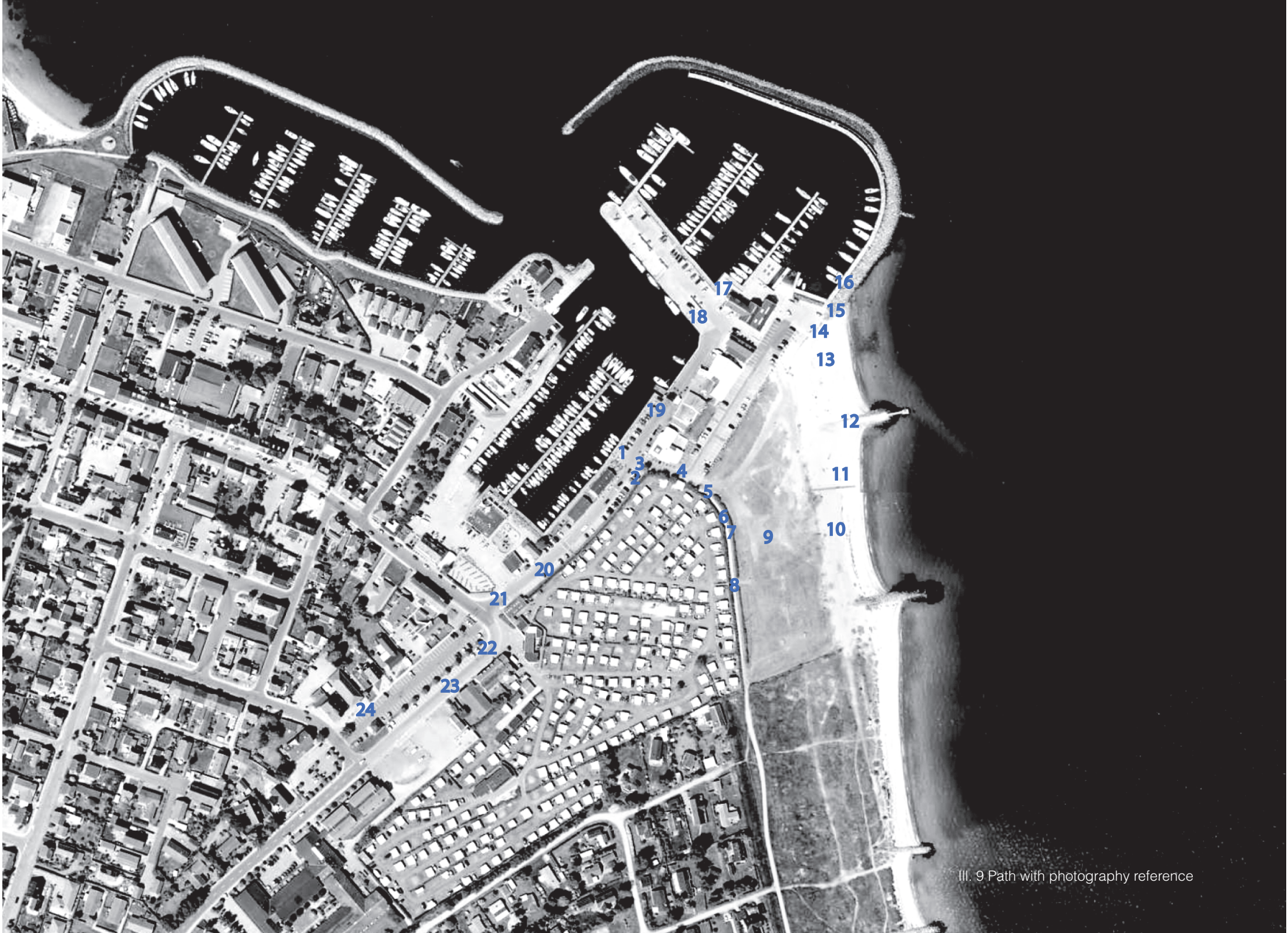
Functions

The site is placed near the harbour of Juelsmindes, the city centre and the shared space main-street with shopping facilities. The harbour is the main tourist area and the resort will therefore tie in well with the commercial and tourist-focused centre of Juelsminde.
Municipal functions, such as the library and the tourist office are placed close to the site and would provide added life and functionality if incorporated in the resort structures.



Ill. 7 Functions diagram

Ill. 8 Collage of context, February 2014



Ill. 9 Path with photography reference

Flows

There are two main roads leading to the site. The road from east is characterized by its transformation into a one-way shared space just before the harbour. This is where many of Juelsmindes shopping facilities are placed.
The main road from south provides a more direct access to the harbour area and the site. Furthermore many visitors arrive by boat and thus arrive to the site at the harbour.

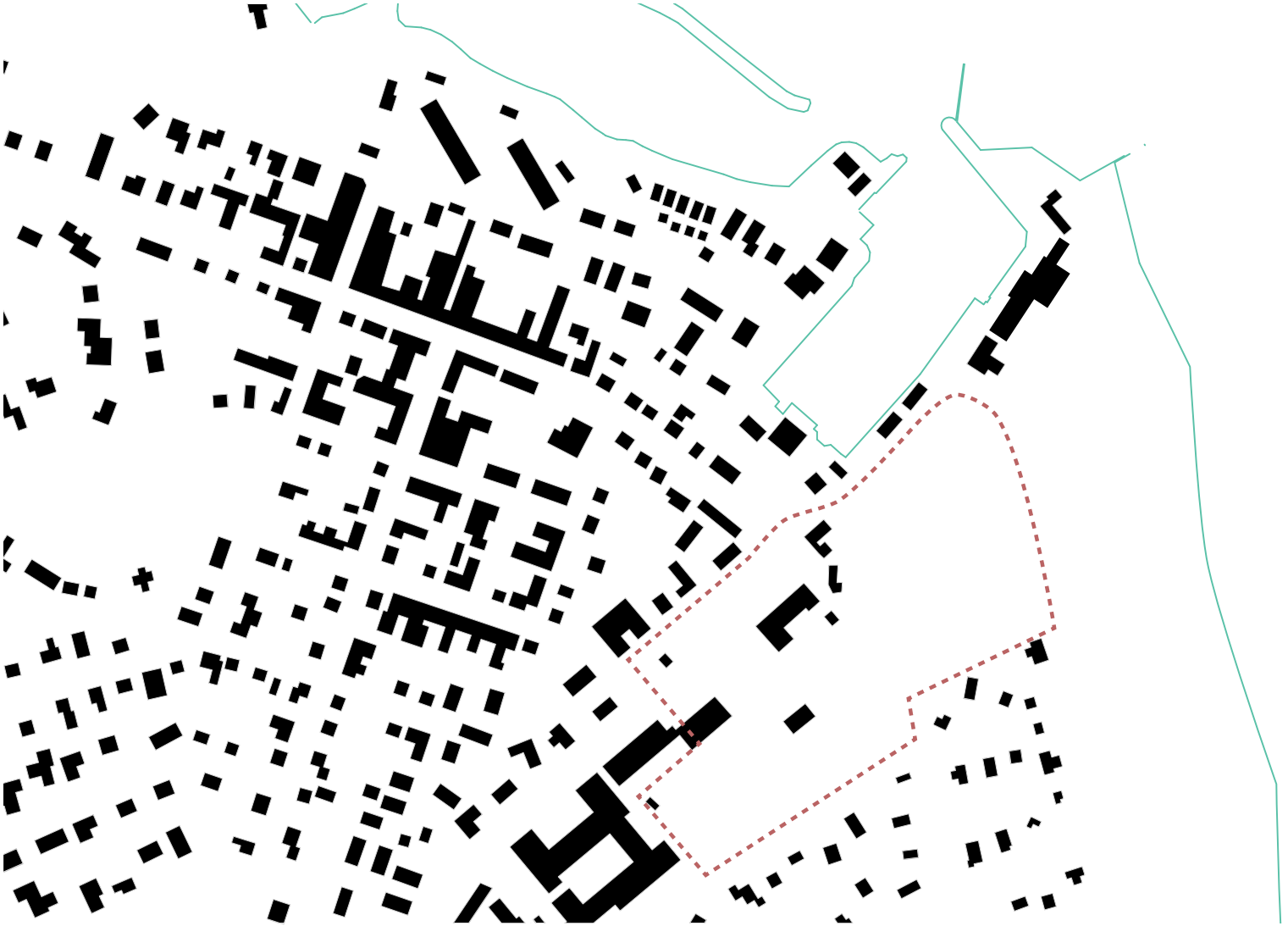
The existing camping site creates a border which separates the city centre form the summerhouse area and prevents a direct access from the centre to the beach.

With the new development on the site this obstruction can be re-worked and create flows between the town, harbour and summer house area. This will help integrate the resort better in the urban fabric.

Ill. 10 Flow diagram

Voids

The area around the site is characterized by the low dense city structure which is bordering an area with more scattered large masses. The dense city centre primarily consists of residential housing whereas the scattered masses along the main road and harbour have other functions.
The site is placed between the traffic edge, harbour area and the open and low summerhouse area.
This means that the site lies in the transition from the dense to open and should therefore relate to both town and summer house area.



Ill. 11 Void diagram

JUELSMINDES POTENTIAL FOR COASTAL TOURISM

Tourists in Juelsminde

Danish coastal tourism is used as a term for the tourism outside the four major cities of Denmark. Juelsminde is one of the towns in this category and accommodates a lot of tourists - Especially during summertime.

Juelsmindes largest accommodation resource is presently holiday homes and the camping site. There has, during the last couple of years, been an increase in the number of over-night-stays in these holiday homes.
This can be seen as a marker for Juelsmindes ability to attract tourist in relation to the general decrease of tourists on a national level.

46% of the tourists renting holiday homes in Juelsminde are German and 15% are Norwegian. These statistics support the decision to enhance and focus on the Danish nature and the atmosphere found in Juelsmidne in the design of the resort.
There has also been a large increase of tourist during Christmas and New Year's, which points to Juelsmindes potential to attract tourists, during winter season as well.[9]

In general tourists mostly visit Danmark's coastal cities during the three summer month, June, July and August - Here 58% of the yearly over-night-stays occur. [10]

Families' whit children account for 48% of the over-night-stays, whereas *couples* for 52%. The *families with children* primarily travel in the industrial holidays whereas there is a predominance of couples travelling during the low season.

Our main target group focus will be the couples without children, the *empty-nesters*. This group vacation throughout the year and their values relate greatly to the values in the project and the atmosphere in Juelsminde. [11]

Location Motivation

A study by “Visit Denmark” where the Danish vacation-market was compared to the charter holiday-market, showed how Denmark, as a tourist destination, often is associated with terms such as:

nature and tranquillity
authenticity
social interaction
inspiration and experience

These terms and associations are part of the expectations tourists have when visiting Denmark. These have often been branded under the theme *Nordic* and form a strong motive for choosing Denmark as a destination.[12]

When choosing a specific resort or accommodation the main concern is the overall *convenience*. This includes:

good accommodation,
satisfying price/quality comparison
easy access to food/restaurants
hospitality and good service [13]

The Danish price level is high in general. This means that the quality and care for the design and atmosphere is a very important factor in the architecture of the resort.

Another major motive is nature. Especially locations close to the coasts and beaches are attractive.
Activities such as *taking a walk, hiking and spending time in nature* are some of the most preferred activities for the coastal tourists

The coastal tourists preferred activities:

1. Short walks 87%
2. Dining out 78%
3. Visiting cities 74%
4. Shopping 73%
5. Excursions into the countryside 69%
6. Long walks of min. 5 km. 43%
7. Visit historic sites, buildings and monuments 41%
8. Visiting museums and exhibitions 39%
9. Bathing in water park/baths 37%
10. Bathing in the sea or lake 37%

Costal tourism in Denmark, VisitDenmark,2011[14]

As the site in Juelsminde is defined by the proximity to both nature and an urban context, this will be an attractive site for a holiday resort. One of the preferred activities is visiting water parks/baths. As there is no holiday resorts with these facilities in the area, this will also be a main attractor working for the resort itself.[15]

Studies point to an increasing request for new experiences as a part of the vacation. These experiences include activities for self-development as well as social activities with the family. The desire for an active vacation alternative seems to be caused by a change in the modern lifestyle which will be discussed in the following. [16]

Fig 12. Nature is one of Juelsmindes greatest qualities

Ill. 13 Juelsminde beach in winter

NEW TENDENCIES

Relaxation and time-poverty

Holiday tendencies change along with everything else, be it economical, technological or societal changes. It has become more normal to have been on holiday in different locations around the world. Furthermore the charter-holidays has become cheaper, better and more child-friendly. Therefore the “tropical water park” might not be as appealing as it once was. At the same time people want more experiences on a personal level. This might be because free-time feel harder earned when factors like stress are more apparent.
The contemporary vacationer wants to relax, evolve, eat and enjoy the company of like-minded people; but in half the time they usually had. Therefore experiences out of the ordinary and everyday life are welcomed and a desire for something new is implemented in modern vacation values.

Time Poverty

Time poverty is a modern phenomenon where the individual feels, that there is increasingly less time for recreation. The alleged reason is stress and longer work hours.
People work more hours, to be able to afford vacations and possessions - things which are only possible to enjoy in free-time situations.
A consequence of this is that time has become more of a resource than before. This changes the perception of what time is and therefore makes it more valuable. This means that free time is something which needs to be spent with care and hopefully should yield worthwhile experiences. [17]

Shift in Values

Values like creativity, health and culture are highly valued in contemporary society. This is where individuality is shown today. If this is a good or bad development of society is a subjective matter; but it needs to be considered all the same.

This could explain why “højskole”-courses has seen an increase in attendance over the last couple of years. People want to feel the personal achievement and fulfilment of self-improvement e.g. by improved cooking skills, knowledge of wines. [18]

These new tendencies point to a form of vacation that gives the possibility to relax as well as be active and learn. Some options are already apparent, such as “højskoler”, and these will therefore be studied in the coming sections.

HOLIDAY TENDENCIES

Holiday resorts

The holiday resorts has always focused upon creating a family-friendly alternative to charter vacations, other vacations abroad and camping. Therefore there has always been a focus on the “tropical water park” and the “vacation apartment”. The context or “the Nordic feel” has seldom been a main focus .
The resorts has often been placed far away from everything else, inside its own protected bubble. The children have their choice of activities and the parents can get a breather from their everyday life - They get a chance to think less about work and more about what crime novel to read.

Another tendency is resorts offering wellness treatments and spa facilities. These facilities primarily attract adults and are often branded on relaxation, health for body and mind ect.

When looking at the pros and cons of both types of holiday options, it seems like there should be room for an alternative in the middle. Some of the pros will be carried along in the project and the cons of each will be considered, when designing the resort.

Ill. 14 Lalandia, Billund

Traditional resorts

Pros

Many activities for kids. These often include pool areas, bowling lanes, mini golf, table tennis etc.

Some activities for both kids and adults together

Everything is on site (restaurants, activities, housing)

no planning needed - “You know what you get”

Cons

Not many activities for the adults, the holiday is often on the children’s terms.

Usually far from urban context (in the middle of nowhere)

Lacking in aesthetical value

Expensive - when compared with charter vacations

Ill. 15 Wellness centre visitors

Wellness resorts

Pros

Activities for adults

Total relaxation for adults

Usually pretty pleasing aesthetically

The resorts often offer different physical activities as well

Cons

Nothing for children - the facilities are often age restricted

Expensive - many of the facilities are requiring more personnel and they are energy demanding which increase the prise of the stay

Interaction between visitors is seen as negative

HØJSKOLER

When seeking a more active and rewarding or self-improving vacation, the Danish “Højskoler” offers a wide variety of summer courses varying from “conquering your fear of water” to literature and painting courses.

“Højskoler” was initially an idea thought out by N.F.S Grundtvig. The schools’ objective were to educate young men and women, make them better citizens and educate them across social classes. Initially the schools had a strong focus on Christian and Danish values. In spite of the ideas it was mainly the farming population that attended the schools.

The “højskole” are an example of unity through diversity: The school should be run by the students, the teachers should not question, but answer questions and no exams were held. [19]

Attending a højskole might be unappealing to some, because it forces you to interact with others, both during the courses as well as during meals.

When attending a højskole, courses and social activities are often the main focus of the stay and full time participation is required. Implementing facilities for activities from the højskole along with the freedom and relaxation-aspect of the traditional resort will could full fill the wishes for an active but relaxing holiday.

Considering the concepts of self-improvement courses and the social interaction between like-minded people, these values will be utilized in the resort at Juelsminde in an attempt to reach more people and help them achieve a more meaningful vacation.


Ill. 16 Brande Højskole


Ill. 19 Herning Højskole


Ill. 17 Herning Højskole (now closed)


Ill. 20 Vallekilde Højskole archive photo


Ill. 18 Løgumkloster Højskole


Ill. 21 Tommerup Højskole archive photo

CONCLUSION

When looking at the qualities and atmosphere of Juelsminde, we understand what a significance our site has and our project will have for the town. There is an atmosphere of a small community, living in sync with the surrounding nature that we wish to retain and amplify. The project will aim to amplify the effect of nature and thereby making it attractive during the low-season as well. The holiday home will have an emphasis on the movement of light and encourage the user to experience the home in different ways.

The increased request for an experience orientated vacation can be seen as a change of values in modern life.

Neither the traditional holiday resort which are based on the activities for children or the wellness centres where pampering is the only activity, suits everyone.
The traditional Højskole-stay offers activities and social interaction. And the different courses can attract a variety of people, but might seem intimidating to some. We aspire to design something in between, accommodating the values and desires of our user group.

A reinterpretation of the højskole-stay, where the relaxing and individual aspects of the traditional holiday resort are integrated, can very well meet the request for an more experience orientated and meaning full vacation.

This type of resort will be the framework of the detailed design of a bath complex, as well as a series of holiday homes, embodying the values described in the program and analysis.

PROBLEM STATEMENT

“How is a new type of holiday created and introduced to the small harbour town of Juelsminde? And how can a holiday home and bath complex be designed with a focus on atmospheres, tranquillity and relaxation, while appealing to an audience, which seeks an experience out of the ordinary, relating to nature?

ROOM PROGRAM

Because the holiday guests want to learn and evolve during their stay at the resort, it will be beneficial that the resort has facilities for different activities - both educational and for physical activity.

The initial project included municipal facilities. Some of these functions are kept in the room program and will be integrated in the overall masterplan.

The following room program shows the intended rooms and their area.

Main building - Area scheme

Reception

Reception	50	m2
Foyer/hall	45	m2
Wardrobe	20	m2
Heated area	*115*	*m2*

Restaurant

Kitchen	50	m2
Storage	30	m2
Dining area	130	m2
Wardrobe	15	m2
Lounge/bar/hall	70	m2
Heated area	*295*	*m2*
Trash disposal area	30	m2
Outdoor dining	100	m2
Unheated area	*130*	*m2*

Bath

Pool areas	1000	m2
Changing rooms	350	m2
Heated area	*1350*	*m2*
outdoor bath	50	m2
Technical & storage	1000	m2
Unheated area	*1050*	*m2*

Conference/educational facilities

Cultural hall	200	m2
Toilets	20	m2
Wardrobe	20	m2
Heated area	*240*	*m2*

Municipal facilities

Library

Library public area	300	m2
Office	50	m2
Archive	60	m2

The municipals common areas

Toilets	30	m2
Staff room	50	m2
Meeting room	30	m2
Storage/printer room	30	m2

Other municipal functions

Tourist office	20	m2
Heated area	*570*	*m2*

Activities

Workshops	150	m2

Outdoor

Play ground
Common areas (ect. Grill area)

Room program dwelling

Living space

Two bedrooms + extra bed

Kitchen

Dining area

Bathroom

Technical room/space

Outdoor terrace

Winter Garden

Dwellings - Area scheme

Holiday homes

27 residences	37	m2
Total	999	m2
112 residences	63	m2
Total	7056	m2
Heated floor area	*8055*	*m2*

Hotel rooms

15 Hotel room	40	m2
Total	600	m2
15 Hotel room	25	m2
Total	375	m2
Heated floor area	*975*	*m2*

170 Residences in total

Residences total	9030	m2

ANALYSIS

Ill. 21 Juelsminde Beach during spring

ANALYSIS INTRODUCTION

Having taken a look at the location, vacationing tendencies and tourism an idea of which values to implement in our project takes form. A more active vacation with a wider variety of possibilities for self-improvement and a more social environment will be the foundation for the use of the resort.

Furthermore a larger focus on authenticity, Nordic themes and nature will be common themes binding together the town of Juelsminde with the architecture of the resort.
Defining what “Authentic Nordic” means to us will be elaborated during the following part of the program.

TARGET GROUP

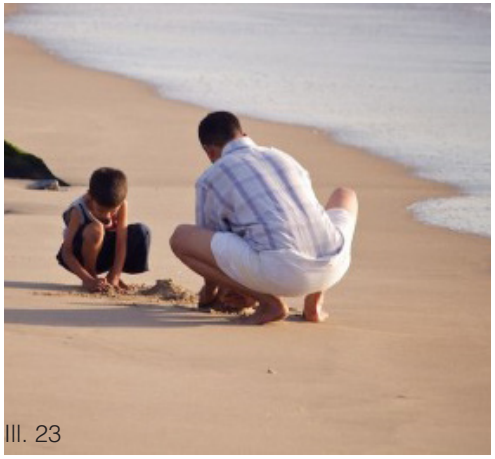
The main user-groups presented concerning the shift in demands of vacation options, are the “Empty nesters”. Concerning the wish of extending the holiday season and bringing life to Juelsminde, this will be the main user group focused upon.
This does not mean that the other user-groups, such as “single parents” or “families with children” will be excluded from the project. These groups share many of the same values as the empty nesters but are also mainly bound by the industrial holidays.
Taking a closer look on our user-group, we try to uncover and ascertain, which values they have and how to accommodate their wishes for a relaxing and rewarding vacation in Denmark.

Ill. 22

Empty nesters
- Main target group

Age group: 50-80

Older couples with no children living at home. This group has a tendency to vacation within a broader, as well as longer, period of the year. They have more money, and spend more, than their younger counterparts. This group want a more active vacation and still want to learn and have a sense of personal evolution. Many are “efterlønsmodtagere”, which means that they have a lot of free-time and do not need as much of a “relaxation” vacation, as one might think.[20]



Ill. 23

Single Parents
-Sub target group

Age group: 30-60

This group is becoming increasingly larger in our society. More and more parents are choosing to live alone and therefore also want a way of bonding with their children as well as experiencing more self-developing activities.
This group tend to have a large focus on their career and are very receptive to develop a feeling of “time-poverty”.

This group will value the self-improvement, along with the social aspects of “højskoler” and will be a strong focus for a more engaging holiday. [21,22]

Ill. 24

Families with children
-Sub target group

Age group: 30-50

This group include parents with children that mainly vacation in the “industrial holidays”. Generally this group are concerned with spending their funds smartly, due to their added expenses because of their children.
This group might be concerned with the term of “time poverty” and therefore want the most out of their hard-earned vacation time. They want value for their money and want to experience as much as possible in short periods of time.
Because many jobs include more psychological stress than physical, there is a need to stimulate the mind as a form of recreation, which is larger than the need for physical recharging. [23]

Activities

An attractive feature for the resort will be to have different activities for the guest. This is examples of activities customized the target group: empty-nesters. Some of the activities are attractive for all the target groups.

Golf
Wine tasting
Cooking classes
Lectures and Readings
Reading in the library
Sports
Bathing in the sea
Winter bathing
Enjoying the nature
Fishing
Water sports
Play and games
Creative workshops
Spa and wellness
Pool area
Grill

This investegation will inform us about the user group. It will give an idea concerning what activities the visitors participate in, outside of their holiday home at the resort.


Ill. 24

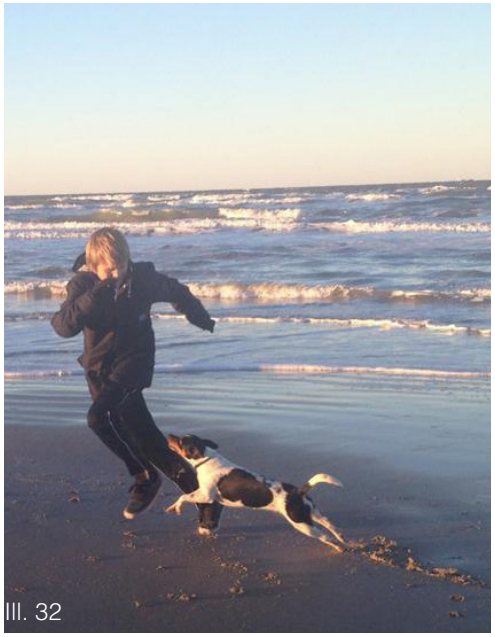

Ill. 25


Ill. 26


Ill. 27

Ill. 28

Ill. 30



Ill. 32

Ill. 29

Ill. 31

Ill. 33

ARCHITECTURAL VISION

Natural Nordic

Having key values derived from our context, both local in Juelsminde as well as the context of Scandinavia, new tendencies in tourism and our user-group, leaves an investigation of what these values mean and how they are best implemented in our project. – We will investigate what “Nordic Architecture” is and which other topics are related to the understanding of this.

The Nordic way of thinking architecture is well known throughout the world. This means that the influence has also reached many architects outside of Scandinavia. Because of this, it is pointless to talk about Nordic architecture without going beyond the borders of Scandinavia. Architects such as Peter Zumthor and also many of the great modernists have worked with the values normally associated with “Nordic Architecture”. This does not mean that all of their works can be put into the box called “Nordic Architecture”; but some works and parts of others, are based on some of the same core values found in Nordic architecture.

But what is Nordic Architecture? And how is it different? Basing the term “Nordic architecture” on geographic is not an adequate way of distinction. This is because most of the distinction of Nordic architecture relates to the mind-set of the people from the North.
The cold, the materials, the light; or lack thereof - These are, among others, all things, which influence architecture. Because of this, the notion of “Nordic Architecture” might be a very obsolete way of talking about these themes. They are the basis of thinking architecture - The point of departure in our work and therefore this project. When realizing this, one realizes that the Nordic Architecture is not as easily definable as e.g. a classical style of architecture like Baroque etc. It is something that relates to many different topics within architecture, both fleeting subjects such as “atmospheres” and “mind-sets” but also practical subjects such as materials and craftsmanship. [24,25,26]

The following sections will help explain what we understand when the term “Nordic Architecture” is used.

THE INFLUENCE OF PLACE

Theories

Theories with point of departure in phenomenological thinking, which focus on how architecture is experienced, have especially been influential on the understanding of Nordic architecture. [27]

Due to this Nordic architecture is often associated with tactility, a use of regional materials as well as architectural solutions with a sensitive approach to the surrounding nature and context.

Genius Loci

This understanding is among others influenced by the architectural historian Christian Nordberg-Shultz who has had a major influence on Nordic architecture. Especially his interpretation of the term *genius loci* has been influential. This attention to genius loci or spirit of place was given as a counter reaction to the international style which tried to formulate a universal form of architecture. The international style was criticized for being "placeless" by not paying much attention to regional conditions like culture, climate, topography, and traditional material use.

Nordberg-Shultz saw human identity as something rooted in the place in which we live. He saw place as an objective parameter with its own characteristics and culture. Therefor these had to be understood by the architect in order to create architecture that relates to the real identity of the place. For Nordberg-Shultz nature and landscape has a central role in understanding the spirit of place and thereby the architecture .[28]

Nordberg-Shultz distinguishes between natural place (landscape) and man-made place (settlement). But stresses how these interrelate. [29]

"*Landscapes also process character, some of which are of a particular "natural" kind. Thus we talk about "barren" and "fertile", "smiling" and "threatening" landscapes…To some extent the character of place is a function of time; it changes with season, the course of the day and the weather, factors which above all determine different conditions of light*" (genius loci, Nordberg-Shultz)[30]

The landscape of the project site is especially characterized by the horizontal and elongated coast and beach line, the flat topography and open plains on one side, and the low and dense structure of the town on the other.
During hot summer days the sea breeze is welcomed and the buzzing life on the harbour characterize the atmosphere.
During the cold, rainy and windy autumn where the streets are dessert the difference between outside and the protective warmth of inside becomes an important matter. This aspect of the changing character is important to consider when the resort should function both during high and low season.

"*if you have a hill and out of the hill grow a castle, you look at this and you think "hey, these so belong together". You couldn't take the castle away… You might think theoretically that they are (it is) completely disturbing, yet the opposite is the case. They (it) actually start to celebrate the landscape"*
Peter Zumthor on the subject of architecture in relation to landscape and place.[31]

Ill. 34 Juelsminde Beach during winter

A CRITICAL REGIONALISM

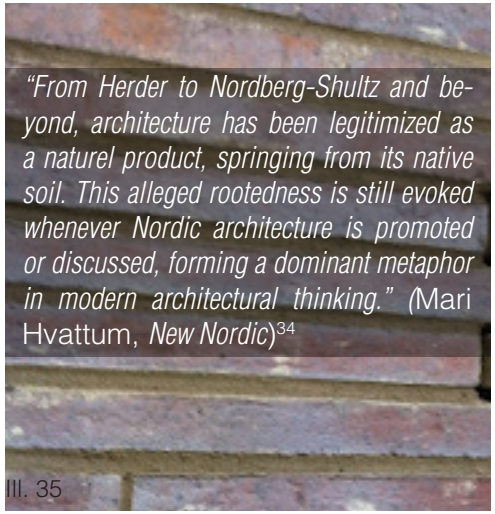
Another architect who also calls for a greater consideration for place is Kenneth Frampton. In his toward a critical regionalism from 1983 Frampton discus the consequences of the globalization influence on architecture. Here he stresses the need for a critical adoption of external tendencies and a careful inclusion of regional cultural conditions, though without neglecting the progressive aspect of modern architecture.

"The strength of provincial culture surely resides in its capacity to condense the artistic potential of the region while reinterpreting cultural influences coming from the outside." (Frampton, towards a critical regionalism)[32]

Frampton sees regional architecture as something that also has a consideration for the local building tradition.[33]

The traditional holiday resorts whit their tropic themes doesn't have a critical adoption of external tendencies. By creating a resort whit consideration for the Nordic context the experience of being in Juelsminde and the identity of the resort will be strengthened. This will also be an interesting approach to the design of the water environment which will offer the guest a very different experience than other similar resort project in Denmark.

Many of the traditional buildings in the town of Juelsminde are brick houses and the summer houses as well as the harbor houses are constructed in wood. New ways of using these traditional materials have the potential of being contextual while giving the resort a distinct character.



"From Herder to Nordberg-Shultz and beyond, architecture has been legitimized as a naturel product, springing from its native soil. This alleged rootedness is still evoked whenever Nordic architecture is promoted or discussed, forming a dominant metaphor in modern architectural thinking." (Mari Hvattum, *New Nordic*)[34]

Ill. 35

Ill. 36 Bank in Juelsminde

Ill. 37. Sorø Museum brick detail

Ill. 38 Sorø Museum brick wall

Ill. 39 Juelsminde boat club house

Ill. 42 Juelsminde harbour materials

Ill. 40

Ill. 43

Ill. 41 Det maritime ungdomshus

Ill. 44

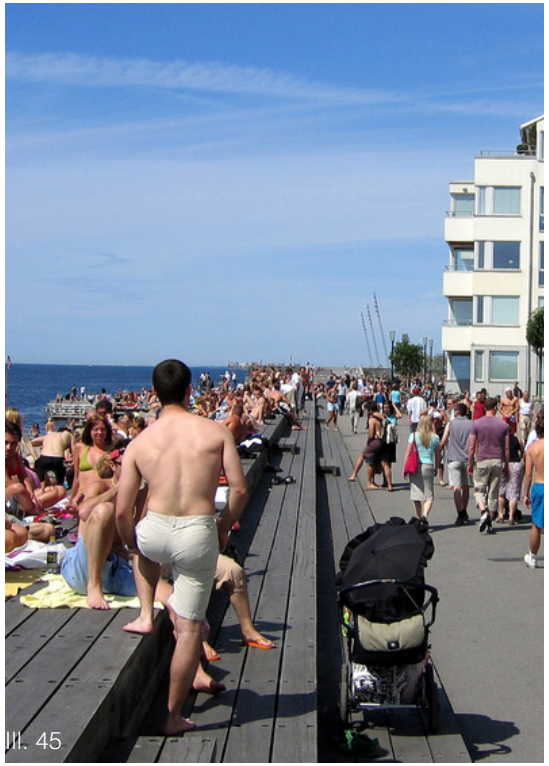
NORDIC ARCHITECTURE FROM A SOCIETAL PERSPECTIVE

The Nordic countries are well-known for their democratic system with the welfare model which focuses on collective values. This part of the Nordic identity is also manifested in the architecture. Especially public architecture and design of urban space is influence by the values of the democratic system, values such as free and equal access for all people.

In Denmark many harbour fronts has during the last couple of decades been changing from industrial areas to attractive building plots and recreational areas. At these sites construction of public buildings has been a priority which illustrate the focus on community-forming urban planning.

These public areas and buildings have the potential of bringing a variety of different people together and thereby the possibility for exchange of social and cultural understanding. The urban architect Jan Gehl argues how these public places not only benefit the citizens but how they also, by generating life, can benefit the town by improve its competitive position. [35]

For this project it could therefor be beneficial to have some parts of the resort public. This would include the library and the water environment as well as public areas in relation to the resort. This approach would not only be positive for the citizens of juelsminde but it would generate life and contribute to a lively and existing resort. This could also result in the resort becoming an integrated part of the identity of juelsminde.


