



Afloat





A project about becoming a catalyst of change, striving to increase awareness, raise discussion and provide a source of inspiration about how we can utilize the ocean to promote future social and environmental sustainability in a local context.

Our team



Emma Frykberg

I am an architect student studying my last year at Chalmers. I grew up on the Swedish West coast and spend most of my time, when not studying, in my family's summerhouse in Havstenssund close located to Grebbestad. The coastal landscape on the Swedish west coast have always been fascinating me and therefore I am very happy to be part of this project located at Dyrön



Emelie Stenhammar

I am an architect student with a bachelor degree from Chalmers. I grew up in an environment characterized by plain land which is far from the dynamic west coast archipelago where our project is situated. I became deeply fascinated about the coastal communities after our study visits to Dyrön and Åstol. A landscape and a society that has been formed and shaped by the sea. I became fascinated about the interaction between man and nature and started to think about how one could possibly strengthen this link and develop it further. This is, where this project took off for me.



Nelly Axelsson

I am an architecture student with a bachelor's degree in Architecture and Fine arts from Umeå school of architecture. I believe that the relation between humans and nature plays a crucial role in every discipline, especially in the design profession. Dyrön is a site with a more extreme set of parameters due to its geographical exposure to the seasons and will face future climate challenges in full blast. So how can one design for what's to come and ensure sustainable development in this local context? I am delighted to be a part of this journey.



Perspective of lounge and exhibition area inside Tångeri

Summary

Afloat is a project part of the studio: *Planning and design for sustainable development in a Local Context*. The overall theme for the studio is to: “plan and design for sustainable development in a small or medium-sized municipality”. The annual theme of 2021 is: “another countryside is possible”. This year, the studio has collaborated with the Västra Götaland region and worked with four different sites: Åstol, Dyrön, Fåglavik, and Hällekis.

The relationship with the sea

Afloat is a project located on the island Dyrön on the Swedish west coast and it is based on the relationship to the sea and the sea’s relationship to the island. Our seas are something that is important for all living things, both in water and on land. At Dyrön, it is particularly clear that the local context has been shaped and developed by the influence of the sea. Our seas today are severely damaged due to pollution, overfishing, and climate change and it is of the utmost importance that we learn more about them and help them be healthy again. In this project, we have therefore chosen to take a closer look at the sea and ecosystems and ecosystem services.

Aim

The aim of this project is to become a catalyst of change, striving to increase awareness, raise discussion and provide a source of inspiration about how we can utilize the ocean to promote future social and environmental sustainability in a local context.

Method

The studio work started off by analyzing the local situation including the larger geographical and functional context, which then was used as a point of departure for our in-depth project. In order to complement our analysis, we conducted interviews with local residents, an ocean farming company, an architect of a floating hotel, and officials from Tjörn municipality. We also went on study visits to Dyrön, Åstol, and Klädesholmen.

Our proposal

The project *Afloat* can be described in three parts. In the first part, we propose a structure similar to a Naturum we choose to call Tångeriet. This structure could be considered a cultural service as it offers knowledge about the sea and extraordinary nature experiences. These aspects can increase awareness about the importance of

our seas. Our belief is that this awareness is interesting on a global, national, and local level. The second part includes short-term housings in form of floating cabins and a floating sauna. These structures will be a complement to the future planned hostel at Dyrön and therefore enables more accommodation options. The cabins and sauna offer extraordinary nature experiences that will attract tourists as well as locals. A place to enjoy the coastal archipelago in a very special way while at the same time being closely connected to nature. In the third part, we propose a new type of activity in the sea around the island: algae farming. We see the potential of this activity as a “provider service” as it could give raw materials such as food, energy, and textiles. Seaweed farming has also other great benefits as it creates job opportunities and helps us fight climate change by storing carbon dioxide.

Why Dyrön needs this project

The project fulfills several interests on a global and local level. It also fulfills goals that lie within the municipality’s agenda regarding its future development. The *Afloat* project intends to help Dyrön (and potentially other coastal communities) to find their connection to the sea again.

