

The background is a watercolor illustration of a coastline. The left side is a dark, textured grey, representing the ocean. The right side is a light, textured white, representing the land. A jagged, irregular line separates the two, representing the shore. Scattered across the water and land areas are several diamond-shaped shapes, each filled with fine, parallel lines. The watercolor has a soft, blended appearance with some darker spots and a slightly grainy texture.

HIGH WATER

LOW SEASON

Exploring coastal living in a changing environment

This project explores living with and by the sea in the face of a rising sea level in the highly seasonal village of Mollösund. A multifunctional sea center House of sea adds a lively “third place” for the people even off-season. The proposal aims at strengthening the special connection to nature that the place has, increase awareness, and start a discussion. Can the force of nature be embraced through architecture that has a responsive relationship to its surrounding environmental conditions?



CHALMERS

Masterprogram Architecture and Planning Beyond Sustainability

School of Architecture, Chalmers Institute of Technology

Design Studio - Sustainable Development in a local context

Orust - A rural island

High level | low season - Exploring coastal living in a changing environment

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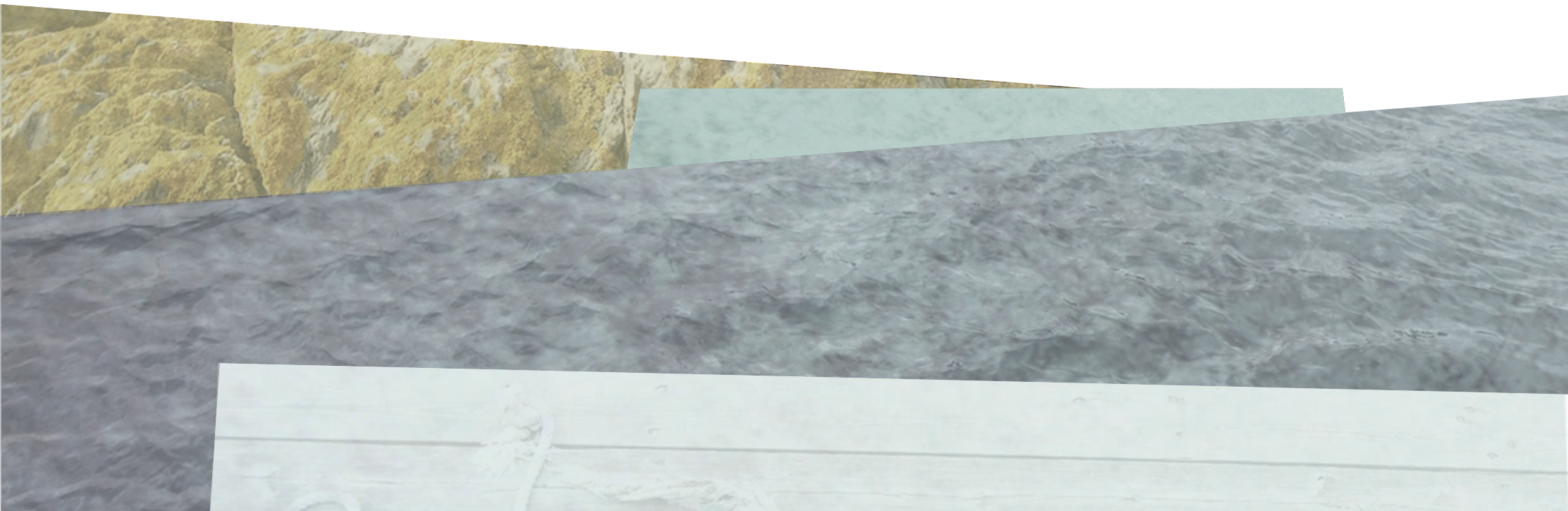
December 2017

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1 | BACKGROUND

The course Sustainable Design in a local context, the location of Orust and central topics regarding the proposal are introduced.



THE LOCAL CONTEXT STUDIO

The course “Design and Planning for Sustainable Development in a local context” is part of the Master Programme Architecture and Planning Beyond Sustainability at Chalmers institute of Technology. The setting for the course is usually a mid-sized municipality in western Sweden. This year, the class explored the local context of Orust as a “rurban island”. During the first half of the term, the local situation, the broader context and strategies for future development were discussed. Through site visits, research and consultation of stakeholders, we got to know the heart of the place. In part two, 13 in-depth projects were conducted, proposing solutions for certain topics and sites on Orust. This booklet presents one of them.



THE GROUP

We that worked together on *High water | Low season* have different academic backgrounds. Sandra holds a Bachelor degree in Architecture and Technology whilst Janna has studied Urban Planning. This is reflected in the proposal, which starts from a broader vision for the development of the area to then also explore some parts in detail on building scale.



THE LOCAL CONTEXT OF ORUST: SWOT, OBJECTIVES & STRATEGIES

High water / low season is based on an analysis of the local context of Orust that was conducted collectively by the class. The most characteristic strengths, weaknesses, opportunities and threats of the municipality were identified to then define development objectives and strategies to meet these. The aspects that are most relevant and serve as starting point for our project are presented here:

S

STRENGTHS

- Closeness to a diverse landscape and rich biodiversity
- A rich cultural heritage, identity and history
- Local craftsmanship
- Alternative rural living possibilities

W

WEAKNESSES

- Homogenous housing market, lack of apartments and affordable housing
- Big differences between summer and winter in spatial quality
- Lack of meeting places, public facilities and public space
- Gap between the East and West in number of permanent and temporary inhabitants

O

OPPORTUNITIES

- Increased environmental awareness
- Rural / slow / sustainable lifestyle
- Digitalisation and connectivity
- Eco tourism

T

THREATS

- Rising sea level and flooding
- Individualization
- Urbanisation
- Tourism
- Us-them / east-west / summer-winter / temporary-permanent

LOCAL OBJECTIVES

Regardless of economic preconditions, everyone can find a suitable place to live permanently in everywhere on Orust

Orust is an island with several centres. Each containing public spaces, services and meeting places for everybody all year round.

Local residents have a sustainable lifestyle and are aware and well informed about environmental and local issues.

The coastal villages on Orust are functioning human habitats, where human live in line with the environment now and in the future. Floods and storms do not create permanent destruction

STRATEGIES

Support ecosystem-services

Protect the existing

Raise awareness

Adapting with water

Planned withdrawal from areas in risk of flooding



COASTAL LIVING

As the title *High water | low season* suggests, this project is mainly concerned with two issues of contemporary coastal villages in Western Sweden: An increasing risk of flooding due to rising sea levels and a low percentage of permanent inhabitants off-season. In this chapter, these topics are reviewed.

RISING SEA LEVELS

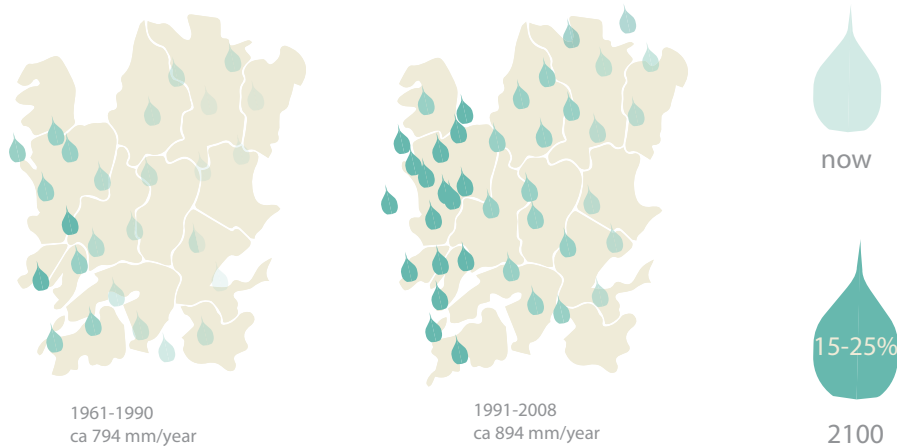
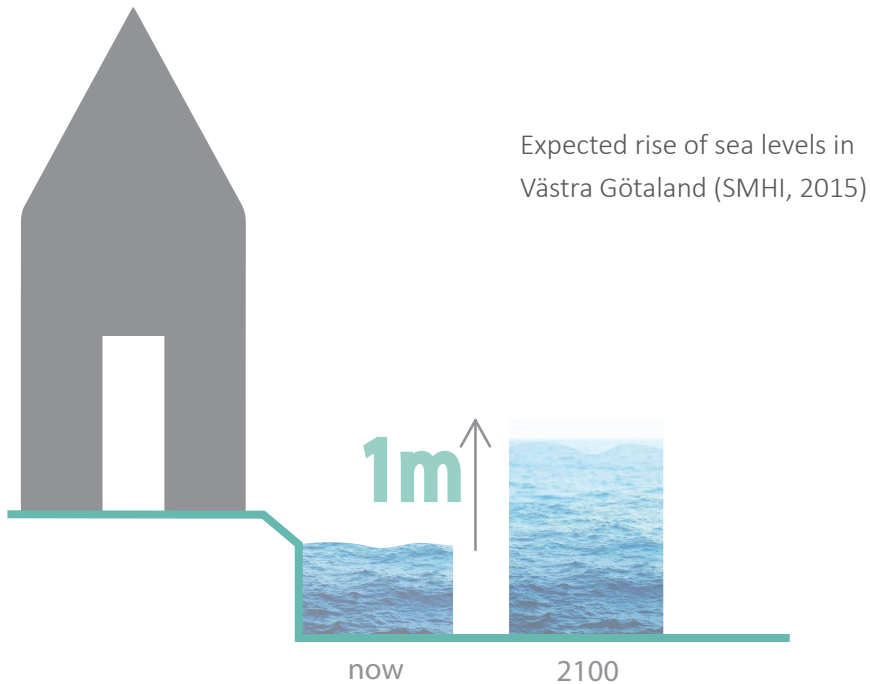
Rising sea levels is one of the biggest environmental challenges we face along the coast in Sweden. At the moment the sea level is estimated to rise up to one meter by the end of the century in the region of Västra Götaland. This level regards the sea rise in relation to the land rise (SMHI,2015). In the last century, the sea level has increased at a rate that has almost doubled over the past 20 years. (SMHI, 2017) Globally the biggest reasons for the sea level rise is global warming: The water expands when getting warmer and the ice glaciers are melting.

In combination with heavy rainfall and storms, this can make the sea level reach extreme levels. (SMHI, 2017). Consequently, floods may become more common in the future along the south-western coast of Sweden.

This is a threat to existing coastal communities and its infrastructure and built environment. In many areas, even

cultural heritage is at risk of being lost. The situation poses a big challenge for planning, both in protecting the existing and in new coastal developments.

The report “Stigande vatten – en handbok för fysisk planering i översvämningshotade områden” of Länsstyrelsen (county administrative board) defines different zones as a guideline for planning by the coast, based on a future high level state along with safety marginals. These zones can be used as a basis for defining the required land heights in planning projects. Flooding that can occur on an average once every 100 years, called the 100-year level is today on an average +1,5 m in the RH2000 system. Added to an expected permanent sea level rise of 0,8 m, the maximum level of water would be +2,3 m (Länsstyrelsen, 2011). Referring to the levels of safety from the report “Stigande vatten” and adding some tolerance, a level that is needed to achieve high safety is about 3,2m. (Orust kommun, 2016)



Average rainfall in Västra Götaland (SMHI, 2015)

FROM FISHERVILLAGE TO TOURIST DESTINATION

The social structure of fishing villages along the coast has transformed throughout history. The economy initially based on fishing changed, becoming difficult to maintain. This led to people moving away from the communities. Today the majority of houses in these fishing villages along the coast are used as holiday houses. Due to the fact that these houses are very attractive and desirable the prices have increased to such an extent that the inhabitants can't afford to stay. This successive transformation of fishing villages has been common along the west coast. (Riksantikvarieämbetet och statens historiska museer, 1980)



Fig. 1 Drying fish

THE CASE OF MOLLÖSUND

The small village of Mollösund is located “at the end of the road” in the southwestern part of Orust. The Western part of the island is more secluded than the East and rather far away from bigger villages and cities. Historically Mollösund has been an important fishing village - in 1610 it was the biggest in Bohuslän with 254 inhabitants. Today, the village is a famous place to visit during the summer, with its picturesque historical townscape and harbor, strong connection to the sea and the rocky landscape surrounding it. (Riksantikvarieämbetet och statens historiska museer, 1980)

Mollösund is a very different place in summer compared to the rest of the year. While the village is overcrowded during summer and lively with a range of shops and restaurants, the population decreases rapidly off-season. Most businesses close during the cold months and with only around 200 permanent inhabitants (20 % of the inhabitants) left, the village feels rather unpopulated (Orust kommun, 2016).



For families wanting to live permanently in Mollösund, building new dwellings outside the core of Mollösund is often the only economical option, while the old houses are left to summer guests, empty most of the year.

Even in Mollösund, rising sea levels and climate change will and do already cause an increasing risk of flooding. The average water level is expected to rise by about 0,8m in the coming century, extreme weather events could cause levels of up to 2,3m (Orust kommun, 2016). Additionally, heavy rainfall is likely to increase the need for day water management (Orust kommun, 2016).

The summer inhabitants have increased and the winter inhabitants decreased.

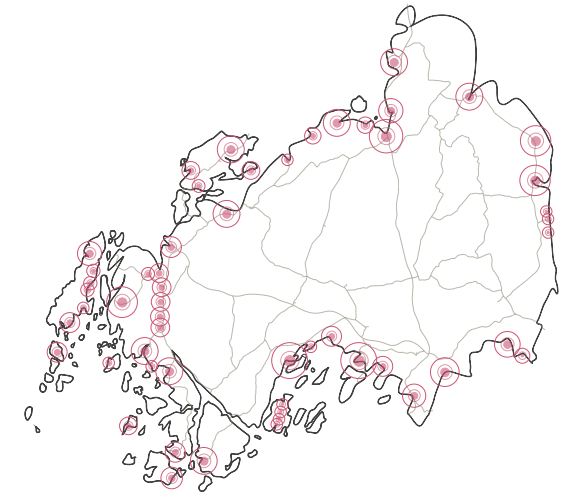
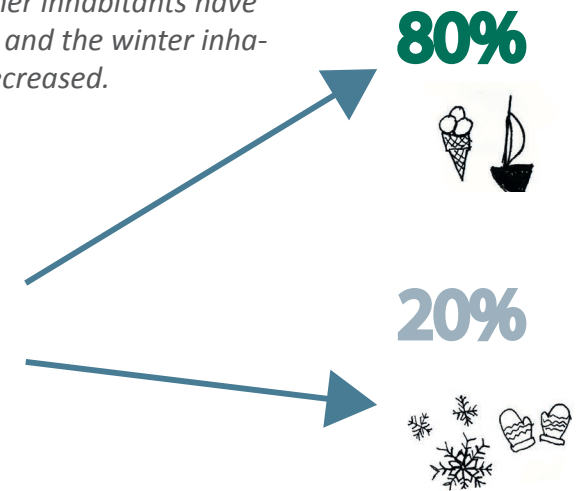
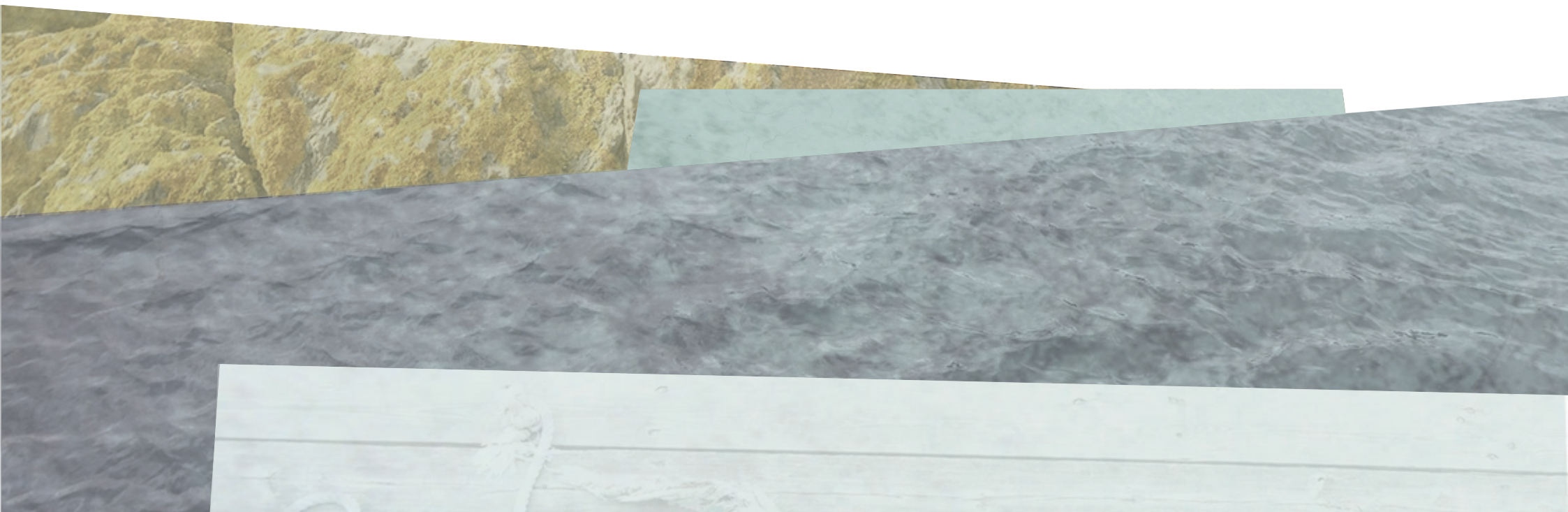


Fig. 2 Areas in risk of flooding on Orust

2 | AIMS

What we want to achieve with this project.



EXPLORE NEW WAYS OF COASTAL LIVING

In order to make the island and its coastal villages livable places now and in the future and protect their cultural heritage, a new approach is needed. In the face of rising sea levels and climate change, the project explores alternative ways of building and living with and by the sea.

It looks into and showcases different forms of flood-protection. The proposal aims to strengthen special connection to nature that the site has, increase awareness, and start a discussion. Can the force of nature be embraced through architecture that has a responsive relationship to its surrounding environmental conditions?