Ill. 45


Ill. 46


Ill. 47

ATMOSPHERE

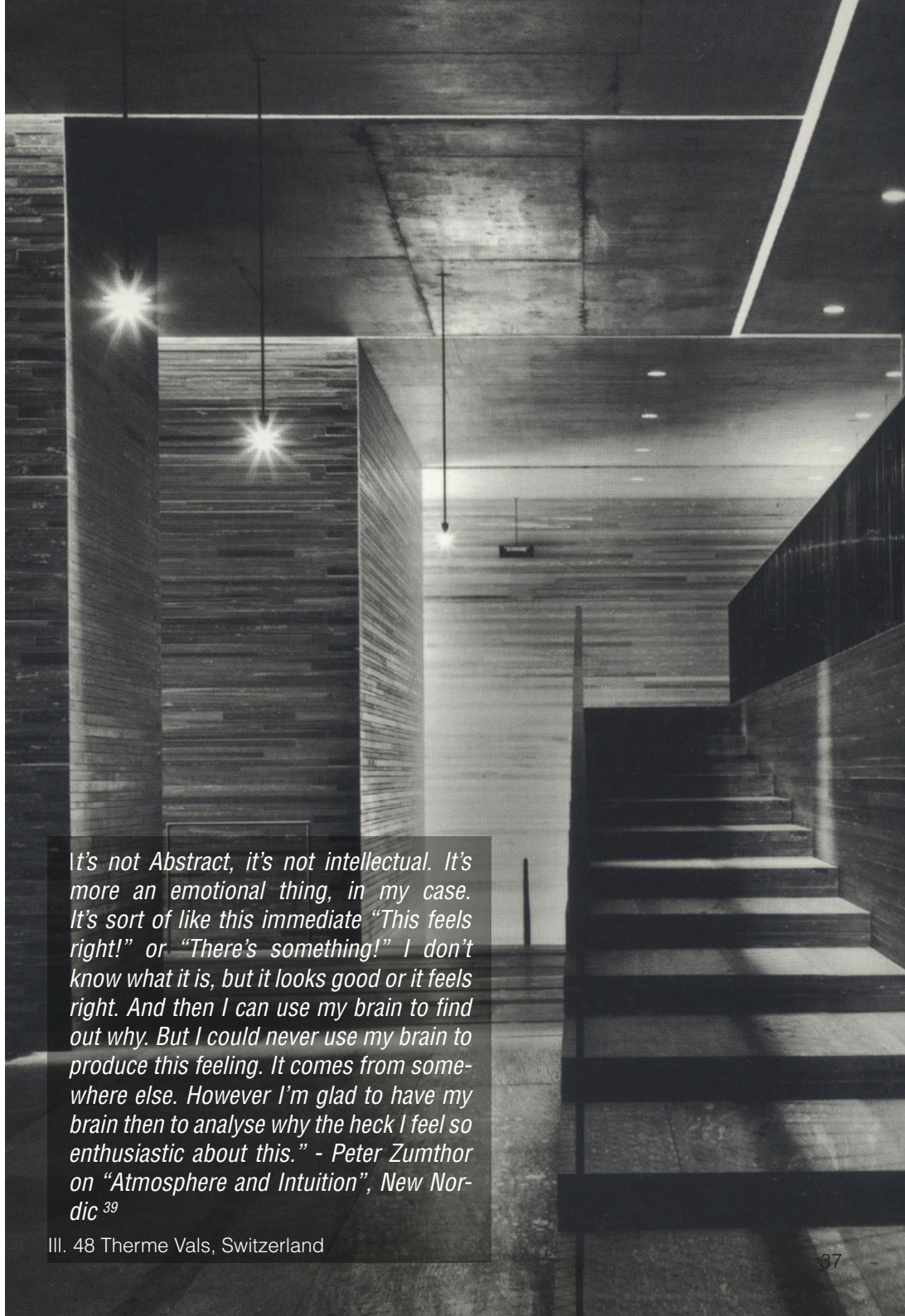
An aesthetic quality or effect, especially a distinctive and pleasing one, associated with a particular place (http://www.thefreedictionary.com/atmosphere)

"Atmospheres" is a fleeting subject in any context. It is based upon many different parameters as well as having a very subjective character. The different aspects of an atmosphere are not entirely measurable and relate to light, sound, materiality, temperature, colour, people etc. subjects which individually are hard to completely understand and master and therefore endlessly more complex when put together.

Luckily we find ourselves thrown into different spaces and situations, with different atmospheres, from the day we are born. All of our sense are tuned into registering atmospheres (seeing, feeling, hearing, smelling) we automatically register and process all of this information and we receive impulses, consciously and subconsciously, based on these, on our memories and feelings associated thereof.

Atmospheres, being the sum of all of these parameters, can be seen as the essence of architecture. Not that atmospheres does not exist without architecture – but architecture will always be a stage in which atmospheres are created. Changes in architecture will change the atmosphere in a minor or major way.

Realizing this, every architect will be working with atmospheres – in one way or the other. This is keeping in mind, that atmospheres might just be the word, that comes closes to the sensation that architecture can create. This could also be a sense of awe or wonder, as well as the impulse to curl up in the corner with a good book. Atmospheres are so closely linked to our emotions, which it sometimes can be hard to explain that specific sensation – atmospheres could also be seen as a psychological impulse or an intuitive thought or action. [36, 37, 38]



It's not Abstract, it's not intellectual. It's more an emotional thing, in my case. It's sort of like this immediate "This feels right!" or "There's something!" I don't know what it is, but it looks good or it feels right. And then I can use my brain to find out why. But I could never use my brain to produce this feeling. It comes from somewhere else. However I'm glad to have my brain then to analyse why the heck I feel so enthusiastic about this." - Peter Zumthor on "Atmosphere and Intuition", New Nordic [39]

Ill. 48 Therme Vals, Switzerland

MULTI-SENSORY EXPERIENCE OF ARCHITECTURE

"Every touching experience of architecture is multi-sensory; qualities of space, matter and scale are measured equally by the eye, ear, nose, skin, tongue, skeleton and muscle." - Juhanni Pallasma, the eyes of the skin.[40]

The architectural experience is affected by all sense stimuli and the body's interaction whit the space. The bodily experience also impacts our emotional experience of a space, which prior was referred to as the atmosphere.

The sense of touch

From early childhood we start experiencing the world especially through touch. The hand can tell us the weight and density, the contours and edges, the temperature as well as tactile characteristics of an object. The visual sense is closely connected with the sense of touch as we early in life learn to visually interpret the surroundings based on former haptic experiences.

"Our eyes stroke distant surfaces, contours and edges, and the unconscious tactile sensation determine the agreeableness or unpleasantness of the experience." Juhanni Pallasma, The eyes of the skin [41]

This agreeableness or unpleasantness is an emotional respond on former bodily encounters with matter. This former encounter influences our perception of the atmosphere. The skins sensibility to temperature also influences the perception of the atmosphere.

"*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, turn into experiences of space and place." Juhanni Pallasma, The eyes of the skin* [42]

The sense of vision

Vision is as mentioned closely connected with the sense of touch but we also recall how certain materials smells and how sound bounces of the material just by looking at it. This makes the vision a powerful perceptive sense.
Generally vision depends on reflected light and shadow, without these the visual sense is nonexistent. Pallasmaa stresses the importance of the shadow and how light has become a matter of quantity rather than quality in modern architecture.

"the window have lost its significance as a mediator between two worlds, enclosed and open, public and private, light and shadow… In great architectural spaces, there is a constant, deep breathing of shadow and light; shadow inhales and illumination exhales light" Pallasma, eyes of the skin [43]

Pallasmaa sees shadow and darkness as essential as they *"dim the sharpness of vision, make depth and distance ambiguous, and invite unconscious peripheral vision and tactile fantasy"* [44]

This emotional respond to the darkness and the shadow also influence our perception of the atmosphere.

Vision is also used for evaluating distance but it is dependent on former bodily experiences. When we walk on stairs our legs measures the height of the steps, when we walk through a door we experience the width and height in comparison to our body. The scale of rooms is in the same way sensed relative to the body. Peter Zumthor discusses the level of intimacy in relation to scale in his book atmosphere.

It all has to do with proximity and distance … It refers to the various aspects - size, dimension, scale, the building's mass by contrast with my own. The fact that it is bigger than me, far bigger than me. Or that things in the building are smaller than me"[45]

This has to be seen in the context of use. Some spaces are designed for solitude or smaller groups and other spaces are designed for big crowds and this can vary the scale and require a different level of intimacy.

Ill. 49 Sea Ranch Condominium, California

The sense of hearing

"Buildings do not react to our gaze, but they do return our sounds back to our ears." Juhanni Pallasma , the eyes of the skin [46]

Alone from the acoustics of a space we can get a clear idea about its form and the materials applied on its surfaces. The sound of a room contributes to the atmosphere and the sense of intimacy. The noises form the activities in a building, the sounds of the city or the surrounding nature all adds to the experience of the architecture.

Conclusion

The multi-sensory experience of architecture stresses the importance of consideration for the way we experience architecture with the whole of our body. As well as the way the different sense stimuli affects the atmosphere. [47]

THE NORDIC ATMOSPHERE

When having a general idea about what parameters the theme of atmospheres work with, we will try to define an authentic Nordic atmosphere.

The word “Nordic” will usually inspire thoughts of coldness, darkness, a warm fire, candles, nature, rocks, lakes, wood etc. Luckily there are many more aspects of this and the immediate associations can be interpreted in many different ways.

When also wanting to create something authentic, one must remember that there is a fine line between imitating and associating. The goal is to invoke emotions in the user, creating situations, where the user believes in the authenticity and the feelings created. There is a difference between looking at a poster of palm trees and the feeling the sand under ones feet.

When trying to create something authentic; the older structures always come to mind first. This is because these are asserted in our minds and we have memories and feelings connected with this, which have followed us throughout our lives. So when creating something authentic, it makes sense to look a bit back in time, finding something which is well-known and then relating to that in a contemporary way. Through time, the tradition of good craftsmanship is very strong in Scandinavia. Carefully crafted, heavy timber constructions and beautifully crafted masonry structures will follow anyone travelling through the Nordic countries – from the big cities to the outskirts.
This attention to detail and the sombre, almost proud, expression which is found in the heavy, functional buildings in the North is something we wish to implement in the architecture on our site. The feeling of not being overdesigned.

“I frequently come across buildings that have been designed with a good deal of effort and a will to find a special form, and I find I am put off by them. The Architect responsible for the building is not present, but he talks to me unceasingly from every detail, he keeps on saying the same thing, and I quickly lose interest. Good architecture should receive the visitor, should enable him to experience it and live in it, but it should not constantly talk to him.” (Peter Zumthor, Thinking Architecture)[48]

The understated, composed architecture that does not have to prove anything – it just is – relates well to the Nordic mind-set of being thoughtful and down to earth. [49,50,51]

CONCLUSION

The context and character of the town should be retained, not pushed aside by an attention seeking complex, pushing in at the meeting point of small town life, nature and maritime life. The resort should accommodate a user-group that wants to get away from the fast-paced life of the cities and spend time with activities and the self-improvement, which sometimes is hard to fit into a modern life schedule.

The resort should focus on stimulating the senses and creating an atmosphere which feels authentic in Juelsminde. There should be space for reflection and relaxation as well as expressing creativity in a social environment where one can interact with others; relating to the Danish traditional “højskole” concept.

The materials and expression of the architecture will help strengthen the feeling of authenticity, while focusing on wood and brick, couples with an attention to detail and craftsmanship seen in Nordic architecture traditions. Furthermore the Architecture should blend in with the existing expression of Juelsminde, not necessarily being the same, but complimenting the context.

Utilizing the integrated design process, the design will be a product of extensive studies, analysis, sketching and experimentation with the design, always looking back on experience gained from the previous activities. The final design will be a product of an informed process.

ENERGY

Energy Class 2020

The goal is that the holiday houses should fulfil the Danish building regulation's energy demand for class 2020. This will be documented with be10 calculations and indoor inviroment simulations.

For the houses it requires the energy consumption used for ventilation, heating, cooling and hot water is lower than 20 kWh pr. m2 pr. year.

Transmission loss

The transmission loss through the climate membrane should according to D.B.R. class 2020 not exceed:

3,7 W/m^2 climate membrane for one story houses

4,7 W/m^2 climate membrane for two story houses

The u-value for exterior doors should be lower than 0,80 w/m2K.

There should always be gained more energy than lost through the windows, meaning that the energy gained cannot be lower than 0 kWh/m2 pr. Year.

The infiltration through leaks in the climate membrane should not exceed 0,5 l/s m^2 heated floor area. This requires a fairly air tight climate membrane.

Influences

The orientation and thermal mass of the houses as well as materials and area of exposed climate membrane can have great influence on the energy consumption. [52]

INDOOR CLIMATE

Guidlines

As described earlier all the senses are used when experiencing architecture. This means that the indoor climate will have an overall influence on the experience and the comfort of the resort.
Studies regarding comfort of indoor environment have formed the basis for a set of guidelines which are described in Cr1752 and DS/EN 15251. These guidelines ensure a pleasant temperature and a good air quality all year round. The aim is to fulfill chosen parts of category B acording to Cr1752.

Thermal criteria

Comfortable temperatures:

Winter:
activity leverl: 1,2 met
Clothing: 1 clo

20°C - 25°C

Summer:
activity leverl: 1,2 met
Clothing: 1 clo

23°C - 26°C.

During summer the indoor temperature might exceed 26°C at the hottest time a day.

According to the D.B.R. the annual limit is 100 hours with temperatures above 26°C and 25 hours with temperatures above 27°C.

Ventilation and air quality

The Co2 concentration should be lower than 660 ppm above outdoor concentration acording to Cr1752.

To ensure the air quality is perceived clean the sensory pollution load from building materials and occupants should be lower than 1,4 dp acording to Cr1752.

The Danish Building Regulations demands to ventilationrate is minimu:
0,3 l/s pr m^2 heated floor area

The demands to exhaust capacity is minimum is 20l/s in kitchens and 15 l/s in bathrooms. This is because of higher pollution and humidity in these rooms

A ventilation rate of min. 7 l/s per person is recomended.

Lighting criteria

According to the D.B.R. class 2020 the sum of the window area should constitute a least 15% of the floor area.

A minimum 2% daylight factor is preferable in educational facilities and offices. [53, 54, 55]

SUSTAINABLE STRATEGIES

To achieve the goal of creating a vacationing resort that fulfil the requirements of the Danish building regalement's class 2020 sustainable strategies have to be implemented.

Passive strategies

Considerations for the site's climatic conditions like wind characteristics, sun path and orientation can help optimise the building design in relation to natural ventilation and passive solar heating. [57]

A compact and tight building envelope can reduce heat transmission and material use.

Limiting thermal bridges and line loss also reduces heat transmission.

Thermal mass is heavy building materials like concrete and rock. It heats and cools slower than light materials and can thereby help stabilize the indoor temperature. It can reduce the need for heating by accumulating heat form passive solar radiation. Night ventilation can cool the thermal mass which gives a lower temperature during the day. The thermal mass is most efficient when it is exposed and it is mostly the outer layer that functions as temperature regulating. [58]

Passive solar heat gained through windows can reduce the energy used for heating during winter. During summer it can lead to overheating if solar shading is not used. Solar radiation can also be used to preheat ventilation air. [59]

Natural ventilation can be used for cooling during summer. Orientation and placing of the windows is important to ensure efficient ventilation. Principles of stack-, cross- and single sided- ventilation should be considered. [60]

Exploiting the daylight can lower the use of electric lighting.

Active renewable strategies

Solar thermal systems for water heating. The system is most efficient if oriented south and tilted 30-60 degrees.[61]

Photovoltaic panel/ solar cells conforms the energy in solar radiation to electricity. The panels are, as the solar thermal system, most efficient if oriented south and tilted 30-60 degrees. Solar cells are very sensitive to shadow because they are connected in series this means that the panels should be placed where there is no risk of shadow. [62]

Mechanical ventilation with heat recovery can reuse up to 85% of the exhaust air's heat. [63]

Swimming pool/ bath area

Swimming facilities are one of the most energy demanding facilities. The need to consider how to lower this use is there for important.

Swimming facilities require high ventilation rates which causes high energy consumption and is responsible for more the 45 percent of the total energy used.
Covering up the pools during night minimizes evaporation and can reduce the need for ventilation with up to 50%.
Reducing the area of wet surfaces will lower the evaporation. When a water surface is reduced with 1 square meter it can reduce the ventilation with 20m3/hour. [64]
Letting the water run out of the pool as evenly as possible through specially designed drains which reduces splashing can also help lower evaporation. [65]

Generally a lot of energy is also used for heating as the traditional swimming pool facilities are not always well insulated. This is also the case whit installations and pips. Heating up water for baths and showers also contributes to the high energy use.

As well a well-insulated constructions and installations, renewable energy sources can also be used to lower the energy consumption.
Solar thermal systems for water heating can be implemented as well as heat recovery of wastewater from showers and warm baths.
Solar cells can be implemented to supply the facilities with energy for lighting, pumps and ventilation systems. [66]

PROCESS

Ill. 50 Juelsminde Beach during winter

INTRODUCTION

The process will illustrate the thoughts made during the sketching and synthesis phase.

The process has been iterative and design has been done in different scales simultaneously. The knowledge gained form working in the urban scale has informed the design in the more detailed architectural scale. Studies of light and energy performance has informed the architectural scale and there by also the urban scale.

The process is here simplified and described in order from the urban scale down to the detailing of the holiday homes and the bath. This is to create a clear overview of what considerations has been behind the various design decisions.

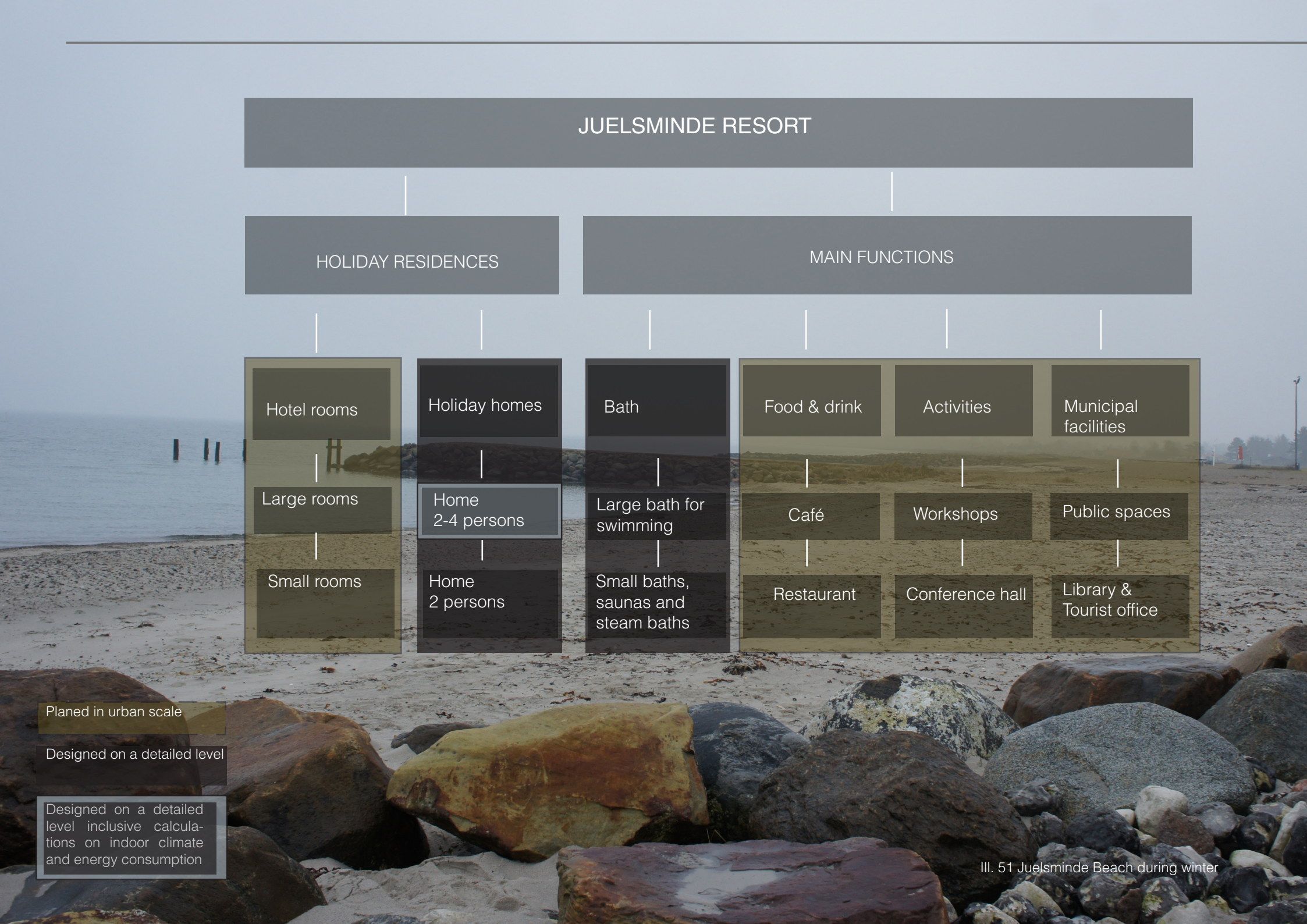
Contents - Process

WORKING IN DIFFERENT SCALES

The urban planning is a very important factor in the design and it has been thought out to compliment the architecture. The strongest emphasis however, has been on detailing the holiday homes and the bath complex.

Due to the comprehensive size of the project only these parts has been chosen for further dealing.
The other functions of the resort has been placed in the urban context.

The diagram shows the functions of the resort and down to which scale each function has been designed



Ill. 51 Juelsminde Beach during winter

URBAN PLANNING

Introduction

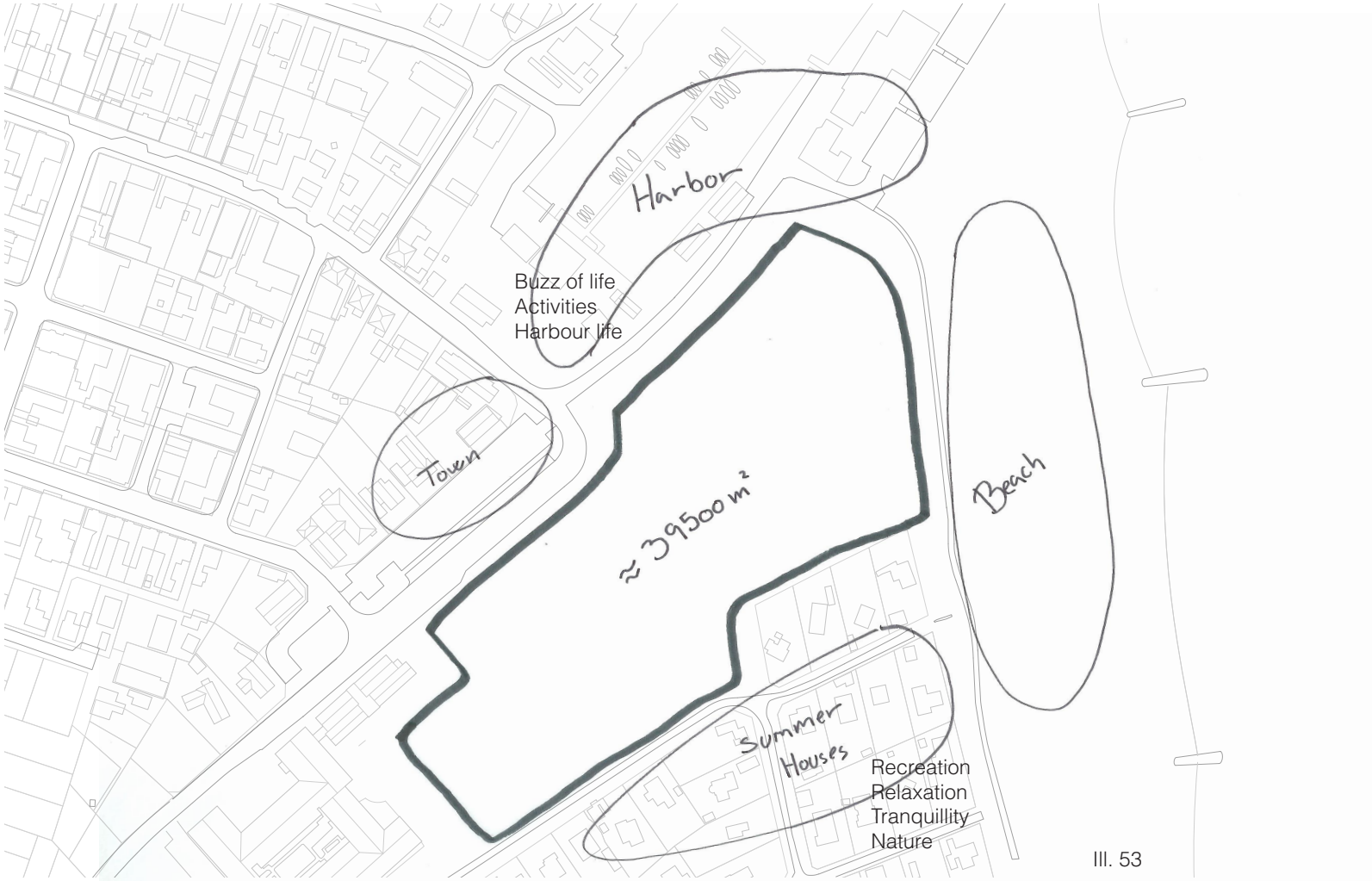
The urban planing consist of both a housing area and the resorts main functions area. These are placed on the site based on analysis of the context. The urban planning focuses on creating a recreative site plan with focuses on nature and the connection to the beach as well as the city

URBAN PLANNING

Sizing and neighbouring context

The site is a fairly large area with many different functions neighbouring it.
The buzz of life, from both domestics and tourists, is concentrated north of the site in relation to the harbour. The summer houses, beach and paths which relate more to quiet recreation and nature lies south and east of the site.

The planing of the site will create the physical framework of the project. The organisation focuses on emphasizing nature and creating pockets of nature that visitors can enjoy. There is a focus on giving the visitors the opportunity to participate socially in the surroundings as well as retreating to more private parts of their vacationing house.



Ill. 53

Separation

The site offers the visitor tranquillity as well as social interaction. The first being concentrated around the holiday homes and beach areas which primarily focuses on values such as nature and immersion. The latter being centred at the resort and functions area where one can experience increased urban activity of a social and recreational nature.

The site will therefore be split at the main traffic flow through Juelsminde and divided in a housing area and a more active area. The border between will still be fluent and access between the two areas will not be obstructed.

Ill. 54 Principle diagram for the separation of the site in a housing area and an area with the main functions of the resort

Borders

Holiday home area

The borders of the site will relate to the immediate context and have harder borders towards the city, relating to the increased building mass, and be more open towards the summer house area. This is done to distinguish the holiday home area from Juelsminde city to emphasise the areas recreative atmosphere.

Resort main function area

The north area of the site will incorporate a public square to accommodate the increase in people and functions. This square will function as a cental gathering point on the harbour as well as the main access point from the harbour to the functions of the resort and the beach.

Ill. 55

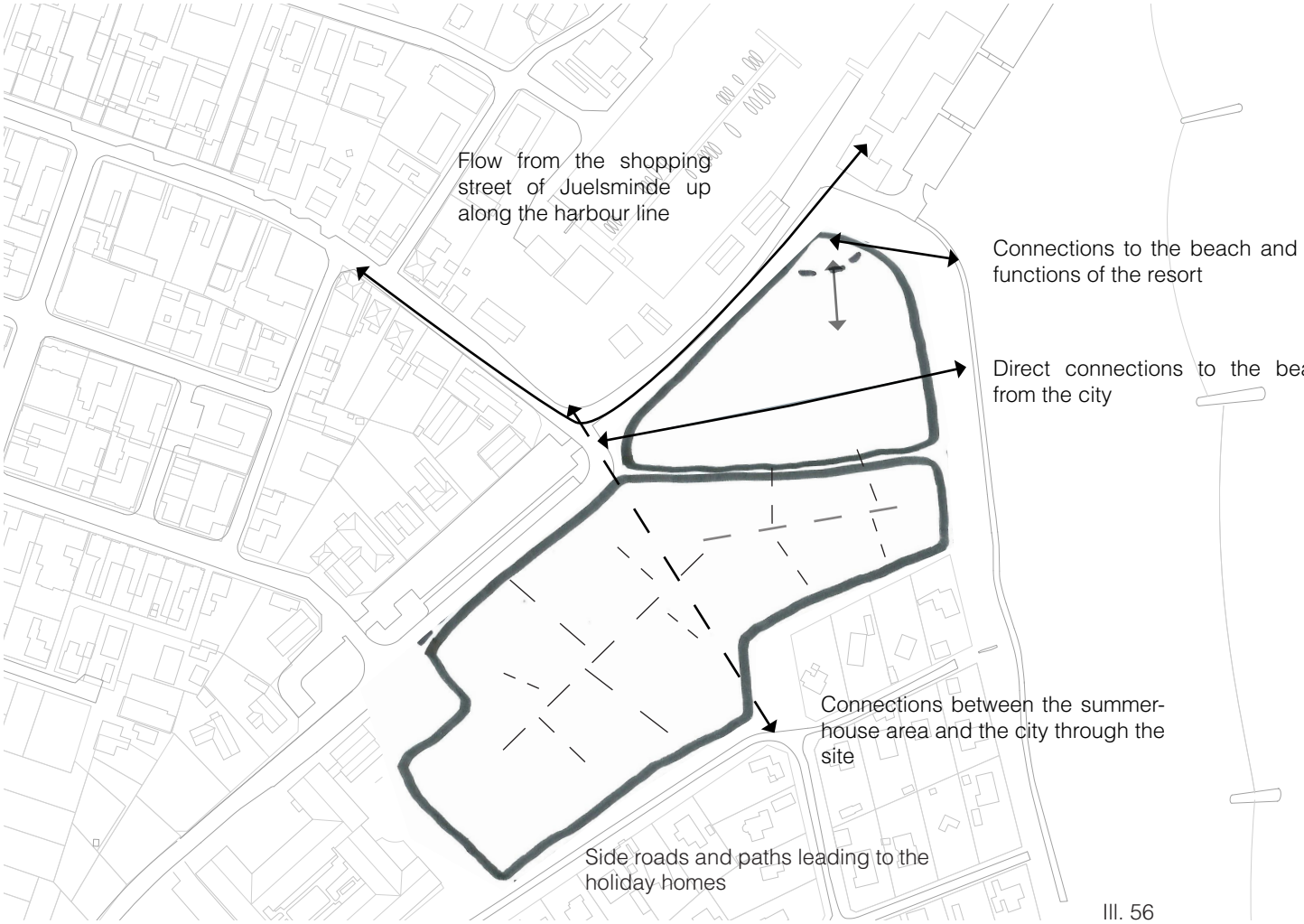
Flows & connections

We wish to maintain the already existing flow along the harbour line and preserve the “narrow” harbour front, currently defined by the borders of the camping site.

From the public square a more articulated access to the beach is established as well as access paths to the main functions.

Currently, because of the camping site, there is only a connection to the beach from the harbour. We want to create a direct beach path which leads the pedestrians by the main functions of the resort.

The housing area should be accessible by smaller roads.
Some of these roads can be used to tie the holiday home area into the fabric of Juelsminde by creating a connection between the summerhouse area and the city.

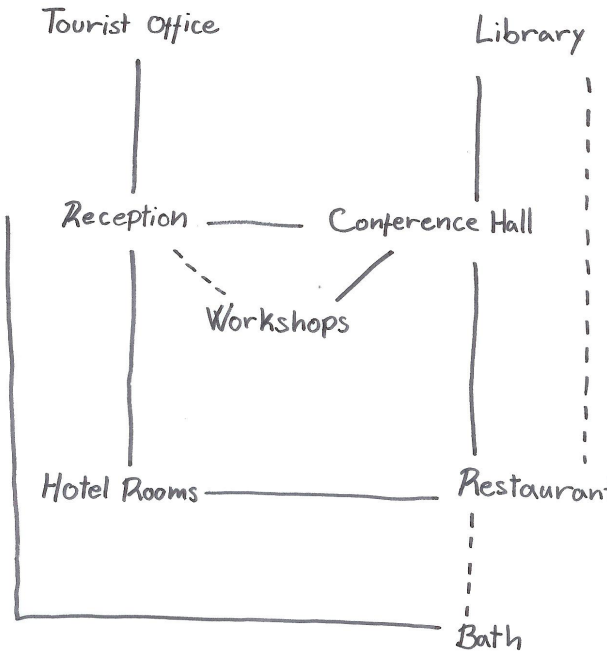


III. 56

URBAN PLANNING - HARBOUR AREA

Placement of the functions

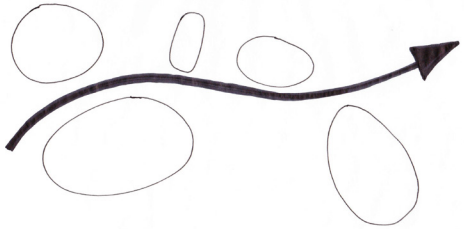
The main functions has been placed according to relations shown in the diagram. The driving factor has been to accommodate the resort guests as well as integrate the resort with Juelsminde, giving tourists and inhabitants of Juelsminde, the opportunity to visit and use the resort functions as well.



Harbour area concepts

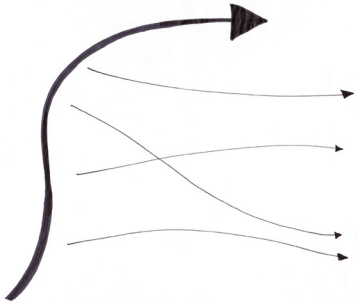
Two simple concepts for tieing together the new harbour area with the existing and the beach area was presented.

Functions on a string:
This concept deals whit the relation between the functions and a pathways which lead the visitors through Juelsminde. This concept is shown with a emphasis on pathways and small pockets of nature throughout the area



Ill. 57

Main flow with shortcuts:
This concept relates strongly to the existing flow along the harbour of Juelsminde. The site borders this area and divides the harbour and the beach. The concept manifests itself in the project by having different routes through the site, connecting the summer house area, beach and town - Giving the users freedom and letting their curiosity guide them without too many obstructions.



Ill. 58

Functions

The library

The public library will have access from the harbour, relating to the town and will incorporate public services such as tourist information and citizen services.

The restaurant

The restaurant is given a sea view to distinguish it from the restaurants already situated along the harbour front. The cafe is placed in the connection between the library and the restaurant and conference hall. Giving you the opportunity to read a book while drinking your coffee.

The reception

The reception will function as an information centre for the conference rooms, bath, hotel and holiday homes and should therefore be placed accordingly.

Conference hall and workshops

The Conference Hall and Workshop Centre will both provide activities for the resort guests as well as the public. These will include; seminars, craftsmanship, creative courses as well as physical activities. The Conference Hall is placed in close relation to the harbour whereas the Workshop Centre is positioned close to the holiday home area.