“Living on water offers a great solution for places where climate change and a rise in sea levels are a looming hazard. It not only protects people against nature, but it also protects nature itself.”

- Sascha Glasl, Co-founder Space&Matter

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PART 1 I INTRODUCTION

Context

Studio

Planning and design for a sustainable development in a local context studio is part of one of the architecture master programs at Chalmers University of Technology, in Gothenburg.

The purpose of this studio is for each group of students to analyze and propose different developments in one municipality within Västra Götaland region in order to reach a sustainable future in their specific local context. This year, the studio has been working with four different sites: Dyrön, Åstol, Fåglavik and Hällekis (ARK 174, 2021).

Location

Our group chose to work with the island Dyrön that belongs to Tjörn municipality. Tjörn is part of the Västra Götaland region on the west coast of Sweden.



Dyrön

Dyrön is an island that belongs to Tjörn municipality which is one of Sweden's largest island municipalities. According to the In-depth aster plan by Orust and Tjörns municipalities, the island has a close relationship to the sea. The sea has always shaped people's lives and is part of the island's identity. The main reasons why the first islanders settled on Dyrön were due to fishing and shipping in combination with agriculture and forestry. Today, there is existing infrastructure for the tourism industry through accommodation and conference facilities, restaurants, hiking trails, and guest harbors (Adolfsson et al., 2019).

Key facts *

Municipality: Tjörn

Inhabitants: 197 all-year-rounders (2018)

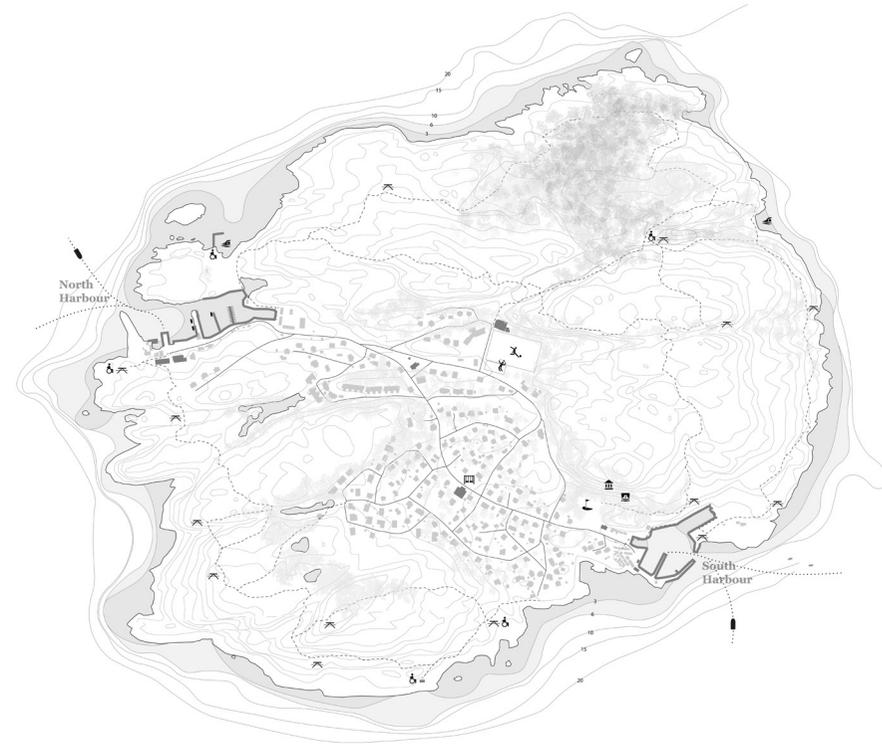
Area: 1,5 kilometer long and 1 kilometer wide

Harbours: 2

Grocery store: 1

Cars: Not allowed on the island

**(Projekt #dyrönåretrunt, 2020)*



The relationship to the site

The built environment

The placement of the buildings on the Swedish west coast is quite unique as they often stand close together, are built on rocky terrain, and have bridges or boathouses next to the water. In addition, according to Bohusläns museum was the closeness to the sea was very important for the early coastal communities as it was the main resource of food. The red boat houses history is closely linked to the development of fishing gear. The oldest boathouses were quite small and often timbered. As more and larger tools were acquired, larger sheds were built. Today, the boathouses are perhaps one of the most characteristic symbols of the Swedish west coast communities (Bohusläns museum). The boathouses also became an inspiration for our projects as in the relationship to the sea, scale, and form.