New coastal living also implies re-thinking the way we construct buildings. By taking up traditional local craftsmanship and materials, we aim to start a discussion, showcase and inspire for “new-old” ways of building in new developments on Orust.

STRENGTHEN THE LOW SEASON

The second main objective is to address the seasonality of Mollösund: We aim at strengthening the qualities of the low season, when the island is rather empty, not crowded with summer guests. How can new visitors be attracted and how can the place be strengthened as a place to live in permanently? New affordable housing that combines the qualities of Mollösund with modern living concepts could attract new inhabitants. The village has a lack of “third places” for locals to meet off-season. By creating an all-year round meeting place, open for everybody we aim to support a rich cultural and social life for the inhabitants. Placing a point of attraction in the “end-of-the-road” village Mollösund could furthermore help to activate the West and attract visitors.

One of the strongest qualities of Mollösund is the magnificent natural environment. The change of seasons can be experienced strongly in the area. By enhancing the accessibility to nature experiences and inviting to explore, Mollösund can be marketed as a low season destination as well. At the same time, environmental awareness is increased.

LAYOUT

The aims are addressed both on neighborhood and building scale. The proposal consists of an overall vision for a smaller area in Mollösund, where a central building functions as acupuncture intervention and starting point for the further development.



3 | SITE ANALYSIS

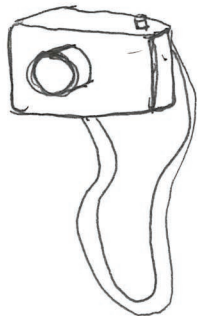
The methods of our analysis are presented and the different aspects of the site are explored.



METHODS

SITE VISITS

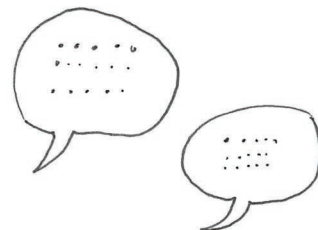
To get local knowledge and a feeling for the character of the area, several site visits have been conducted. During our visits, we experienced the spaces by walking on different paths through the village and its surrounding natural areas, taking photographs and drawing sketches. Aspects we looked at specifically were the open space structure, materials and building techniques, the connections between water and land, points of interest and flora and fauna.



INTERVIEWS

The project is supposed to be of value for the people of Mollösund. Thus, it is essential to understand their needs and draw from their experience as experts of the place. Due to the limited time, an in-depth participation was however not accomplishable. To get an idea of the inhabitants experiences and views on life in Mollösund, a few key persons were interviewed: We talked to the owner of the local supermarket, some long-term permanent inhabitants and the owners of the hering processing company.

Additionally, interviews with experts of different relevant fields were conducted. To learn more about local craftsmanship, we consulted a boatbuilder. A member of the nature conservation association contributed with knowledge about the specific characteristics of Galgeberget.



MATERIAL AND MAPS

Studying planning documents, historical maps and literature helped to get a deeper understanding of the site and area. From similar projects and places, we derived inspiration.





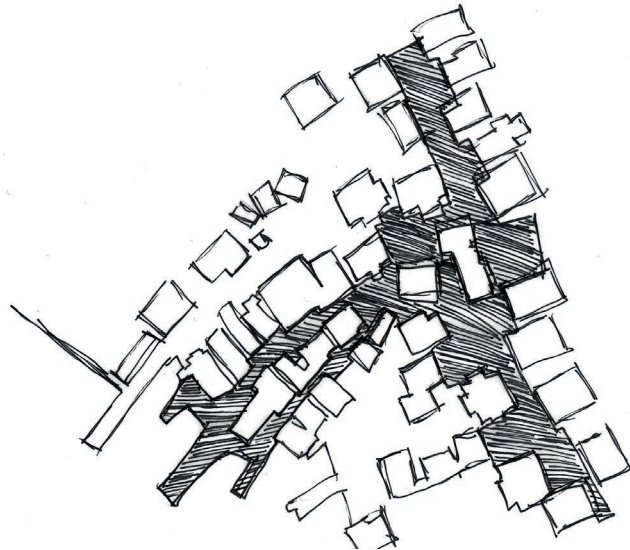
MOLLÖSUND

CHARACTERISTICS OF THE AREA

SPATIAL STRUCTURE

Mollösund can be understood as a village with different layers. The historic center runs from the fishing harbor along the coast. Here, everybody seems to seek a connection to the water. Most waterfront houses have private piers; the public paths are enclosed by houses, only seldom allowing for water views. Newer settlements are attached on the hillside behind it. The area of Tången is laid out like a satellite village on a neighboring hill. Between and around the different housing areas, there are large natural, rocky areas. Located on a peninsula, the village is surrounded by nature and water. This can though not be experienced in all areas, since hills are blocking the view to the water.

The most central public space in Mollösund is around the small harbour. It becomes a natural meeting point connecting the boatlife to the pedestrians, with a surrounding of cafés and restaurants. The typical structure in the historic village is the main street from which small alleyways stretch out towards the sea. The streets are fitted for walking and in human scale.



Public space structure



Fig. 3 Fishing huts and storages in Mollösund around 1915



Impression of the space (©Johanna Galleron)

BUILDING TRADITION: CRAFTSMANSHIP AND MATERIALS

“The identity and wholeness needs to be preserved”. The majority of the buildings that characterize Mollösund are built between 1800 till the beginning of the 1900, with some renovations made after. The materials used are almost solely wood. The colours of the houses are red (faluröd) and white, with some in pastel colours and natural weathered wooden colours. (Riksantikvarieämbetet och statens historiska museer, 1980)

Reflection

The building tradition in Mollösund is of great importance to preserve and to respect when building new. Since the characters of the buildings in Mollösund is significant for its identity, new buildings should not override the existing environment. The materials and colours should be chosen carefully to fit the general picture of the place and quality should not be forgotten, as mass-produced and low quality buildings contrast to the existing.



Fig. 4 Houses in central Mollösund

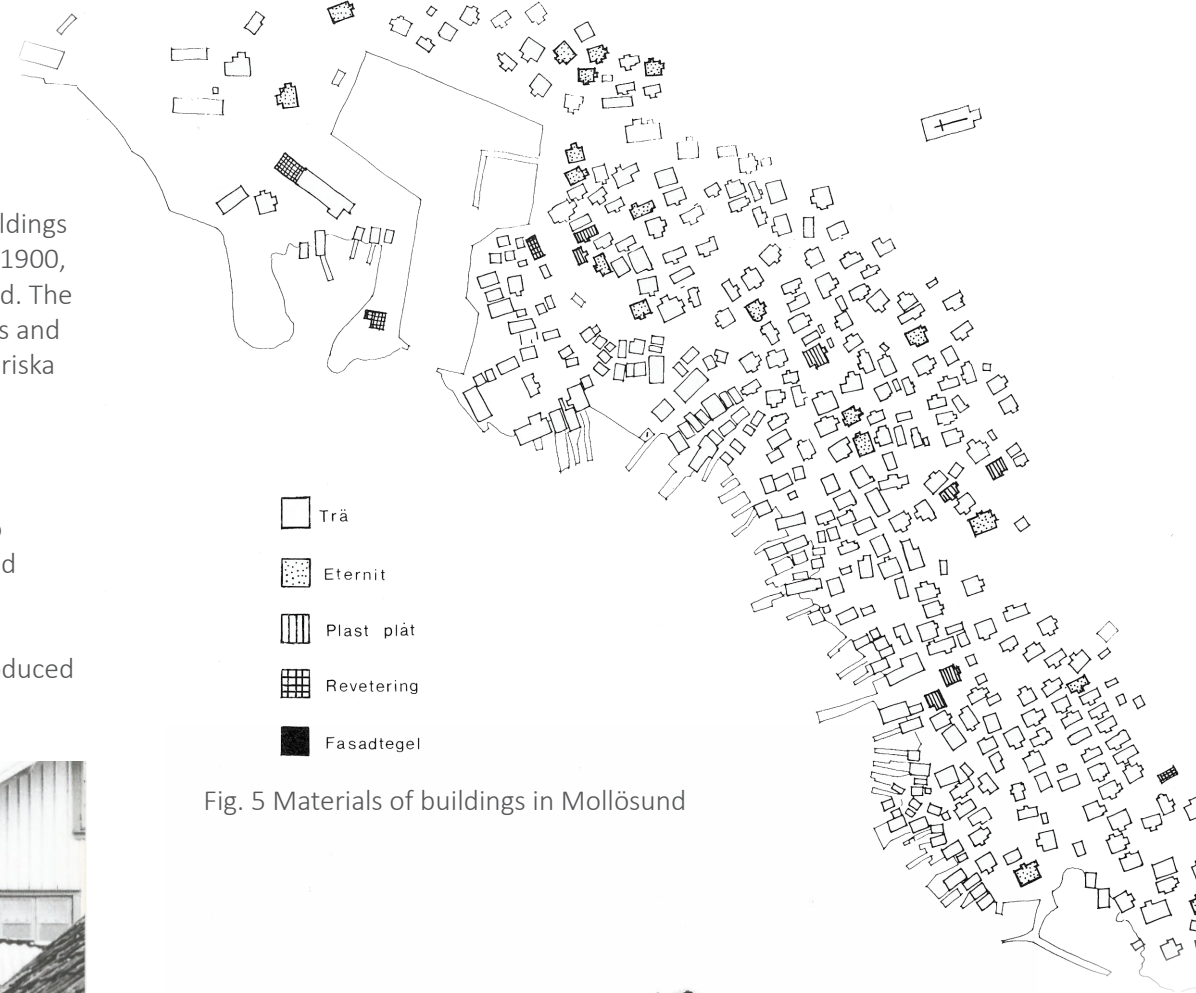
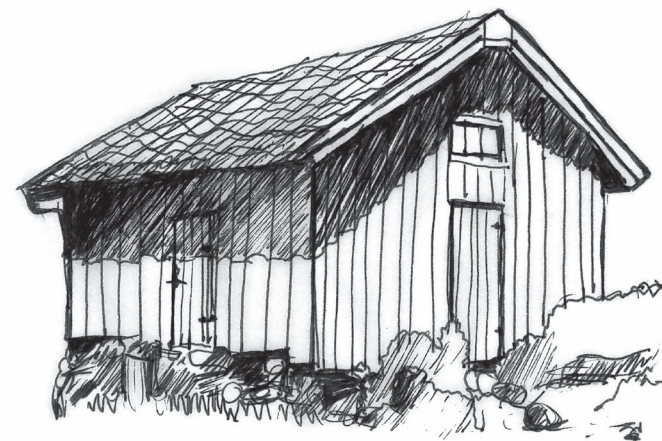


Fig. 5 Materials of buildings in Mollösund

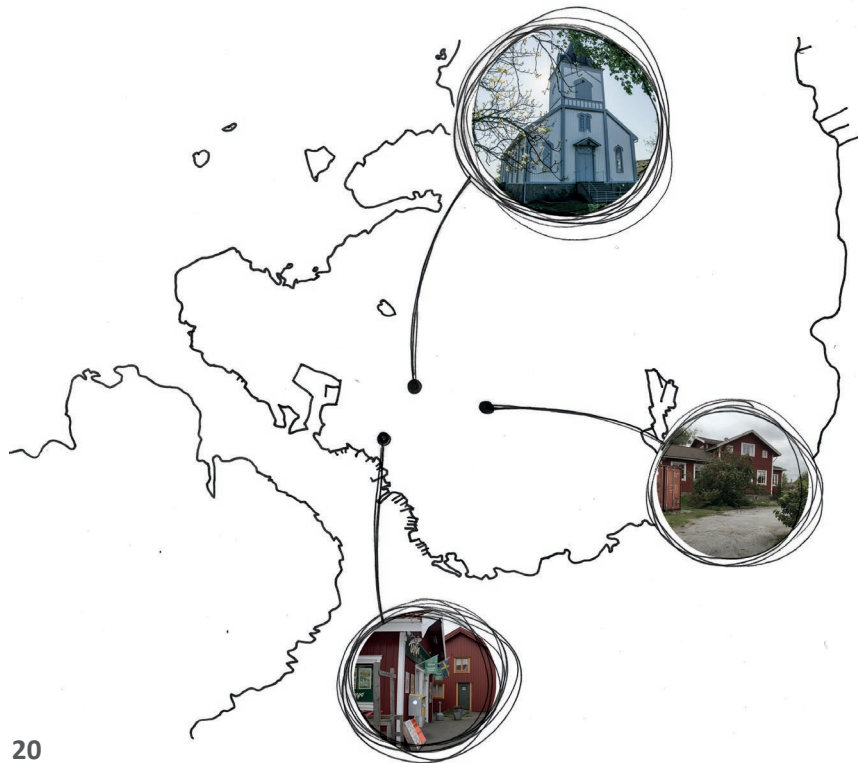
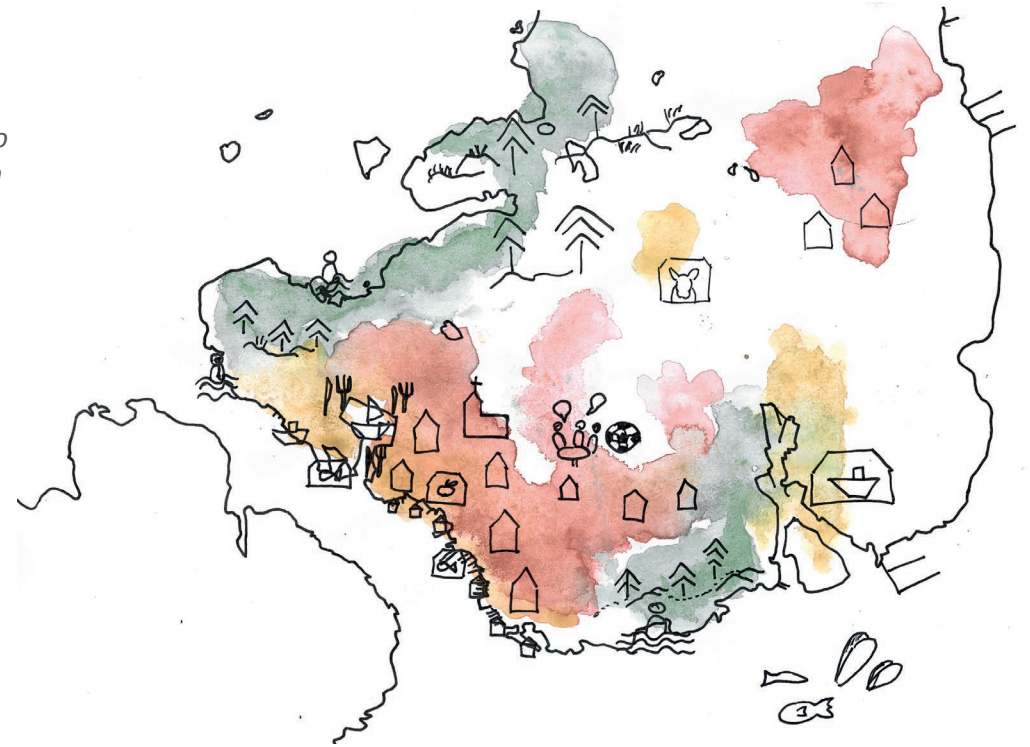


USAGES

The village mainly contains of housing. In the center, there are several shops and restaurants, mainly open in summer. The largest local business is a herring processing company, located at the harbor. Natural areas with bathing places are located within short distance of the village. On the outskirts, there is a larger boat storage company. The local school closed down several years ago.



"It is very important to preserve businesses in Mollösund"
(inhabitant)



IMPORTANT POINTS

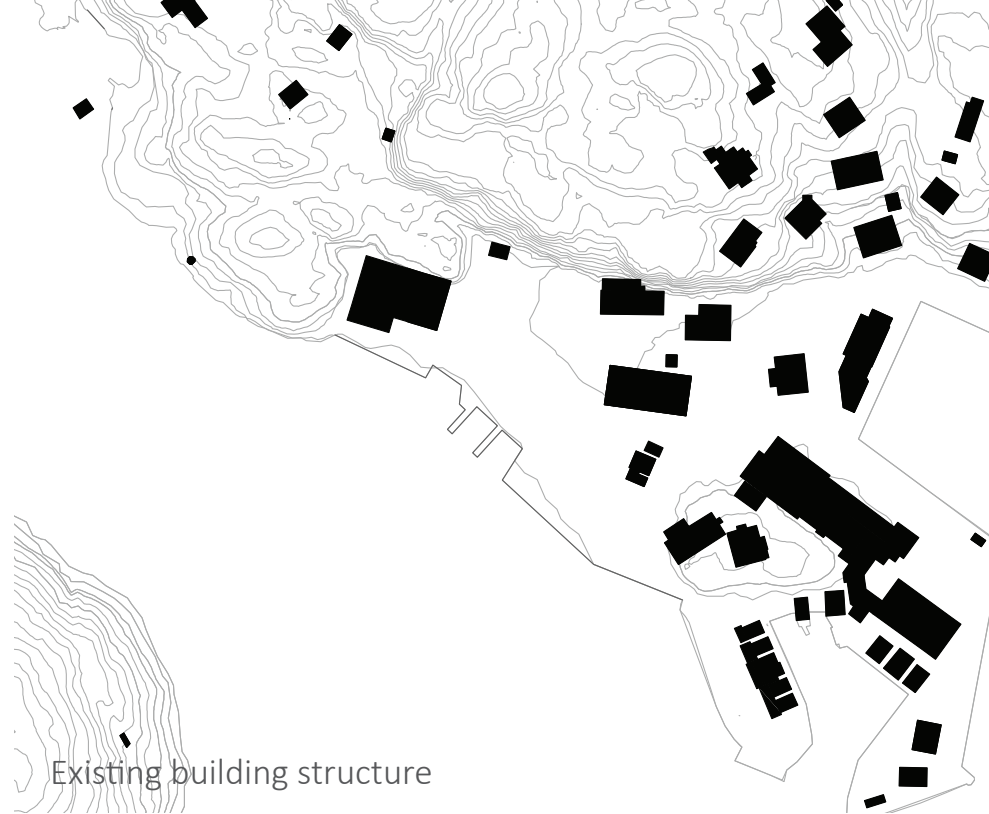
Important meeting places in Mollösund that were identified are the church, the Tempo store and a former school. The church acts as both a religious gathering space as well as a space for other meetings such as book clubs. Tempo is open all year, even though it struggles with scarcity of customers in the winter time. Tempo is nevertheless considered very important for Mollösund, both for the local economy and as a place where spontaneous meetings can occur while buying the daily newspaper. The former school is used as a workshop for craftsmanship. For example some winter activities for children take place here. Most of the activities in Mollösund are summer-based. The cafés and restaurants close down when the season is over, and the bathing places are abandoned. Except for the possibility of strolling or playing soccer on the soccer field, or the occasional events and gatherings the perception is that there is a lack of meeting places in winter time.