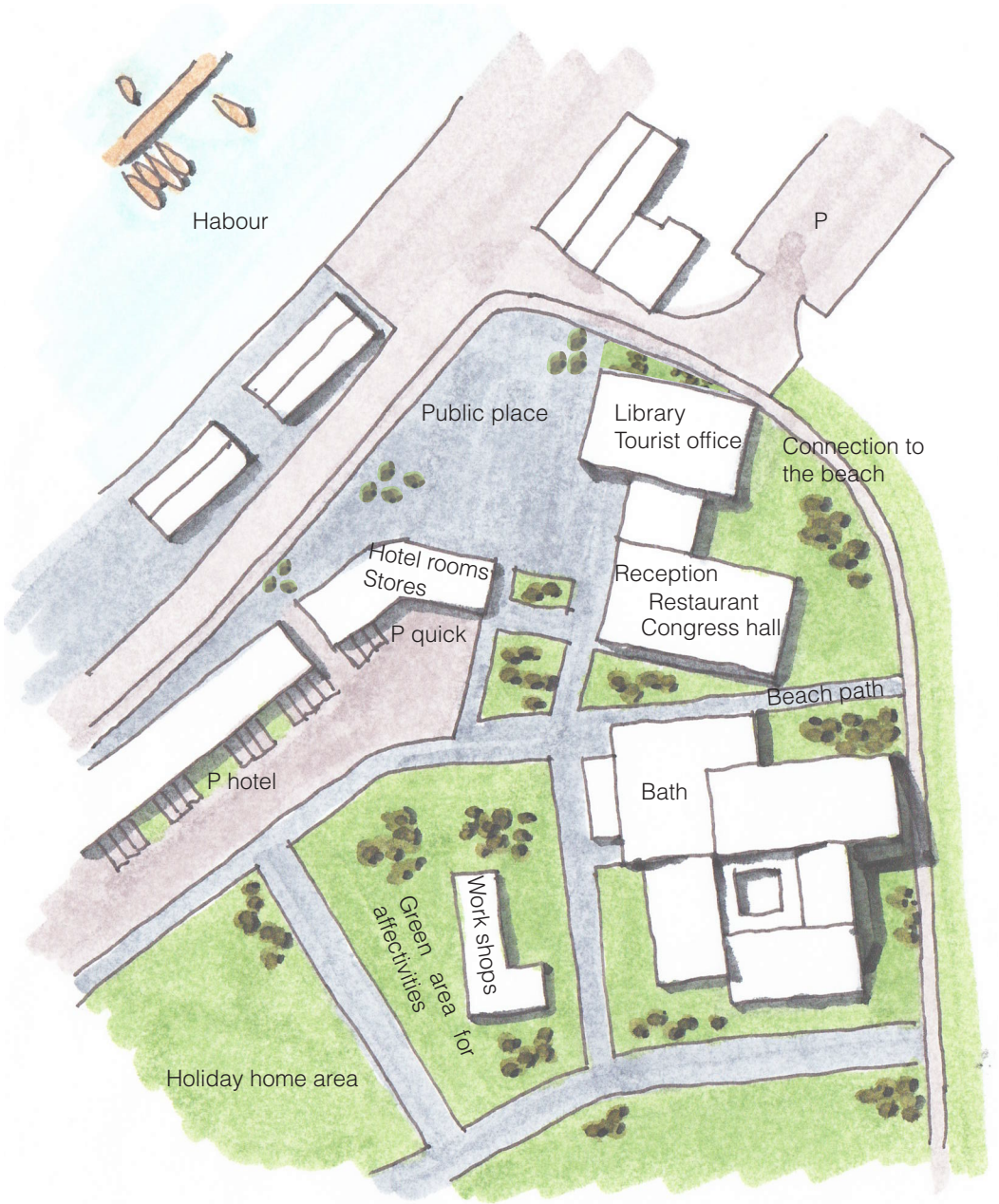
These functions are open towards the public as well to ensure diversity and use during the low-season. The concept of mixing public facilities as the library and the facilities of the resort is also done to create a stronger relationship between Juelsminde and the resort. The resort can become a part of Juelsmindes identity.

The Bath

The bath is located next to the holiday home area creating easy access for the resorts guests. The entrance is visiblee form the public area at the harbour.

Hotel rooms

The hotel buildings overlooking the harbour will also provide a commercial space for stores relating to the harbour.



Ill 59 The master plan has been developed simultaneous with the holiday house area, therefor is this final placement of the functions also reflect how the design of the holiday house area has changed during the process.

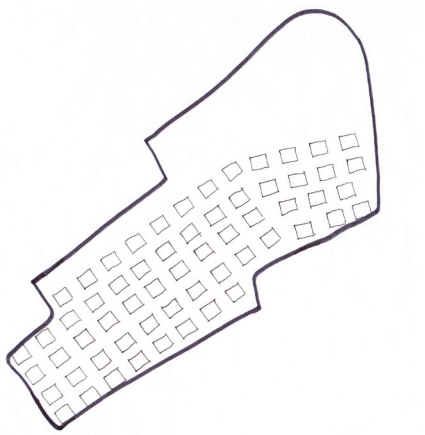
URBAN PLANNING - HOLIDAY HOUSING AREA

The relation between the decisions made in the urban scale strongly relate to the decisions made for the individual housing unit. The urban planning of the housing area is especially concerned with the experience of nature and the mix of town house and summer house organisation. Furthermore the social aspect and how the units will relate to each other and their surroundings also played a large factor in the design of the housing area.

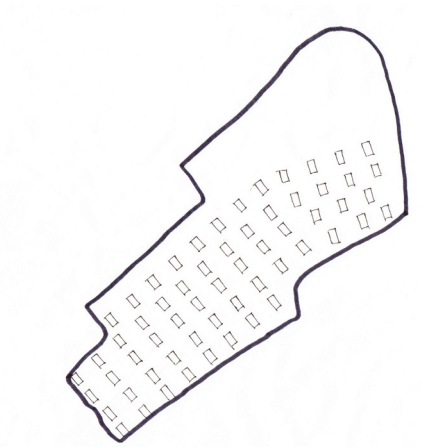
First off, the amount of space is analysed and because of our strong emphasis on nature, the decision to work mainly in two stories were taken.

This will approach intrude less upon the natural surroundings and be more cohesive with the land scape

Few single story buildings are, however, scattered throughout the site to accommodate visitors with disabilities.



Ill. 60 140 holiday houses each 60 m^2. The total floor area is 8400 m^2 which correspond to a plot ratio of 32 %. There is not much room left for green recreative areas, parking or gardens if all houses are in one plan.



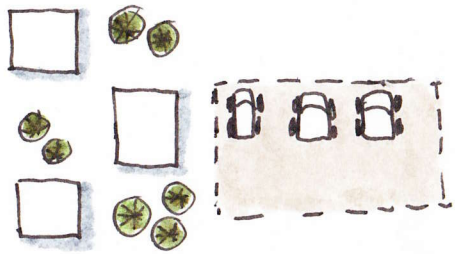
Ill. 61 140 holiday houses each 60 m^2 in two plans. The footprint is 4200 m^2 which correspond to a plot ratio of 16 %. This leaves more room for infrastructure and green areas

Parking

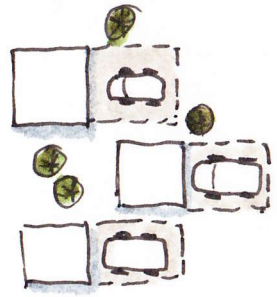
Each holiday home has to have access to a parking space. These parking areas take up a lot of space on the site. Therefor parking had to be considered when designing the urban plan.

The concepts of larger collective parking spaces and the concept of private parking in direct relation to each home was considered.

Parking in relation to the home creates a stronger sense of belonging for the visitors; giving them a feeling of visiting their own summer home. It requires more infrastructure, but it is also more convenient for the guests. As the project focuses on designing a resort which can be used during low season where the weather can be rainy and cold, parking in relation to the home was chosen. Other considerations like how the area would appear visually and aesthetically was also considered before deciding.



Ill. 62 Parking spaces gathered beside the homes. This will require less infrastructure, but it is not as convenient.



Ill. 63 Parking spaces in relation to each home. This will require more infrastructure, but it is more convenient for the guest.

Typologies

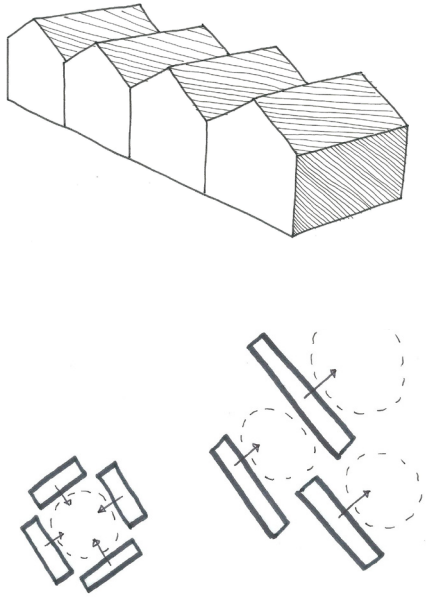
In relation to the single housing units two different typologies stood out in the considerations. The cluster house and the row house.

These considerations were based on factors concerning energy use, views, connectivity, aesthetic potential and organisational qualities.

Due to the organisational qualities, the possibility of private integrated parking for each unit and the relation to Juelsminde, the row house was selected as the preferred typology.

Row houses

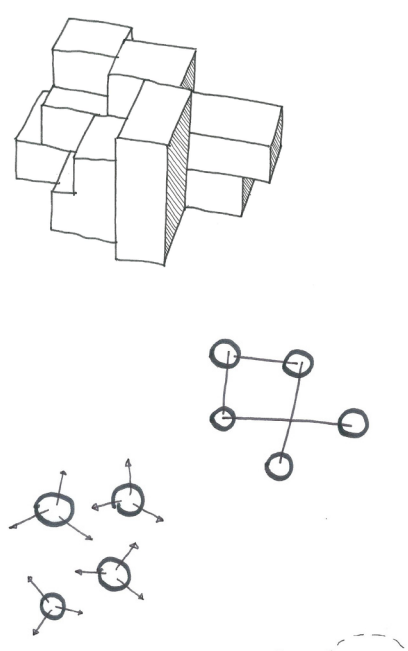
The row house is easily organized and is a solid base for creating equal qualities for all users and keeping to a fairly simple constructional system. Furthermore The row house is very good at defining space in between them and all units has direct access to outside.



Ill. 64 Row house organisational sketches of row house functionality

Clusters

The cluster house has the potential to be very energy efficient and can create a strong landmark expression. They will need to be taller, because all facades will need to be open. Connectivity between clusters are harder to achieve. As are uniform conditions for the individual living units.



Ill. 65 Cluster house organisational sketches of row house functionality

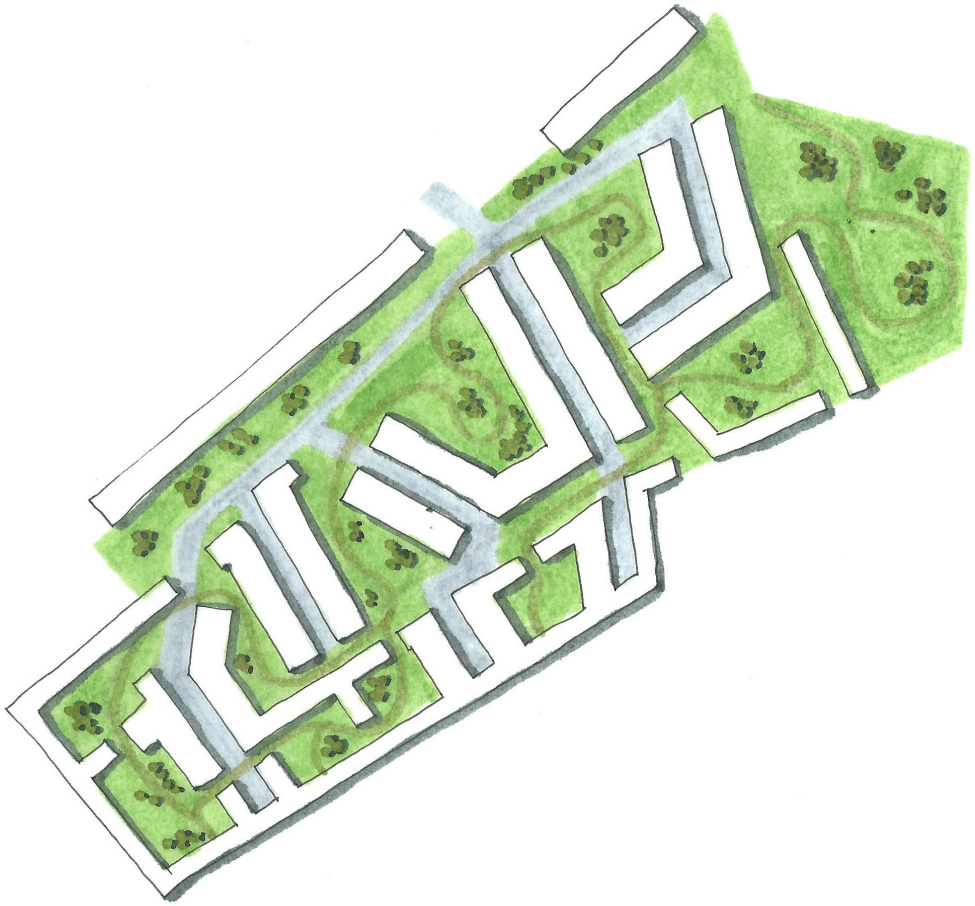
Housing area iteration 1

The initial experimentation with a full master plan incorporated the idea of parking under an overhang protruding from the houses, along the back of green courtyards.
The concept were that the courtyards should have a different character of nature and therefore be ideal for a stroll through the site.

The general expression does not fit the scale of Juelsminde. Furthermore the master plan created some undesirable spaces, such as the long car corridors.

The idea of incorporating the car was not as well utilized as it could be - it seemed more like an attempt to hide away the cars. The idea needed refinement.

The courtyards vary a lot in size and there were no real defining factor concerning what character they had. The idea was intriguing but needed refinement as well.



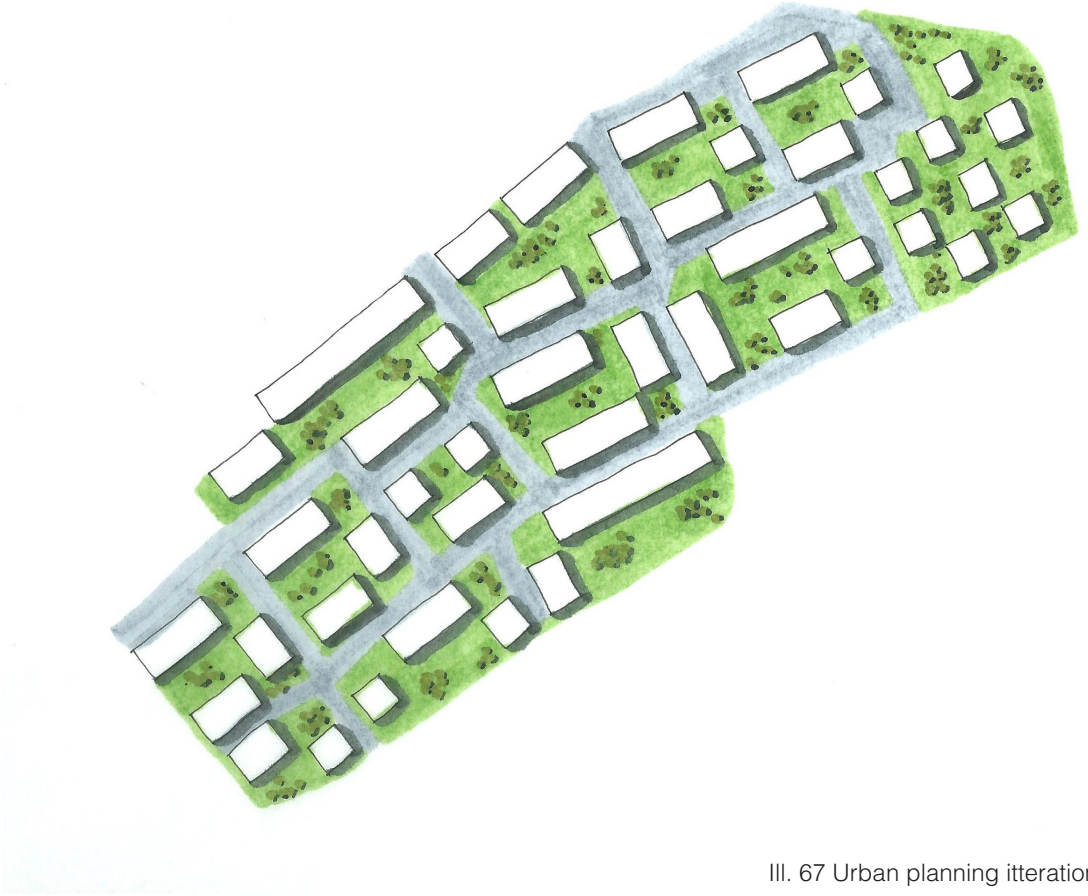
Ill. 66 Urban planning itteration one sketch

Housing area iteration 2

The next iteration shows a stronger relation to the summer house area, and the fragmentation of the houses relates better to the scale of Juelsminde. The courtyards have changed character and become smaller private gardens for the surrounding houses.

The change in scale is welcome, but the necessary added roads squeezes both the houses and the courtyards and creates a privacy issue between the individual dwellings.

Solar studies also showed that some of the court yards often would be over shadowed because of the proximity of the houses. This would also influence the amount of passive solar heat the houses could receive.



Ill. 67 Urban planning itteration two sketch

Housing area iteration 3

The final master plan retains many of the qualities from the previous iterations in the design process. The court yards has different sizes and character and is connected by paths. The building mass is fragmented which fits the scale of Juelsminde. Many of the court yards are open towards south/west letting in sun both during the day and during evening.

Furthermore the existing character of the site has been enhanced through landscaping. The slope, downwards from east to west, which are currently part of the site today has helped characterize the different courtyards in shape and size, as well as defining the nature and experience in them.

The houses always retain views outside of their courtyards. The units now always feature a place for stay which feature evening and/or morning sun.

Ill. 68 Final iteration for housing area

URBAN PLANNING - FINAL MASTER PLAN

The drawing illustrates the final master plan for the whole area. The pedestrian paths leads through the court yards and up to the harbour functions and connect the different areas.

Ill. 69 Final master plan sketch

THE HOLIDAY HOUSES

Housing process introduction

The holiday home is a central part of the project and has therefore received a lot of attention. The home aspires to give the visitor a different experience from what is normally seen at holiday resorts and summer houses. The goal is to strongly emphasize the connection between inside and outside as well as letting the visitor follow the light to different spaces throughout the day.

Ill. 70

Initial sketching

Alongside the urban planning, the house typology was designed. The ideal typology was found to be the row house. This typology offered different advantages in organisation as well as energy consumption.
Different concepts for the house was discussed and tried out.

Form the initial sketching phase and the analysis it became clear that nature and specifically the connection between in and out plays an important role.

Because Juelsminde is an area with rich nature and the resort should be used during low season, the idea of adding winter gardens appeared. This would encourage outdoor use throughout the colder low season.
Different concepts concerning this were sketched upon, while also exploring the possibilities which the two-story house offered.

From these studies a concept of having light from facade to facade were being developed, as well as different privacy options within the relatively small units.

Ill. 71 sketch of experimentation with different styles

Parameters explored in the initial sketching

- Close relation between in and out

- Winter gardens can extend the seasons

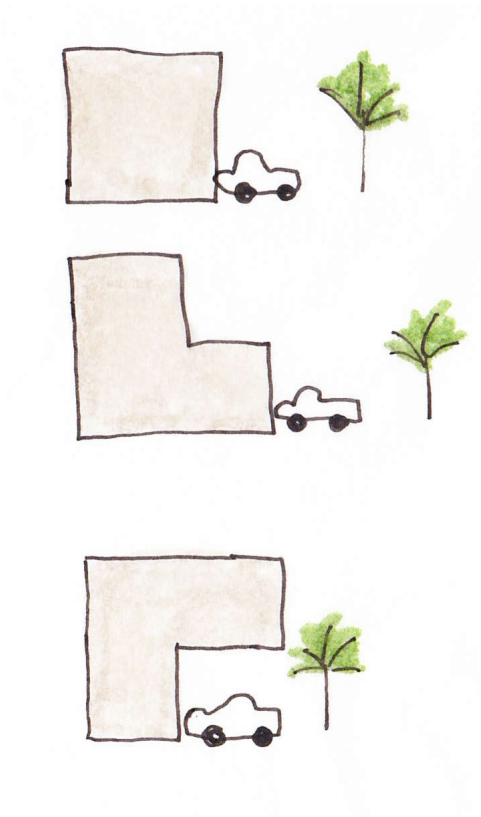
- Private zone on first floor, more public zone on ground floor

- Light form facade to facade

Parking and arrival

The visitors will mainly be arriving by car and the incorporation of parking has therefore been an important factor since the beginning of the process.

Different ways of integration were explored and the decision to park underneath an overhang were chosen. This solution strengthens the arrival by adding a sense of belonging to the specific holiday home and strengthens the relationship between the user and the architecture. Further more it makes the cars less apparent in the area.

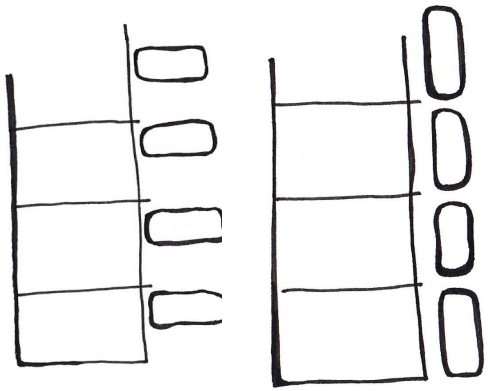


Ill. 72 Sketch of different parking options

Concepts of parking in relation to the holiday home.
By parking under an overhang the floor area of the first floor is larger than the ground level. This is in line with the room layout where more private rooms are placed at the top floor. It also protects the car from the elements..

Parallel or perpendicular parking

The difference between parking parallel or perpendicular to the road was examined and parking perpendicularly was chosen as this takes up less of the facade.

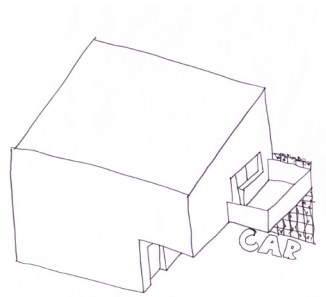


Ill. 73 Sketch of perpendicular and parallel

Parallel parking will create a long “car wall” of metallic paint, but also allow for a shorter distance between the houses placed opposite from each other. Parking perpendicularly creates a space between each car and breaks up the continuation of cars.

Trellis

Trellis are used to create a defined parking and entrance zone for each home. The greenery also creates a link between the front and back of the houses.

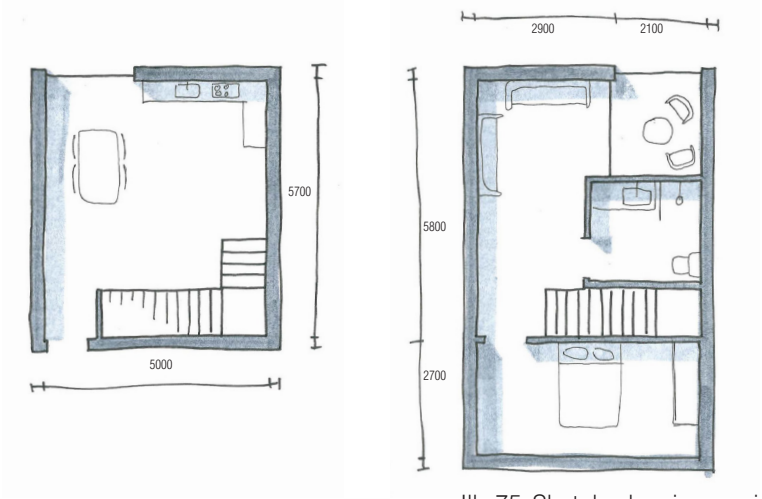


Ill. 74 Sketch of parking along a trellis under a balcony

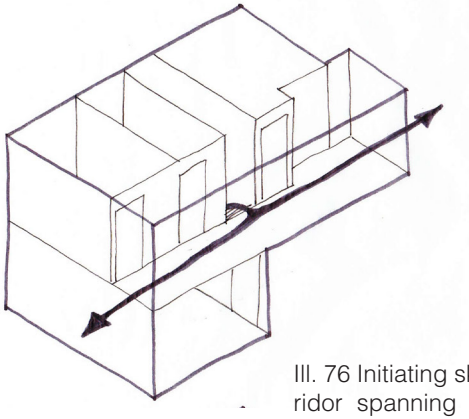
Experimenting with different plans

To accommodate the general idea for the area concerning the green pockets and nature, the urban lay-out made it difficult to create equally good lighting situations and room layouts. Therefore ideas concerning parametric systems were discussed.

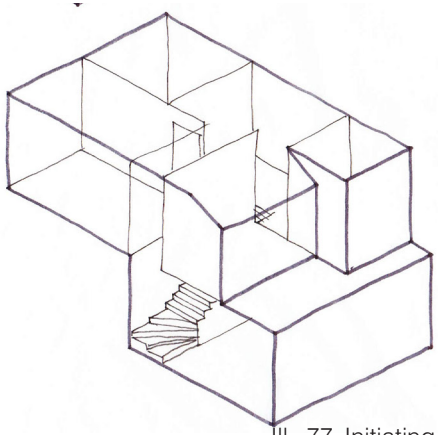
Trying to accommodate the different functions and arrival situations, the floor layout became fragmented and many areas became problematically small. Some things worked in certain situations and others did not.
Therefor it was decided to work with a more permanent room layout for all orientations.



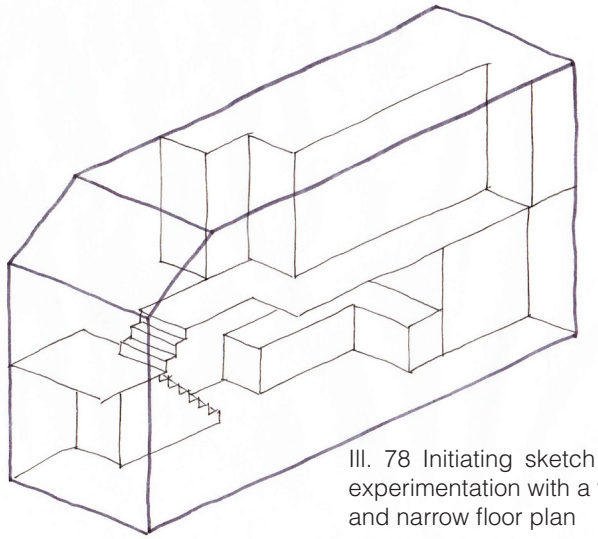
Ill. 75 Sketch showing an initial floor plan proposal



Ill. 76 Initiating sketch with a corridor spanning from facade to facade



Ill. 77 Initiating sketch showing compact room organisation



Ill. 78 Initiating sketch showing experimentation with a very long and narrow floor plan

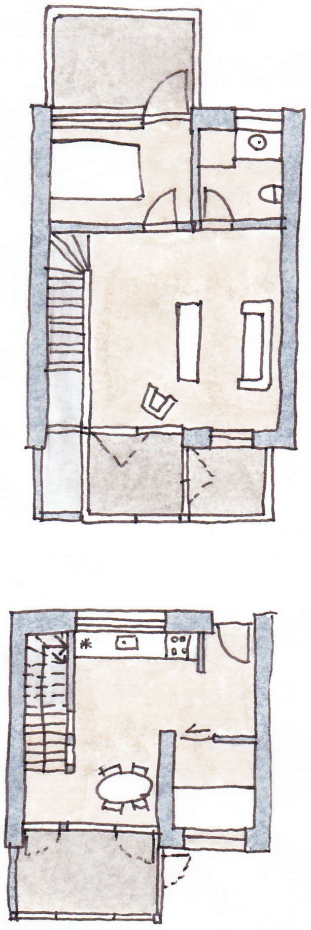
The final plans

As a consequence of the fragmented plans, the facade had become messy and fragmented. The relation between the inside functions and outside had purely been a product of the inside.

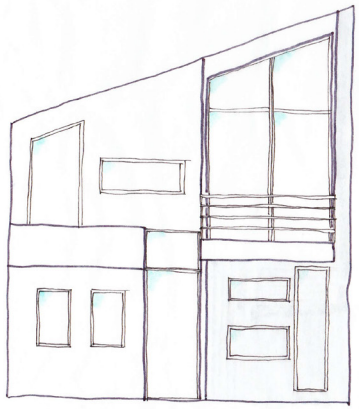
Wanting to create a house which reflected calmness and encourage the movement towards the outside, the facades were simplified and made to reflect the movement inside the house.

The double high part of the staircase is reflected both in the winter garden and inside living room, as well as the facade. Furthermore the banister of the winter garden connects with the banister of the outside terrace, linking the rooms better. The winter gardens were stacked, making it a stronger element in the facade.

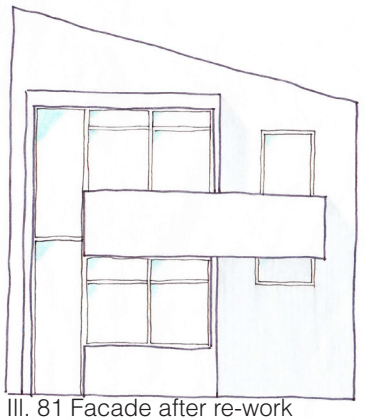
The idea of having the living room go from facade to facade was refined and the relations and sizes between the rooms were refined as well.



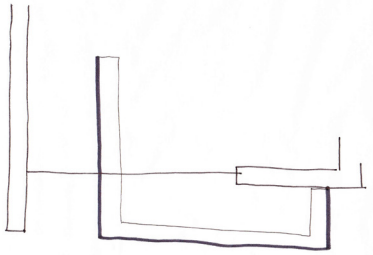
Ill. 79 one of two plans where the living room were placed according to different situations.



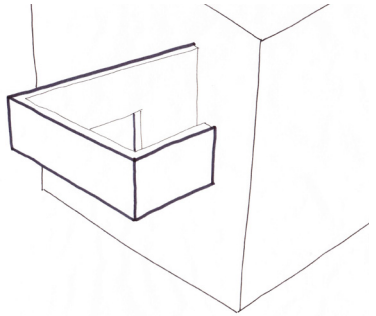
Ill. 80 Early process sketch



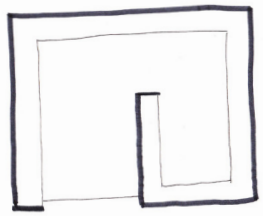
Ill. 81 Facade after re-work



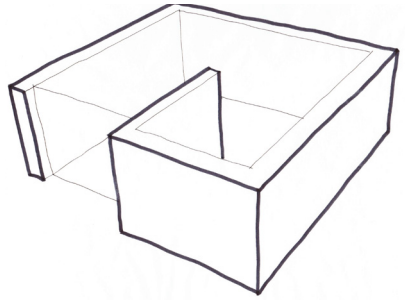
Ill. 82 Sketch of banister wall



Ill. 83 Sketch of banister wall



Ill. 84 Sketch of wall on ground floor



Ill. 85 Sketch of wall on ground floor

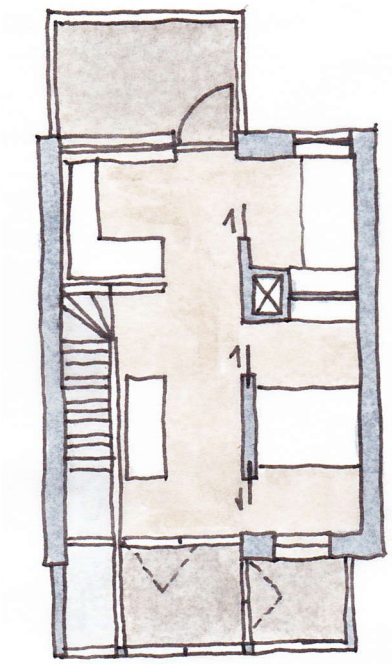
The final plans

The final plan reflects many of the choices made in the iterations. The house is a two-story row-house with a strong relation to the surroundings.

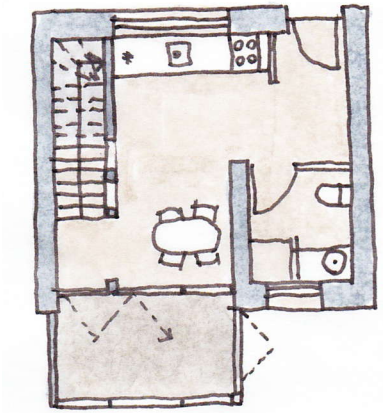
It features a kitchen and dining area, connected to a winter-garden which extends the room and connects to an outside terrace nook.

Following the staircase, which is placed in a double high room which extends into the winter garden, the house opens up into a living space spanning from facade to facade. The living space ends in either a larger terrace or a winter garden connected to a smaller outside terrace. Connected to the living space along one side, are the sleeping areas and storage. These are connected with large sliding doors, blurring the lines between the rooms, giving the users the opportunity to interpret them, as they see fit.

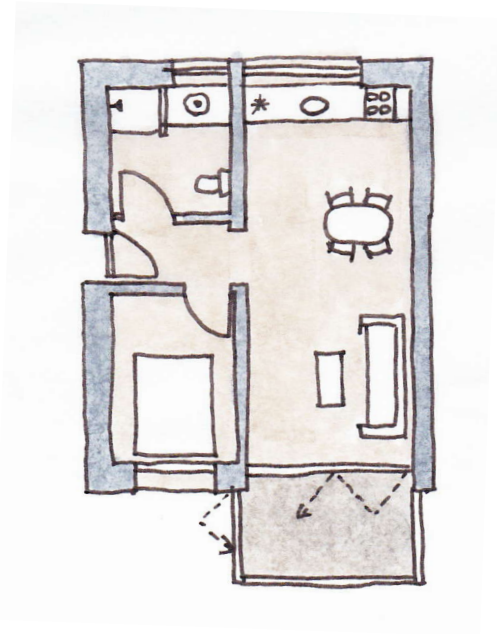
Along side the development of two plan home a single floor home was designed. The general concept for the single floor home is the same as for the two plan home. It is designed to be placed in the gable at the terraced houses.