The tourism connection to the landscape

The coastline and the archipelago are important factors that make the site attractive for tourism and outdoor activities. Nature and culture are important prerequisites for the continued development of viable tourism industry. The two islands, Dyrön and Åstol, attract many visitors, and the basic industries on the islands depend on it. In recent decades, the municipalities, Tjörn and Orust, have been striving for projects that broaden tourism and attract visitors even outside the summer season which also creates the potential for more full-time jobs on the islands (Adolfsson et al., 2019).



Picture of from the North harbor at Dyrön

Aim

The aim of the project is to become a catalyst of change, striving to increase awareness, raise discussion and provide a source of inspiration about how we can utilize the ocean to promote future social and environmental sustainability in a local context.

Dyrön is an island with an engaged and active community with a rich culture where they greatly identify themselves by their strong relationship with the sea. The Islanders love to share their scenic surroundings with others and are keen to make spaces for everyone. The project aims to preserve and strengthen the values that already exist on site today through the concept of ecotourism. By designing for the ecosystem service in collaboration with social interaction, the project will propose a spatial experience that will highlight and redefine the relationship between humans and the sea. The project aims to ensure knowledge and practical solutions for resilience to meet future challenges such as population growth, changed working habits, extreme weather conditions, and rising sea levels. This will be achieved by using a holistic approach, looking into the social, ecological, and economic dimensions.

Strategy

The overall strategy of the project is flexibility.

Flexibility /flek.sə'bil.ə.ti/

noun

The ability to change or be changed easily according to the situation

Floating structures enable flexibility in adaptation and location as well as adjusting to future climate challenges such as a rising sea level. Building these structures by using modular systems allows them to adapt in scale and space, so they can be altered to meet future needs and societal changes.

Key aspects

The four key aspects listed below are approaches in how to meet the aim of this project.

Lengthening tourism season

The island is dependent on tourism. Unfortunately, the season is too short. By adding spaces with functions for all-year-round purposes, as well as strengthening the identity to the sea, it will become a destination for all-year-round activities. In these spaces can tourists and other visitors meet, have overnight stays, work, have conferences, exhibitions, or other educational events.

Connecting the locals

Today, there is a wish for more spaces to meet or arrange activities for the locals on the island. The spaces used by the tourist can therefore also be used by the local residents to meet, work, or arrange other events.

Knowledge sharing

The sea is vital for earth's existence and for us too. It is therefore important to create space for sharing knowledge about the sea's history, its contemporary and future challenges. The project strives to increase awareness, raise discussion and provide a source of inspiration about how we can utilize the ocean to promote future social and environmental sustainability in a local context.

Regenerating the ocean

Seaweed farming provides a wide range of values for the island. It becomes a source of economic income, creates collective social engagement, and contributes to a positive environmental impact. It increases biodiversity in the sea, stores carbon dioxide, creates work opportunities, and provides back with raw materials such as food and fuel. Seaweed farming will enable a mutual utilization between humans and the ocean.

Method

In order to design the most relevant project for this site, we used four different methods.

Interviews

We performed interviews at our site visits regarding the past and future development of Dyrön and Åstol. We picked different actors as they could have different interests and perspectives regarding the situations on the two islands.

First, we performed an interview with the architect of the hotel “Salt and Sill” in order to find out more about the strengths and weaknesses of his project.

Secondly, we interviewed two people at the planning department of Tjörn, in order to find out more about restrictions and shoreline protection.

Finally, we interviewed a person in the ocean farming industry to get some more insight into how it works and their thoughts about the future development of the industry.