THE SITE

After spending time in Mollösund and getting an overview from walking around, doing sketches and talking to people we decided to base our project at Hamnplanen and the adjacent Eastern part of Galgeberget. We chose this site because it was currently underused and seemed like a fitted place for our ideas of a meeting place: It is very valuable land, with a central position in the village and right by the water. Additionally, the beautiful nature of Galgeberget filled us with inspiration. At this site, the rising of the sea levels can be explored, with Hamnplanen that will be directly affected and Galgeberget that showcases other solutions. The municipality has plans to develop this area, both on the industrial Hamnplanen and on Galgeberget. It felt like an exiting task to explore the area and make an alternative proposal.

EXISTING BUILDING STRUCTURE

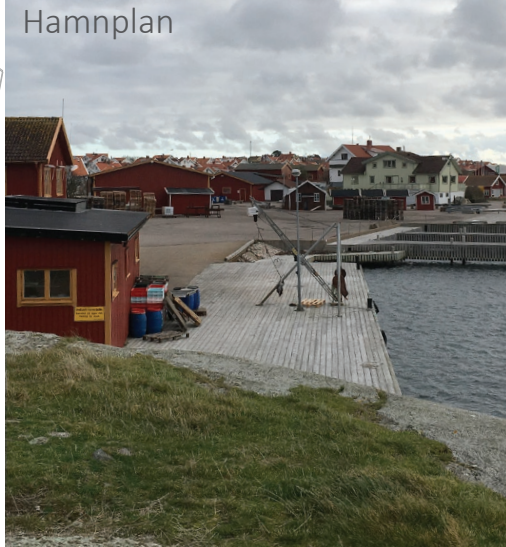
Existing buildings on Hamnplanen are mostly storage spaces and other facilities belonging to the herring business. There are also a couple of one-family houses and an art gallery. On Galgeberget there are a few residential houses along with a bathing area and a lighthouse.



Existing building structure



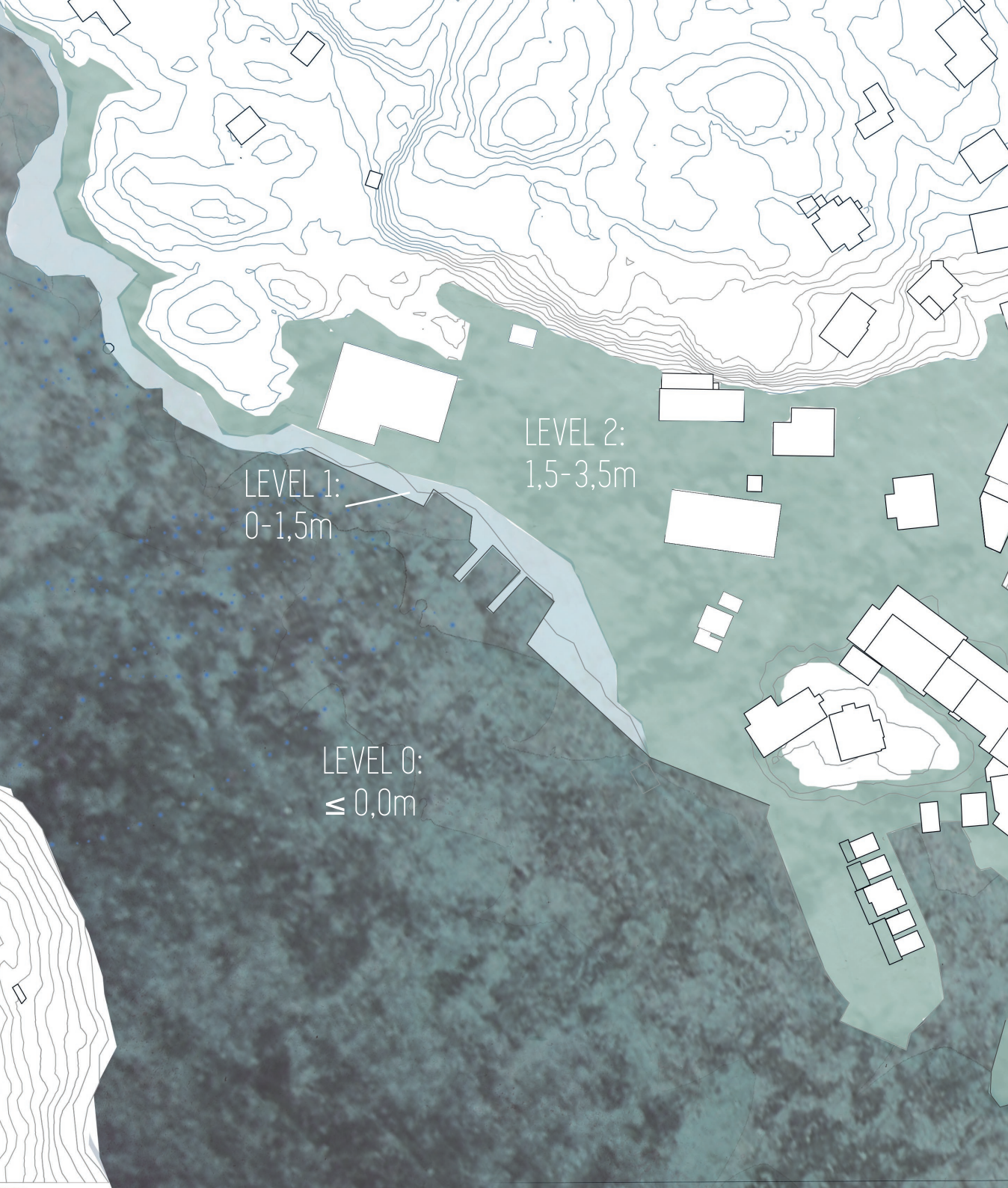
Location of the site



Hamnplan

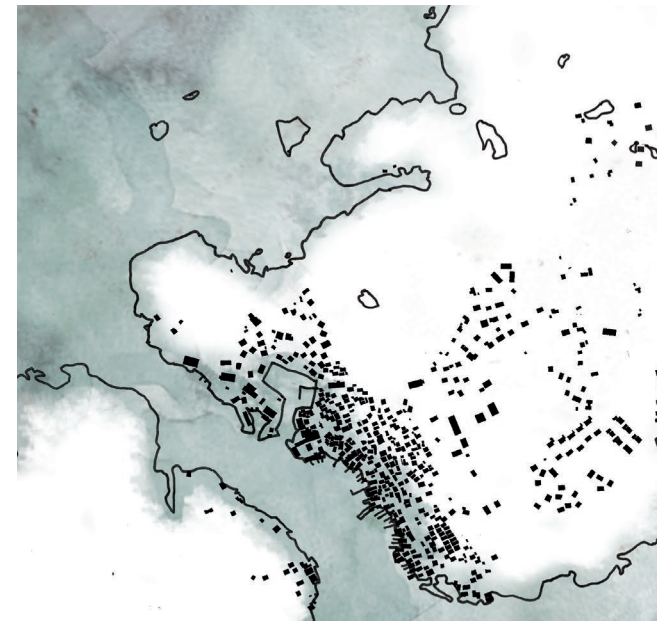
Hamnplan

Galgeberget



TOPOGRAPHY AND FLOODING

Hamnplanen has a height of about $+1,5\text{m}$ in the system of RH2000 (Orust kommun, 2016). Looking at the case of a permanent rising of the sea level of $0,8\text{ m}$, the area is not at risk. However, in the case of storms causing the sea level to rise with just a little more than $0,5\text{ m}$, the entire area will be flooded.



The center of Mollösund is in risk of flooding.

GEOTECHNICAL CONDITIONS

Hamnplanen was originally covered by the sea, it was part of foothills and small islands and notches. In 1936, It was rebuilt to the state it is today, through blastings and fillings. The coast line then changed dramatically as a part of developing the fishing port. (Orust kommun, 2016)

The surface of the area of Hamnplanen consists mostly of hard surfaces in the form of asphalt, concrete with wooden platforms and is at a level of around +1,5 m (though varying) according to the RH2000 system. Since the filling is of a permeable character, it is evaluated not to be an option to build up barriers as a protection against rising sea levels. (Orust kommun, 2016)

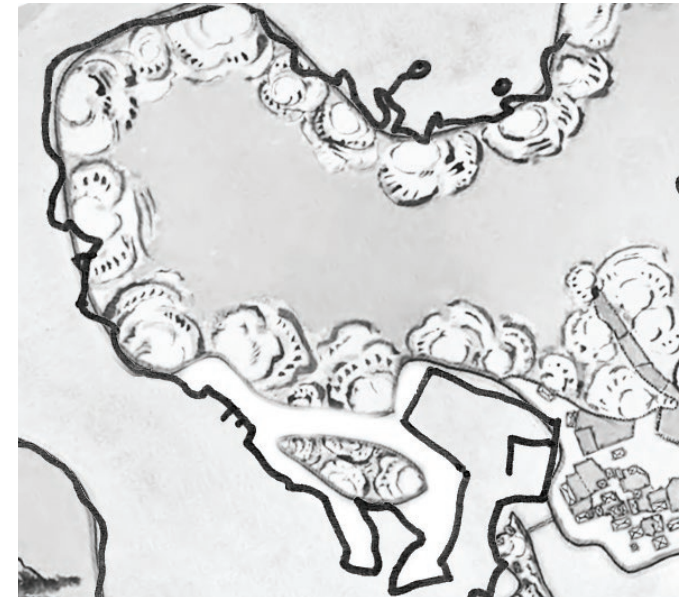
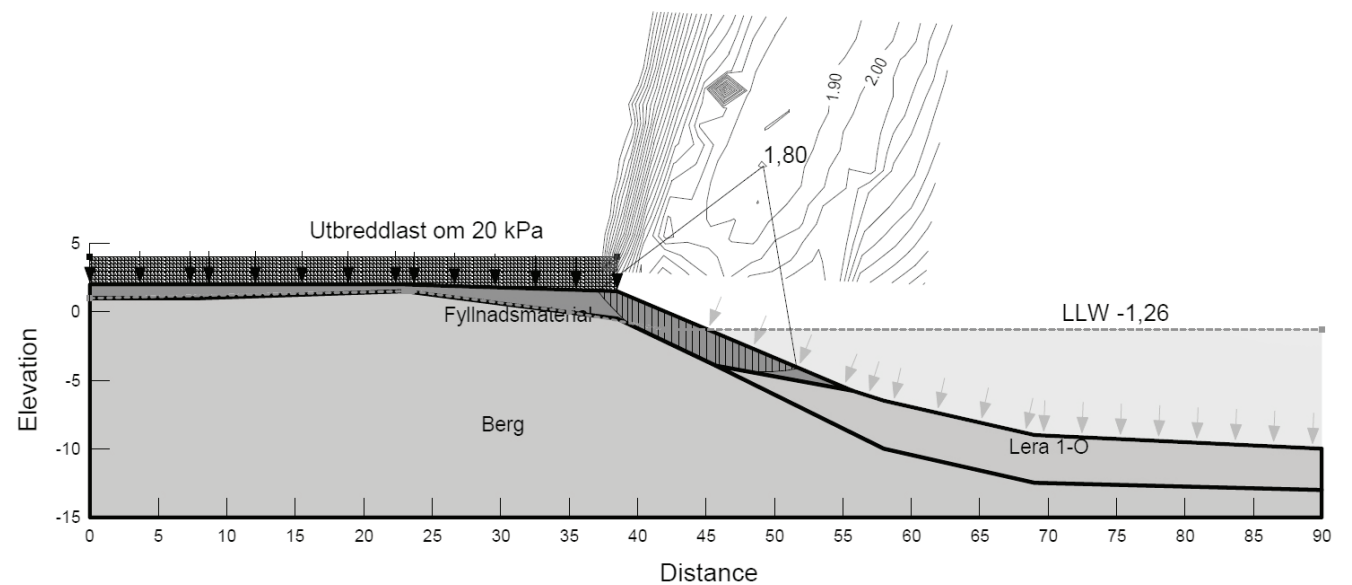


Fig. 6 Comparison of the natural and constructed coastline





NATURAL ENVIRONMENT

Nature plays a central role in Mollösund. The surroundings of Mollösund are characterized by the contrast of a very rocky, scarce landscape and dense vegetation. But even in the dense, historic part, flora and fauna are very present: In the gardens and the spaces in-between houses, there is a mixtue of cultivated and wild vegetation that creates diverse areas with a special character.

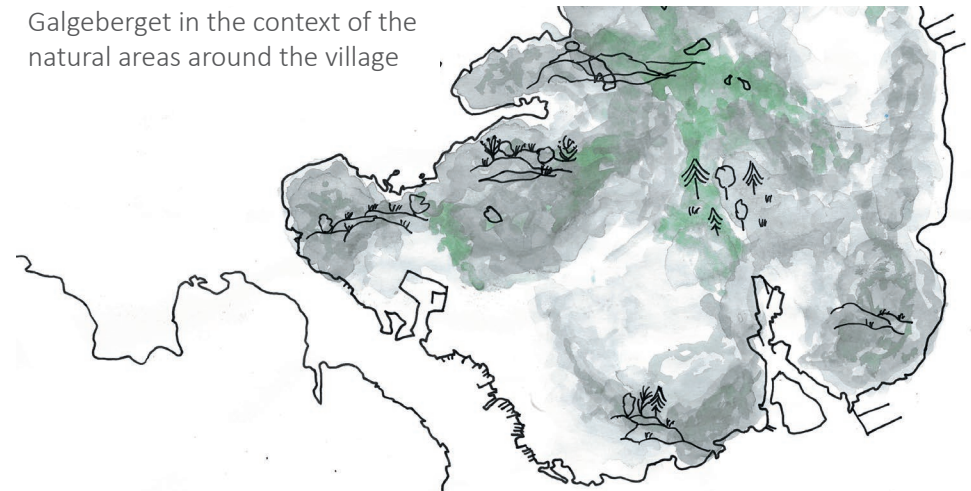
Galgeberget is an important link in the interconnected natural environment the village is embetted in. There are both bare rocks, basins and meadows. Among the clovers you will find pine, birch and some spruce. In the thin soil there are heather and crowberries

that compete with herbs and grass. Different lava contributes to an important flora. On the peninsula there are amongst other thrift, violins, orpine (Naturcentrum AB, 2013) and red-listed blackberries, such as the “Mollösund blackberry” (Natureskyddsforeningen, 2017)

Reflection

The environment on Galgeberget is of great value to preserve. It offers a beautiful scenery, both towards the open water and the archipelago. Here you can indulge in boats that go in and out of the harbour. Accessibility across the cliffs is limited however, with cliffs and wetlands that are hard to cross.

Galgeberget in the context of the natural areas around the village



"It is very special to experience the nature and the change of seasons here."

(inhabitant)



"Do we actually need to build houses by the sea? For the sake of the outdoor life it is essential to preserve the area"

(Natur conservation association)



1 In this area there are mainly bare rocks, basins, smaller rocky areas along with some meadows with violin, and thrift.

2 In this area you find ponds, small wetlands along with bushes, shrubs and smaller trees

3 In this area there is catchfly, heather, violin, thrift and Blackberry

Area 1 and 3 were classified as of high nature value whereas area 2 was classified as of general natural value (Naturcentrum AB, 2013).



WEATHER CONDITIONS

The area of Hamnplanen is oriented towards the South, and will get a beneficial sun ratio. The wind is very palpable, mostly from a south-western direction, but seems to vary a lot. (Möllösundsväder, 2017), (Suncalc, 2017).

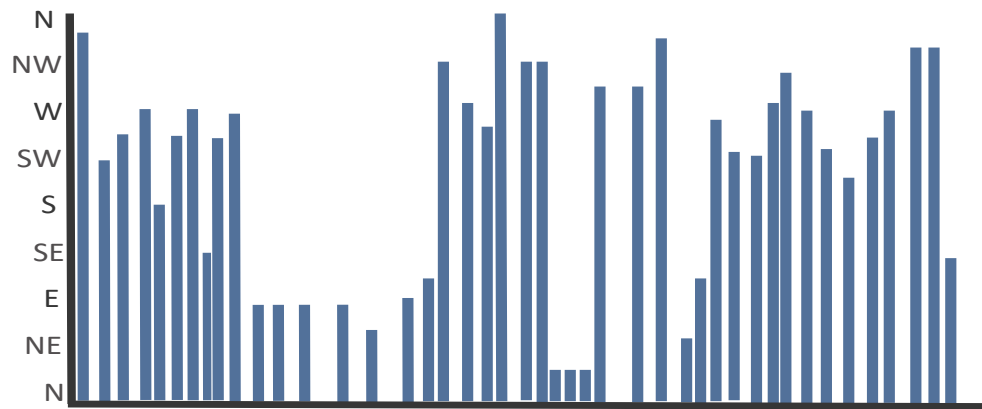
Reflection

The sun qualities are very good, but at the same time, the space of and around Hamnplanen and Galgeberget are exposed to winds. Wind and weather protected places to stay and enjoy the area and its view are missing.