Ill. 86 First floor



Ill. 87 Ground floor

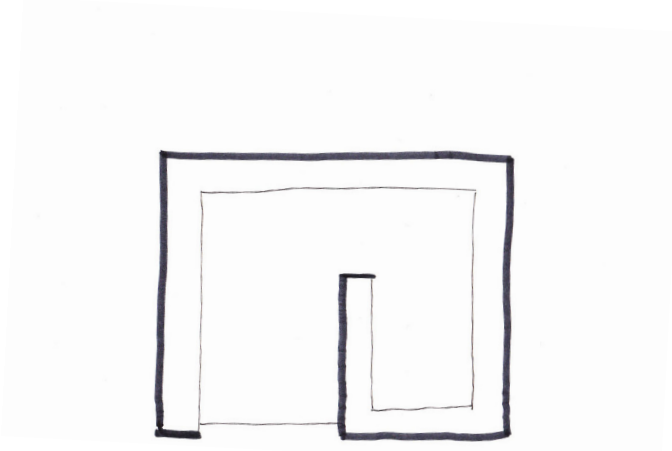


Ill. 88 Single floor home

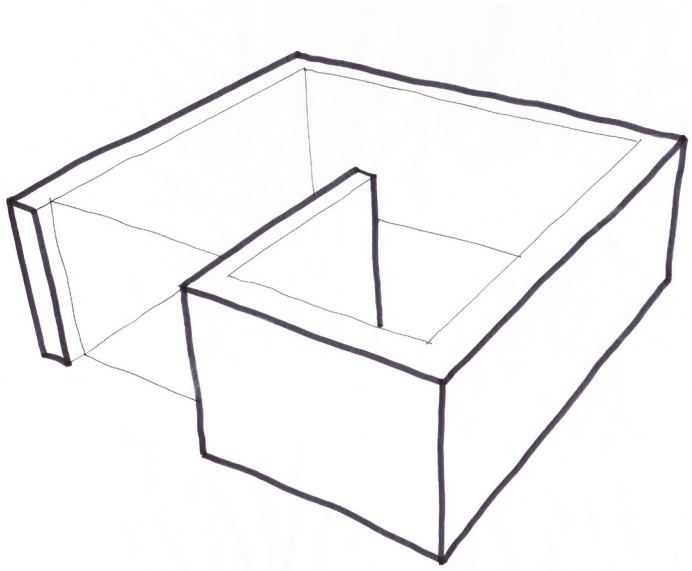
Detailing

Relating to the outside

To strengthen the relation between inside and outside, the material continues from the outside and into the kitchen area. When the wall ends, it changes character and switches to veneer, which is a lighter material.



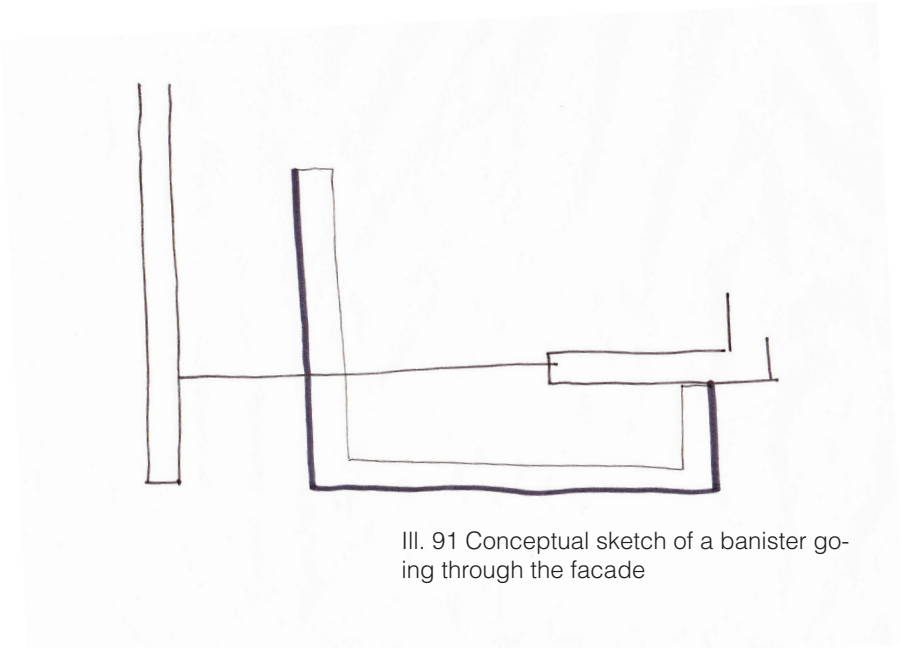
Ill. 89 Conceptual sketch of outside wall going inside



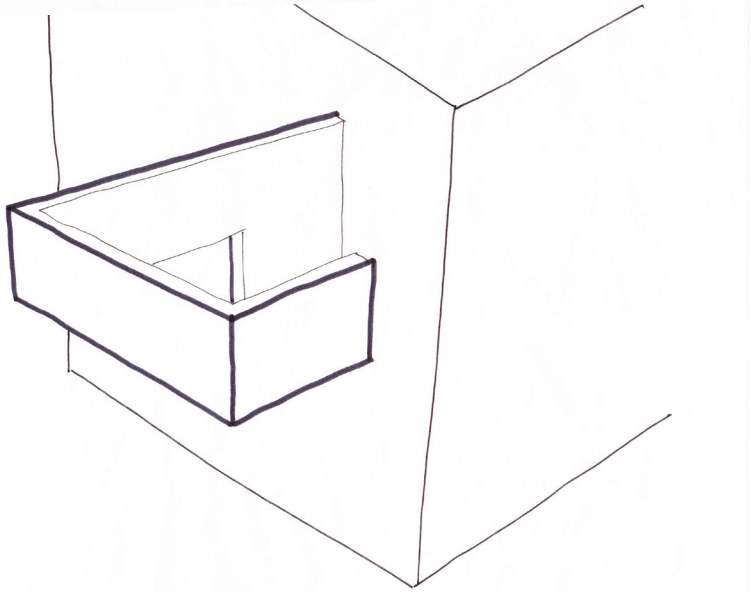
Ill. 90 Conceptual sketch of outside wall going inside

Relating to the outside

On the top level a similar situation is apparent in the banister of the balcony. This element connects the two levels, as well as the inside to the outside. The outside material is a more weather and sun-proof timber cladding, where the inside is a more delicate, but waterproof, cross-laminate which is also used inside the house.



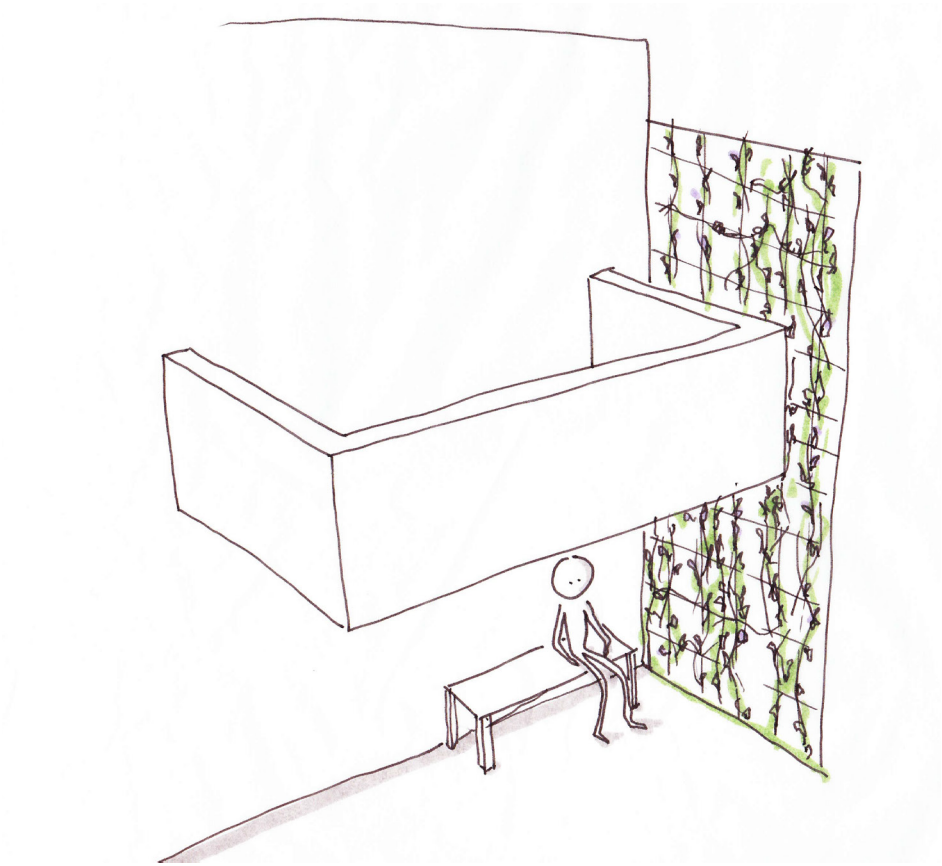
Ill. 91 Conceptual sketch of a banister going through the facade



Ill. 92 Conceptual sketch of a banister going through the facade

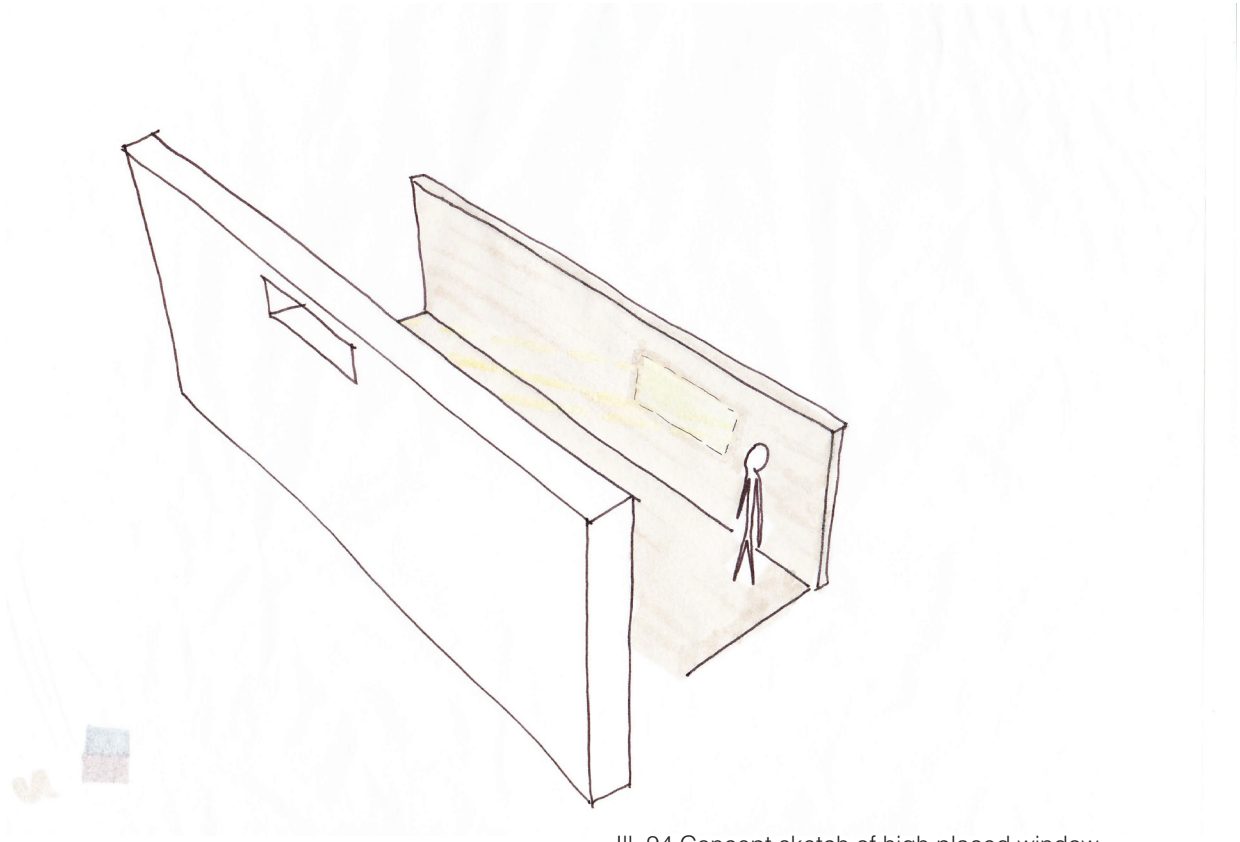
Trellis

A trellis is added on both sides of the holiday homes, tying the front and back of the house together.
Furthermore the effect of detaching the balcony from the neighbouring house and letting the vegetation grow freely towards the sky creates an effect, which expands the space upwards.



Ill. 93 Trellis concept sketch

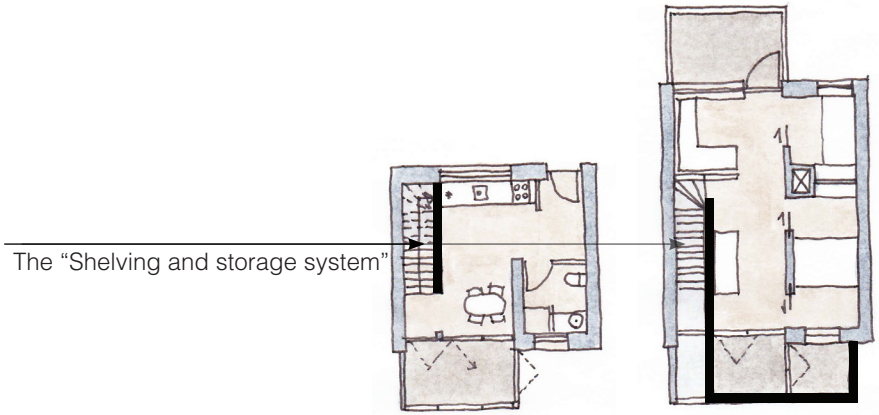
The Top light in the upstairs living room lets light in and gives the opportunity to ventilate efficiently. Furthermore it gives the user a “sky view” letting the user observe the change of colour in the sky during the day.



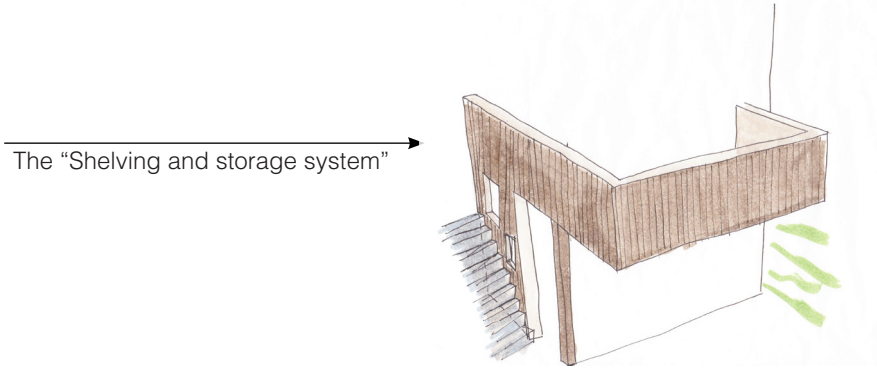
Ill. 94 Concept sketch of high placed window

Shelving and storage wall

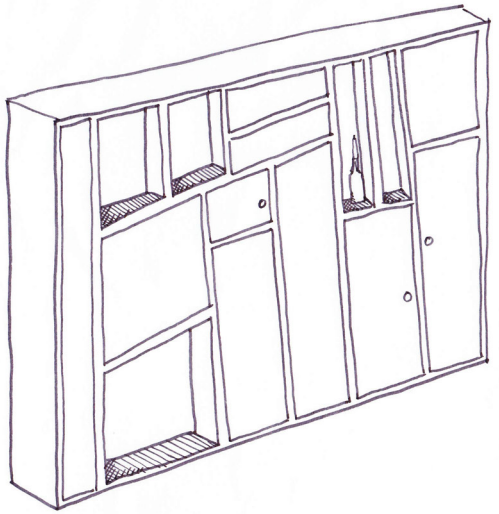
The load-bearing wall along the staircase is constructed as a shelving and storage system around the structural columns. This wall is connected to the banister.



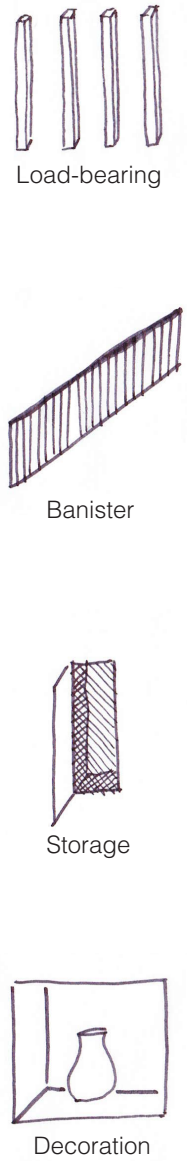
Ill. 95 Sketch of plan highlighting the wall/banister



Ill. 96 Concept sketch of the wall/banister



Ill. 97 Concept sketch of wall and functions



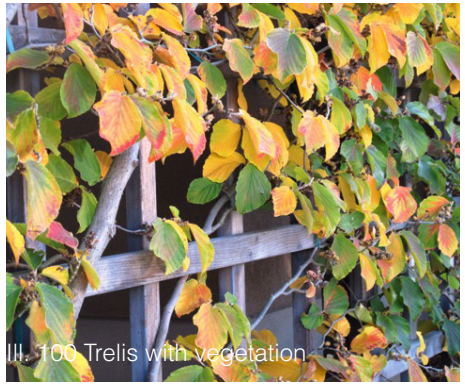
Exterior materials

The materials used for the holiday homes are brick and wood lamellar. The materials relate to the context of Juelsminde and have references to both the townhouses and the summer houses.
The espalier gives the house a green wall which ties it well to the green court yards.

The building is in brick and the winter garden is clad with wood lamellar. This is to emphasise the light construction of the winter garden which is connected on the heavier base of brick.


Ill. 98 Brick reference, Sorø Museum


Ill. 99 Wood lamellar


Ill. 100 Trelis with vegetation


Ill. 101 Trellis with green vegetation


Ill. 102 Brick reference, Sorø Museum

Interior materials

The interior walls, except the end walls, are clad with veneer. Some of the specially designed furniture and the shelving and storage system are also in veneer, making them connect more with the wall, making them seem more like a part of the home.

Ill. 103 Birch veneer

Ill. 104 Oak strip parquet

Energy and indoor climate

The winter garden is meant to extend the season, which meant that the indoor temperature of the winter garden was an important factor in the design.
Simultaneous working with the plans and facades of the house the indoor climate of the winter garden was investigated.

The graph illustrates how the temperature fluctuations for a home which is rotated 54° from south. This shows that the temperature gets high during the day during winter - This illustrates the fact that the winter garen serves its purpose in this situation.

Indoor climate simulations has amongst others had an influence on the size and placement of the windows as the ventilation source is natural ventilation during summer. The final simulation shows that the windows are capable of providing a natural ventilation rate which can keep the indoor temperature on an acceptable level.

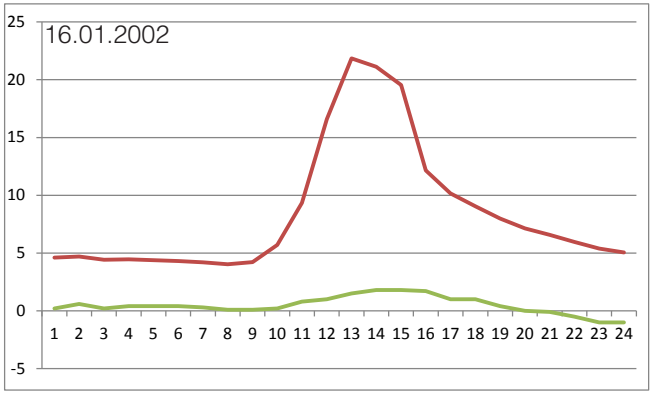
In the appendix the result for the indoor climate simulation can be seen.

Be10 calculations has been done simultaneously with the design of the holiday homes to ensure that the they can comply with the energy demand.

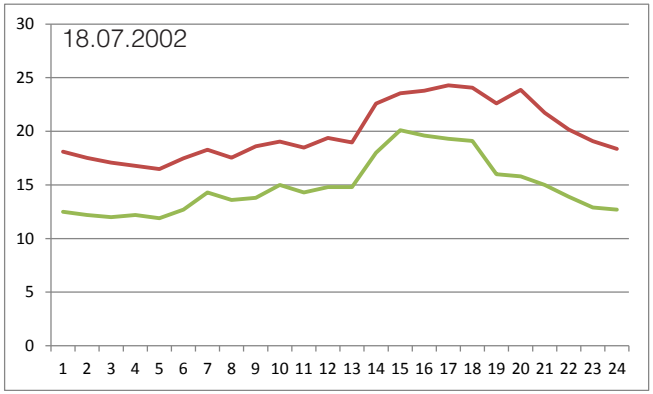
The holiday homes lives up to the Danish building regulations demands to building class 2015.

By applying 5 m^2 solar cells to each holiday home the building class 2020 is reached.

The results concerning the Be10 can be seen in the appendix



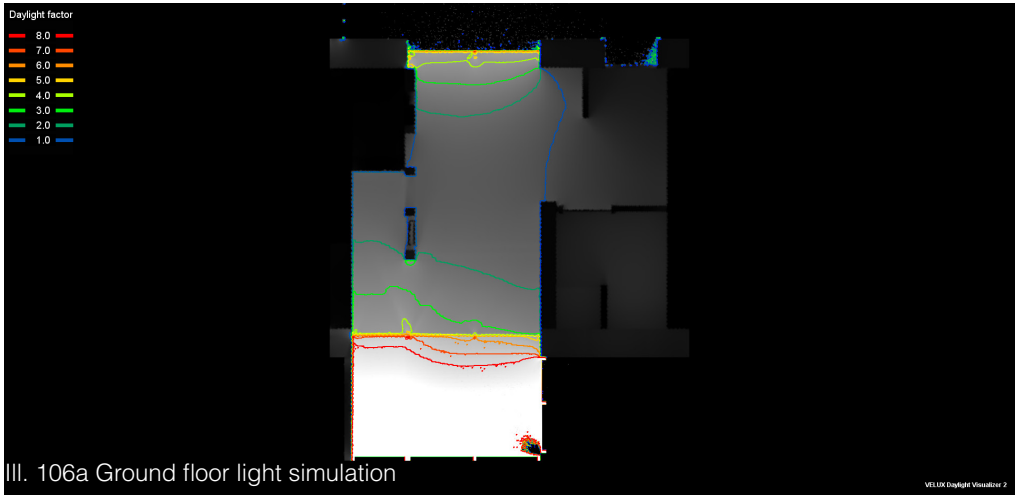
Ill. 105 The temperature a day during Janurary



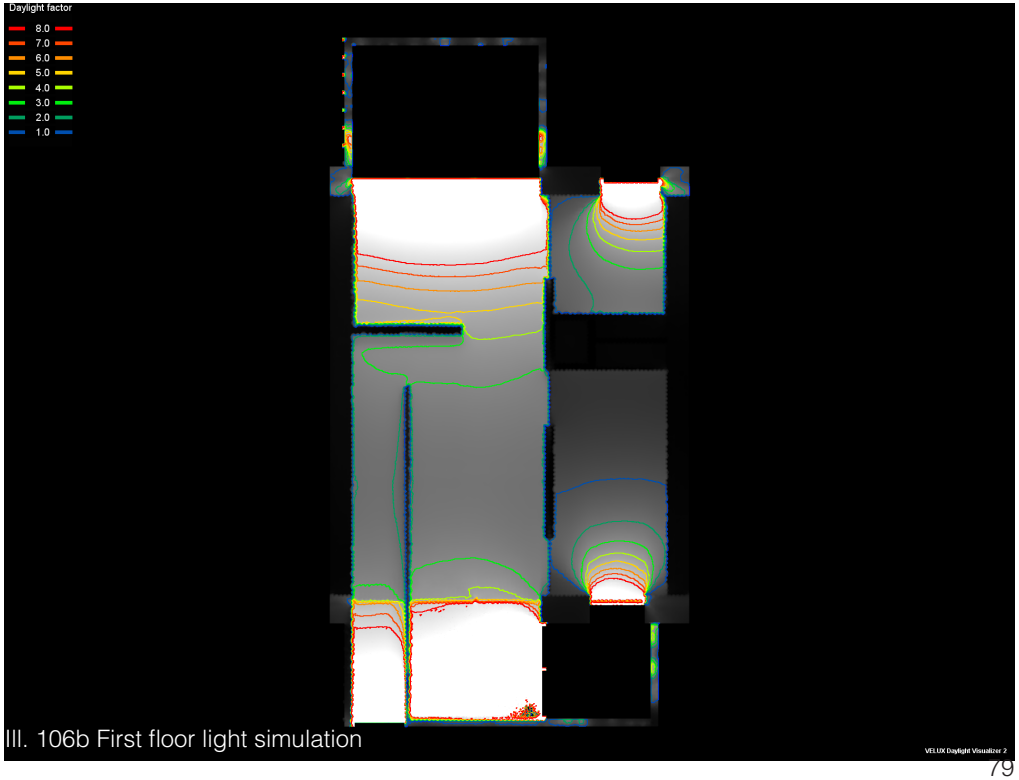
Ill. 106 The temperature of the winter garden a day during June

Daylight

Throughout the process the daylight situation were continuously tested. Rather than trying to reach a monotonous daylight factor throughout the house we decided to take advantage of the lack of hard constraints in homes as to create an interesting light composition.
The design is meant to encourage movement in the home and the large change from the facades to the core of the building will help encourage the users to follow the light and move with the sun, according to their moods and requirements.
Furthermore the diagram shows that the entire building retains an acceptable daylight factor throughout.



Ill. 106a Ground floor light simulation



Ill. 106b First floor light simulation

THE BATH

Introduction

The bath complex is an essential part of the resort. This will be the main attraction of the resort and create a large incentive for visiting Juelsminde as a tourist.
Based on the site analysis and the main user group, the goal became to create an alternative to the traditional water park. An alternative which is compatible with its surroundings and were atmosphere and the sensuous experience of the warter is the main focus.

Ill. 107

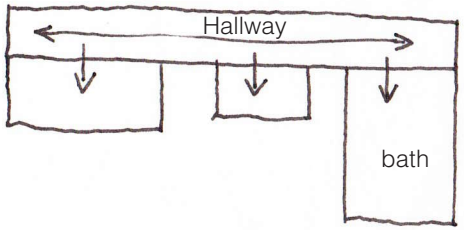
Concepts

The room program for the bath includes different types of baths, saunas and steam baths. By working with issues such as, light, texture and sound the intention has been to create different atmospheres which will enhance the experience of the particular bath or sauna.

These different *bath-experiences* has been the main concept and the following shows the development of the design concept with focus on flow and organisation.

Iteration 1

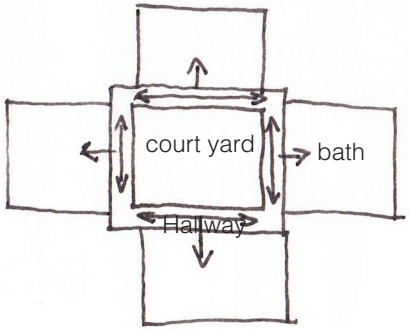
This approach is to connect the different baths by a hallway leaving the opportunity to close some sections during low season, without closing the whole bath. The building volumes would be small and fragmented as each *bath-experience* will be its own unit which would fit the “small town” scale of Juelsminde.
The down side of this approach is that the flow of the hallway ends up in a dead end.



Ill. 108 Concept sketch

Iteration 2

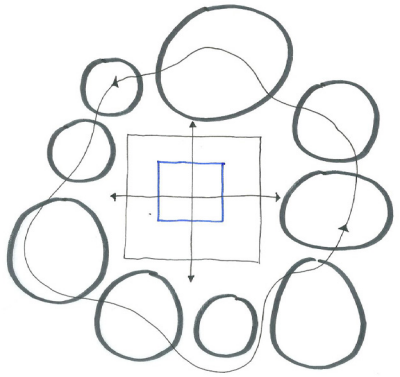
Placing the hallway around a central court yard will create a continuous flow. The baths can still be expressed as individual building volumes. However the flow is still only restrained to the hallway.



Ill. 109 Concept sketch

Iteration 3

By creating a connection between the baths the flow is not solely restrained to the hallway. This gives the opportunity to swim from one bath to another and experiencing the different atmospheres in a flow.



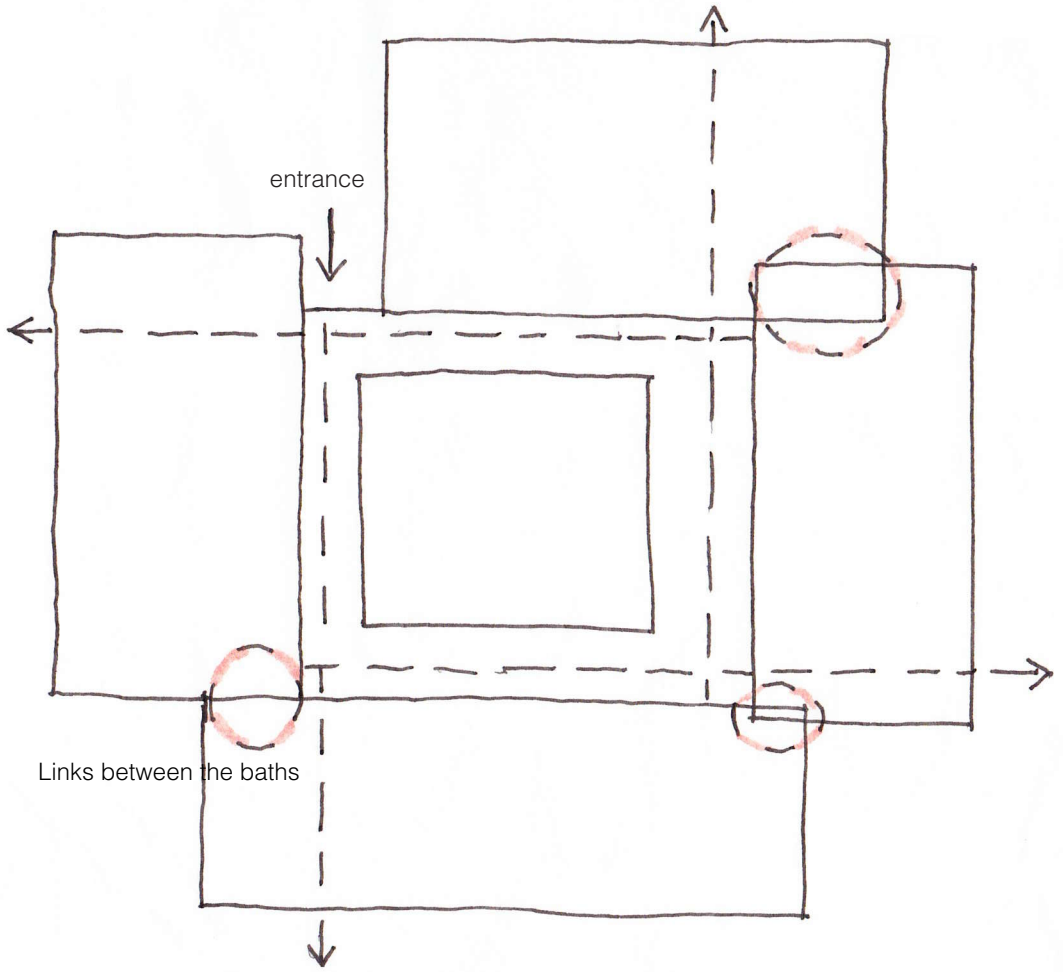
Ill. 110 Concept sketch

Refinement of the concept

The final concept concerning the organisation and flow of the bath is based on different parameters.
The central hallway area will have access to the different baths and always have some views to the baths as well.

The different baths are placed in the periphery and always have some sort of link - both physically and visually. A pathway will guide the user through the baths if the user chooses to be guided. The path will manifest itself in different ways, relating to the user, the physical framework and the atmosphere in the different baths.

The links between the baths are important, as the atmosphere of the room changes at this junction. The links has to be visible for the users to guide them through the bath, but in a subtle way that does not break the continuous flow between the baths.



Ill. 111 Concept of views, flows and links between baths

Placement of functions

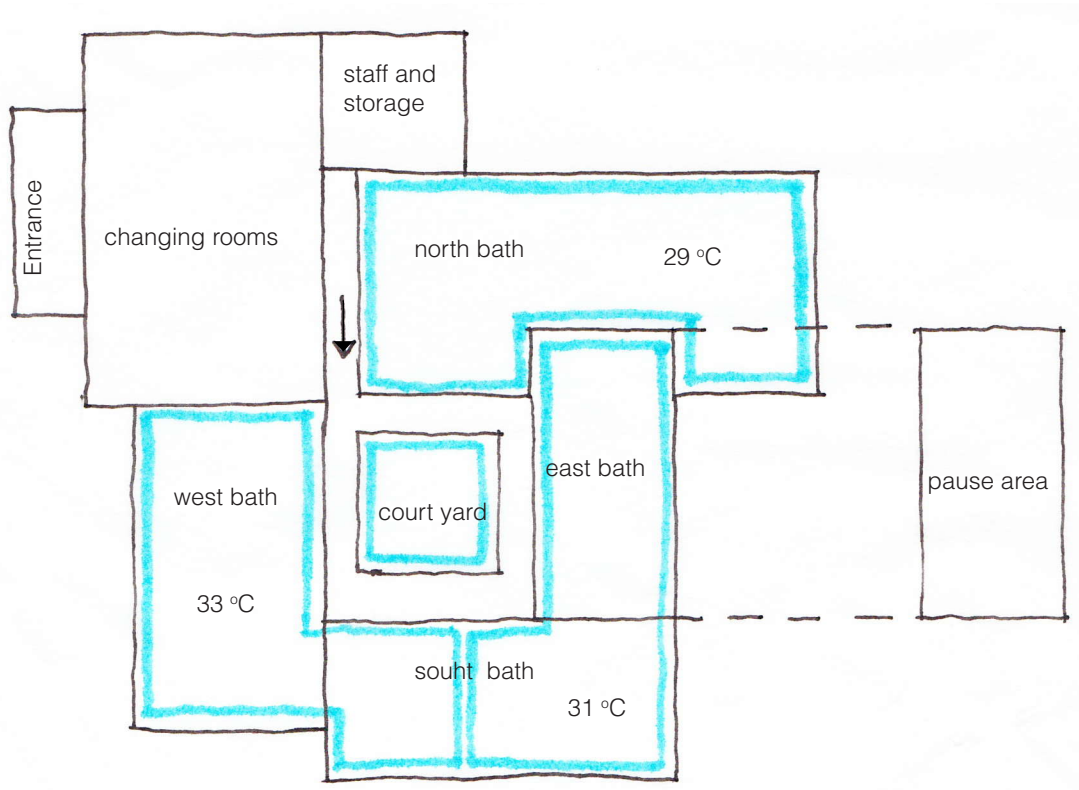
The bath is subdivided in the different *bath-experiences* which all have different functions and atmospheres. The placement and sizes of these rooms has changed along with the detailing of the design. This diagram however shows the relation between the rooms and their sizes for the final design.