Literature studies & Analysis

We choose to look deeper into four different analysis methods: SWOT, the sustainability goals, ecosystem services, and FÖP.

In the previous phases in this course, we performed a SWOT analysis where we listed the strengths, weaknesses, opportunities, and threats of the site.

At the beginning of this project, we choose to reflect upon the sustainability goals and how they are connected to our project. We also looked into the ecosystem and ecosystem services around Dyrön.

At last, we also looked into “the in-depth master plan over the sea for the municipalities Tjörn and Orust”. This helped us find an approach to potentially realize our project.

Study visits

We went on two site visits to Dyrön and Åstol to talk to some local inhabitants and to find a suitable site for our project.

We also visited the operation manager at the hotel “Salt och Sill” at Klädesholmen. The hotel is located close to Dyrön and offers 23 floating hotel rooms as well as a restaurant on the mainland with delicacies from the sea and the local area. As our project is about floating structures and running a business closely related to the sea, this visit was highly informative and relevant in order to develop our own project.

Key references

We choose to look into mainly three key references for our project.

To find inspiration about floating structures we looked into the project “Salt and Sill” at Klädesholmen as it is a hotel close to our site and also because it is one of Sweden’s few floating projects. In addition, we got our hands on some construction drawings which helped us develop our project further. The master thesis project, “Floating visions”, by Karin Axelsson also gave us some inspiration.

Secondly, we looked into the “Spa-hotel Arctic Bath” in Luleå as it is a floating hotel and spa resort.

Lastly, we got inspired by the Naturum “Victoriahuset” in Lidköping and choose to use it as an inspiration for the interior of Tångeriet.

Delimitations

Site flexibility

Even though the project Afloat is designed for a specific site on Dyrön, we had a flexible approach in mind. Moreover, we see the project as a “pilot project” that potentially could be implemented on other islands on the Swedish west coast. Åstol could be one other good example of an island where these structures may be implemented but further studies need to be done.

Overview approach

Due to the limited amount of time, we had to limit ourselves by having a more overview approach and not going into detail within different themes. Therefore, one will have to investigate: detailed plan, ecosystem service analysis & soil mapping, ocean farming, suppliers and contractors, and financing before a possible realization.

Detail plan

We have looked into the in-depth master plan of the sea for Tjörn and Orust which helped us get an overview of the planning and development around Dyrön. However, we did not go over the detailed plan for our specific site which one would have to do before a possible realization.

Ecosystem service analysis & soil mapping

After going through the in-depth master plan we become more aware of where one can or can not build. With that in mind, we tried to pick a site that would have as little impact on the environment as possible. We saw a possibility in that our project could potentially give back to the ocean as it: educate people about the ocean, make the coastal line more accessible and develop algae farming with positive outcomes. Yet, when realizing the project, one will have to do a more detailed mapping of the soil and ecosystems at our site.

Suppliers & contractors

As mentioned before, due to the limited amount of time, we have chosen to do a

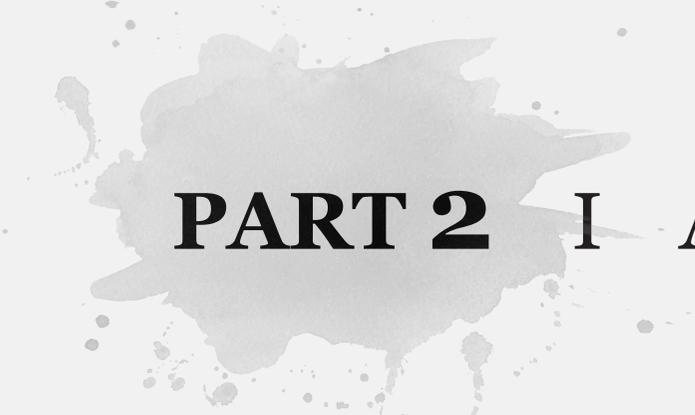
suggestion but not to go into detail when it comes to the choice of suppliers and contractors for our project.