Sun ration in winter

Sun ratio in summer



Wind direction per day during November and December 2017

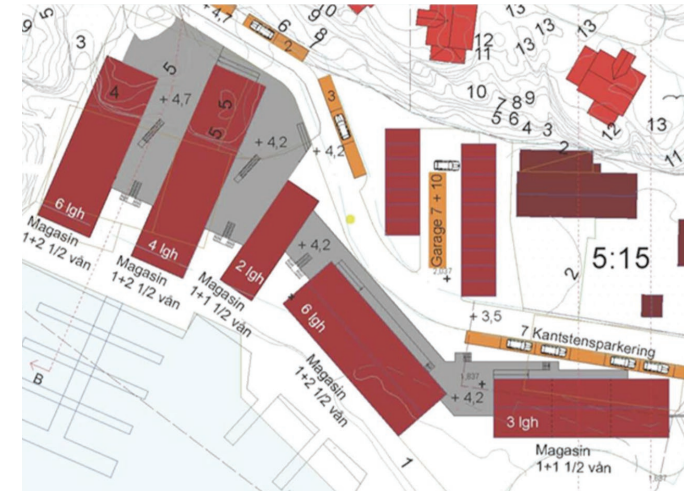


Fig. 8 Detailplan for Hamnplanen



Fig. 9 Illustration of the municipalities proposal

THE MUNICIPALITIES PLANS

A detail plan of the municipality of Orust has been made over the site of Hamnplan and Galgeberget. At the time when the plan was published, the herring business intended to move, so their facilities were included in the plan for a development of the port area with tourism, activities, services and housing. The scales and design were inspired by the existing industry buildings, and therefore of a rather big scale. On Galgeberget some housing was proposed to complement the already existing ones.

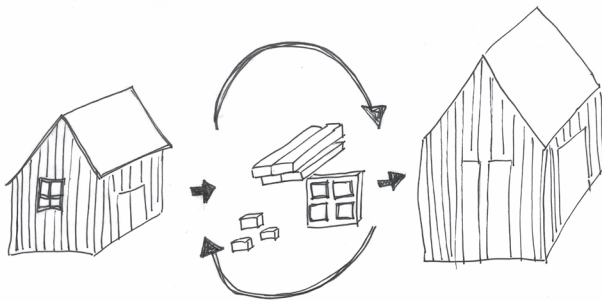
4 | DESIGN PROPOSAL

The design proposal is described in its three parts: The overall neighborhood planning, the House of Sea and a vision for enhancing nature experiences on Galgeberget. It is concluded with a suggestion of possible stakeholders and the different development steps in the process.



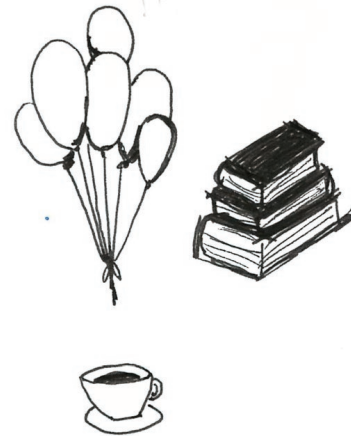
DESIGN PRINCIPLES

Based on a sustainability thinking some design principles have been chosen as “working ethics” to characterize the overall design of the project.



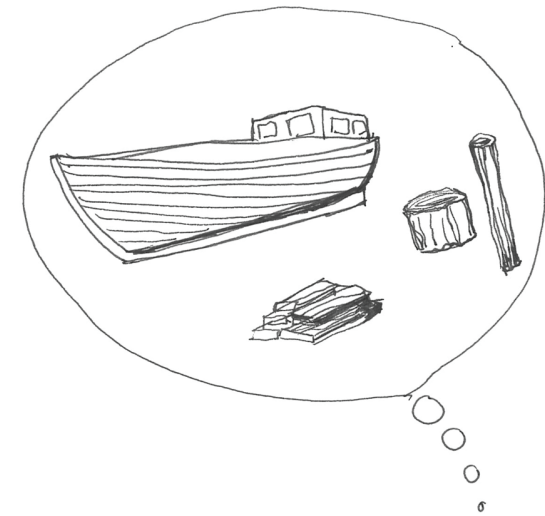
REUSED MATERIAL & LOCAL RENEWABLE MATERIAL

The project uses as much of the landfill and building material of the existing structures on site as possible, along with locally sourced waste material. The aim is to follow a belief of using what we already have and in this way extend the life of materials. What can't be reclaimed will be locally sourced to make sure it has a low carbon footprint.



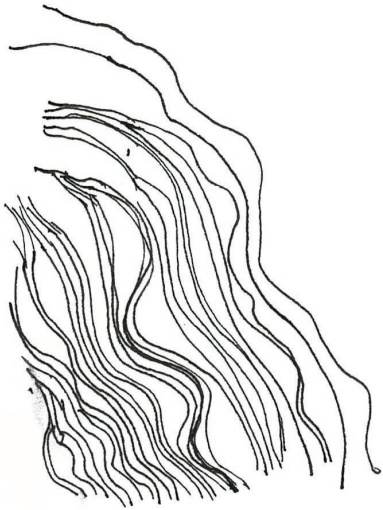
MULTIFUNCTIONALITY AND FLEXIBILITY

Space is thought multifunctional and allows for flexible use wherever possible. Places should be usable at different times and by different people. Flexible architecture is able to act responsive to a changing environment, such as the sea rising and sinking.



TAKE UP TRADITIONAL CRAFTSMANSHIP SKILLS

The structures are constructed with the help of traditional local building techniques. Orust has a rich cultural heritage, identity and tradition of local craftsmanship. By listening to the place and its history, local architecture is created. Solutions for living with and by the water have been created and tested here over years. To create solutions that “fit in”, in the way that they can cope with the environmental conditions and work well together aesthetically with the old structures, we draw on the knowledge and skill within local craftsmanship. In this way, important and characteristic knowledge of the island is valued, preserved and communicated again.



WATER AS A FLUENT BORDER

The project is based on the understanding of water as something that changes and fluctuates. Instead of seeing the coastline as a defined border between land and sea, we act on the assumption of a fluent border that changes daily and over time. This questions architecture that is usually considered to be in a stable, static environment where for example the water is expected to be controlled and opens up new ways of thinking the built environment.



THINK ALL SEASONS

Working in a summer-focussed place, we make sure to always consider different seasons. Places are supposed to work all year around. The natural shift of seasons is, similar to the water levels, accepted and embraced. Spaces thus have to be flexible: In the winter time for example a dance pavilion can turn into ice skating with hot chocolate and christmas markets.



ECOSYSTEM INTEGRATION

Don't destroy. enhance

We believe that building sustainably implies building in line with the environment. Everything is built in a way that tries to support ecosystem services instead of disrupting the natural environment. Buildings that live well in their place can support the natural, cyclic system and contribute to a rich flora and fauna. What is built in places of important ecosystem values should be able to be removed without harming the nature.

Integrating settlements and nature also brings people closer to their natural surroundings. Enhancing the experience of nature increases awareness for nature and the ecosystem services we use daily.

STRATEGY DISCUSSION

WHERE?

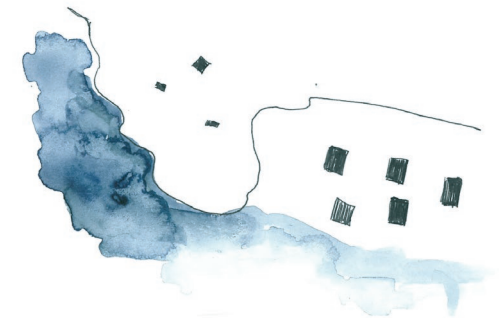
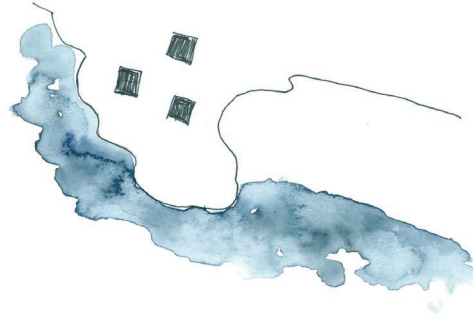
There are two different strategies on where to place new structures.

We propose to place larger interventions on Hamnplanen, whilst on Galgeberget, only small, low impact elements are placed that strengthen the areas qualities.

HOW?

Different strategies that can be used to handle the problem of rising sea levels are explored in this project.

Our approach is to combine all three strategies: Where needed, connections on a safe level are established. Where possible, the built structure merge with the water to create a physical closeness.



Developing a new neighborhood on Galgeberget damages the nature severely, and thus impedes the recreational value.

The Hamnplanen site is suitable in the way that it already is exploited and of low value for the ecosystem and supposed to be developed in either way. The site is though located on a level in risk of flooding. A development here requires special measures.



SAFE GROUND

The buildings can be placed on safe ground, thus making it almost unaffected by the changes of the sea level. Hillsides and naturally or man-made higher ground can be used. A disadvantage with this strategy is that the contact to the water can be lost.



ON WATER

An option is raising buildings on plinths. In this way the most vulnerable part of the house is safe if the distance to the water is great enough. With this way of construction, the close connection to the water might be weakened. Additionally, it's difficult to ensure safe emergency accesses to all houses.



FLEXIBLE WITH WATER

Letting the water into the building enables for a close relation with the environment. Damages can be prevented by welcoming the natural power instead of fighting it. The usability of spaces is dependent on the water level and requires flexibility of the users.

INSPIRATION

Fig. 10-13: Inspiration for buildings



Fig. 14-17: Inspiration for Galgeberget

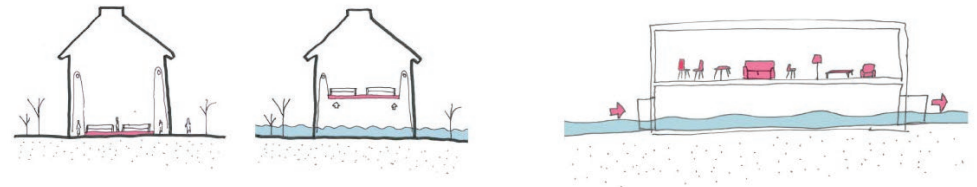


Fig. 18-20: Inspiration for flexible buildings in risk of flooding

PROGRAMME

It is proposed to develop a new neighborhood on the Hamnplan site in Mollösund that broaches the issue of living by and with the water in the face of rising sea levels and offers space for permanent living and off-season activities.



HOUSE OF SEA

As the central element, the House of Sea, a multifunctional research center and meeting space is proposed, to function as a starting point for a further citizen-driven development of the neighborhood. The center is a think tank for sustainable coastal living and offers facilities to research and experiment how to build with water, an exhibition and other publicly accessible spaces. Especially off-season, when summer guests leave, it works as an attractor for researchers and for example groups that participate in workshops about building with water. At the same time, with a co-working space and a lounge space, the House of Sea offers a so called “third place” to meet for the local community. - The center is open for everybody all year round and offers a lively, welcoming spot in the “end-of the road” location of Mollösund.



THE NEIGHBORHOOD

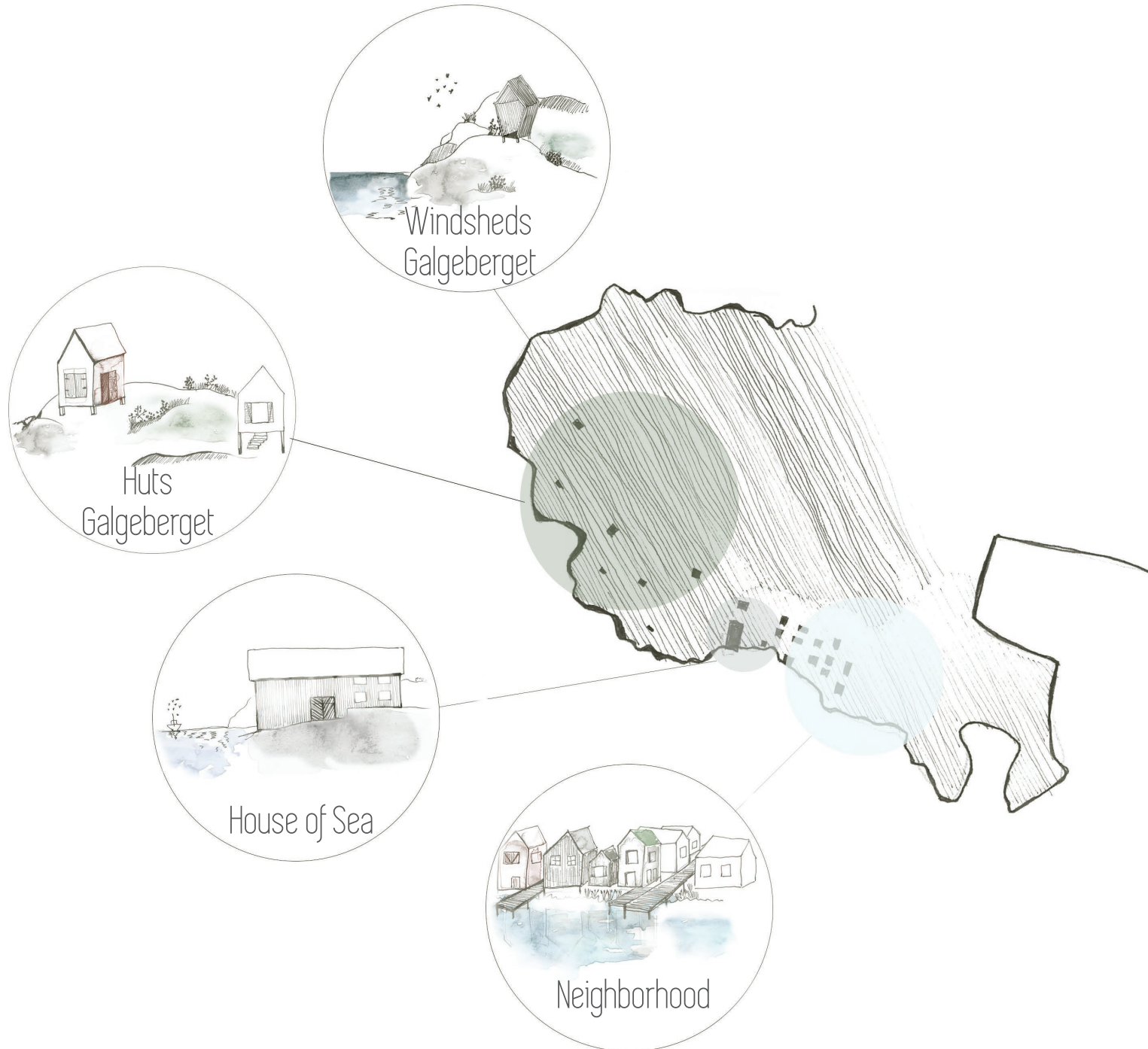
In the adjacent area, new housing and some small businesses are proposed. Here, different ways to live by and with the water are implemented and tested on a bigger scale. To enable a broader range of people to live permanently at the coast of Mollösund, rather small rental units are proposed, featuring different characteristics that address different people. The landscaping in the area, which is based on the natural environment of Mollösund encourages wandering along the water, getting closer and exploring.



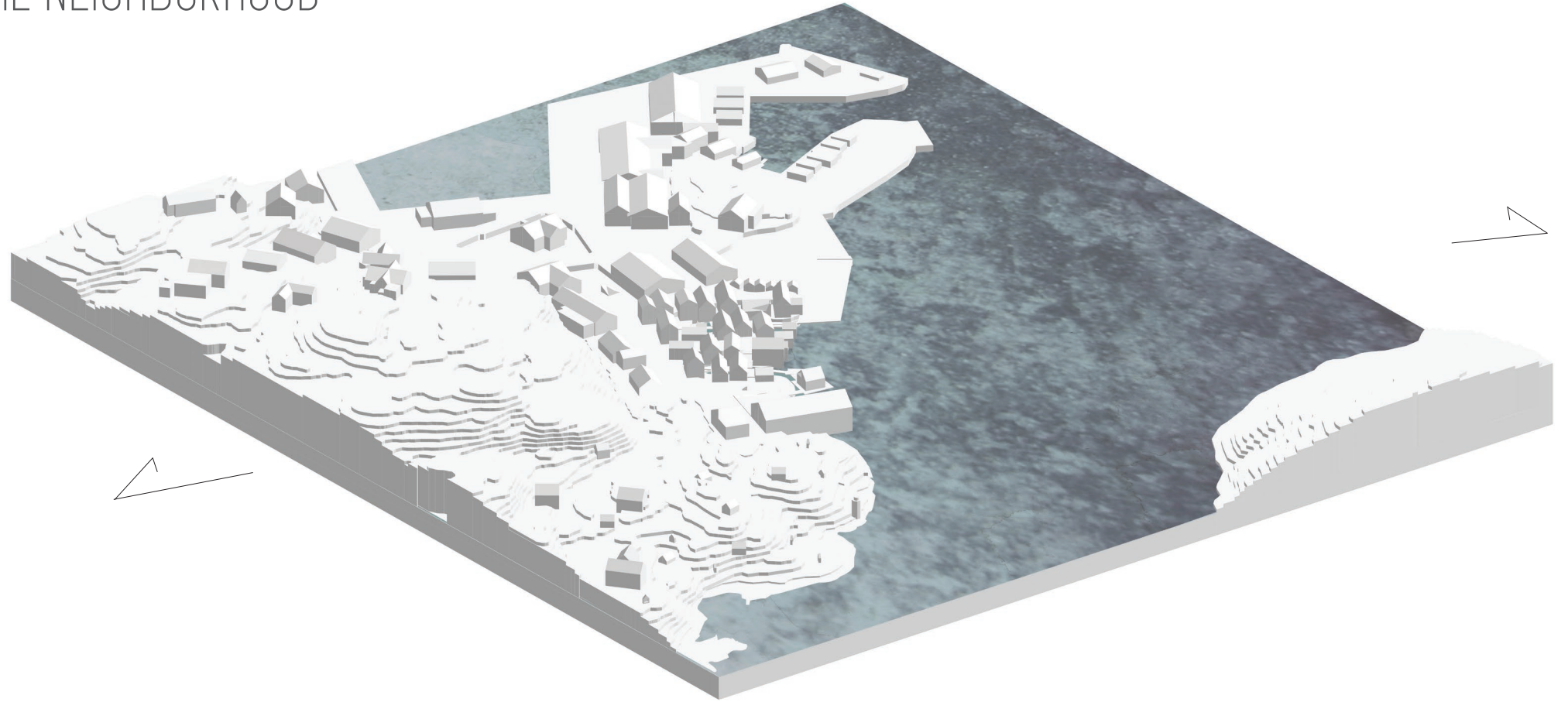
GALGEBERGET

To enhance the special qualities of the site, not only the connection to the water, but also the magnificent nature on Galgeberget is strengthened: By adding walking paths and wind protection sheds, the area becomes more accessible. Tours and information signs can additionally support the experience of nature and its fluctuations and raise awareness for environmental issues and increase learning about coastal ecosystems.