The more practical functions such as changing rooms, pause area, staff/ storage rooms and technical rooms are illustrated as well. Drawings of the basement and conceptual arrangement of the technical rooms can be seen in the appendix.

To make it possible to swim between the different *bath-experiences* the pools are separated as shown on the diagram.

The pause/sitting area is located on the first floor which is accessible from the hallway and the north bath.

Function diagram of the bath



Ill. 112 Functions sketch

The atmosphere of the baths

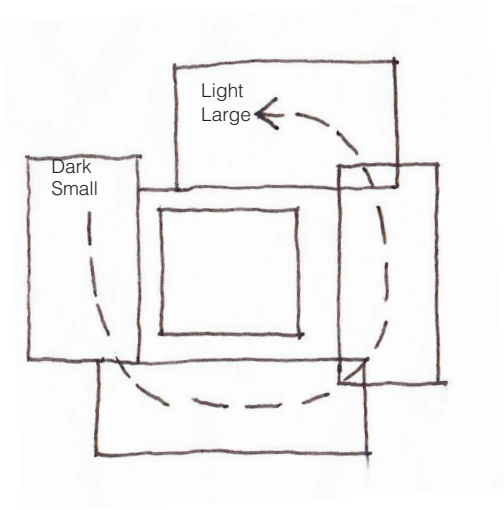
Creating different atmospheres has been a main focus point.
Atmosphere is defined as an emotional response to the physical framework which is sensed with our whole body.

The four seasons

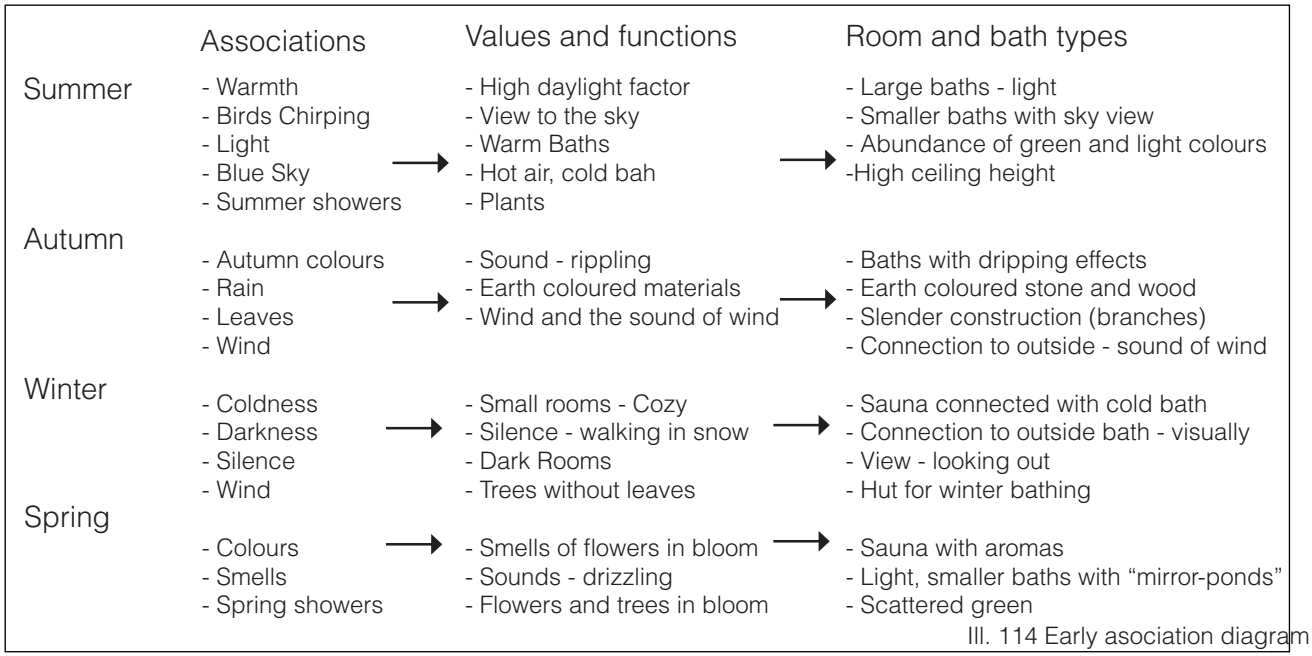
As a generator for the design of the different baths *the four seasons* has been examined as a theme. It is not meant as a literal interpretation of the seasons, but rather serves as inspiration for transition and diversity.
The contrast and movement from dark to light which characterizes the seasons, has been manifested in the design by the rooms atmospheres changing from dark to light, from smaller spaces to larger spaces. The diagram below is created from a brainstorm on the seasons. This shows how the seasons could be linked with different baths, functions and values. Even though the final design does not stick exactly to this formula, there are still many of the ideas incorporated in the project.

Experiencing water

Different ways of experiencing water has also been a valuable tool when working with the atmospheres. Examples such as the sound of running water, the feeling of falling water against your skin, different temperatures and movements of water, how water reflects light and how the body relates to the materials in water, are all intruiging ways of creating sensations for the visitors.



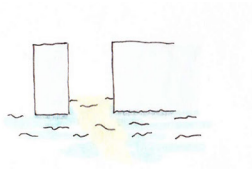
Ill. 113 Light and size sketch



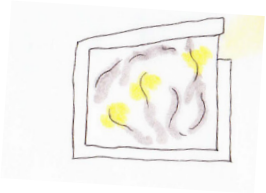
Ill. 114 Early asociation diagram

Initial sketching

Different ideas and concepts concerning experiences of water and ways of creating atmospheres were generated. A selection of the ideas and sketches are shown here.
In the final design we have focused on using a subtle amount of different effects to ensure they are integrated as seamless and natural parts of the baths.

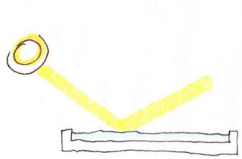


light coming through slits in a wall reflected by water



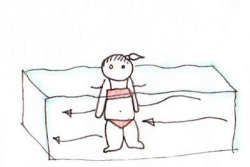
cone of light created by steam in a steam bath

Views to the baths to create curiosity

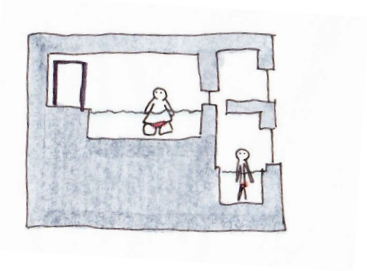


light reflected in reflective pools

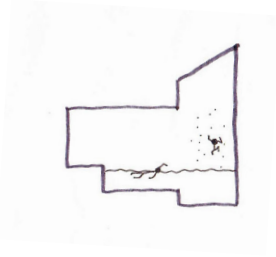
Water falling form above



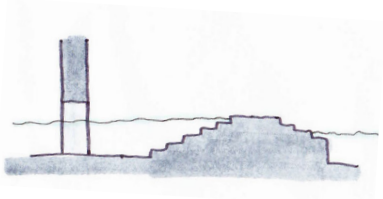
Water stream used as guide of the flow and as massage jets



different levels and views between the baths and to the outside



Activities, water depths, room volume and light influence the perception of the atmosphere



Different ways of following a path through the bath. Swimming underneath something, swimming into a “cave”, swimming in between columns, walking in between pools ect.

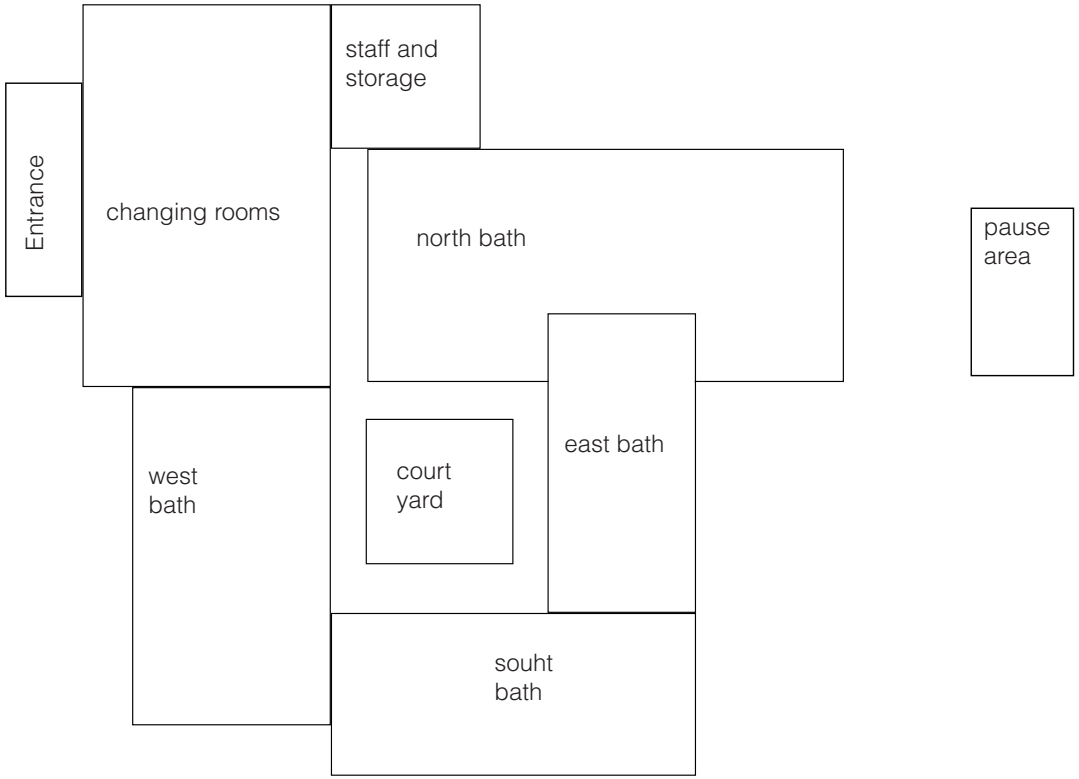
The body’s relation to the pool bottom relates to the texture and curvature of the floor.

Ill. 115-124(From top left) Sketches of different details in the bath

The Baths

In the following the design of each bath-experience and their intended atmosphere will be described.

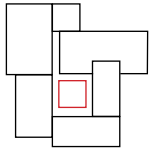
The diagram shows the organisation of the baths as well as reference names for added understanding of the descriptions.



Ill. 155 Bath orientation diagram

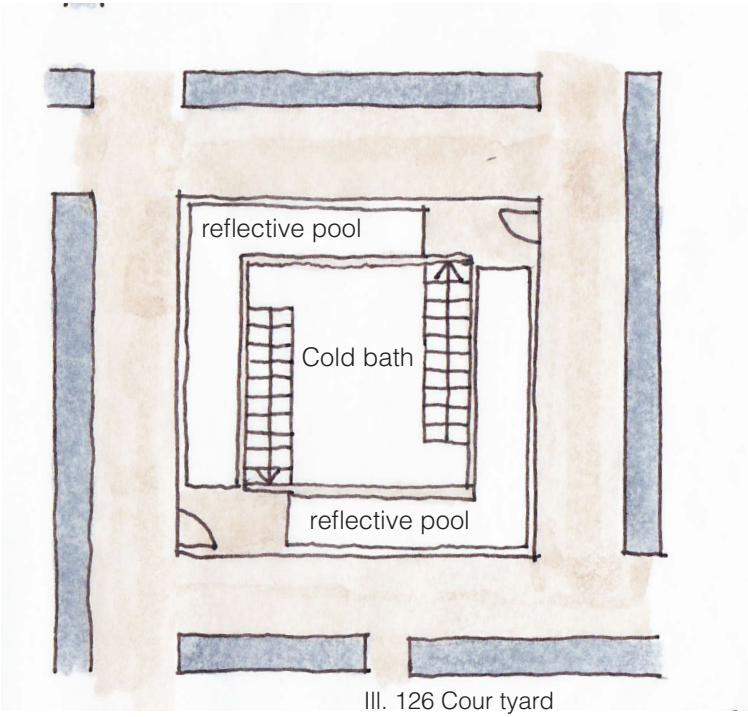
The court yard

Functions:
Cold outdoor bath
Reflective pool

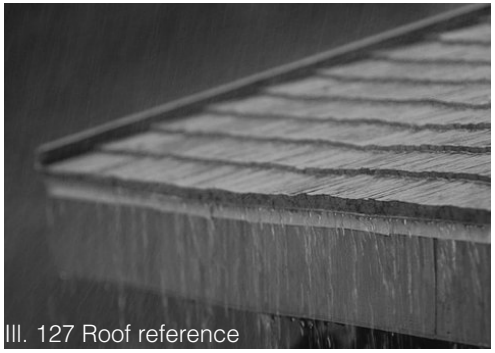


The central courtyard is an outside area, which provides light to the hallway as well as a possibility to have a dip in a cold outside pool. Furthermore the reflecting pool will emphasize the calmness and coldness which characterizes Juelsminde and the North. The court yard will be the heart of the bath.

When it is raining the water from the roofs is led to fall into the reflective pool enhancing the experience of rain.



Ill. 126 Cour tyard

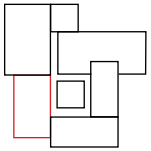

Ill. 127 Roof reference


Ill. 128


Ill. 129 Reflective pool

The west bath

Functions:
Warm bath 33 °C
Steam bath



In the design of the west bath focus has been on the contrast between light and shadow.

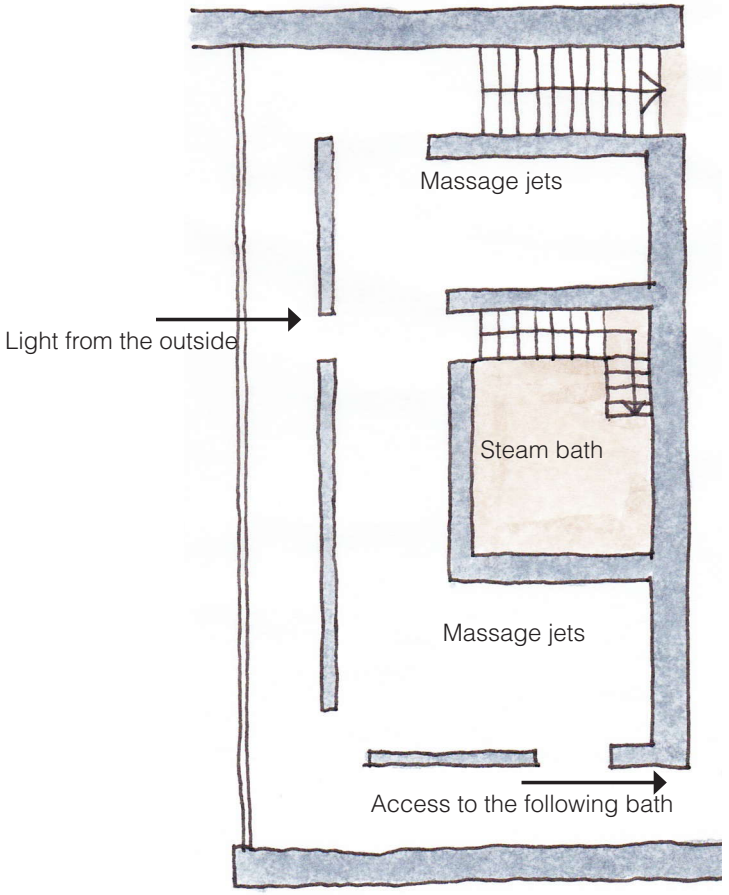
To enhance this contrast the lighting in the centre of the room is dimmed by partition walls. Light from the outside penetrates slits in these walls which creates a glowing effect.

This light encourages one to explore what is on the other side and eventually find your way through the bath along the different paths.

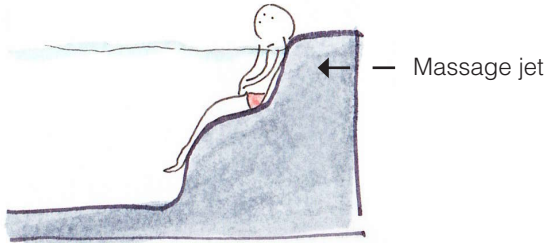
Lamps light the water up from beneath. This makes the water a light source in itself. It also makes it possible to see the pool floor which makes it more pleasant and safe to move around.
The ceiling of the bath slopes from the hallway down towards the ground. This enhances the downward movement when walking down the stairs into the water.

In the centre of the bath there is a small opening to the steam bath. When swimming in through the opening one is met by a stair leading up into the steam.
The steam bath has light coming in from a ribbon window in the top of the wall. The light reflected in the steam creates an effect like fog and underlines the slow movement related to the warm steam.

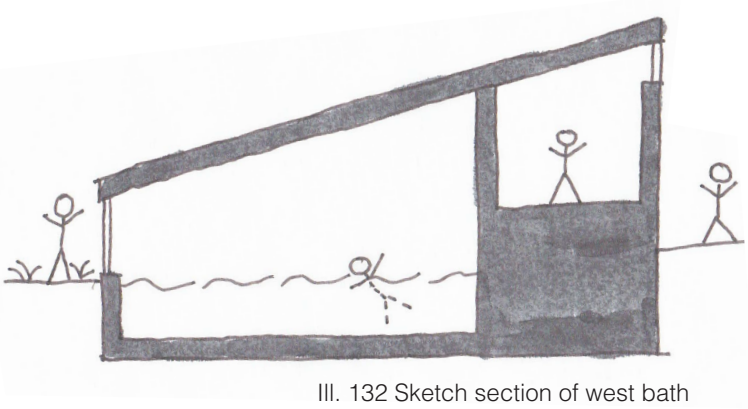
The water temperature is suitable for low activity and relaxing whilst being massaged by massage jets.



Ill. 130 The wast bath



Ill. 131 Concept sketch



Ill. 132 Sketch section of west bath

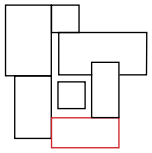
Ill. 133 Steam bath reference

Ill. 134 Underwater lighting reference

Ill. 135 Light beam reference

The south bath

Functions
Warm baths
33 °C, 31 °C
Small cold bath
Saunas



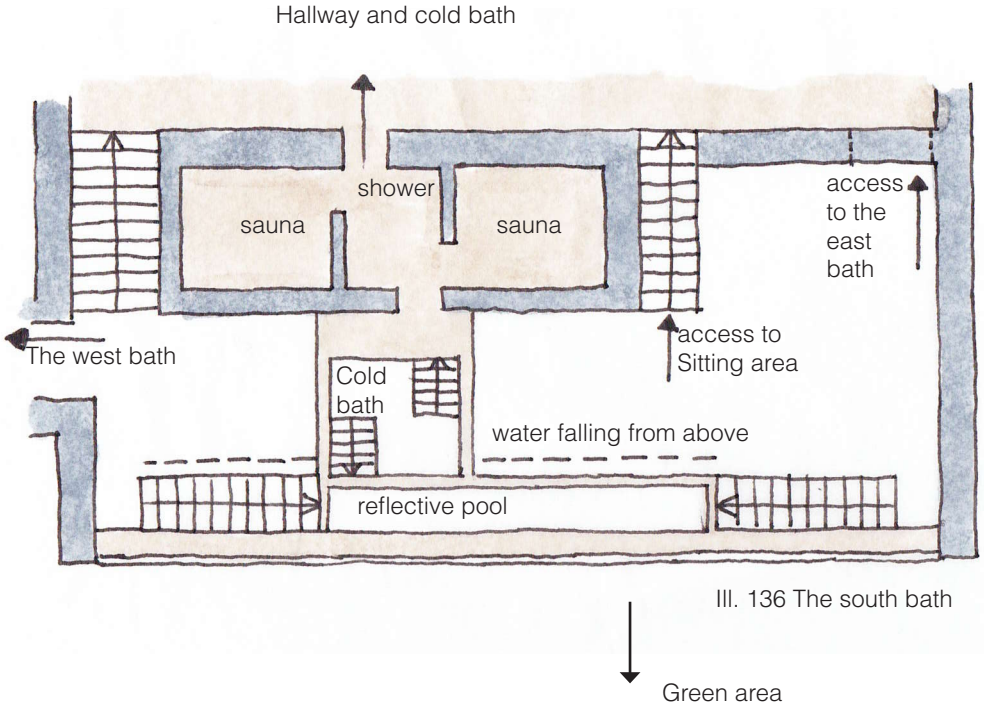
The main focus when designing the south bath has been the experience of different water temperatures and light.

A large glass facade creates a view of a green area outside while letting in light from south creating a contrast to the darker west bath.

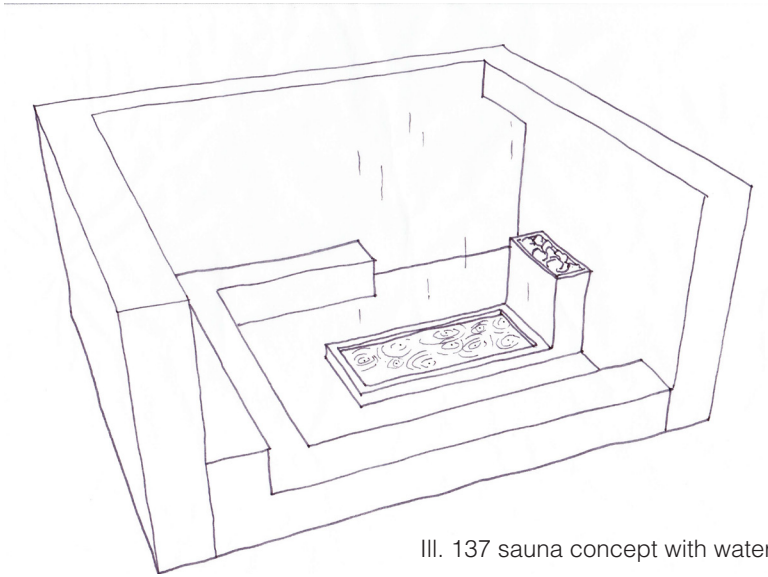
The light is reflected in a reflective pool which lights up the roof construction.
This reflective pool also functions as a path between the two pools as well as leading to the cold bath. The cold bath has to be passed to enter the saunas directly from this side; making the users aware of their movement and choises in the bath.

Along the edge of the reflective pool water is falling from above. The sound created by the falling water will be part of the atmosphere of the room.
The light from the facade will be broken by this falling water . This as well as the water itself can be experienced when sitting in the pool.

The saunas which are placed in relation to the cold bath have an interior of wood. One of them is a aroma-sauna whereas the other has a water feature.
It is also possible to enter the saunas from the hallway avoiding the cold bath. This furthermore gives the opportunity to go from the cold bath in the court yard directly to the saunas.



Ill. 136 The south bath

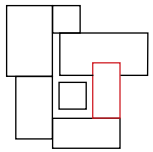


Ill. 137 sauna concept with water feature

Ill. 138 Water effect reference

The east bath

Functions
Warm bath 31 °C
bubble bath



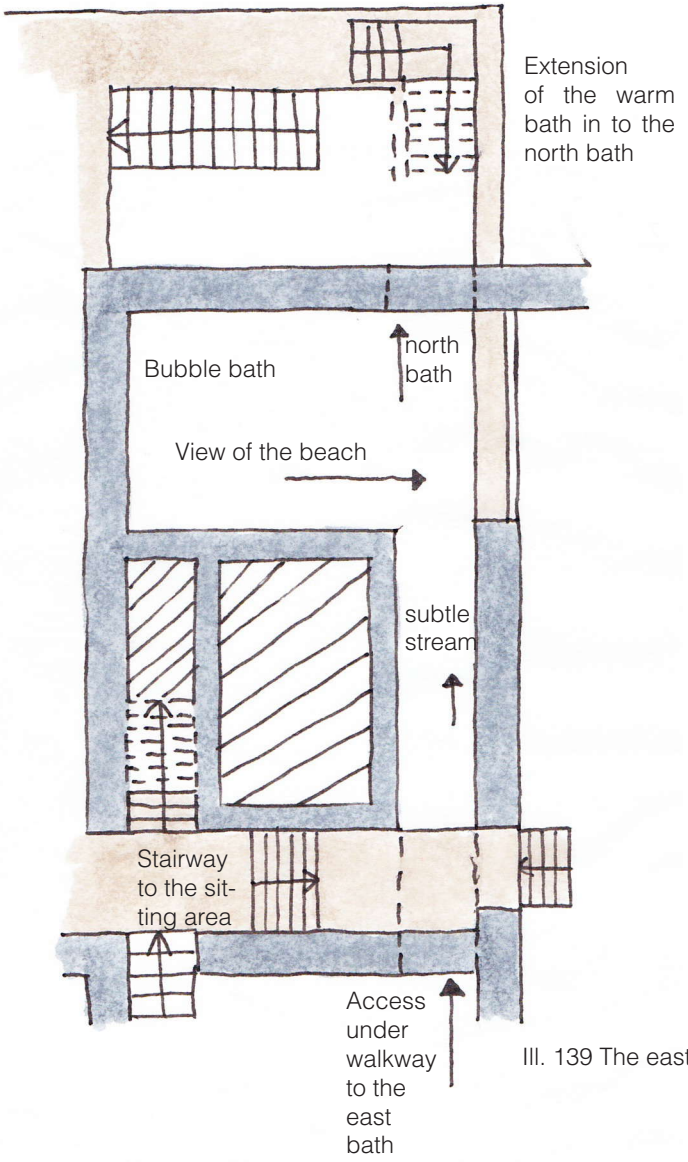
When designing the east bath focus has been on creating curiosity and exploration.

The east bath is entered through small openings either in the south or north bath.

When entering from the east bath you swim along a narrow passage leading under a walkway. The passage has a subtle stream, subtle enough to swim against, but strong enough to feel the resistance or flow depended on which way you are swimming.

After the passage the bubble bath reveals it self. From here there is a view to the beach.

The east bath is extended out in the cooler north bath as an enclosure where one can sit comfortably in the warmer water observing people swimming.

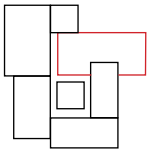


Ill. 139 The east bath

Ill. 140 View of Juelsminde strand

The north bath and the sitting area

Functions
Large bath 29 °C
Salt water bath
Pause area

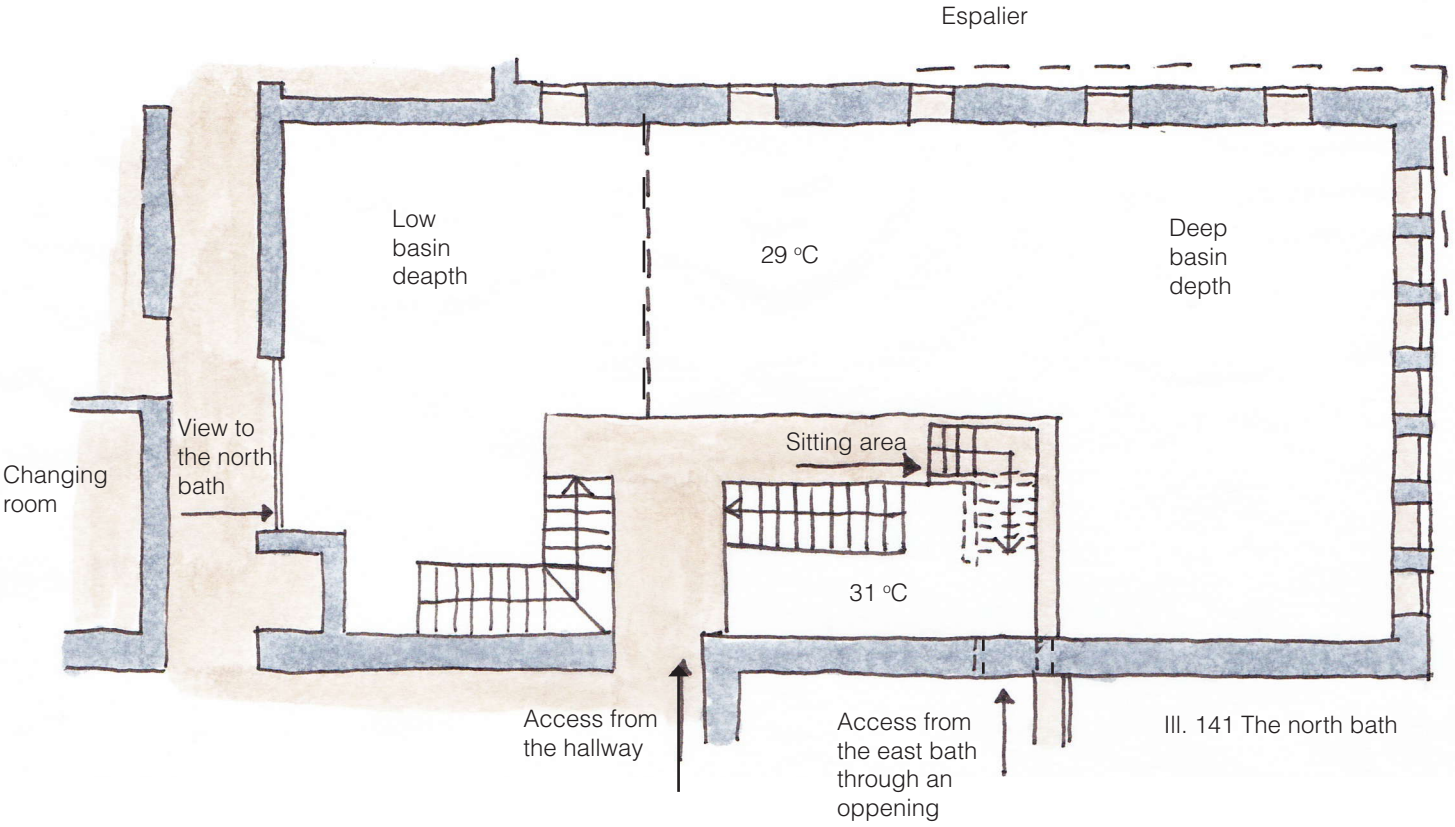


The main focus when designing the north bath has been the experience of the large and well lit interior.

The size of the bath makes it usable for swimming lanes and other physical water activities which requires space and a lower water temperature.

When coming from the changing room you walk past a window revealing a view of the bath. There is access to the bath from the hallway creating a close relation to the changing rooms.

The light coming in through the windows is filtrated through leaves of plants growing on an exterior trellis. Creating interesting shadows on the water surface.



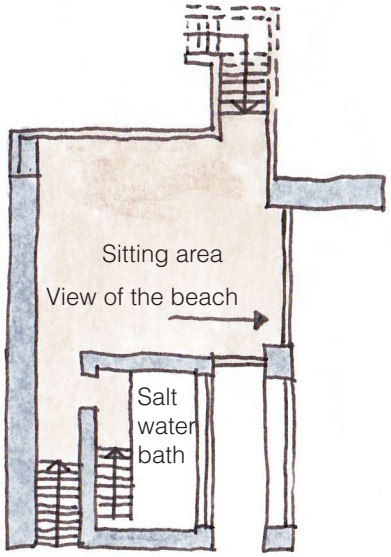
Ill. 141 The north bath

In the north bath a stairway leads up to the sitting area overlooking the bath.

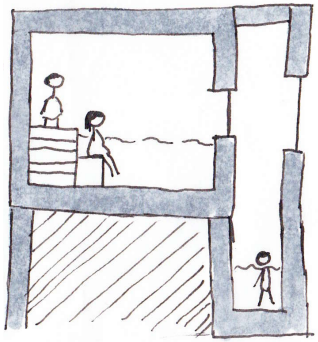
Different placements of the sitting area was tried out. The decision to place it on the first floor overlooking the large north bath was taken as this would be a natural pause after expe-riencing the smaller baths.

The sitting area has a view of the beach and sea which can be enjoyed while taking a pause from swimming.

In relation to this area is a salt water bath. When sitting in the salt water bath a slim elongated window reveals a view to the sea



Ill. 142 The sitting area

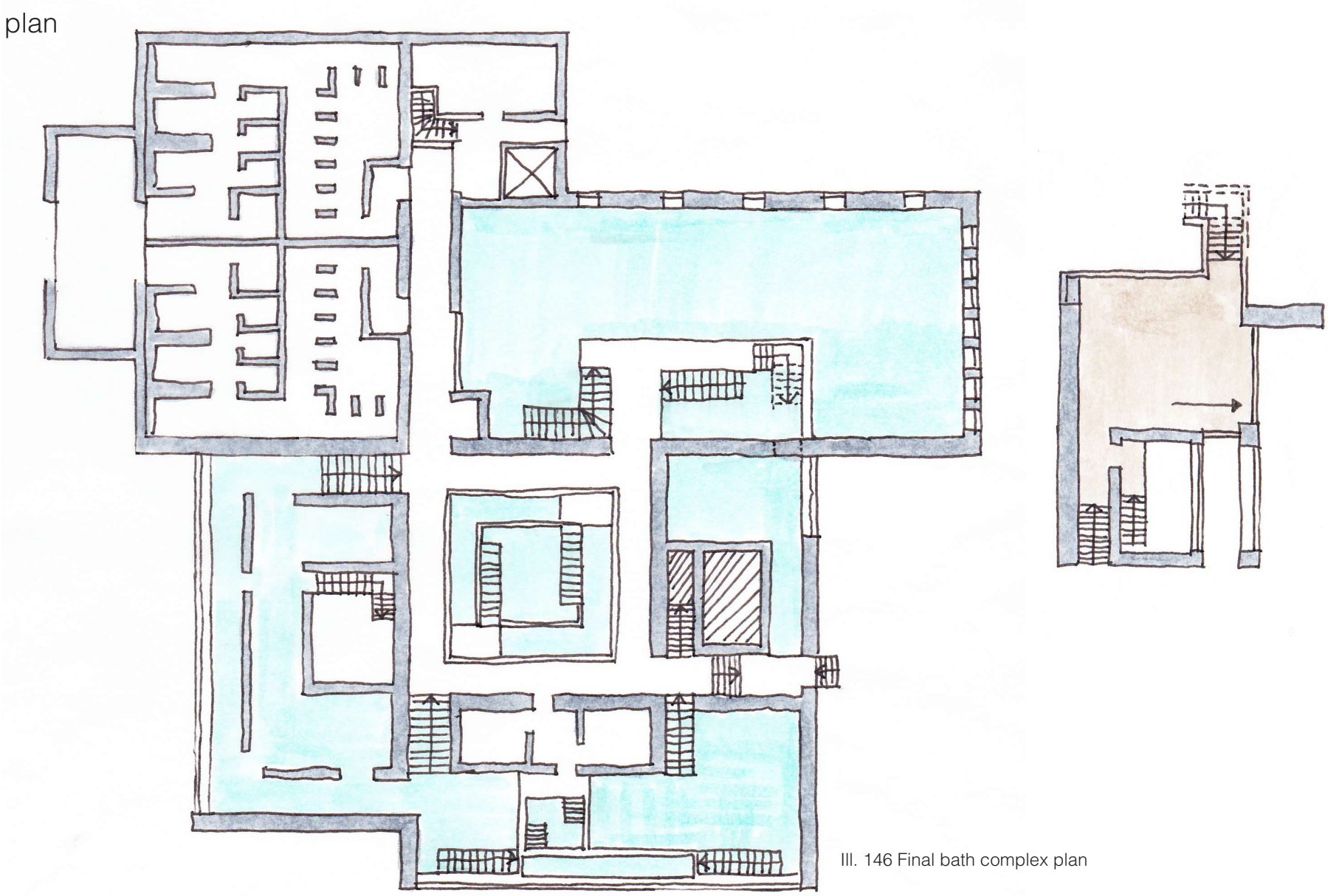


Ill 143 Concept section of the salt water bath

Ill. 144 shadow reference

Ill. 145 filtered light reference

The complete plan



Ground floor

First floor

Ill. 146 Final bath complex plan

Interior materials

For the interior walls of the bath grey bricks are chosen.