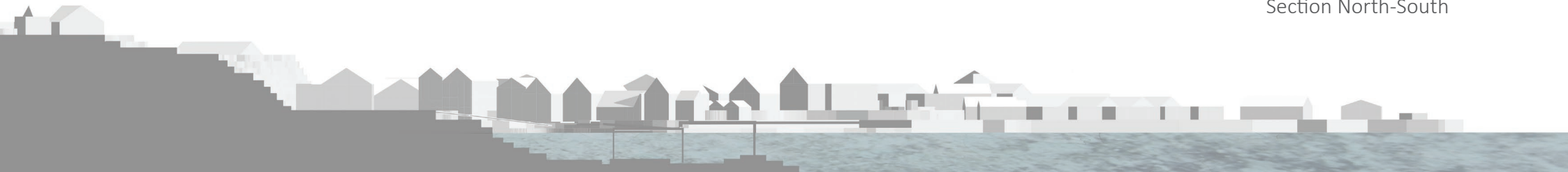
Small, simple huts can be added over time on Galgeberget, enabling low-budget eco-tourists to stay in the area without harming the environment severely. To learn, showcase and inspire for “new-old” ways of construction, these can for example be built by carpenter apprentices with the help of traditional local building techniques and renewable materials.



THE NEIGHBORHOOD



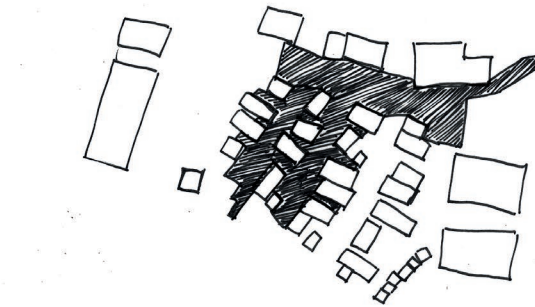
Section North-South





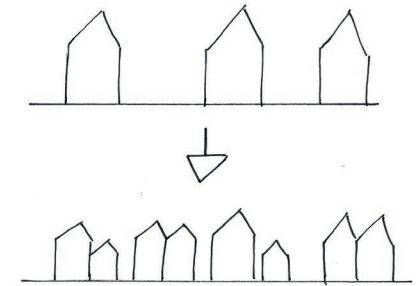
FINGER STRUCTURE

Some areas are lowered, some raised, so that parts become flooded while others become more protected from the water. By creating a finger structure of different height levels, the coastline becomes longer and more houses get a direct access to the water. The padding and clay that is dug up can directly be reused to fill in the higher parts. This way, the use of additional resources and transport costs are kept low.



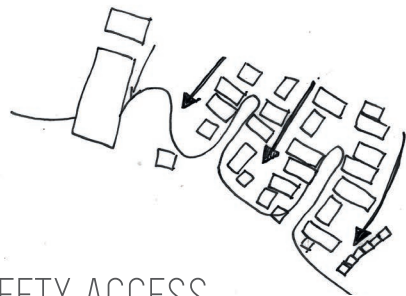
A SMALL SCALE STRUCTURE

The building structure is based on the traditional layout of the village center, where fishing huts line up along small alleyways towards the water and slightly larger one-family houses are placed behind, at the foot of the hill. In such a structure, small cozy spaces in between houses emerge. These qualities are translated into a layout which meets today's needs, by placing small housing units and just a few businesses in a fishing hut structure.



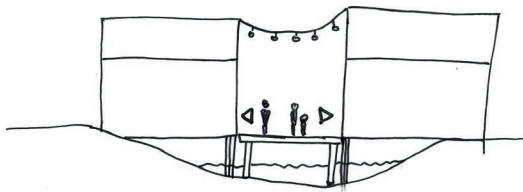
LIVE SMALL AND MORE DENSE

Part of the strategy to be able to offer affordable housing by the sea is to create small units and a dense structure. This way, for example single elderly or children of locals get a better chance to find a place to stay. Although these kinds of houses are not typical for the area, they fit in since they resemble the structure of fishing huts.



SAFETY ACCESS

Whilst the lower levels enable a close contact to water, the fingers on a high level reach most houses and ensure a safe access in case of flooding, e.g. for emergency services to come through.



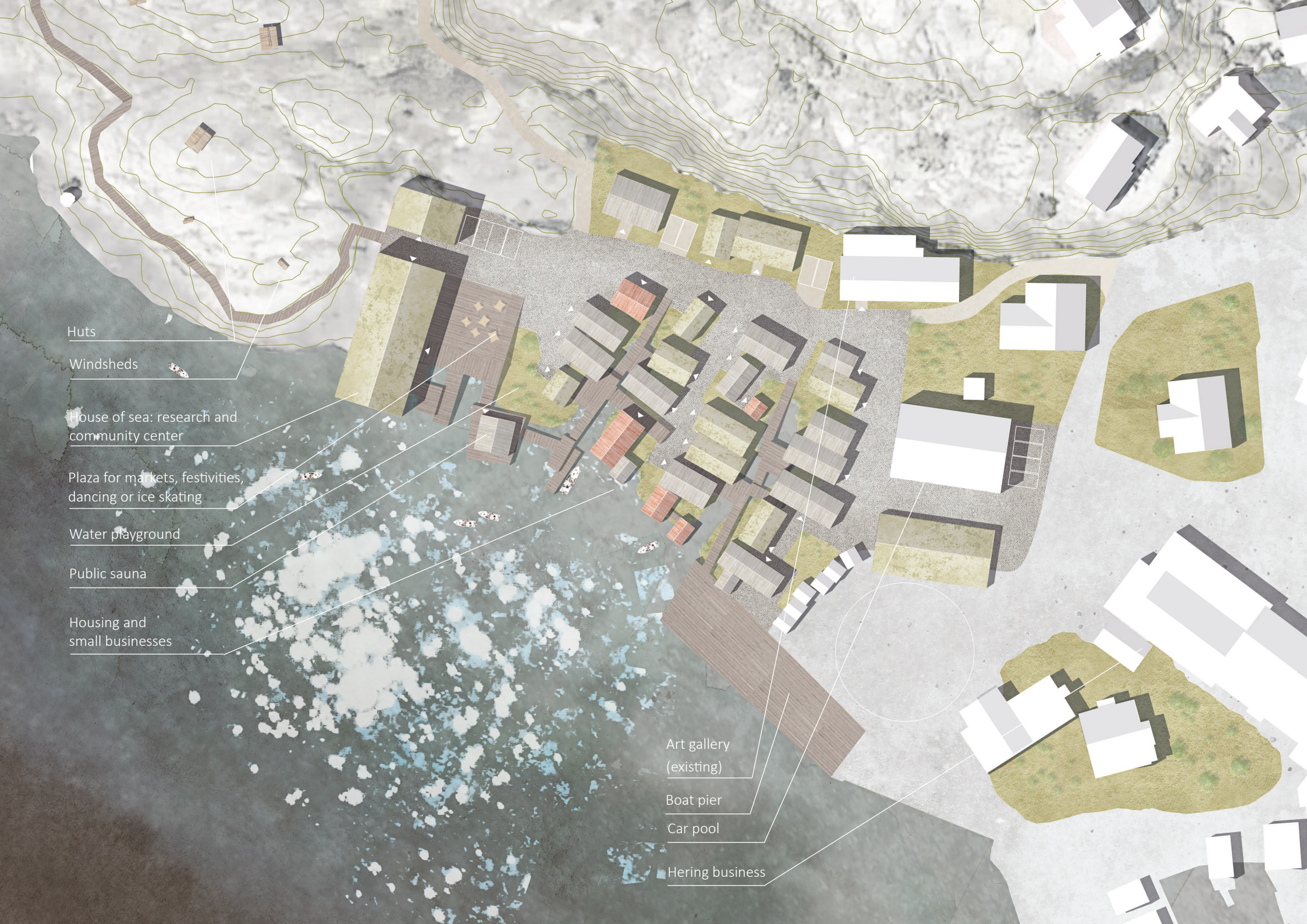
OUTSIDE CORRIDOR

The area works like a disassembled apartment house: Wooden boardwalks connect the small units in a common recreational area.



WATER MANAGEMENT & BIODIVERSITY

The floodable areas can delay, direct and collect the water. Since their landscaping is based on the surrounding nature, they support ecosystem services and offer inhabitants recreational spaces and nature experience right in front of their home.



Huts

Windsheds

House of sea: research and community center

Plaza for markets, festivities, dancing or ice skating

Water playground

Public sauna

Housing and small businesses

Art gallery (existing)

Boat pier

Car pool

Herring business

Following the main path from the inner harbor to the West, the street leads directly to the House of Sea, which sits confidently nestled up against the hillside. Getting closer, the small street opens up and becomes a square. Next to a wooden platform, where festivities and events take place, a green hill invites the children to play in the puddles. A pier leads out to the public sauna, from where you have an unobstructed view onto the sea and Mollön.

Similar to in the historic center, small alleyways are stretching from the main street towards the water, allowing for occasional views to the sea, but still protecting the structures behind from strong winds. The pedestrian friendly, small scale structure offers diverse impressions when strolling through. In between these smaller paths, wooden boardwalks invite to explore the other, more secluded part of the housing rows and go further down to the water level. Here, nature and the built environment merge.

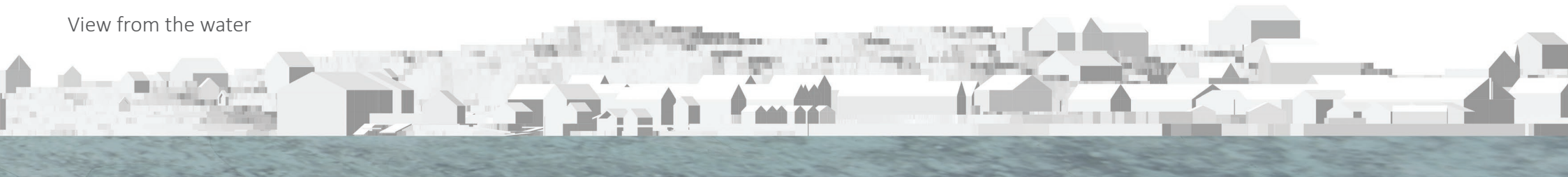
Most of the buildings are housing; in some of the ground floors and huts, small businesses have opened up. There is for example a kayak renting agency, an ice-cream shop, and art studio and shop and a fishing store.

Since the House of Sea opened, there are frequently coming visitors that also explore the area, which is known as a pilot project showcasing different ways to build by the water.



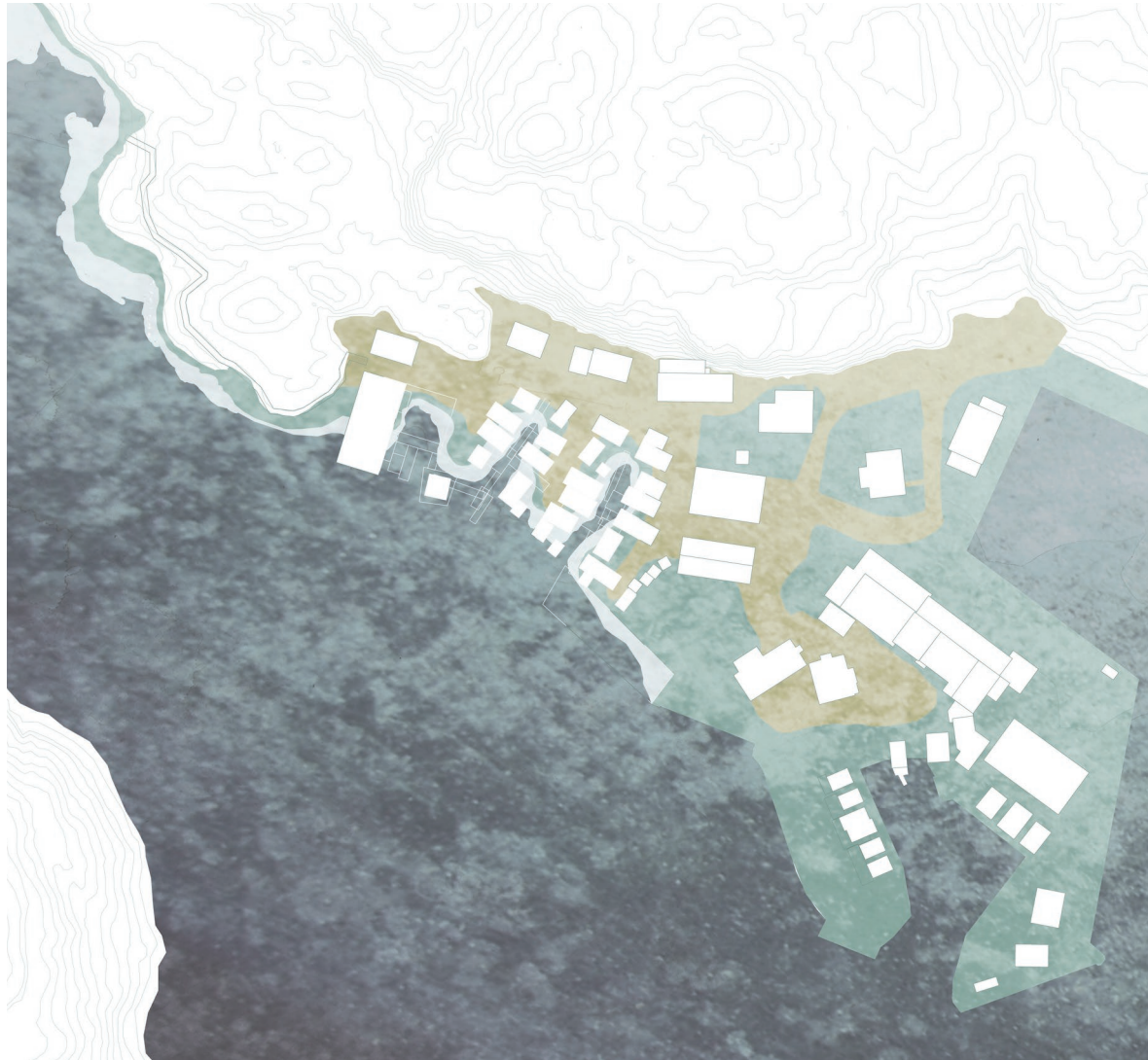
Next to a wooden platform, where festivities and events take place, a green hill invites the children to play in the puddles. A pier leads out to the public sauna.

View from the water



LEVELS

Based on the level that the sea is expected to rise till the end of the century, 0,8 m, and the expected so called 100-year level of about additionally +1.5m as well as the safety level of 3,2 m (Orust kommun, 2016), it is proposed to construct zones of four different levels.

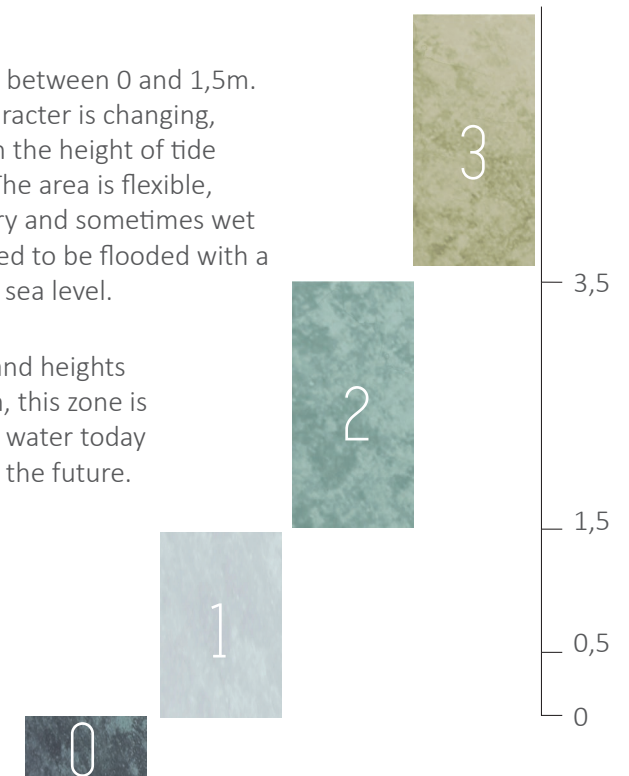


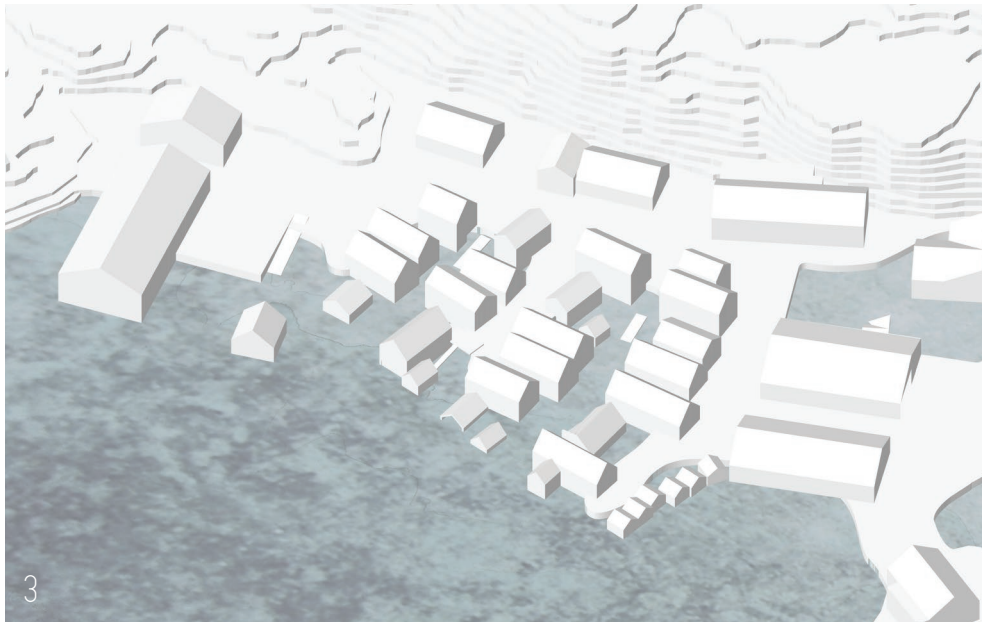
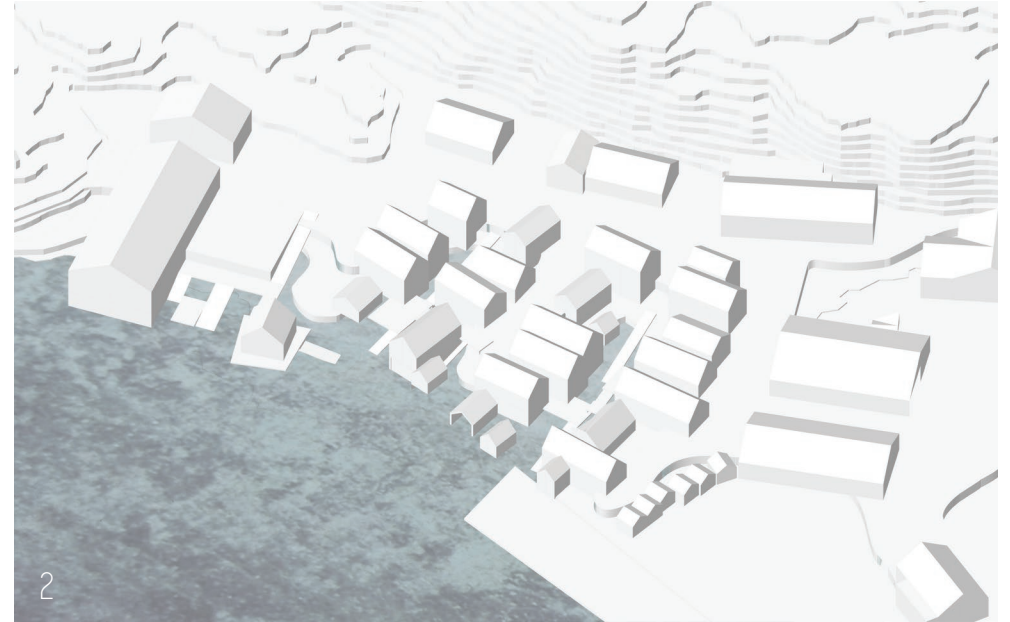
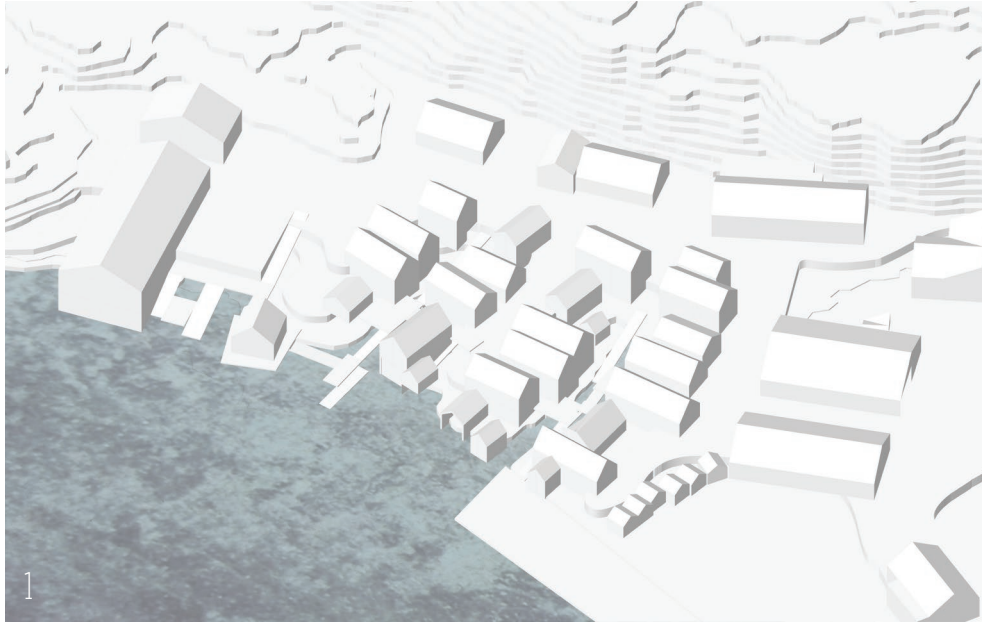
ZONE 3 is placed on the “supersafe” level of min. 3,5 m. This zone has a high safety marginal against sea levels and can be designed with high confidence that it will not be flooded at all during the next century.

ZONE 2 is a “semi-safe” level that varies between 1,5m and 3,5m and equals today’s ground level. This will only be flooded in extreme weather conditions. Therefore, it can be used as a zone without water, but needs to be flexible in the case of extreme levels. Here, a close contact to water is possible on rather save ground and a filling in of clay is not necessary.

ZONE 1 varies between 0 and 1,5m. Here, the character is changing, depending on the height of tide and rainfall. The area is flexible, sometimes dry and sometimes wet and is designed to be flooded with a future higher sea level.

ZONE 0 has land heights of max. 0,0m, this zone is mostly under water today and will be in the future.





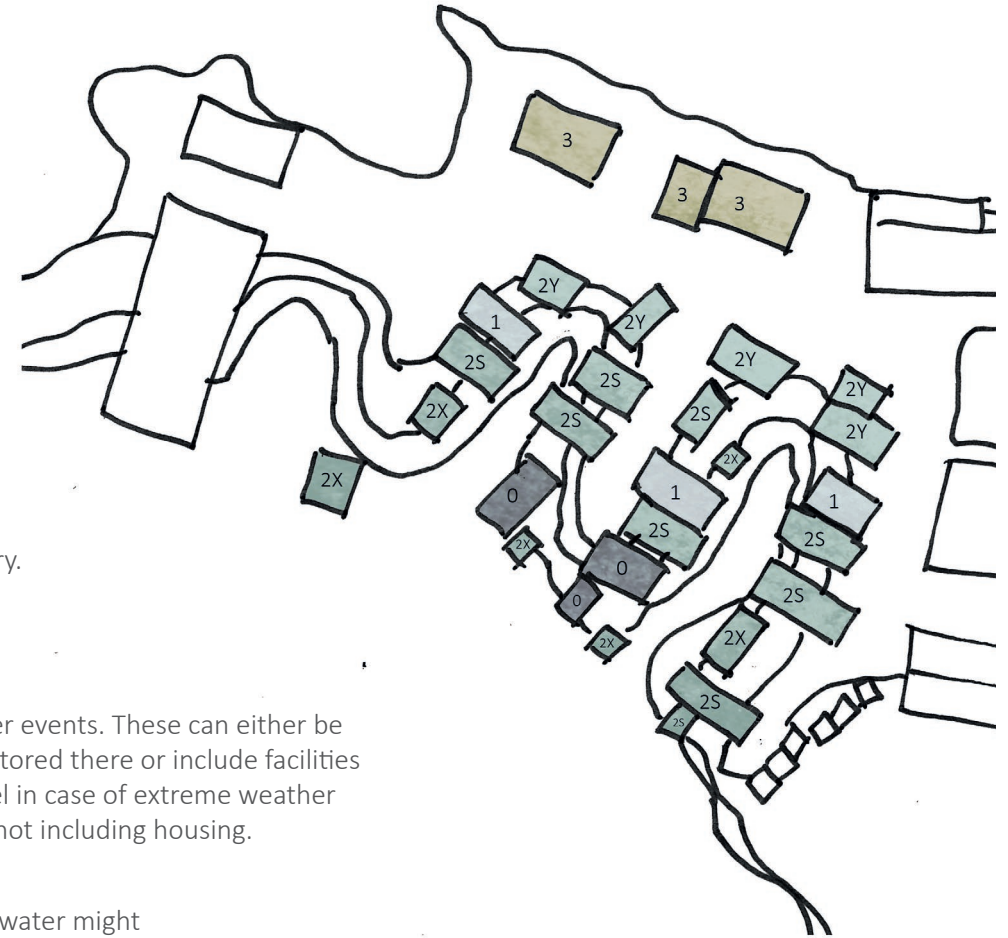
The pictures illustrate the different character and accessibility at the different sea levels of 0m (today's level), 0,8m (the expected permanent rise in the next 100 years) and 2,3m (the 100-year extreme weather prediction).

Small alleyways are stretching from the main street towards the water



BUILDING TYPOLOGIES

To combine flood protection with a close contact to the water, the buildings follow the constructed topography and often have several levels. They can be sorted into 4 groups, according to which constructed land level their lowest floor is reaching.



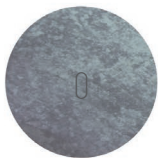
This type stands on safe ground all year round and for the next century. Nevertheless, they are placed in close proximity to the water.



These types have spaces that might flood seldomly in extreme weather events. These can either be used for freetime activities that does not require valuable stuff to be stored there or include facilities like a liftable table, on which furniture can be secured on a higher level in case of extreme weather events. 2X does not have a safety access on a higher level and is thus not including housing.

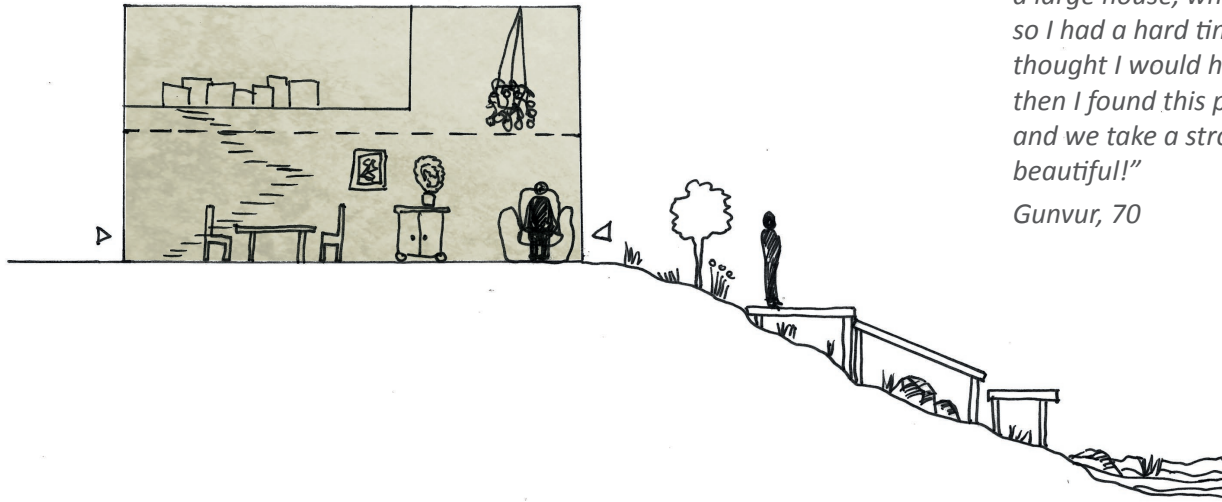


The so-called greenhouse partly reaches down to a level to which the water might reach more frequently in the future. The lowest part includes a glassed, less insulated sunroom, which makes it possible to sit close to water and nature even in colder seasons.



The boathouse is the only type that includes a space permanently filled with water. This area is not insulated and can be used as a boat garage.

3 | STAY DRY

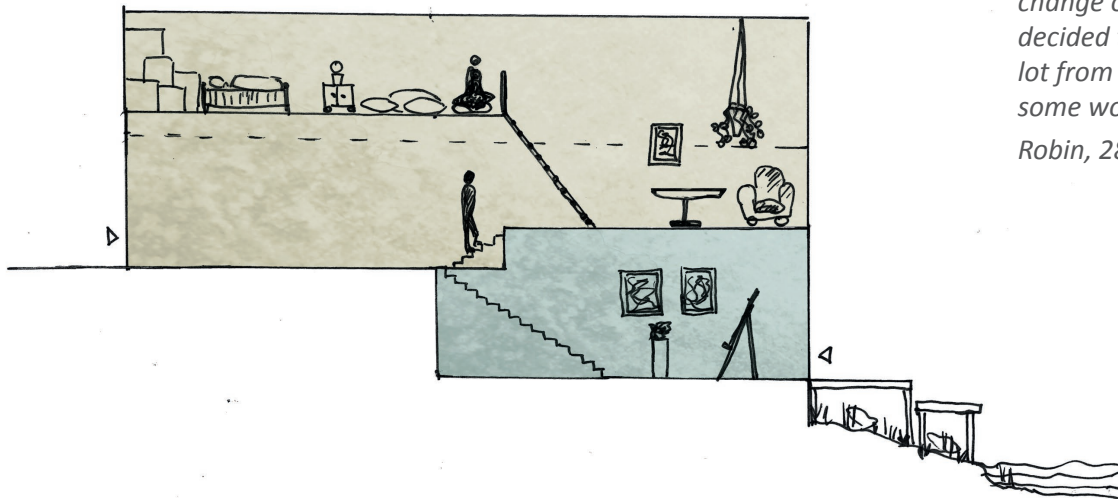


"I have lived in Mollösund all my life. Now, I am a widow and my children have moved out many years ago, so I ended up alone in a large house, which felt very empty. Also, my body got weaker, so I had a hard time walking up and down the hill to my place. I thought I would have to move from the place I love so much, but then I found this place. Now I share a flat with my friend Astrid and we take a stroll everyday and sit down by the water. It's beautiful!"

Gunvur, 70



2S | LIVE SMALL

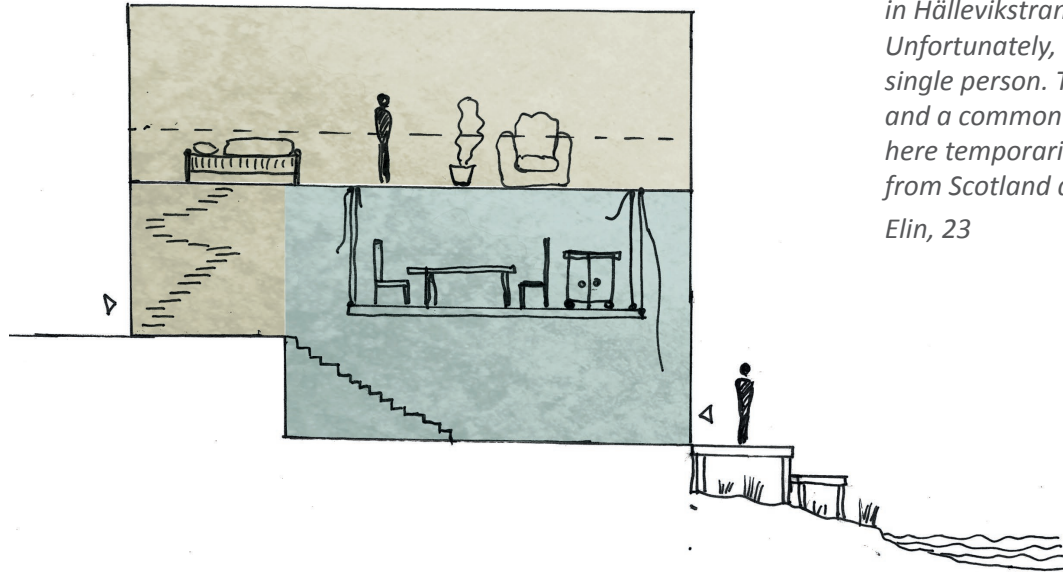


"We are originally from Gothenburg, but Emma wanted to come here to do her research on the effect of climate change on maritime ecosystems research center, so I decided to join her. I am a freelancer and can work quite a lot from home or at the co-working space, but I also offer some workshops at the House of Sea occasionally."

Robin, 28



2 Y | LIVE TOGETHER

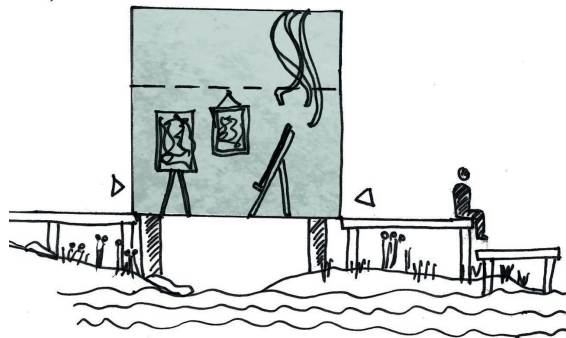


"We are a group of friends that grew up on the island. Most of our friends moved to the city, but we wanted to stay. Emil does an apprenticeship in boat building in Hällevikstrand and I work at the refugee accommodation here in Mollösund. Unfortunately, we cannot afford to buy a house here, and they are also too big for a single person. That's why we decided to move in here together. We have two bedrooms and a common living room. The third bedroom we have, we rent out to people staying here temporarily for a project or something. At the moment, Tom stays with us. He is from Scotland and does a hiking trip around Sweden."

Elin, 23



2 X | TINY BUSINESS



"I am a painter and my friend Markus is a photographer. We came to Mollösund because of its fascinating nature. We were very lucky to find this little shed we could rent for some months. It has a perfect view onto the water and serves both as our atelier and as a tiny exhibition where we show and sell our work. The people here are very interested and often come by to say hi."

Sara, 35

1 | GREENHOUSE

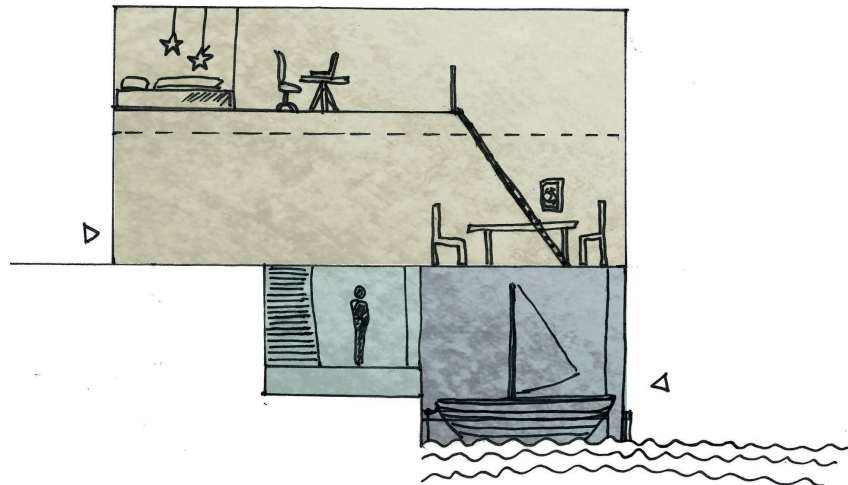


"I am an author. When I first came to Mollösund, it was a rainy November day, and the special atmosphere inspired me for my new book. I decided to stay so I rented this cozy little house. My favorite place is the sunroom, which i filled with a lot of plants. Here I sit, contemplate the environment inside and outside my window and write. On most weekends, my daughter Hannah, who lives with her mother in Uddevalla, stays with me. She enjoys playing outside and going to the crafting workshops at the House of Sea."