Ideas of mixing or separating brick and wood more or having different colours of brick was considered. But as the light conditions and volume of each room vary the idea of using the same material throughout the bath would enhance the experience of these different conditions.

The roof construction consists of wood beams and columns. The visible wood beams are used to emphasize the slope of the roof.

The pool floors are made of light coloured concrete.

Ill. 147 Gluiam column and beam reference

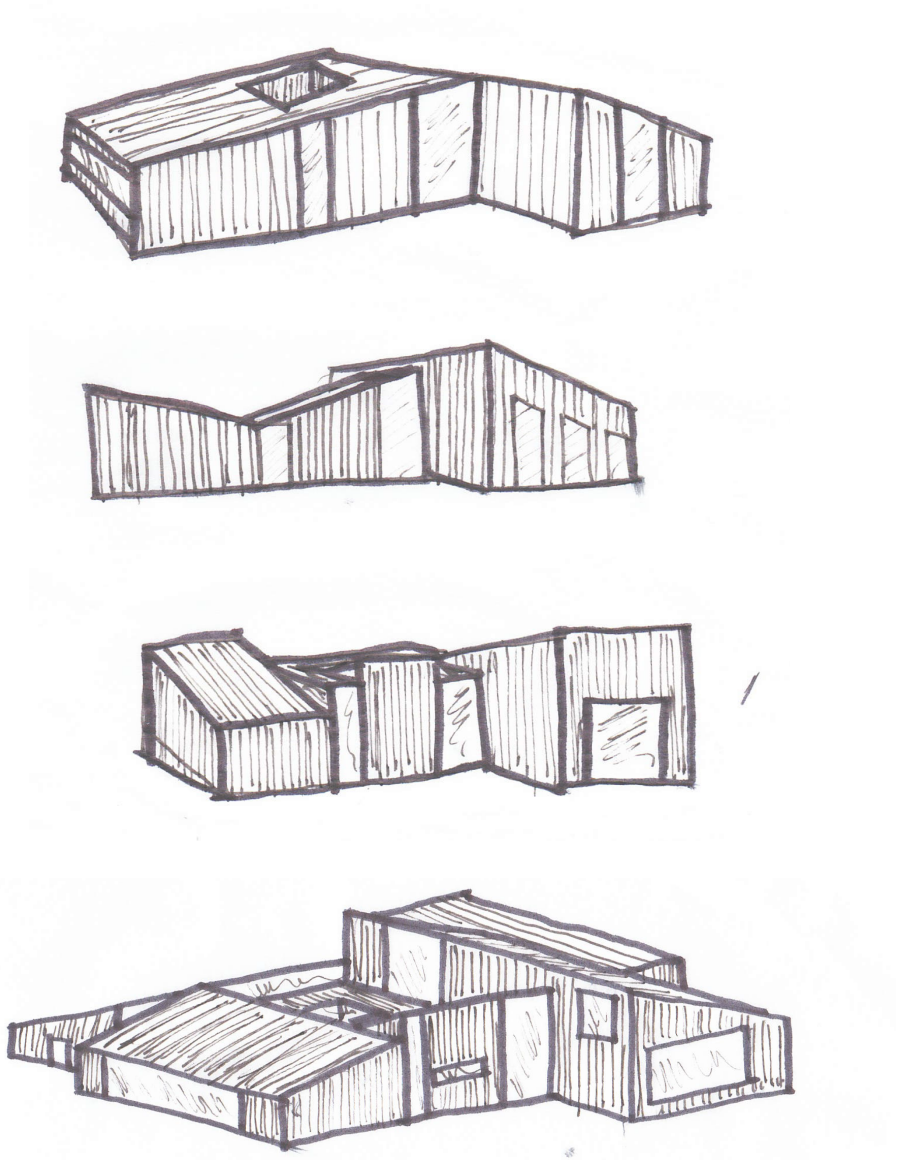
Ill. 148 Grey brick

The building volumes

Design and detailing of the building volumes was done simultaneously with the plans. The volume's heights vary according to which functions and atmospheres are intended inside.

In the emphasis of the final solution is put on the baths being expressed as individual units. Units which are connected by the hallway.
The possibility for implementing solar panels has also been a factor influencing the final solution

Ill. 149 Process render example of material study



Ill. 150-153 Studies of different building volumes

Exterior materials

The material used for the exterior of the bath are the same as the ones used for the holiday homes.

The building volumes are each clad with either brick or wood lamellar. To decide which volumes should have which materials different iterations were performed.

The two largest volumes are in brick and the rest in wood. This was based on the concept of expressing the volumes sizes, height and perceived weight through the use of material.

Trellis' are placed on the facade.
The scale of the espaliers adds more detail to the otherwise large volumes.

Ill. 154 West facade process render

Ill. 155 Brick reference, Sorø Museum

Ill. 156 Wood lamellar

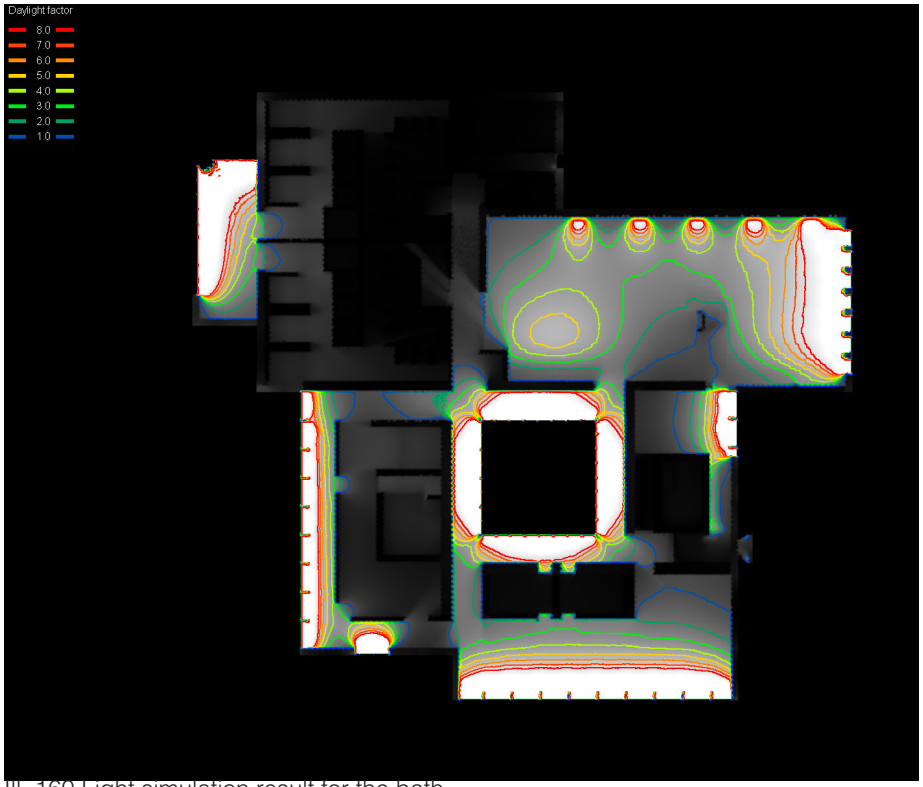
Ill. 157 Trellis with vegetation

Ill. 158 Trellis with green vegetation

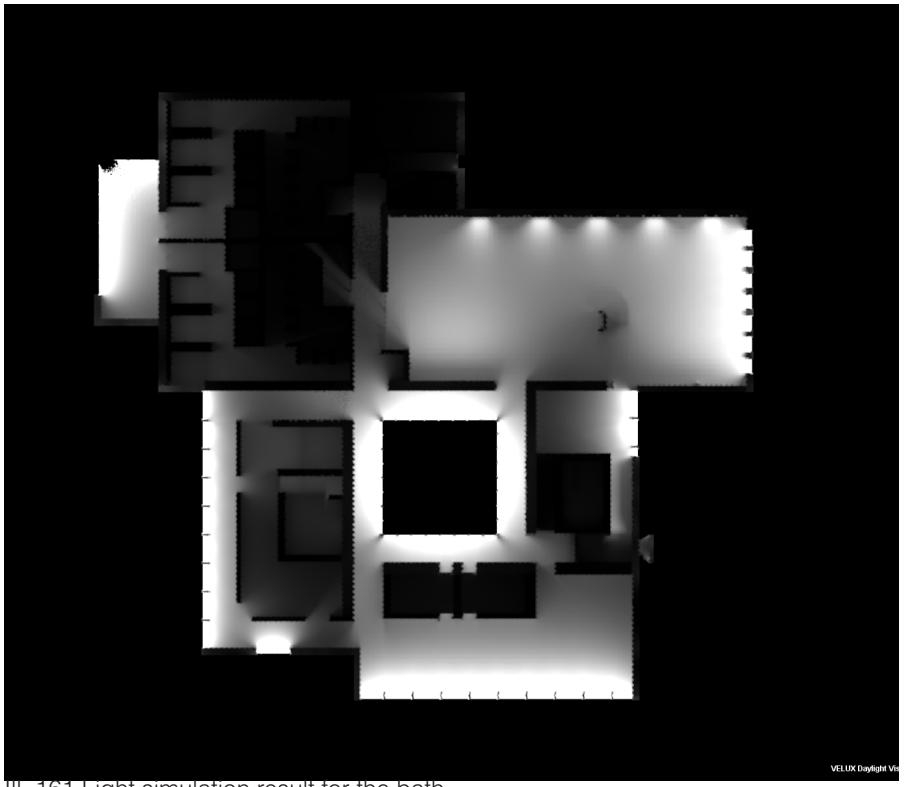
Ill. 159 Brick reference, Sorø Museum

Facades & daylight

Placement of windows in the facade has been influenced by the interior atmosphere, the general facade expression, as well as daylight studies. The illustration below is the final light simulation for the bath. These show the difference in lighting situations throughout the bath. and shows some of the details mentioned in the process



Ill. 160 Light simulation result for the bath



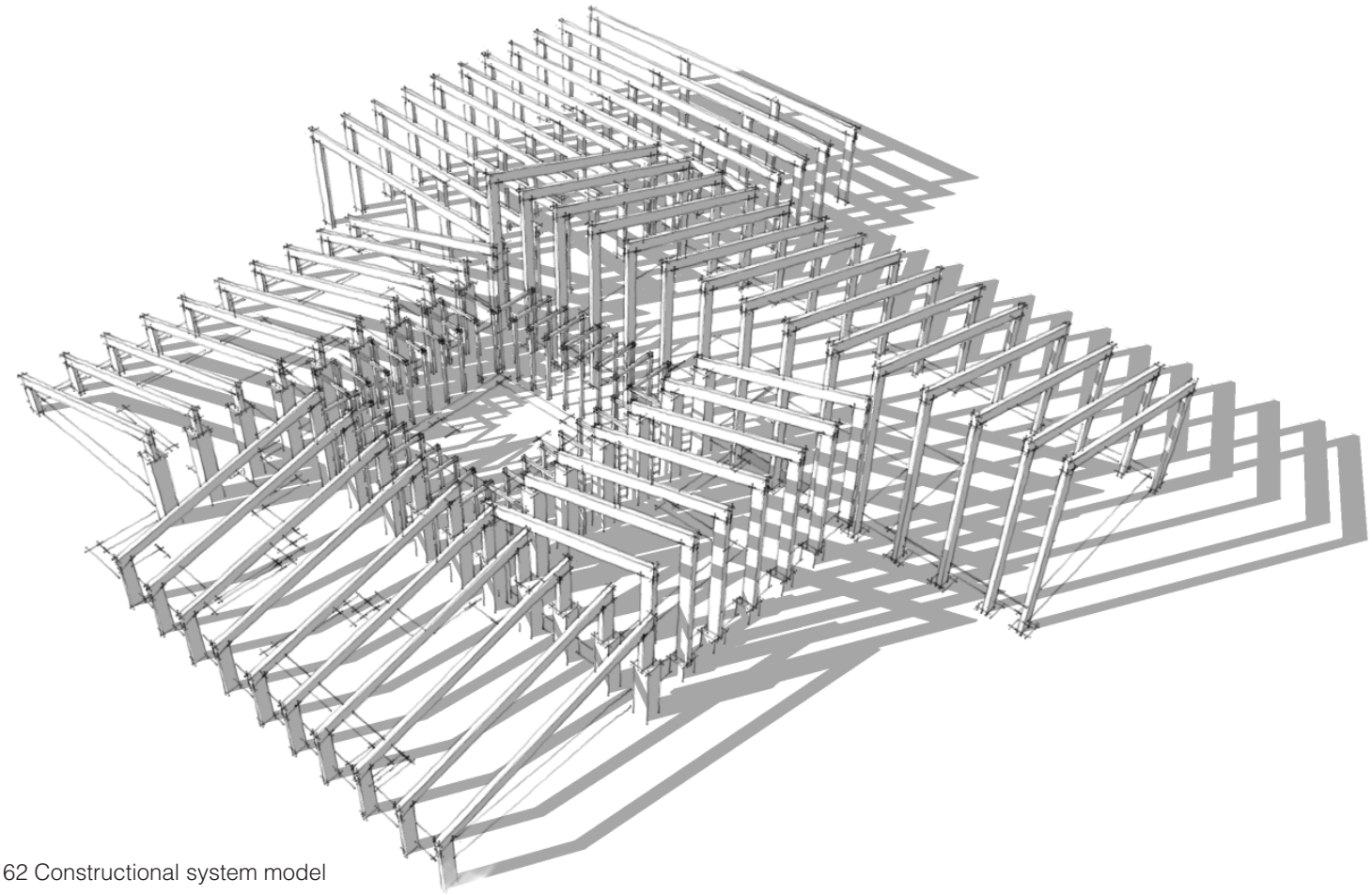
Ill. 161 Light simulation result for the bath

Constructional system

The constructional system consists of load-bearing concrete columns and load bearing walls based in the basement. The columns will be situated inside the brick walls of the ground floor. The roof is supported by a wooden structure connected to the columns.

The hollow brick walls are dimensioned to be used for plumbing and ventilation.

The basement has been dimensioned and worked with concerning mechanical ventilation and pool equipment access and load-bearing walls.
The load-bearing elements under the pools however, have not been detailed. These would probably be dimensioned to fit equipment and utility access to the pools, which is not our area of expertise. Space and access however has been ensured.



Ill. 162 Constructional system model

CONCLUSION

The focus of this project has been on the framework of an active vacation, where tranquillity, calmness and nature are key values. We have tried to address the mind-set and desires of our user-group in our design of a holiday resort in Juelsminde.

The initial studies of Juelsminde, Danish coastal tourism, atmospheres and the main user group informed the design in every scale of the project. A lot of emphasis was put on the organization of the holiday homes and the relation between inside and outside. Furthermore the possibility to move around in the homes to different spaces with different amounts of privacy and lighting situations were a large factor in the design as well.

The main focus was put on the holiday houses and the bath complex. The holiday houses are seen as the physical retreat from an active day at the resort as well as the stressful everyday life, where time seems to be in short supply. The home is designed to give the visitor the possibility to enjoy the nature of their context and experience living in different surroundings. The focus on verticality and the movement from façade to façade, underlines the fact that the visitor is encouraged to use the home as they see fit. The users are encouraged to move their seating and occupy the spaces they find most desirable during the day. The strong relation between in and out are further emphasized in the winter gardens, the expression of the façade and the materials. The winter gardens invite the users to move closer to the light and feel the temperature change relating to being outside; but without the nuisance of chilly winds or rainy days. They are part of the architectural expression and express the life inside them. The materials wrap around the house and continue either inside or out through the large glass sections, partly possible because of the winter gardens.

The houses are designed in a way where they fulfil the 2015 standard energy requirements without any active sustainable features added and can easily fulfil the 2020 requirements with a small amount of photovoltaics on the roofs. The focus has rather been on improving the winter garden and optimizing the space, expanding the period of use of the winter garden itself as well as the entire house. The focus on the winter garden and the added quality of the house because of it, addresses the wish to expand the period in which the resort will be in use.

The bath complex is a further enhancement of different atmospheres relating to the seasons and nature of Juelsminde. The materials are deliberately heavy and simple to highlight the different lighting situations in the baths. Furthermore the roof construction is emphasized by large glulam beams which add the different atmospheres in the amount of light they are exposed to and how far they are from the visitors. The bath focused on leading the visitor through the different sensuous situations created by light, views, temperature differences and different ways of perceiving water. The experience is designed as a path, but with many different opportunities to let the curiosity of the user take over and explore the different baths and saunas.

The technical aspects of the bath have been explored conceptually but not in detail. Information concerning temperatures of the baths, ventilation principles, energy requirements and others has been considered alongside different standards for low-energy pools and reference projects.

Together, the two entities focused upon compliments a different type of vacation, were the individual is in focus during their stay; but with an emphasis on being able to socialize during self-improvement classes. The effect of encouraging the visitor to make their own choices on how to occupy their space, stimulate the users' awareness of their choices and focus on their own well-being and ultimately makes them focus on getting the most out of their hard-earned holiday.

REFLECTION

Reflecting upon such a large project brings up many key issues, some addressed, some not. The size of the project as well as an ambition to define a new type of vacation insists upon having a very strong focus and a realistic approach to the amount possible to achieve within a project period. This was something we were aware of from the beginning - But a lack of control during the analysis and sketching phases had the consequence that some processes continued for too long considering the value of the outcome. This regretfully meant that the process of defining the alternative way of vacationing, as well as detail the master plan further, were finished too late in the process. This does not mean that the research made and the detailing of the master plan did not help the project – on the contrary it informed the design tremendously, but the project might have benefitted from keeping these subjects on a more conceptual level.

If this focus were achieved from the beginning the different features of the bath could have been explored in larger detail as well as some of the constructional details in the house, especially concerning the meeting of materials and between inside and outside. These details have been discussed and detailed, but were not included in the final product. If further detailing were to be done, these would be some of the things to be polished and reconsidered, bringing to project to a more detailed level. Furthermore the winter gardens were added and adjusted as to stay comfortable for a longer period of time. This part of the dwelling could be more detailed through further iterations and perhaps the integration of a ventilation system, which would benefit from the large fluctuations of temperature.

When looking at the solution for the site plan, one could consider cutting the building mass down, giving the opportunity to further put an emphasis on nature. This could make different interesting situations, where landscaping and the ideas of introducing water to the site could be further detailed. Working with more levels, maybe introducing a third housing unit on the third floor, could further integrate the fantastic views into the site and clear up some land for nature to flow through. Furthermore the decision of integrating the car and designing the house with an overhang does have the potential for refinement in the fact that the home still takes up a fair amount of space, even though it is compact inside.

Even though the choice was made to leave the concept of a parametric design, the holiday homes could benefit from smaller or more subtle elements, which addressed some of the concerns, when the building is rotated and changed – This might also help create a stronger link between the holiday homes.

Overall this project has been an attempt to use the integrated design process in a large scale. The integration of technical aspects has been kept on a conceptual level until late in the process, which, regretfully, made these aspects have a lesser impact on the project than desired. The practice was trying to work with concept, urban planning and three separate architectural areas with different use and scale as well. The positive effect was that they each informed each other, however a stronger focus and harder constraints might have helped in getting into even larger detail with the project

APPENDIX

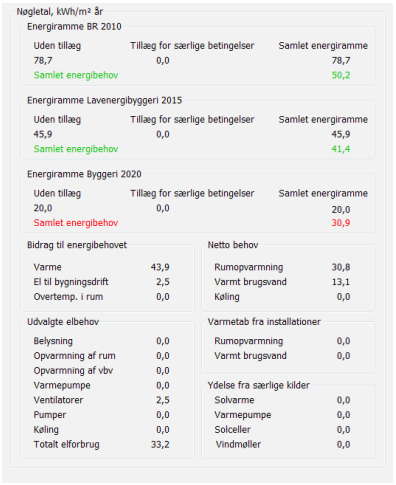
ENERGY CALCULATIONS

Be10

Be10 calculations is done to evaluate the buildings general energy performance.
The holiday houses have different orientations. The Be10 is done for the houses rotated 54, 133 and 313 degrees from south. The different orientations are reflected in the results of the Be10.
All the houses meet the demands of the building class 2015.

Because of the relatively large windows and shadowing terraces the energy demand is higher than the 20 kWh/ year pr m^2 which is the demand of class 2020. The energy demand could be brought down by not having the shadowing terraces. The terraces on the other hand helps reduce the risk of over heating during summer.

The Be10 shows that the winter garden has a positive effect on the energy demand as the transmission loss through the windows facing the winter garden is lower than the windows facing outdoors. The solar heat gained through the windows facing the winter garden is lower because of the glass in the winter garden, but the overall gain is larger than without the winter garden.



Nøgletal, kWh/m² år

Energiramme BR 2010

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
78,7	0,0	78,7
Samlet energibehov		50,2

Energiramme Lavenergibyggeri 2015

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
45,9	0,0	45,9
Samlet energibehov		41,4

Energiramme Byggeri 2020

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
20,0	0,0	20,0
Samlet energibehov		30,9

Bidrag til energibehovet

Varme	43,9
El til bygningsdrift	2,5
Overtemp. i rum	0,0

Netto behov

Rumopvarmning	30,8
Varmt brugsvand	13,1
Køling	0,0

Udvalgte elbehov

Belysning	0,0
Opvarmning af rum	0,0
Opvarmning af vbv	0,0
Varmepumpe	0,0
Ventilatorer	2,5
Pumper	0,0
Køling	0,0
Totalt elforbrug	33,2

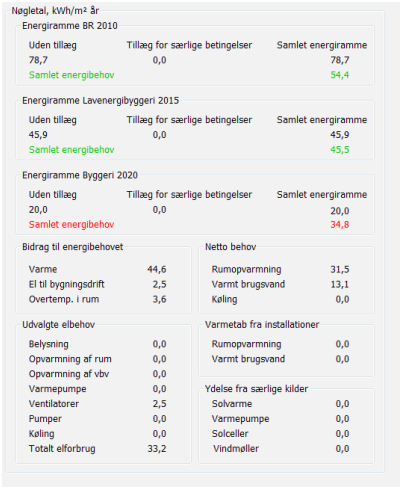
Varmetab fra installationer

Rumopvarmning	0,0
Varmt brugsvand	0,0

Ydelse fra særlige kilder

Solvarme	0,0
Varmepumpe	0,0
Solceller	0,0
Vindmøller	0,0

III. 163 54 ° rotation from south



Nøgletal, kWh/m² år

Energiramme BR 2010

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
78,7	0,0	78,7
Samlet energibehov		54,4

Energiramme Lavenergibyggeri 2015

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
45,9	0,0	45,9
Samlet energibehov		45,5

Energiramme Byggeri 2020

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
20,0	0,0	20,0
Samlet energibehov		34,8

Bidrag til energibehovet

Varme	44,6
El til bygningsdrift	2,5
Overtemp. i rum	3,6

Netto behov

Rumopvarmning	31,5
Varmt brugsvand	13,1
Køling	0,0

Udvalgte elbehov

Belysning	0,0
Opvarmning af rum	0,0
Opvarmning af vbv	0,0
Varmepumpe	0,0
Ventilatorer	2,5
Pumper	0,0
Køling	0,0
Totalt elforbrug	33,2

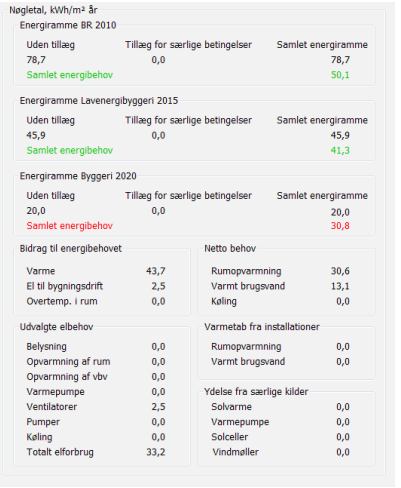
Varmetab fra installationer

Rumopvarmning	0,0
Varmt brugsvand	0,0

Ydelse fra særlige kilder

Solvarme	0,0
Varmepumpe	0,0
Solceller	0,0
Vindmøller	0,0

III. 164133 ° rotation from south



Nøgletal, kWh/m² år

Energiramme BR 2010

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
78,7	0,0	78,7
Samlet energibehov		50,1

Energiramme Lavenergibyggeri 2015

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
45,9	0,0	45,9
Samlet energibehov		41,3

Energiramme Byggeri 2020

Uden tillæg	Tillæg for særlige betingelser	Samlet energiramme
20,0	0,0	20,0
Samlet energibehov		30,8

Bidrag til energibehovet

Varme	43,7
El til bygningsdrift	2,5
Overtemp. i rum	0,0

Netto behov

Rumopvarmning	30,6
Varmt brugsvand	13,1
Køling	0,0

Udvalgte elbehov

Belysning	0,0
Opvarmning af rum	0,0
Opvarmning af vbv	0,0
Varmepumpe	0,0
Ventilatorer	2,5
Pumper	0,0
Køling	0,0
Totalt elforbrug	33,2

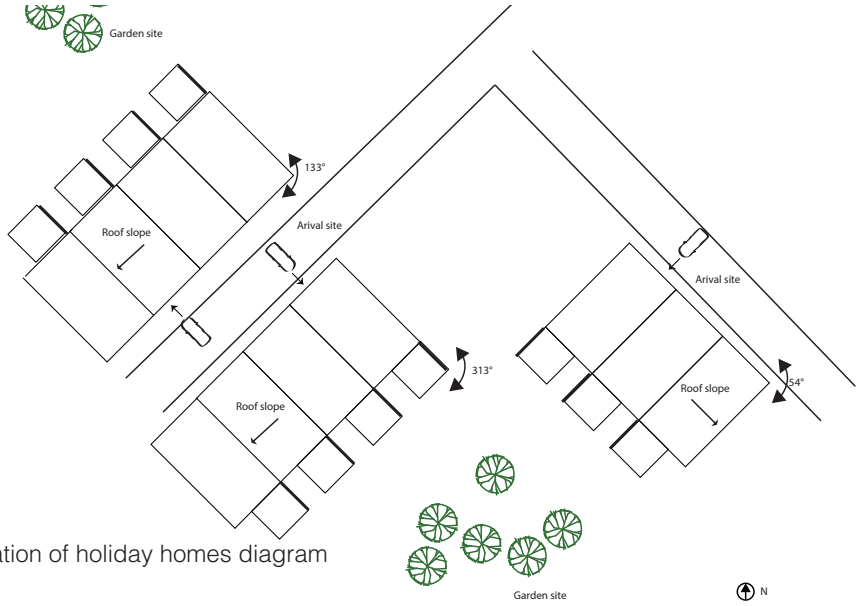
Varmetab fra installationer

Rumopvarmning	0,0
Varmt brugsvand	0,0

Ydelse fra særlige kilder

Solvarme	0,0
Varmepumpe	0,0
Solceller	0,0
Vindmøller	0,0

III. 165 313 ° rotation from south



III. 166 Rotation of holiday homes diagram

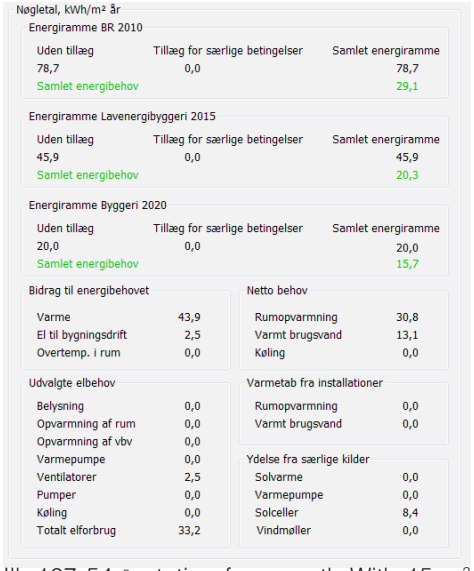
Implementation of renewable energy sources

To reach the building class 2020 solar cells are implemented. The roofs of the holiday houses has been designed with a slope to be able to implement solar cells.

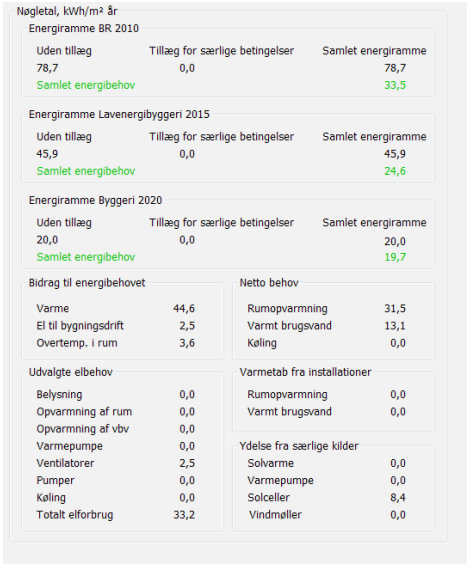
Integrating solar cells will typically not be the most optimal solution as it can be seen in the Be10 calculation that it is not the electricity but the heating which is the largest figure.

In this case the excess electricity produced can be used for the bath, which has a high energy demand. Implementation of solar cells will therefor be more efficient than implementation of solar thermal panels as the excess energy produced easily can provide electricity for the bath. The hot water produced by solar thermal panels has a great line loss which would make it unsustainable to transport the excess hot water form the houses to the bath

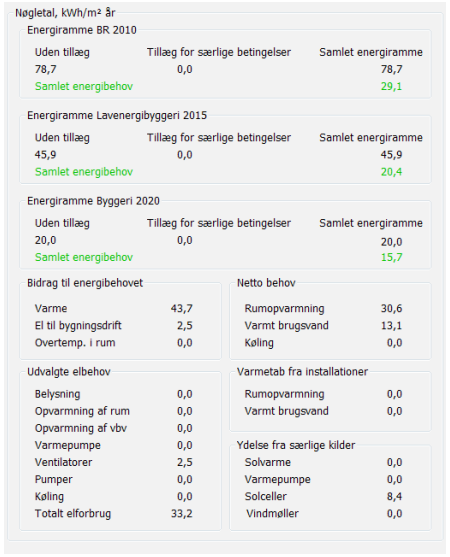
In the schema to the right it is seen how big an area of solar cells necessary for each house to reach building class 2020.



Ill. 167 54 ° rotation from south With 15 m² solar cells for every third house



Ill. 168133 ° rotation from south with 15 m² solar cells for every third house



Ill. 169 313 ° rotation from south with 15 m² solar cells for every third house

Solar cells, area per house

Rotation	class 2020	zero energy
54 °	3,66 m²	10,3 m²
133 °	5 m²	11,3 m²
313 °	3,66 m²	10,3 m²

INDOOR ENVIRONMENT SIMULATION

BSim

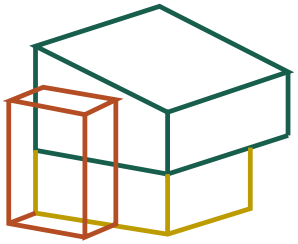
From the Be10 calculation it was found that the buildings can fulfil the demands in class 2015. The results shows that there is no over heating in the house. Be10 calculates the average temperature and does not consider the climatic fluctuations during the day. A dynamic indoor environment simulations is therefor performed to evaluate the indoor climate more specific. This simulation is done in BSim.

The simulation has been used to, amongst others, examine the operative temperature during summer to make sure it is acceptable.

It also provided data which told us in which time intervals the winter garden has a pleasant climate during winter and what influence the thermal mass and construction of the winter garden has on the indoor environment.

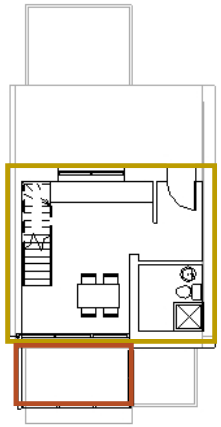
The BSim model is divided in 3 thermal zones, the ground floor with kitchen and bath, the first floor whit living room and bed room, and the winter garden. BSim calculates the average temperature for each zone and a division in three zones is therefor necessary to get an idea of the different temperatures in the different parts of the house.

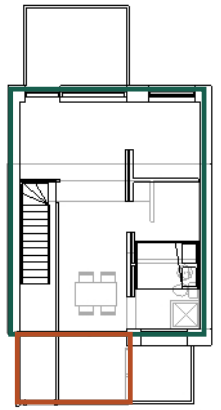
The input parameters for the model are described in the section *model data*



Thermal zones

- Wintergarden
- Kitchen/bathroom
- Living/beedrooms





Ill. 170-172 Thermal zone diagrams

Ventilation rate examined in BSim

It is examined if the ventilation rates during winter and summer are capable of keeping the temperature, Co_2 level and sensory experience on an acceptable level.