Hans, 48



0 | BOATLOVE



"I live here with my wife Ann-Kathrin. First, we only stayed here in summers and did long tours on our beautiful restaurated boat Elsa, which was laying here. Now we found a job in the area so we decided to stay permanently. To be able to just go downstairs and get into the boat is a dream come true!"

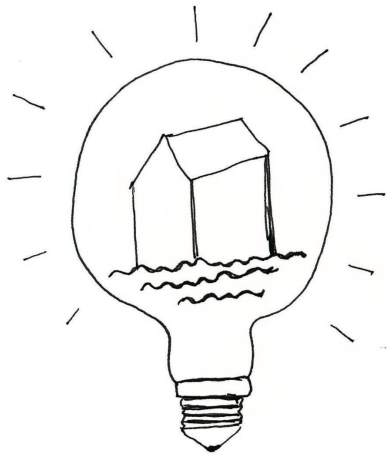
Gunnar, 55



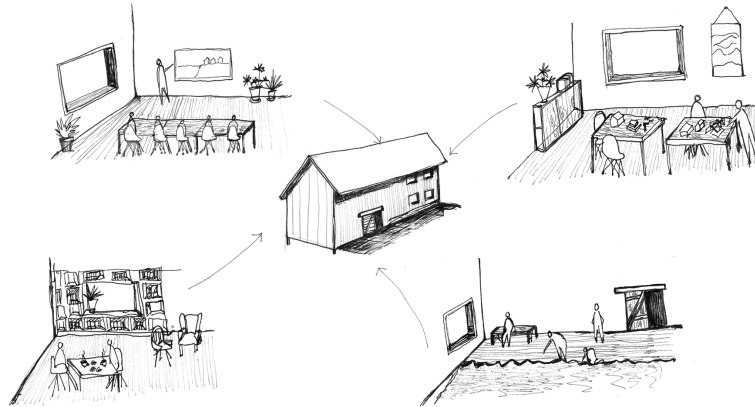
THE HOUSE OF SEA

House of Sea is a multifunctional meeting place and research center. The design is meant to explore the topics of how to build by the water. Architecture is explored in a non static environment, where sea and nature is accepted. The center is open for everybody all year around and offers a place, with no consumption obligation, to meet up, relax, indulge in nature or engage in activities. Research on sustainable coastal living along with exhibitions or events form the basis of a discussion about the connection between culture, building and water.

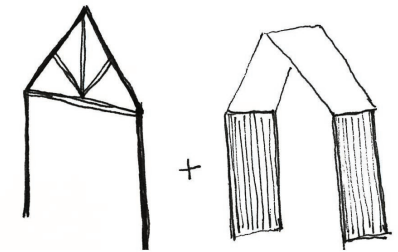




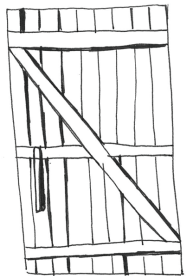
A think tank. Water is used as a quality and pedagogical tool to increase knowledge about the connection between culture, building and water.



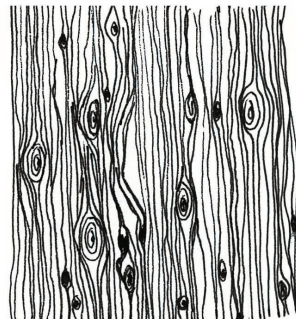
Flexible and multifunctional spaces that allows for mix use
e.g. lectures, workshops, research, fika



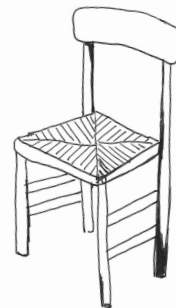
Robust structure



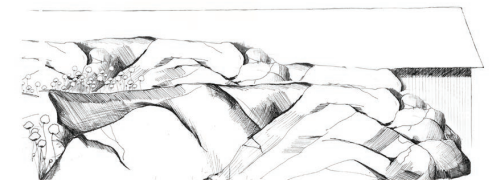
The building's scale and materials takes inspiration from traditional buildings in Mollösund.



Use of organic and reused material.

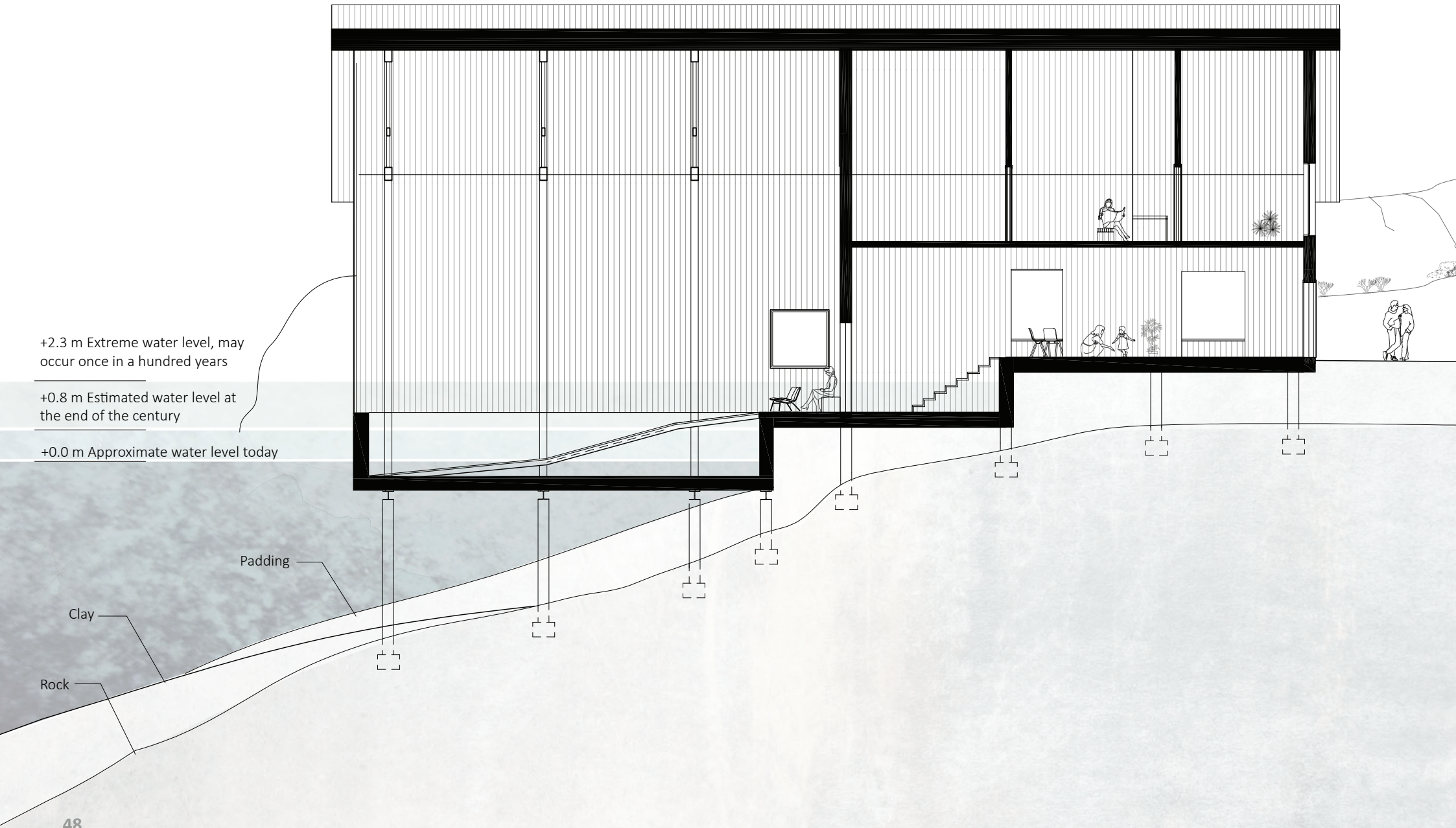


Hand made and crafted interior design from the island.



Connection to Galgeberget. Green roof, with for example thrift, extends the habitat for Galgeberget's flora and fauna.

Section 1:150



+2.3 m Extreme water level, may occur once in a hundred years

+0.8 m Estimated water level at the end of the century

+0.0 m Approximate water level today

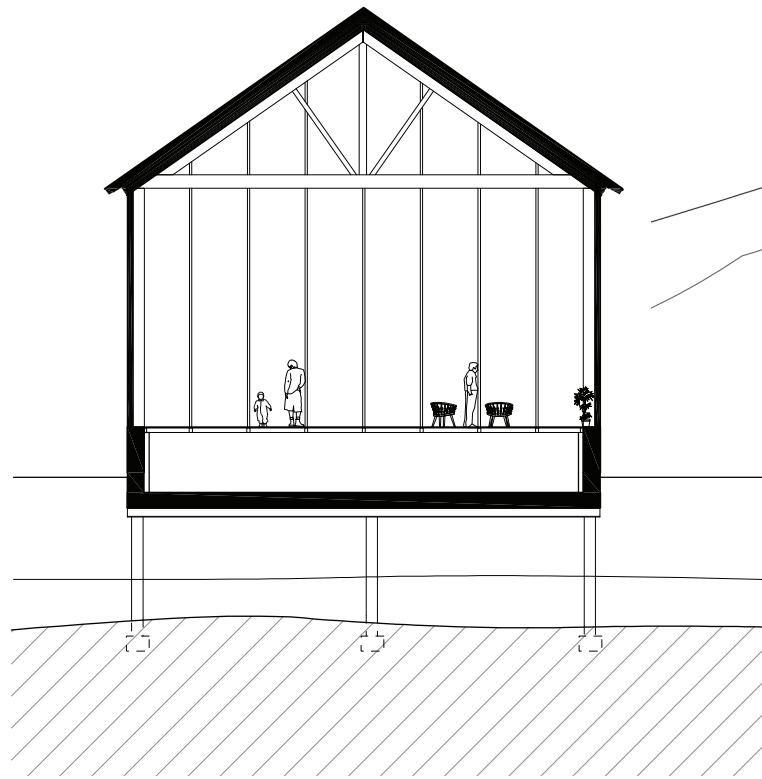
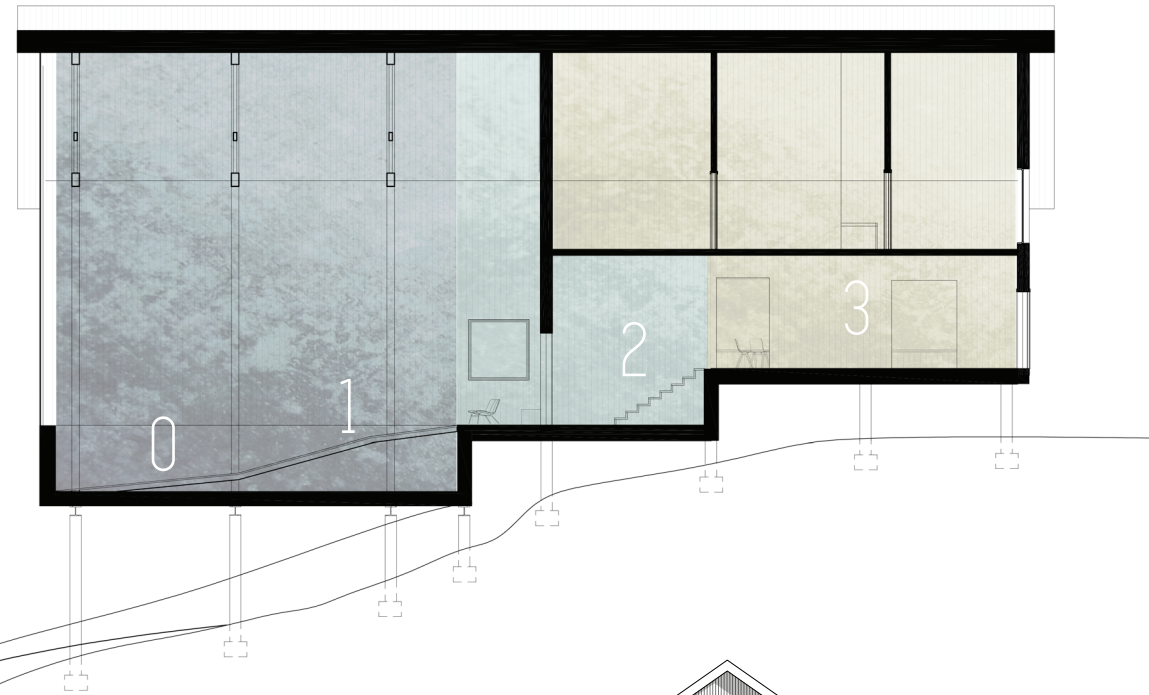
Padding

Clay

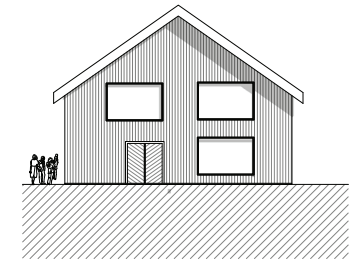
Rock

RELATIONSHIP TO THE WATER

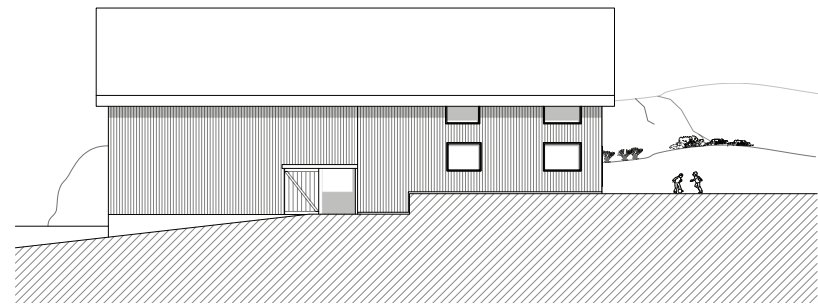
The multifunctional areas are in different vulnerability to the sea, that follows the system of the zones of the whole area. The area nearest the water, the “basin area” corresponds to the water levels 0 and 1. Here the water is allowed to “come in” and be present, it has a changing character. An entrance level corresponds to level 2, only vulnerable to the sea in extreme conditions. The rest of the house, with an additional entrance, corresponds to level 3 and is a “safe” from the water, here all the permanent functions are gathered. The spaces are all accessible by everyone, but will be used differently depending on the state of nature.



Section short side 1:200



Facade North 1:400



Facade East 1:400



The space can be used imaginatively for waterplay or educational theories can be tested, e.g. by placing prototypes of buildings in the basin.



Contemplating changing water flow



Dancing on a plain floor



Testing theories and waterplay

MULTIFUNCTIONAL BASSIN SPACE

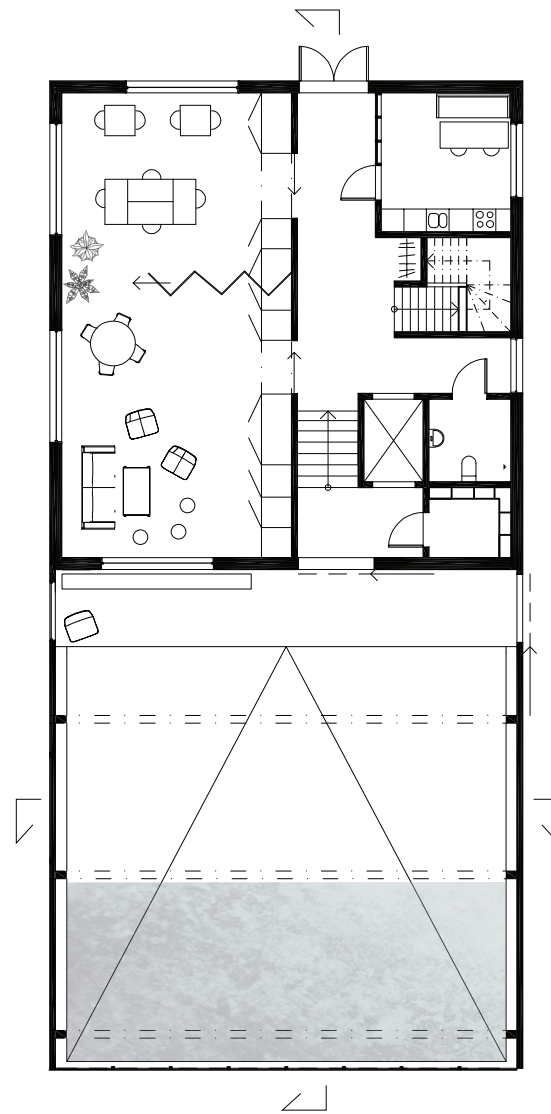
Half of the building is designed as a space where building and sea literally meet. The space has a foundation of concrete with wooden platforms that can be tilted or set plane according to activity. At “normal” state the water can come and go as it naturally fluctuates, allowing for contemplation and observation of it. Different water levels can also be simulated, and the concrete foundation then acts as a “tank” that can be filled and likewise emptied. This will create a lab-like area where research and educational theories and cases can be tested, e.g. by placing prototypes of buildings in the bassin. Visiting groups can participate in workshops where they build flood protection structures and test them in different water levels. The space can be used imaginatively for waterplay, or perhaps even water gymnastics or a cinema. In the case of a gathering, disco or other event the space can be emptied on water and the boardwalks act as a plane floor.