The holiday homes are dimensioned for 4 persons therefor the simulation is done with 4 persons in the kitchen/bath zone 100% of the time between 9 and 20, and in the living/bed room zone 100% of the time between 20 and 9.
This is not likely to accrue as the amount of persons varies according to season and as they wont be 100% present in the holiday home all the time, but the simulation shows if building have the necessary ventilation capacity.

Summer scenario

During summer natural ventilation is used. The ventilation rate depends on the openings of the house. The simulation showed that the openings provided the necessary ventilation rate to keep the temperature on an acceptable level. Less than 100 hours above 26 and less than 10 over 27.

The simulation also showed that the Co2 level is the main cause of venting during night in the living/bed room zone. The venting cause the temperature to drop under 20 degrees sometimes. Therefor it is necessary to have the mechanical exhaust on during night in some month. This will increase the energy demand for ventilation.

Winter scenario

The mechanical ventilation rate is dimensioned from the goal of having a good sensory experience. The simulation shows that the 0,08 m^3/s ventilation is enough to keep the temperature at an acceptable level.

The simulation concerning the winter scenario is also done for a scenario where two persons occupy the holiday home. The mechanical ventilation rate is 0,06 m^3/s. This scenario also gives an acceptable indoor climate.

People load
4 persons

Living/bed room
kl 20-9 100%

Kitchen/bath
9--20 100%

Cooling season: natural ventilation
Warming season: mechanical ventilation

Results for a year
Rotation: 54 degrees

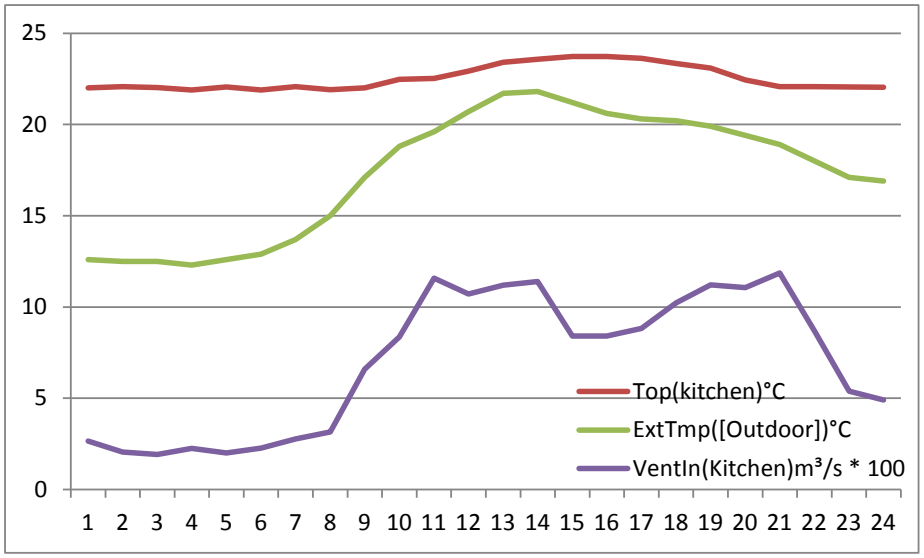
living/bed room zone:
Hours > 26 degrees: 10
Hours> 27 degrees: 0

Kitchen/bath zone:
Hours > 26 degrees: 17
Hours > 27 degrees: 2

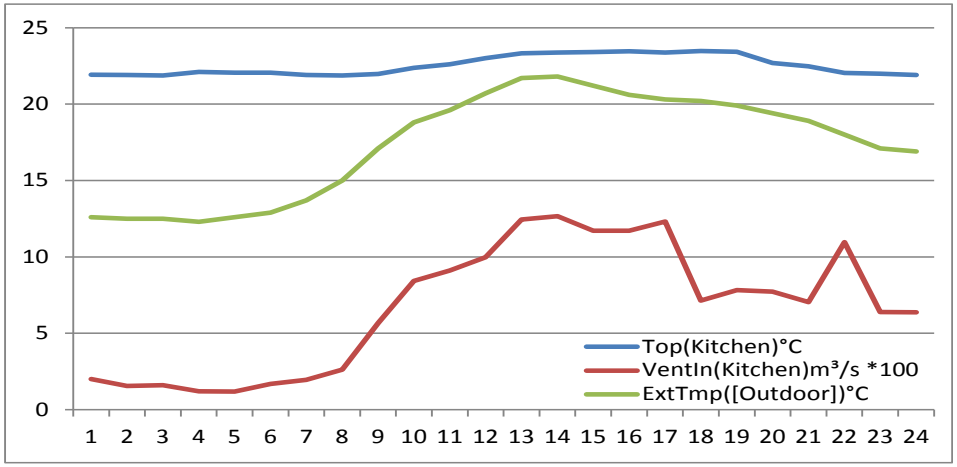
Result for a year,
Rotation: 133 degrees

Living/bed room zone:
Hours > 26 degrees: 63
Hours> 27 degrees: 5

Kitchen/bath zone:
Hours > 26 degrees: 27
Hours > 27 degrees: 5



Ill. 173
14.06.2002 the indoor temperature of the kitchen and the natural ventilation rate. The building is rotated 54 degrees from south



Ill. 174
14.06.2002 the indoor temperature of the kitchen and the natural ventilation rate. 133 degrees rotation from south.

Thermal comfort - the winter garden

Thermal mass and insulation

To design the winter garden investigations on the insulations and thermal mass' influence on the temperature in the winter garden is done.

The test is done on a winter garden attached to a holiday home rotated 54 degrees from south. In this test thermal buoyancy is the only ventilation source.

A simulation was done to determine the level of insulation and if the floor should be wood or bare concrete.
The result showed that the winter garden gets hot even during sunny days during winter. As the winter garden is expected to be used during the day the u-value was changed from the initial 0,2 W/m2 K to 0,7 W/m2 K. This made a significant change on the high temperature during summer but without reducing the temperature during winter to much.

The simulation also showed how the bare concrete floor helped keep the temperature more stable than if the winter garden had a wood floor.

Temperature

The orientation of the winter garden influence the temperature. A simulation is done for a holiday home rotated 54 and 133 degrees from south. It can be seen that the holiday houses rotated 54 degrees has a higher temperature than the outdoor. This means that the winter gardens on sunny days during winter has an comfortable temperature and can prolong the season.

The winter garden rotated 133 degrees does not get as warm during winter because of the orientation. During summer the holiday homes rotated 133 degrees on the other hand are warmer during evenings where the guest are expected to use the winter garden.

From the simulations it is seen that some orientations are better during summer where as some are better during winter.

It can also be seen that there are some days during the hottest months where the winter garden gets hot in the middle of the day. It is assumed that the winter garden is most likely to be used during morning and evening, but when used during the middle of the day solar shading can be used to prevent over heating.

Results

54 degree rotation

Max temperature: 43

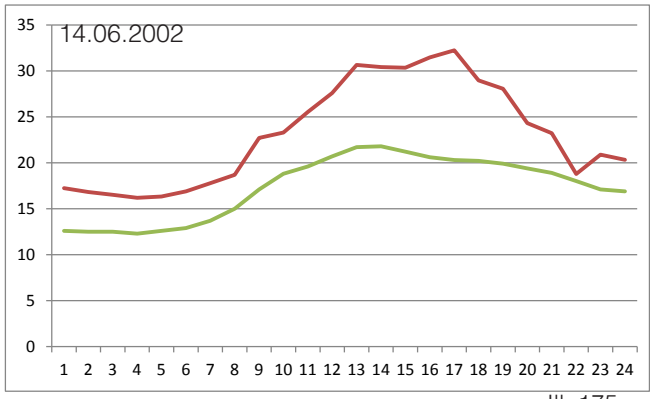
This is without solar shading

Results

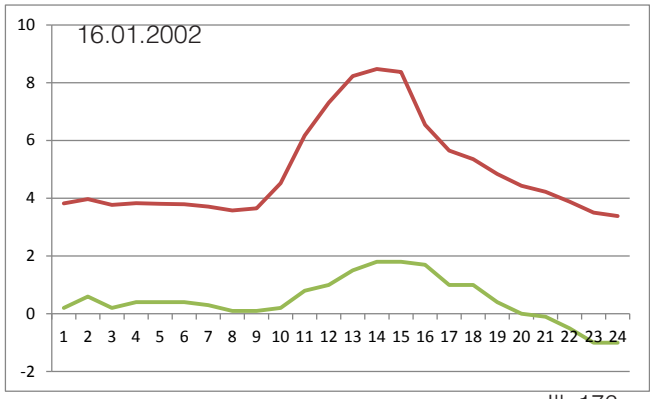
133 degree rotation

Max temperature: 42

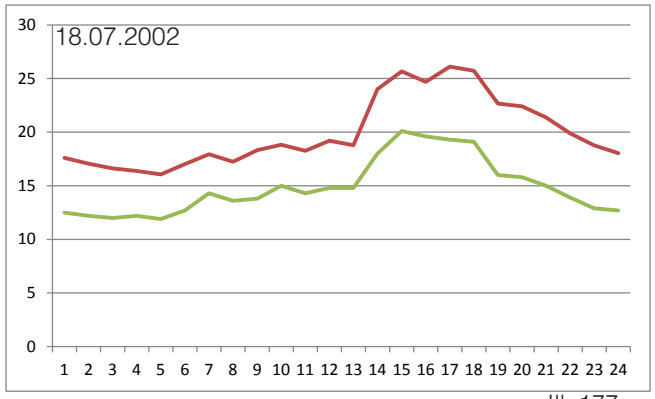
This is without solar shading



Ill. 175

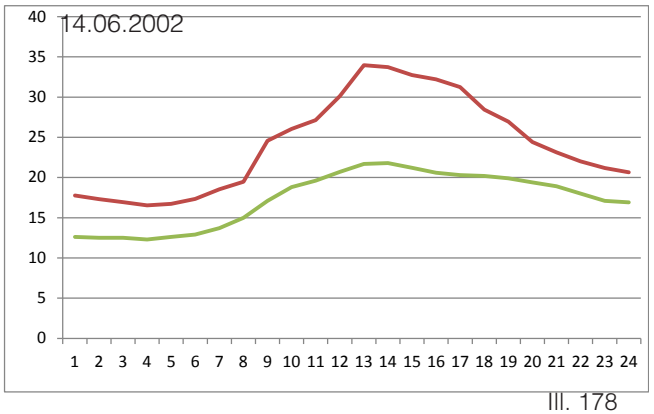


Ill. 176

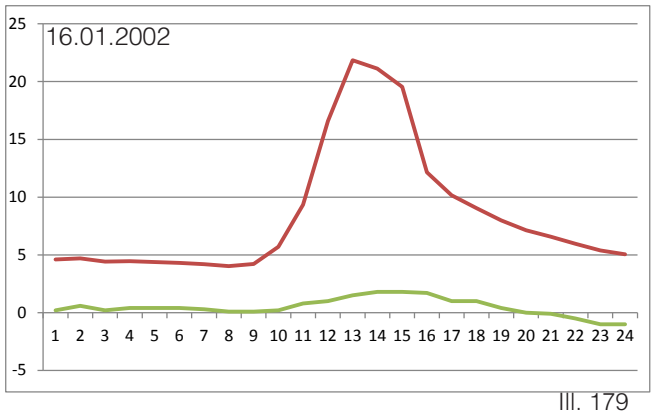


Ill. 177

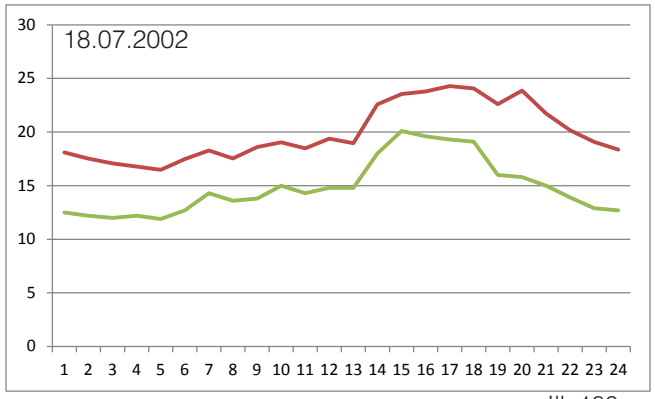
133 degree rotation. Temperature in the winter garden



Ill. 178



Ill. 179



Ill. 180

54 degree rotation, temperature in the winter garden

Temp winter garden

Outdoor temp

Heating during winter

During winter some of the holiday homes are not occupied. This means that the heating can be turned down and activated before the guests arrives.

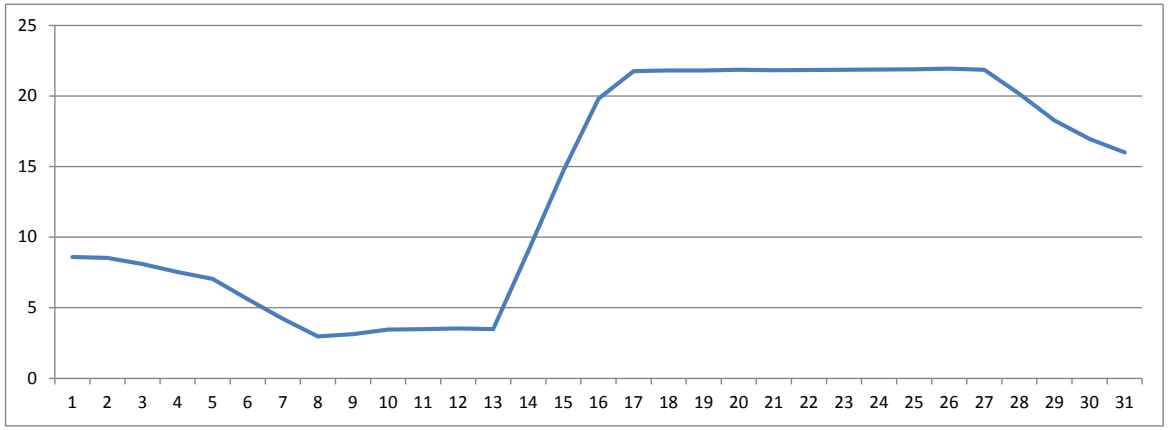
A simulation of the situation where the heating system was shot down showed that the holiday home because of the low infiltration wouldn't have an indoor temperature below 4 degrees. This means that the holiday houses can be unheated during winter without reaching the freezing point.

The holiday home has to be heated to 22 degrees when the guests arrive. A simulation is done to find out how long before the heating has to be turned on to have a the mean radiant temperature reach 22 C°.

The simulation shows how long it takes to heat up form, 5 C°, 10 C°, 15 C° and 22 C°.

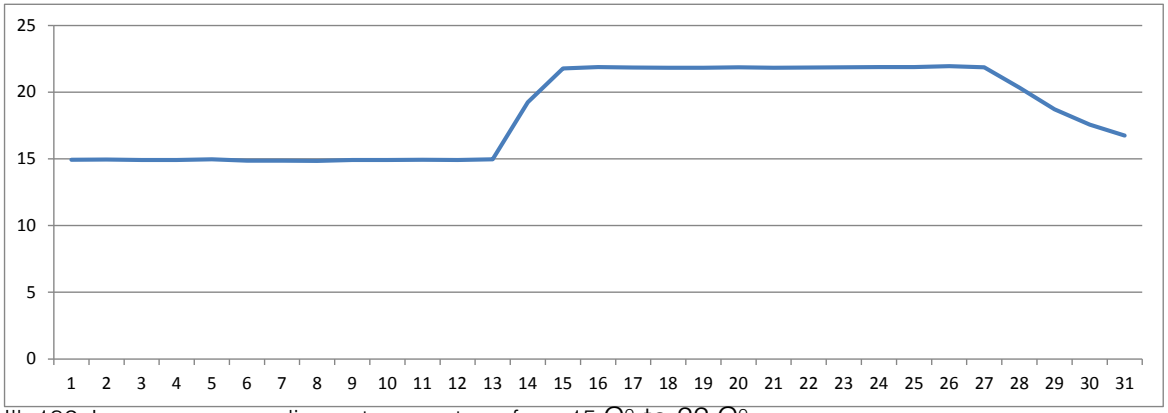
The result shows that it almost takes 4 days to reach a mean radiant temperature of 22 C° when the house is unheated.

Less energy is used for heating, but in situations where the house is used more frequently during this period the heating has to be on, to insure that the temperature have reached 22 C° when the guests arrives.



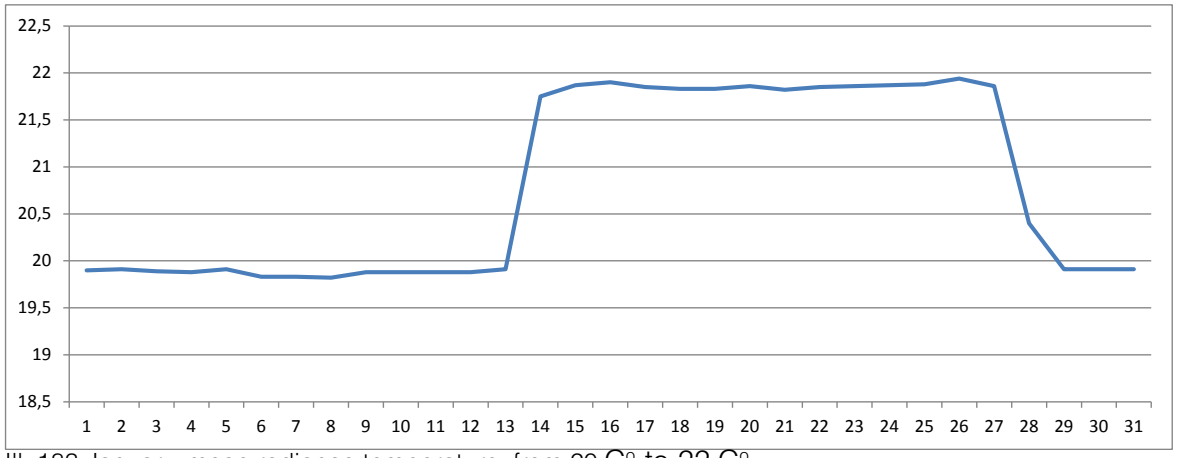
Ill. 181 January, mean radiance temperature, from 3 C° to 22 C°

it takes approximately 3 days to reach a mean radiance temperature of 22 C° when the house is unheated



Ill. 182 January, mean radiance temperature, from 15 C° to 22 C°

It takes approximately 1,5 days to reach a mean radiance temperature of 22 C° from 15 C°



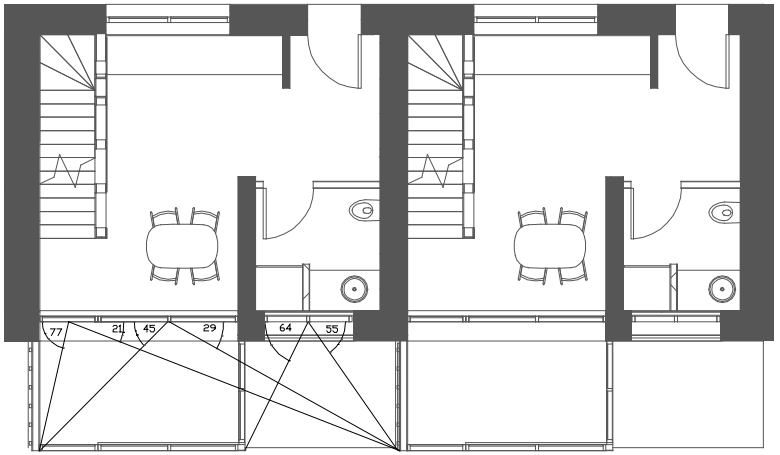
Ill. 183 January, mean radiance temperature, from 20 C° to 22 C°

It takes approximately 0,5 days to reach a mean radiance temperature of 22 C° from 20 C°

MODEL DATA

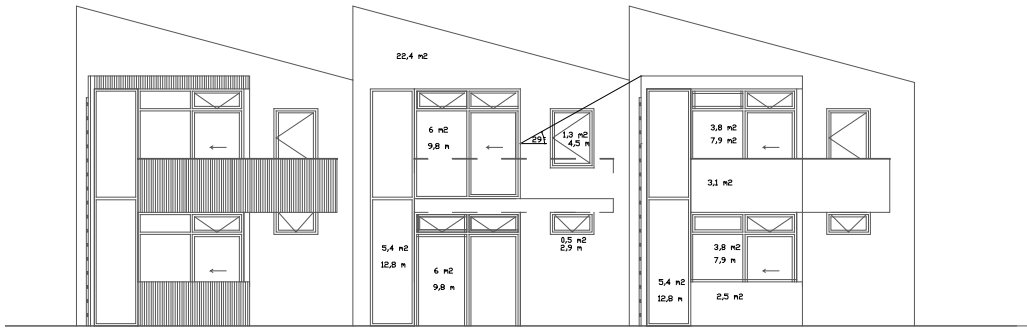
Netto area and volume of a holiday house

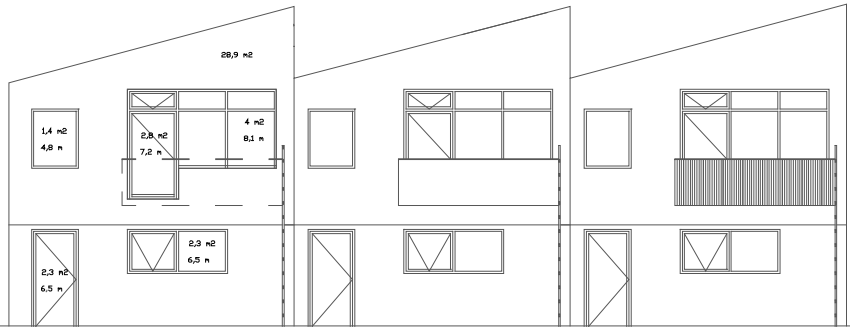
Heated floor area kitchen	27,5 m^2
Heated floor area first floor	35,5 m^2
Sum	63 m^2
Volume ground level Room height 2,4 m Volume	66 m^3
Volume first floor Room height 1,8- 3,4 m Volume	106 m^3
Total volume	172 m^3



III. 184

The shadows created by the winter garden and terraces has a great influence on the amount of solar transmission through the windows. The drawings shows some of the angels used for shadow calculation in Be10.

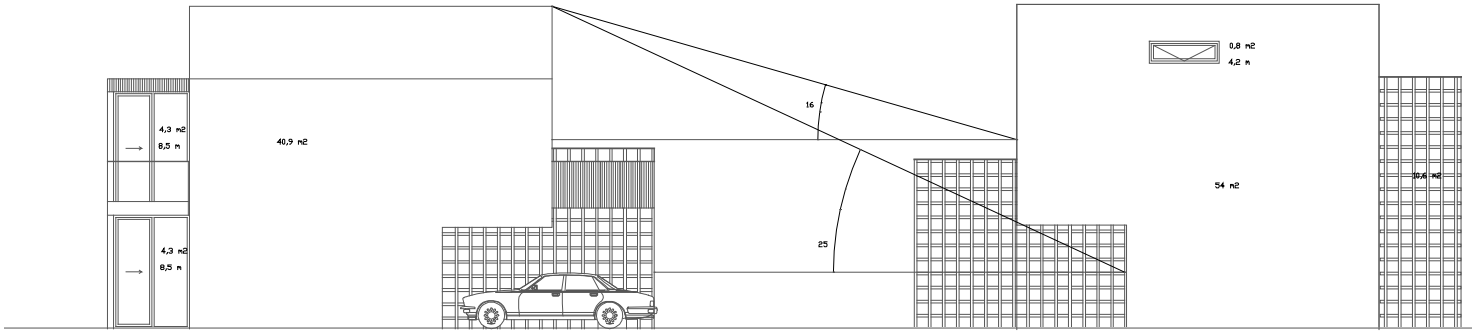


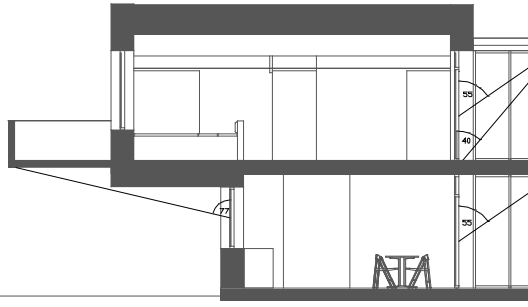


III. 185

Windows

Windows		Antal	Orient	Areal (m²)	U (W/m²K)	b	Ff (-)	g (-)	afrac	cnt
Small bed room	3	N	1,4	0,72	1,000	0,85	0,50			
Living room window	3	N	4,0	0,72	1,000	0,79	0,50			
Living room door	3	N	2,8	0,90	1,000	0,81	0,50	1	0,5	
Front door	3	N	2,3	0,80	1,000	0,80	0,00			
Kitchen	3	N	2,3	1,00	1,000	0,88	0,50	0,3	0,2	
Bedroom	3	S	1,3	0,82	1,000	0,85	0,50	1	0,5	
Bath	3	S	0,5	1,10	1,000	0,49	0,50	0,4	0,2	
Winter garden tall window	3	S	5,4	1,20	1,000	0,89	0,80			
Winter garden window	3	S	3,8	1,30	1,000	0,87	0,80	0,5	0,5	
Winter garden window	3	S	3,8	1,30	1,000	0,87	0,80	0,5	0,5	
Winter garden door	3	Ø	4,3	1,30	1,000	0,84	0,80	0,7	0,5	
Winter garden door	3	ø	4,3	1,30	1,000	0,84	0,80	0,7	0,5	
Living room towards w. g. tall window	3	s	5,4	0,90	0,664	0,89	0,59	0,5	0,5	
Living room towards w. g. double door	3	s	6,0	0,90	0,664	0,84	0,59	1	0,5	
Living room towards w. g. double door	3	s	6,0	0,90	0,664	0,84	0,59	1	0,5	
Small window over the stair	3	v	0,8	1,00	1,000	0,72	0,59			





Ill. 186

Wall construction

The scheme shows the U-values and construction of the different parts of the house.
The U-values are standard values provided by Isover and Rockwoll, the drawings can be seen on the attached CDrom.

Brick wall 519 mm

60 mm brick, petersen tegl kolumba

40 mm wood cross battens

9 mm ventilated cavity

340 mm insulation,
Columns (45 mm x 340 mm)

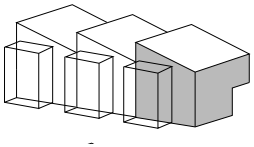
Vapour barrier

45 mm insulation,
Cross battens (45 mm x 45 mm)

13 mm plasterboard

12 mm veneer

U value: 0,10 W/m^{2}K



Partition wall 374 mm

12 mm veneer

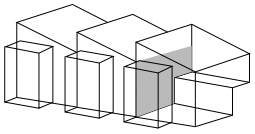
100 mm concrete

150 mm rigid insulation,

100 mm concrete

12 mm veneer

U value: 0,18 W/m^{2}K



Extension of part. wall 371 mm

60 mm brick, petersen tegl kolumba

40 mm wood cross battens

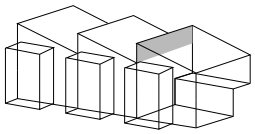
9 mm ventilated cavity

150 mm rigid insulation,

100 mm concrete

12 mm veneer

U value: 0,18 W/m^{2}K



Roof 656 mm

60 mm brick, petersen tegl kolumba

40 mm wood cross battens

9 mm ventilated cavity

2 mm Asphalt

13 mm plywood

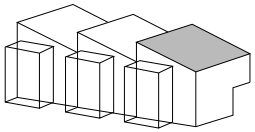
400 mm insulation

vapour resistance

120 mm insulation,

12 mm ceiling

U value: 0,07 W/m^{2}K



Ground slab 589

22 mm wood flooring

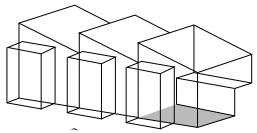
vapour barrier

100 mm concrete

375 mm polystyrene

150 mm sand

U value: 0,08 W/m^{2}K



Overhang 579 mm

22 mm wood flooring

70 mm

vapour barrier

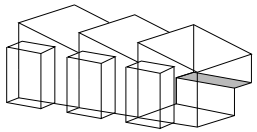
200 mm concrete

220 mm insulation between laths (45 x 275) pr 600 mm

45 mm insulation between joits

22 mm wood cladding

U value: 0,1 W/m^{2}K



interior floor slab 314 mm

22 mm wood flooring

70 mm insulation

Vapour barrier

200 mm concrete

22 mm plaster

VENTILATION RATES

The following describes the necessary ventilation rates.
The ventilation rates which comply with the Danish building regulations and the rates insuring a comfortable indoor climate.

INFILTRATION

Infiltration is determined by the equation:[67]

Infiltration = 0,04+0,06 $\times q_{50}$ *l*/s pr m^2 heated floor area

q50 is the ventilation rate at a pressure test with 50 Pa.

The Danish building regulations class 2020 demand to q_{50}:

q_{50}= 0,5 *l*/s pr m^2 heated floor area

Infiltration =0,07 *l*/s pr m^2 heated floor area

Infiltration for the holiday house:

Infiltration = 0,07 *l*/s pr m^2* 63 m^2 = 4,41 l/s =0,092 h^{-1}

VENTILATION DEMANDS

Minimum ventilation rate according to the Danish building regulations:[68]

0,3 *l*/s pr m^2 heated floor area

Ventilation rate the whole holiday home:

0,3 *l*/s pr m^2 * 63 m^2 = 18,9 l/s

Minimum exhaust in the more polluted zones according to the Danish building regulations.:

15 l/s bath
20 l/s kitchen

The ventilation rate for the holiday home:

35l/s / 63 m^2 = 0,5 l/s pr m^2

Ventilations rate calculated based on sensory experience

The calculations are based on guidlines in Cr1752 [69]

The ventilation rate is given by:

$Q_c = 10 * (G_c/(C_{ci} - C_{ca})) * (1/E_v)$

$Q_{c,}$ the required ventilation rate, l/s

$G_{c\ ,}$ the sensory pollution, olf
- Low pollution building 0,1 olf/ m^2
- Pollution per person 1 olf/occupant

C_{ci} , The desired perceived indoor air quality,
- For category B the goal is1,4 dp

C_{ca}, the perceived outdoor air quality at air intake
- For low towns with good air quality: 0,1 dp

$1/E_v$, the ventilation effectiveness
- For mixing ventilation the value is 1

For two persons in the holiday home the ventilation rate is:

$Q = 10 * ((0,1\ olf/\ m^2 * 63\ m^2 + 2\ per. * 1\ olf)/(1,4 - 0,1)) = 63,8\ l/s$

For four persons in the holiday home the ventilation rate is:

$Q = 10 * ((0,1\ olf/\ m^2 * 63\ m^2 + 4\ per. * 1\ olf)/(1,4 - 0,1)) = 79,2\ l/s$

The building in itself contributes to a large part of the pollution:

$Q = 10 * ((0,1\ olf/\ m^2 * 63\ m^2)/(1,4 - 0,1)) = 48,5\ l/s$

Ventilations rate based on CO_2 level

The calculations are based on guidlines in Cr1752 [70]

The ventilation rate is given by:

$Q_h = (G_h/(C_{hi} - C_{ha})) * (1/E_v)$

Q_h, is the ventilation rate,

G_h, is the pollution, l/s
- CO_2 pollution is 0,0053 l/s per person

C_{hi} , The desired concentration of CO_2 above outdoor concentration
- For category B, 500 ppm

C_{ca}, the outdoor concentration of CO_2
- Average for outdoor air 350 ppm

$1/E_v$, the ventilation effectiveness,
- For mixing ventilation the value is 1

The ventilation rate for 2 persons:

$Q_h = (2\ per * 0,0053\ l/s) / (0,0005) = 21,2\ l/s$

The ventilation rate for 4 persons:

$Q_h = (4\ per * 0,0053\ l/s) / (0,0005) = 42,4\ l/s$

Conclusion

BE10

The ventilation rate used in the BE10 calculation have to fulfil the Danish building regulations demands.

Infiltration: 0,07 l/s pr m^2

Ventilation: 0,5 l/s pr m^2

With this ventilation rate the CO_2 level is held under the concentration recommended in DS/EN 15251 when two persons are in the holiday home.

As Be10 is a tool for showing the buildings general energy performance the ventilation rate based on sensory experience is not used. If the indoor environment is improved by a higher ventilation rate the extra energy used for ventilation is deducted form the overall energy use in Be10 as a bonus for creating a better indoor climate.

BSim

In BSim the ventilation rates based on sensory experience is used. These can give an acceptable indoor environment according to DS/EN 15251's class II.
The calculation showed that the ventilation rate of the holiday home will depend on the number of occupants.

In periods where the holiday home is occupied by 2 persons the ventilation rate is:

63 l/s

In periods where the holiday homes are occupied by 4 persons the ventilation rate is:

79,2 l/s

Be10 composition

The scheme describes the different input parameters for Be10

Building	Terraced houses, 3 units- 189 m^2 heated floor area Heat capacity - 100 Wh/k m^2 - building whit few heavy exposed materials Occupancy - always
Construction	The constructions and their U-value are decried in the scheme above
Line loss	Line loss form the foundation with the light wood construction is 0,06 tabel 3.13.1 Ds 418 Line loss form the foundation with the heavy concrete construction is 0,08 tabel 3.13.2a Ds 418 [71] Line loss from windows placed in the insulation is low. 0,01 W/mK
Windows	Window areas and U-values are decried in the above
Internal heat load	Persons, 1,5 W/m^2 App 3,5 W/m^2, based on data from Skallerup Klit resort
Ventilation	Fo: 1 Mechanical ventilation winter (qm): 0,5 l/s m^2 Heat recovery: 85% Supply air temperature (ti): 18 C° There is no electric heating coil: 0 Infiltration winter (qn) : 0,07 l/s m^2 SeL : 1 kJ/m^3 maximum according to DBR, in the model 0,8 kJ/m^3 Natural ventilation summer (qn,s):1,4 l/s pr m^2 The natural ventilation can as standard be set to 0,9 l/s pr m^2 if the effective ventilation area is 1,5% of the heated floor area. If the effective ventilation area is larger the ventilation rate can be potentially larger The holiday house' effective ventilation area is larger than the 1,5 m^2 which is required for a ventilation rate of 1,4 l/s pr m^2. 1,5 m^2 is 2,38 % of the floor area. This gives an estimated ventilation rate of: 2,38% / 1,5% * 0,9 l/ pr m^2 = 1,4
Hot domestic water	250 l/year pr m^2 heated floor area.
Unheated room	The winter garden is an unheated room which get a lot of solar heat. The windows facing the winter garden gets less solar heat because the heat waves have to pass the windows of the winter garden. The windows facing the winter garden therefor gets a lower solar heat transmission value. The b factor is also different for the construction facing the winter garden as the heat transmission is lower due to the higher average temperature in the winter garden

BSim composition

The scheme describes the different input parameters for BSim

Systems	Persons	Equipment	Infiltration
Description	During the year there is a variation in the occupancy of the resort. The holiday house i dimensioned to accommodate 2-4 people. According to what is beeing examined the people load is changed.	Value based on data form skallerup Klit resot. 0,22 kW	The infiltration is based on the airtightness demands for class 2020. There is no demand to the infiltration in rooms like the winter garden. As the winter garden have no mechanical ventilation, the ventilation rate of 0,6 l/s is used.
Living/bed room zone		0,22 kW 50%, allways	*0,092h^{-1}* Temp factor 0, temp power 0, wind factor 0 100%, allways
Kitchen/bath zone		0,22 kW 50%, allways	*0,092 h^{-1}* Temp factor 0, temp power 0, wind factor 0 100%, allways
Winter garden			*0,5h^{-1}* Temp factor 0, temp power 0, wind factor 0 100%, allways

Ventilation

Heating

Venting

Mechanical ventilation is used during winter
To simulate the air flow of the house as realistic as possible the ventilation is set to supply air in the living/bed room zone and exhaust air in the kitchen/bath zone.
There is no heat recovery since the air is exhausted in the kitchen/living zone. The air is heated to 18 C° by a heating coil.

The rooms are heated to 22 degrees

Natural ventilation
Set point: 22 C,
Set point: 650, the ventilation will first ventilate after co2 and then after temperature
fact 1

input:
Supply : 0,0792
Pressure rise: 200 Pa
Total eff: 0,7
Part to air: 0,5

Output:
Return: 0
Pressure rise: 0
Total eff: 0
Part to air: 0

Heating coil:
Max power 1 kW

Air source:
Outside

Active during heating season.
The ventilation rate is regulated based on the number of persons in the house

Inlet ctrl.
Part to nom flow:
- 1, when occupied by 4 persons
- 0,8 when occupied by 2 persons
When the home is unoccupied the ventilation is not on.

Point 1 te 1: -12 C
Tinl 1 on line: 18 C
Point 2 te 2: 18 C
Tinl 2 on line: 18 C

The air is heated to 18 C

Max power 5 kW
fixed part 0,05
part to air 0,5

Factor:1
Setpoint: 22
Design temp: -12
Te min: 10

Active during warmng season

Cross ventilation for the zone through the window in the bath room to the window in the kitchen
The areas are described in the window shed.

active during cooling season

input:
Supply : 0,0792
Pressure rise: 200 Pa
Total eff: 0,7
Part to air: 0,5

Output:
Return: 0,048
Pressure rise: 200 Pa
Total eff: 0,7
Part to air: 0

Air source:
Living/bed room zone

Active during heating season.
The ventilation rate is regulated based on the number of persons in the house

Inlet ctrl.
Part to nom flow:
-1, when occupied by 4 persons
-0,8 when occupied by 2 persons
when unoccupied the ventilation system is off

There is no heating or cooling coil defined for this ventilation system as the air is coming form the living/kitchen zone

Max power 5 kW
Fixed part 0,05
Part to air 0,5

Factor:1
Setpoint: 22
Design temp: -12
Te min: 10

Active during warmng season

Cross ventilation for the zone through the window in the bath room to the window in the kitchen
The areas are described in the window shed.

active during Cooling season

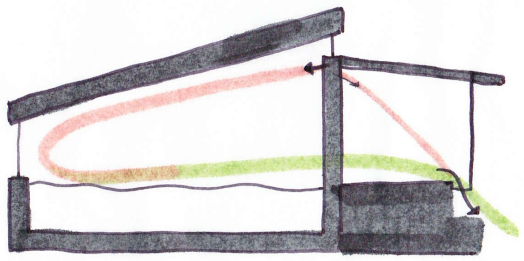
Thermal bouncy for the zone through the window in the winter garden. The areas are described in the window shed.

Always active

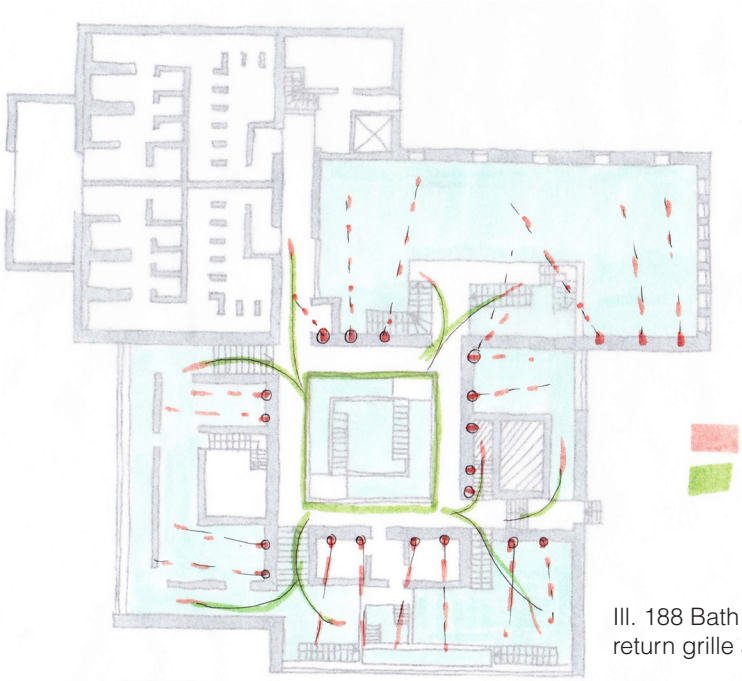
Bath ventilation concept

The ventilation concept is based on a system with supply nozzles blowing fresh air in from above and return vents along the corridor of the court yard.

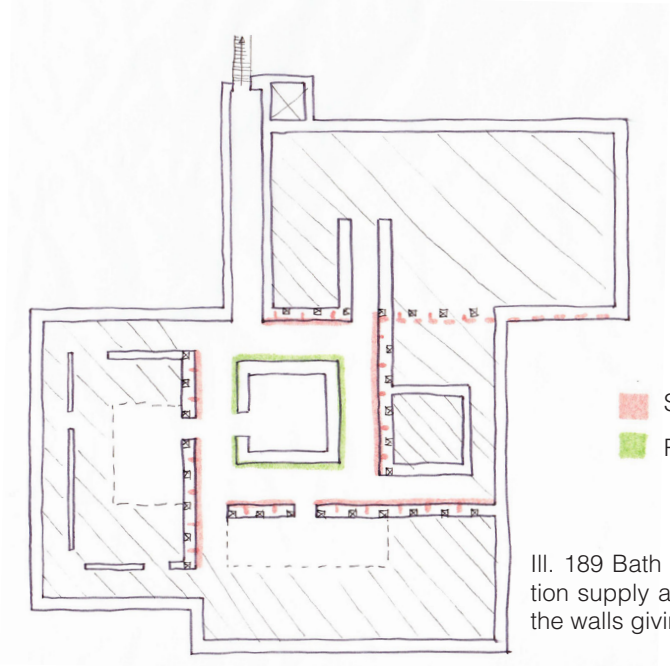
The constructional system and arrangement of the building volumes compliment this type of system and could work well together.



Ill. 187 Concept section showing the supply and return positions



Ill. 188 Bath main floor plan, showing supply nozzles and return grille along the court yard



Ill. 189 Bath basement plan showing access for ventilation supply and return, fitting in between the columns in the walls giving them efficient access to the bath.

Illustration list

Illustration 1: Own photograph

Illustration 2: Own illustration

Illustration 3-4: Own photographs

Illustration 5: http://m.sejlnet.dk/sites/default/files/imagecache/Bredde_600_px/images/juelsminde2_0104.jpg

Illustration 6: Own illustration

Illustration 7: Own illustration

Illustration 8: Own photographs

Illustration 9-11: Own illustrations

Illustration 12: http://www.visitdenmark.dk/sites/default/files/styles/galleries_ratio/public/vdk_images/Attractions-Activities-interest-accommodation-people-geo/Hiking/vandre-skov.jpg?itok=x4Y2ZCOP

Illustration 13: Own Photograph

Illustration 14: http://images.sembo.se/ImageService/ImageHandler.ashx?service=sembo&nameOfImage=4870.jpg&resizeMode=FitInside&formatSettings=jpeg(quality-90)

Illustration 15: http://www.visitdenmark.dk/sites/default/files/styles/galleries_ratio/public/vdk_images/Attractions-Activities-interest-accommodation-people-geo/Wellness-relaxtion-spa/par-i-spabad.jpg?itok=k7L0-sgC

Illustration 16: http://da.wikipedia.org/wiki/Fil:Brande_H%C3%B8jskole.jpg

Illustration 17: http://aoh.dk/sites/aoh.dk/files/styles/630x420/public/Luftfotos_FH_26_jpg_crop_display.jpg (available 01-03-2014)

Illustration 18: http://da.wikipedia.org/wiki/Fil:L%C3%B8gumkloster_H%C3%B8jskole.jpg

Illustration 19: http://aoh.dk/sites/aoh.dk/files/styles/630x420/public/h%C3%B8jskole_FH_jpg_crop_display.jpg (available 01-03-2014)

Illustration 20: http://www.denstoredanske.dk/@api/deki/files/29391/%3D501885.501.jpg

Illustration 21: http://fynhistorie.dis-danmark.dk/files/historie-info.dk/images/Tommerup%20h%C3%B8jskole.preview_0.jpg

Illustration 22: Own Photograph

Illustration 23: http://www.friluftsraadet.dk/nyhedsoversigt/2013/juni/aeldre-bruger-naturen-flittigt.aspx

Illustration 24: http://www.google.dk/imgres?imgurl=http://multimedia.pol.dk/archive/00308/DM_i_vin_308351a.jpg&imgrefurl=http://politiken.dk/mad/tjekmadguide/tjekguidemad/ECE618780/vintjek-koeb-hvidt-til-nytaarsmiddagen/&h=1000&w=1500&tbnid=aHzw_WRU7M4RGM&zoom=1&tbnh=183&tbnw=275&usg=__fdak2ztIB12pkfffEjVGsetVx-Q=

Illustration 25: http://digitalfoto.dk/photocompetition/lejrbal

Illustration 26: http://www.friluftslauget.dk/images/fotogalleri/kajaksejlads.jpg (Available 01-03-2014)

Illustration 27: http://www.nordjyske.dk/nyheder/e5b6e0e7-fb81-44b6-a994-5db0f017227b/45/1457

Illustration 28: http://www.visitdenmark.dk/da/danmark/sport/golf-i-danmark#

Illustration 29: http://lokaltindblik.dk/loka-lnyheder/nutidens-kvinder-moedte-ranum-eftrskole-og-troels-.aspx

Illustration 30: http://stickyricecookingschool.com.au/funstuff/wp-content/uploads/2009/01/sticky-rice-10.jpg

Illustration 31: http://www.hjemmet.dk/artikler/Nyt-fra-Hjemmet/Familien-Lijcklamas-glade-feriebarn/

Illustration 32: http://www.toppenafdanmark.dk/denmark/galleri-hirtshals-vinter

Illustration 33: http://www.arken.dk/content/dk/deltag/unge/arken_bgk/undervisning

Illustration 34: Own photograph

Illustration 35: http://sv.wikipedia.org/wiki/Skogskrematoriet_II

Illustration 36: Own photograph

Illustration 37: http://www.coastarc.com/97829/1942291/work/soroe-kunstmuseum

Illustration 38: http://www.coastarc.com/97829/1942291/work/soroe-kunstmuseum

Illustration 39: Own photograph

Illustration 40: http://kjeldslot.dk/media/hospice-djursland-070.jpg

Illustration 41: http://www.loa-fonden.dk/nyheder/info-fra-fonden/info-2012/info-2012/vi-er-jo-en-slags-boern-af-lokale-og-anlaegsfonden

Illustration 42: Own photograph

Illustration 43: http://studio1-2.dk/wp-content/uploads/2011/06/19c.jpg

Illustration 44: http://zeospot.com/sea-ranch-residence-by-turnbull-griffin-haesloop-a-natural-comfortable-japanese-house-design/the-sea-ranch-residence-open-corridor-architecture-design/

Illustration 45: http://farm2.staticflickr.com/1094/1418510158_2782dcd76a_b.jpg

Illustration 46: http://www.nyhedsarkiv.aau.dk/vis+nyhed/ny-forskningsmetode-giver-praecis-viden-om-biblioteksbrugere.cid31569

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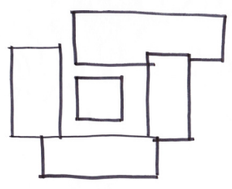


Juelsminde Holiday Resort

Aalborg University
Department of Architecture & Design

Spring semester 2014
4th Msc. Arch, May 2014

Bjarke Apollo-Andreasen & Sofie Maj Andersen

Presentation material

URBAN PLANNING

The urban planning focuses on creating a recreative site plan with focuses on nature and the connection to the beach as well as the city

The site offers the visitor tranquillity as well as social interaction. The first being concentrated around the holiday homes and beach areas which primarily focuses on values such as nature and immersion. The latter being centred at the resort and functions area where one can experience increased urban activity of a social and recreational nature.


SITE PLAN 1:1000

THE HOLIDAY HOMES

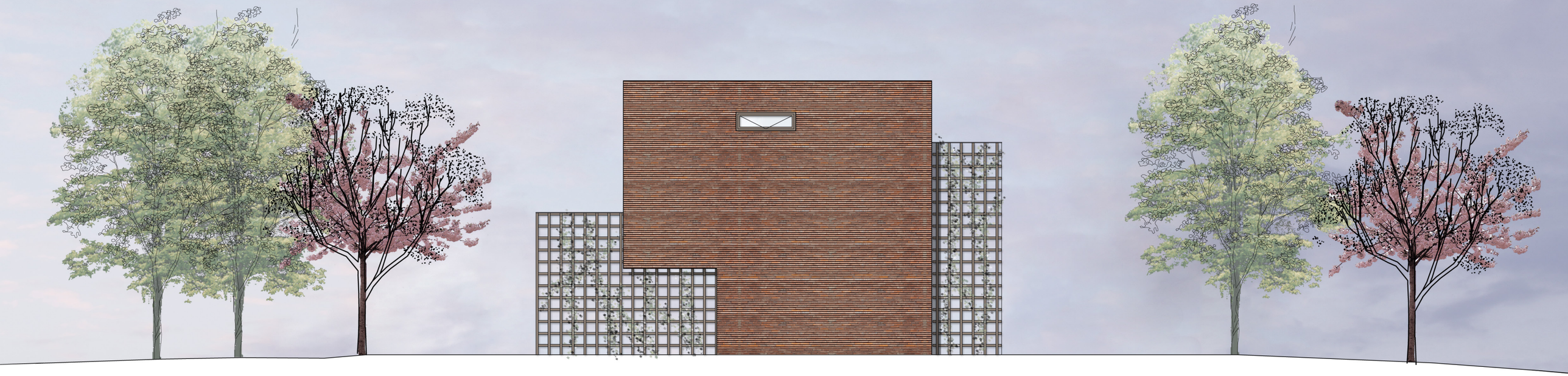
The home aspires to give the visitor a different experience from what is normally seen at holiday resorts and summer houses. The goal is to strongly emphasize the connection between inside and outside as well as letting the visitor follow the light to different spaces throughout the day.

Holiday homes seen from the court yard

SOUTH ELEVATION 1:100

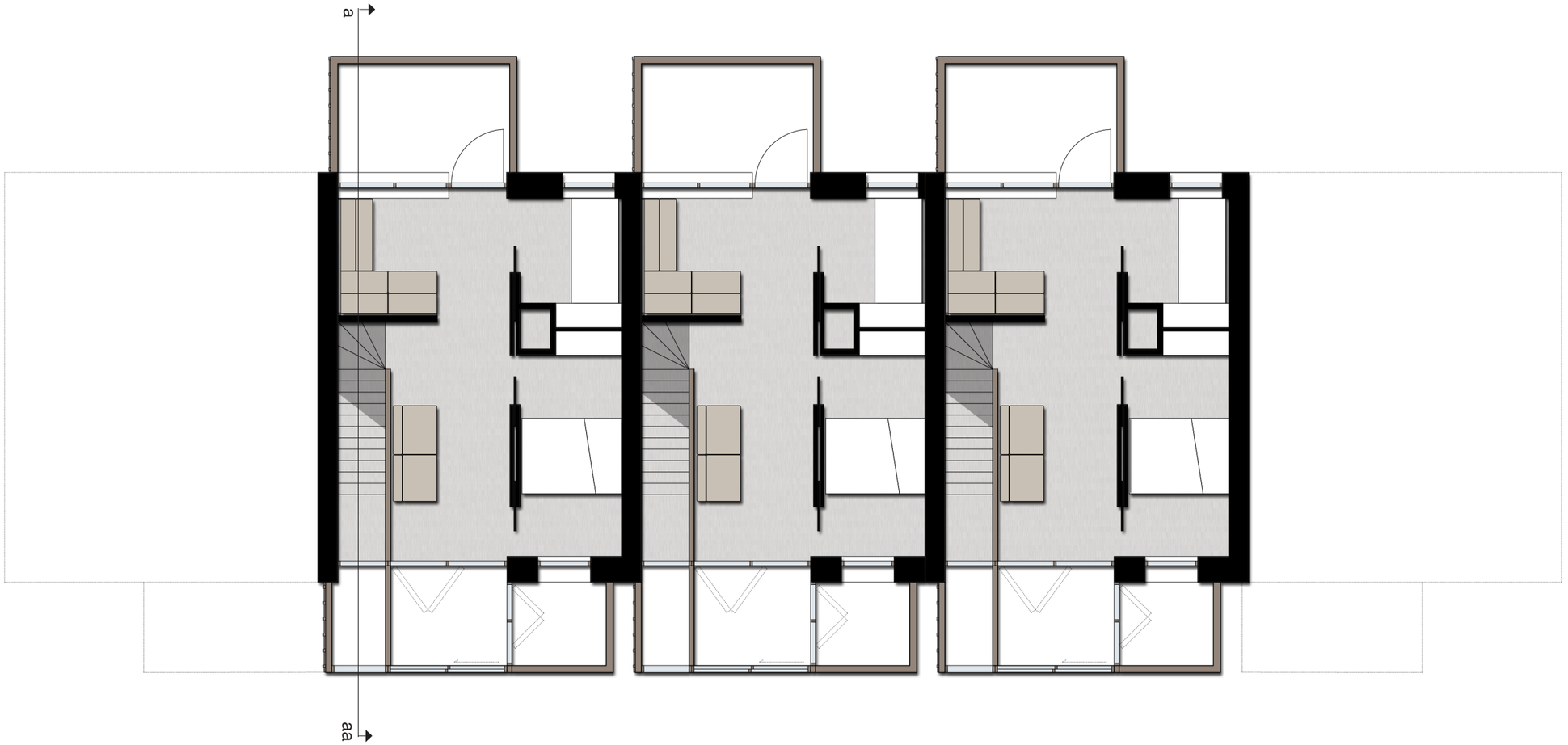
WEST ELEVATION 1:100

NORTH ELEVATION 1:100

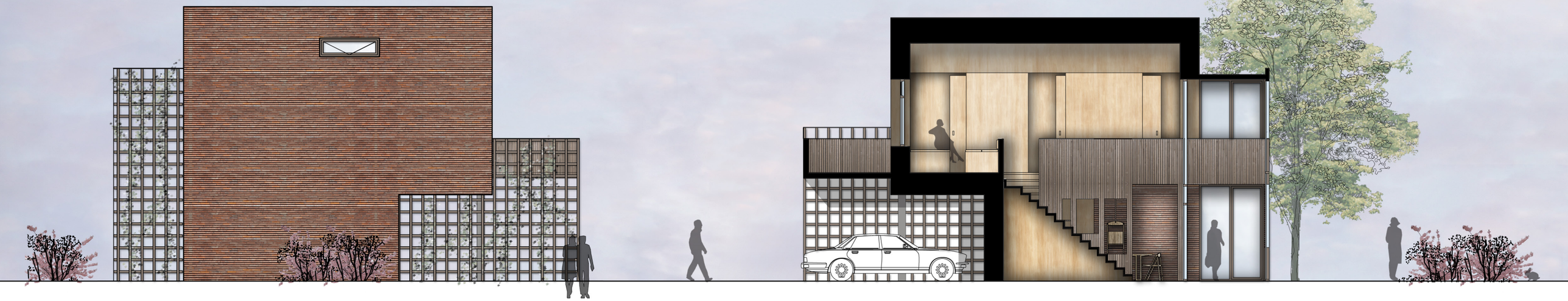


EAST ELEVATION 1:100

GROUND FLOOR 1:100



FIRST FLOOR 1:100



SECTION a-aa 1:100

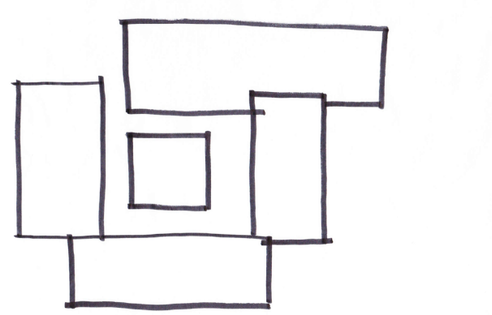
The view from the kitchen towards the courtyard through the winter garden.

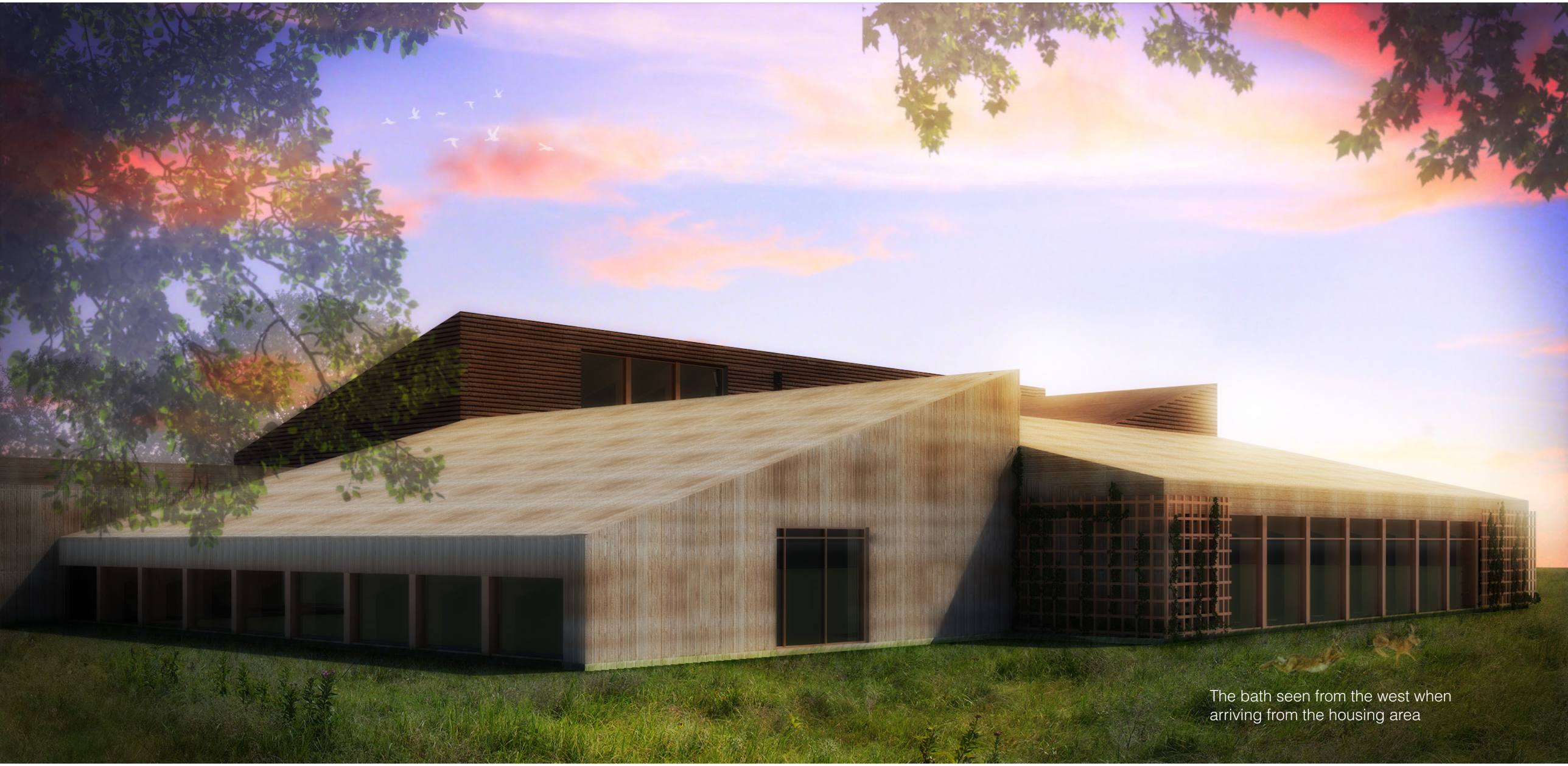
The living room has a direct connection to the balcony.

THE BATH

The bath complex is an essential part of the resort. This will be the main attraction of the resort and create a large incentive for visiting Juelsminde as a tourist.

The bath is designed to be compatible with its surroundings and give the visitor an atmospheric and sensuous experience.





The bath seen from the west when arriving from the housing area

WEST ELEVATION 1:200

Entrance

West bath

South bath

North bath

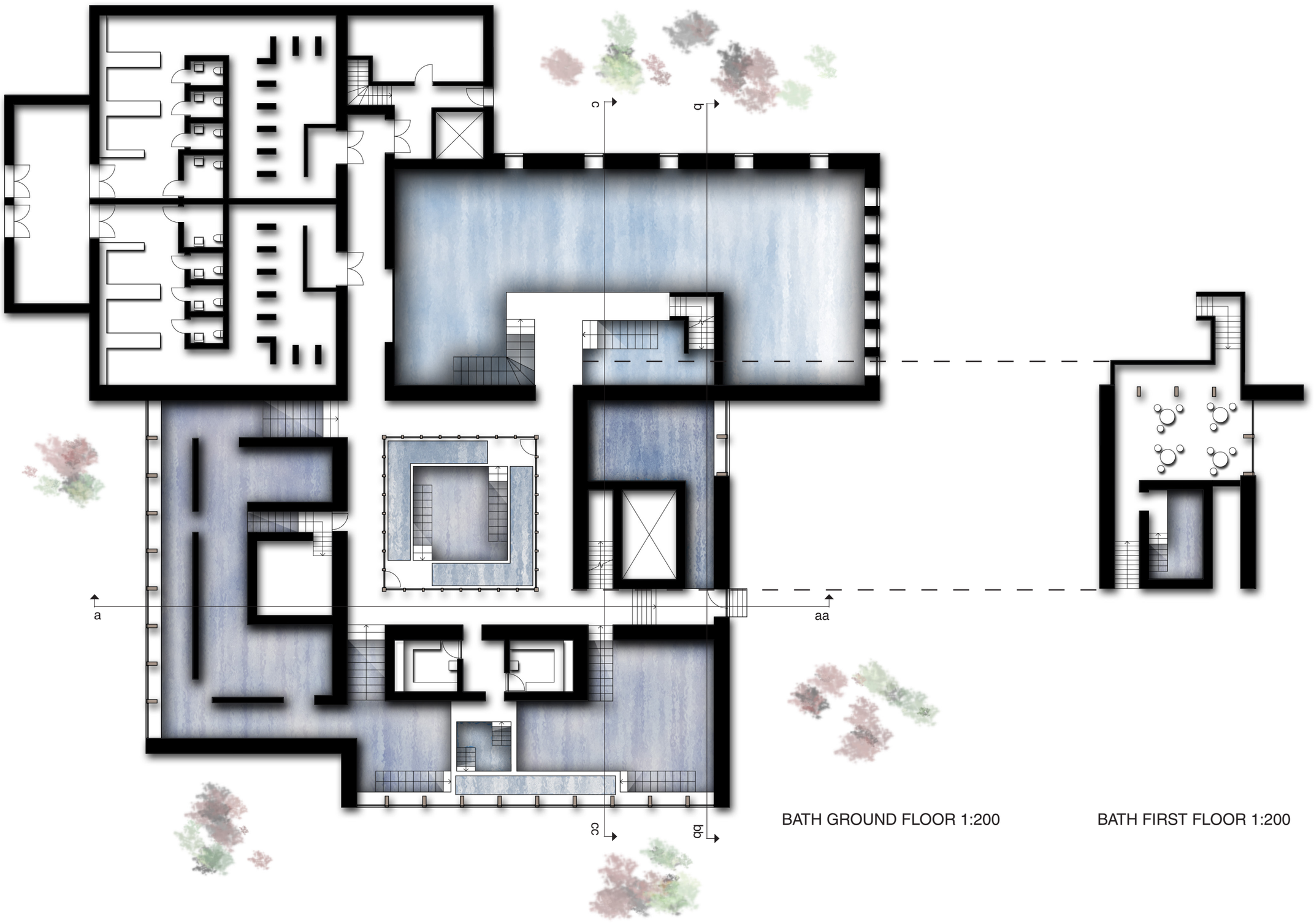
Beach

SOUTH ELEVATION 1:200

South bath East bath North bath Staff

EAST ELEVATION 1:200

NORTH ELEVATION 1:200

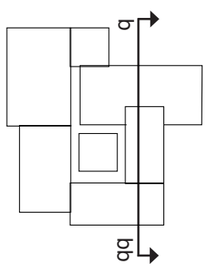


BATH GROUND FLOOR 1:200

BATH FIRST FLOOR 1:200

View of the hallway along the court yard

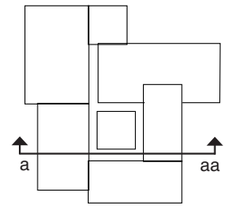
North bath East bath South bath



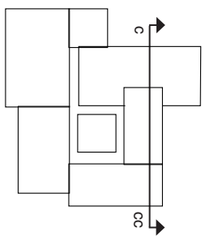
SECTION b-bb 1:200

View towards the outside from the south bath, displaying the combination of views and light fragmented and reflected by water in different settings

View along the periphery of the west bath showing the light corridor and the low ceiling construction



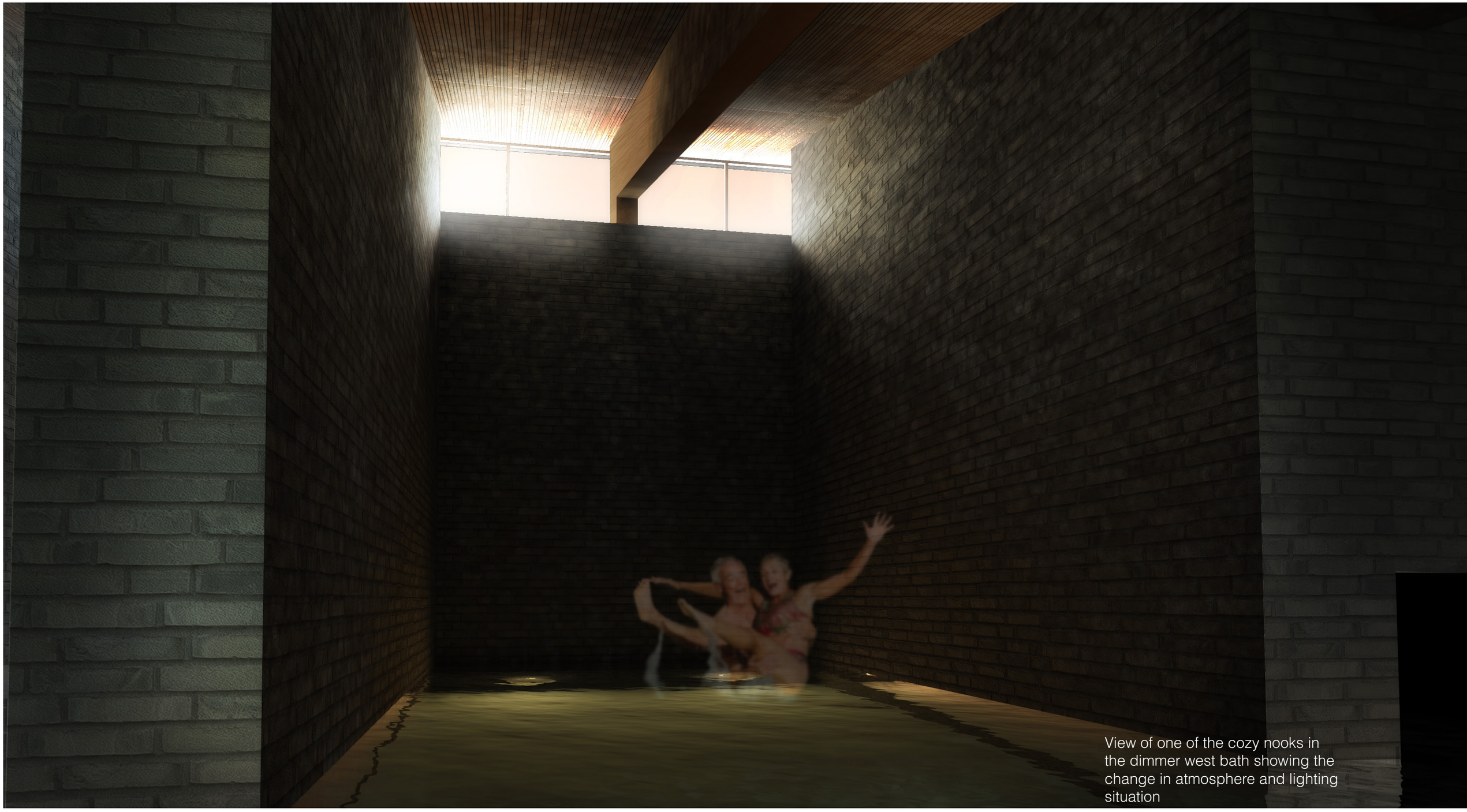
SECTION a-aa 1:200



SECTION c-cc 1:200

The large north bath seen from the viewing platform showing the light shining through the outside trellis

View of the bath from east side when arriving from the beach, displaying the change of material



View of one of the cozy nooks in the dimmer west bath showing the change in atmosphere and lighting situation