MULTIFUNCTIONAL LOUNGE

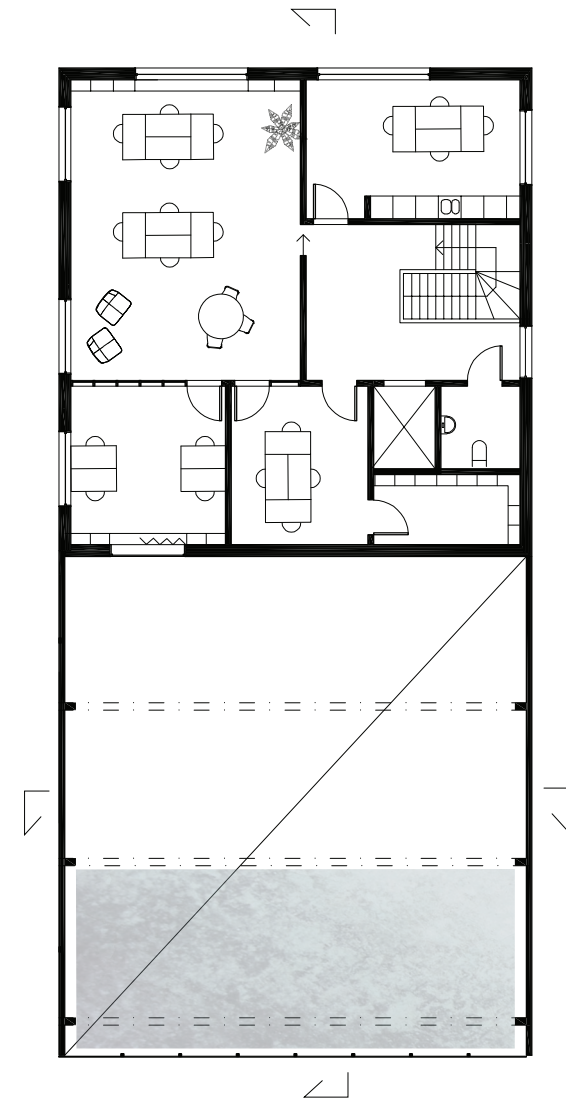
The building's entrance level functions as a lounge-like area and can be used for exhibitions, conferences and lectures about coastal living, with topics such as architecture in a future of rising sea levels. Here researchers and visitors can meet at lunch time or the local book club can meet for coffee. A room can be booked to offer space for local groups, clubs and indoor activities such as arts and crafts courses. A small library, partly digital, can be established in collaboration with Henån's library, providing and exchanging media. A local guide can use the *House of Sea* as a base to talk about tradition and history about the fisher village. Tempo or Café Emma can deliver fresh fika for a sort of self-service café. Through flexible furnishing and walls the spaces can change according to activity.

CO-WORKING

The upper floor is equipped for co-working, which includes both space for researchers working at the center or inhabitants working remote. A possible collaboration can be with universities that connect their research to Mollösund. Research on sustainable coastal living is meant to start a discussion and be the basis of the house functioning as a think tank, sharing the research with the municipality and visitors. Here researchers can observe and analyse the natural and built environment.



Plan Ground floor 1:200



Plan Second floor 1:200



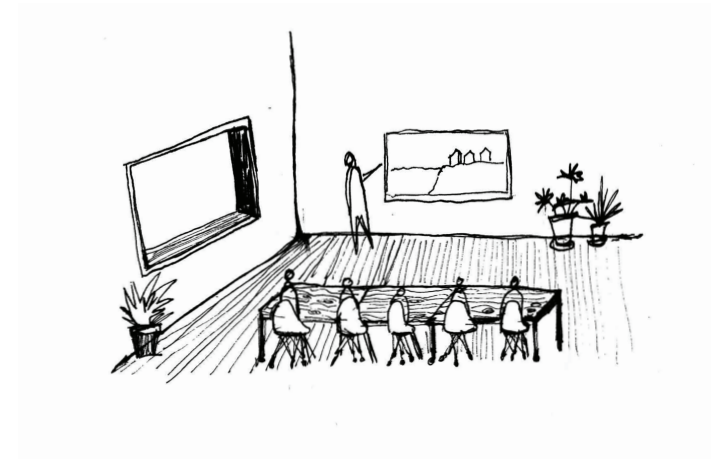
With a co-working space and a lounge space, the House of Sea offers a so called "third" place to meet for the local community

EXAMPLE USERS AND ACTIVITIES



LOCAL GROUPS OR CLUBS

Föreningen Mollösund, a book club or other group hosting events or courses



EMPLOYEES

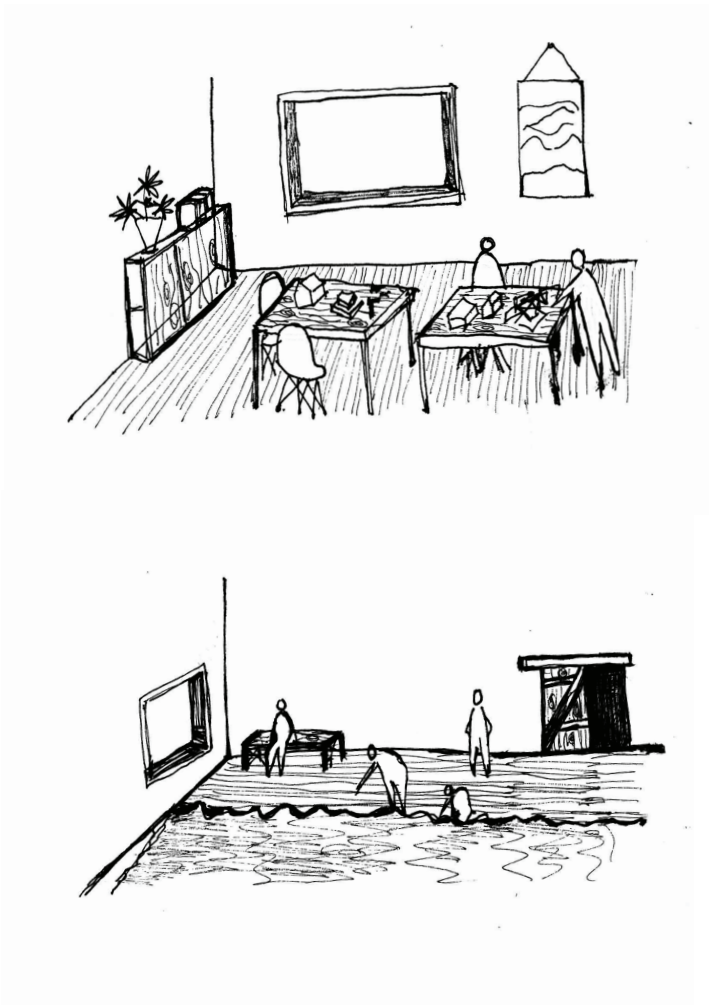
Employees running the center and facilities and exhibition.



LOCAL INDIVIDUALS

Locals come here for fika, reading, self-studies and remote working





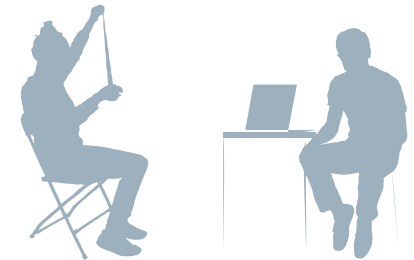
SCHOOL GROUPS

Different age school groups learning about climate change, the local coastal nature and planning with water. Pedagogics become reality based and creatively fun.



RESEARCHERS

Researchers meeting each other and working together, they can observe and analyse the natural and built environment



REGIONAL VISITORS

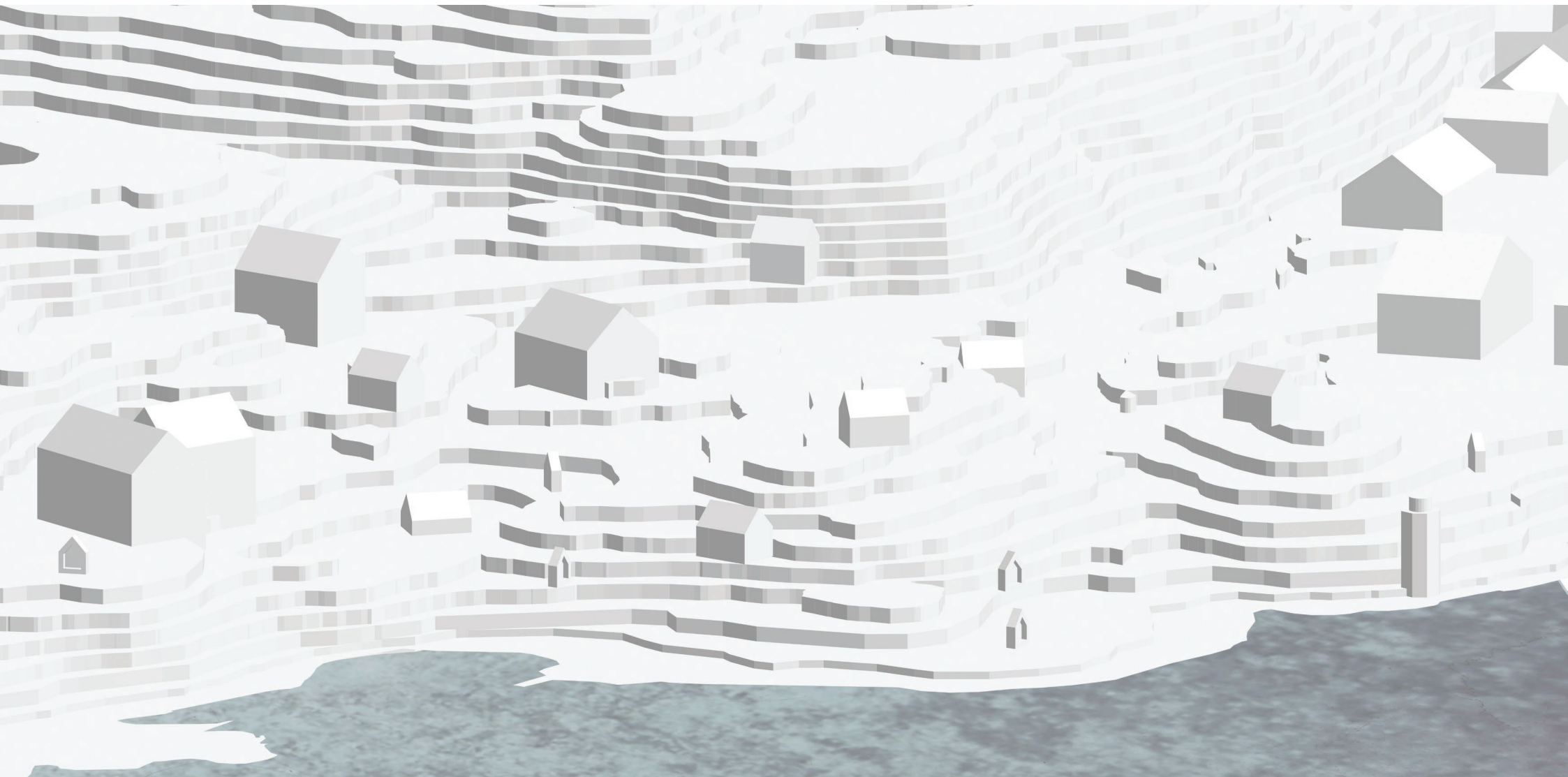
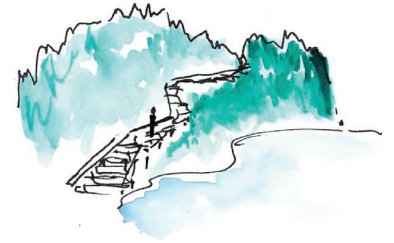
Come for events like markets, looking at exhibition, participatory events with municipality and/ or researchers



GALGEBERGET

Safe from threats of rising sea levels, Galgeberget is a great place to enjoy the beautiful sceneries. To connect the new suggested meeting and living place with Galgeberget and make it more accessible, studios, small sleeping accommodations and wind/rain shelters connected with boardwalks are placed here.

This part of the project is not designed in detail, and is rather meant to present ideas that can inspire an alternative future development instead of building expensive housing with a lasting and damaging footprint here.



The wooden boardwalks consisting of weathered planks hover just slightly above the ground that features an abundance of rocks and blackberries.



The small, low-impact living can be used for short stays for students or researchers or for example as artist studios. The structures could be constructed successively in the course of craftsmanship projects and can be removed if needed. The path and the studios are all placed so to not disturb the delicate ecosystems of Galgeberget. The idea is that the area should be accessible and welcoming for everyone, avoiding privatizing the place.



IMPLEMENTATION

PHASES

- 1 To bring a point of attraction to the area, the **House of Sea** can serve as a starting point for the further development. Here, it can be discussed what future coastal living can look like. The municipality and research institutes can lead a process discussing solutions like the one proposed here.
- 2 Step by step, depending on the demand, the **neighborhood** can be developed.
- 3 To strengthen the existing qualities and enhance the close connection to nature in the area, the low cost solutions of improved **walking paths and wind sheds** can also be implemented rather early. When the center has gained a certain level of attraction, the **huts on Galgeberget** can be constructed successively.

STAKEHOLDERS

To be able to ensure that the new quarter is inhabited permanently, **the houses should be rentals, driven by the municipality.** In this way, step-by-step development of the area is possible, meeting the needs and ideas of the inhabitants.

The House of Sea could ideally be realized **in cooperation between a research institute and the municipality**, since it is both of use for educational purposes and the broader public. An involvement of the municipality is not only favorable to ensure the public character, but also as a long-term investment in the future development of Mollösund, in which such a center could become a driving force.

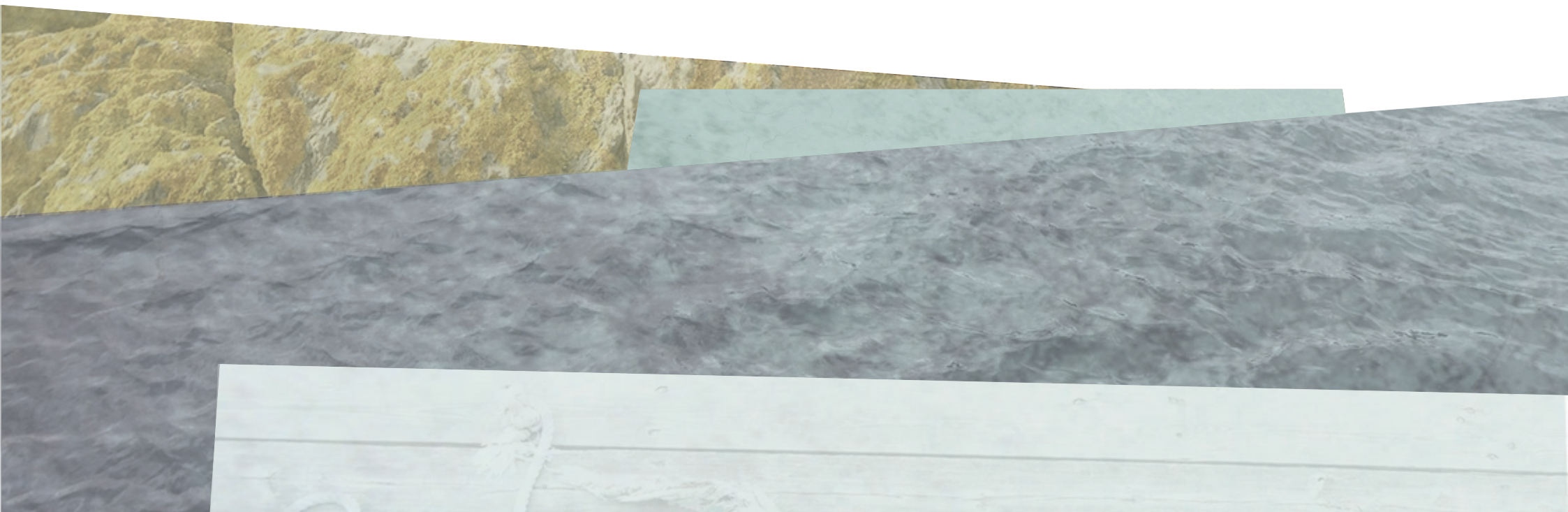
The realization in cooperation with a private investor is possible; in this case though, constraints have to ensure the full accessibility for the general public.

Corporations with several local organisations could create mutual profit: Café Emma or Tempo could for example provide fresh fika, the library in Henån can provide a changing selection of books and media for a small library, local groups can host events and courses and locals or clubs like the nature conservation association can offer tours in the surroundings, starting from the House of Sea.



5 | DISCUSSION

Concluding thoughts about the project.



LIVING BY THE SEA?

Different approaches of living with and by the water have been shown and explored. Some might be more realistic than others, but it has also shown that it is worth pushing seemingly more radical ideas and think them through. A lot of questions have arisen during the process, and even though not all of them could be answered, they feel of value for future planning. The project has been an exploration of new ways of thinking and to reflect what will happen when we no longer can control the force of nature.

Problems we have faced along the way are high height differences and a risk of strong differences between the experience on high level and low level spaces in the quarter, along with steep ramps. Furthermore the connection between buildings and water, that we tried to push to its extreme, would be hard to realise for practical reasons and questions such as comfort arose. It has been difficult to find the perfect combination of close contact to the water but also the right safety standards. Further research on innovative solutions for safety and accessibility in connection to developments at and on the water is needed to make these kind of developments feasible.

Facing these difficulties regarding the coastal protection, one could question if we should build by the sea at all or accept that we have to retreat and keep the coastline free of houses?

To preserve the special natural character of coastal areas and keep it accessible for all, new developments on environmentally valuable land should be seen critically. However, people have striven for centuries to be close and live close to the sea. So where spaces are already exploited and are developed either way, we should make sure to continue it in a deliberate way.

A STRONG IDENTITY PERMANENT?

An important step has been to analyze the area with its traditions and an aim has been not to override it, but to embrace it. It has been a challenge to try new ideas in a place with such an incredibly strong identity and character.

The topic high water and low season meant that one big part of the project was to address the high seasonality of Mollösund and find a way to attract people, both visitors and permanent inhabitants. We identified that apartments and gathering spaces was a good starting point to this. However, it is important to bear in mind that to activate Mollösund, more jobs are needed, along with schools and a well-developed public transport infrastructure.



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