Ocean farming

By reading the in-depth master plan, talking to Nordic sea farm, and looking into the reports about “food of the future”, it is clear that we now see a development towards humans having a more sea food-based diet. We also see potential in algae farming as carbon storage and helping us fight climate change. In a further development of this project, one would have to look more into the exact location for algae farming, the sales process, and the relationship between Dyrön and Nordic Sea farm.

Financing

As we see it, our project up-fills interests for different actors. Therefore, we suggest that the Afloat project should be realized by contribution from different possible actors and funders such as the municipality, the sauna association, and the private sector. We believe that a “triangle of finance” is key in order to build up a strong community sense and development. Nevertheless, this requires more examination of interest.



PART 2 I ANALYSIS

S

STRENGTH

- Tourism destination
- Cultural heritage
- Two harbours
- Strong community
- Farming in ocean
- Digitalisation

W

WEAKNESS

- Lack of local production
- Only seasonal tourism
- Summer residents
- Demographic unbalance
- Gentrification
- Dependent on mainland
- Limited collaboration with other islands

O

OPPORTUNITY

- Tourism destination
- Cultural heritage
- Harbour
- Strong community
- Digitalisation
- Farming in ocean

T

THREAT

- Lack of local production
- Only seasonal tourism
- Summer residents
- Limited collaboration with other islands
- Demographic unbalance and Gentrification
- Dependent on mainland
- Unbalance with the ocean

Thoughts based on the SWOT analysis and the in depth master plan

After our SWOT analysis, it is clear that Dyrön faces many challenges but also exciting opportunities. Challenges such as climate change, overfishing, marine pollution but also opportunities in marine-based energy, ocean farming, and reaching stronger year-round tourism are also aspects mentioned in the in-depth master plan by the municipalities Tjörn och Orust (Adolfsson et al., 2019).

Threats

Climate change

Climate change is one of the major threats to the marine environment. Climate change affects how much nutrients flow out of land and algae blooming, as well as the rising sea level affecting coastal communities in particular. This will increase the need for climate adaptation.

Overfishing

Another reason for the increase in algae is the declining amount of predatory fish. Overfishing of predatory fish affects the entire food chain.

Eutrophication

Eutrophication is a cause of dead bottoms. With increased nutrient load and nutrient flows from sewage, agriculture, and air pollution, algal blooms increase. When the algae then sink to the bottom, they are broken down by bacteria which leads to a lack of oxygen. This in turn leads to dead bottoms.

Marine pollution

Marine pollution is a threat to the marine environment as the coast of Bohuslän receives large amounts of trash daily. The marine debris causes extensive damage to wildlife. Animals get entangled in the trash, mistake it for food, fill their stomachs with plastic and then starve to death.

Opportunities

Marine-based energy

Although there is no offshore energy at Tjörn or Orust today, it is a development area that is affected by international and national investments in renewable energy and an area that is expected to increase in the upcoming years).

Ocean farming

Marine foods demand is growing at the same time as wild stocks are overfished and many local fish stocks have disappeared. The potential for growth at the local level could therefore lie in ocean farming. So far, the cultivation of algae in the sea occurs only to a small extent, and then mainly in research. Algae have a little environmental impact in terms of nutrient emissions, bottom impact, the spread of infection, or competition with other species. The algae also bind carbon dioxide. The algae industry can also generate raw materials for various future industry areas such as fuel, plastic, food, cosmetics, and fashion.

Tourism

Dyrön is today dependent on tourism and therefore strongly protects it. In the in-depth master plan, one can read that Tjörn municipality sees potential in tourism if they at the same time can meet future challenges regarding environmental impact and conflicts over space along the coast.

Spreading knowledge

The sea is vital for earth existent and for us too. We need to increase awareness, raise discussion and provide a source of inspiration about how we can utilize the ocean in a healthy way.

Interviews

In order to achieve our goals and design the most relevant project for our site, we performed interviews with different actors. We wanted to find out more about Dyrön, floating structures, future planning at Dyrön and algae farming. Below are the main comments (relevant from our perspective) from each interview.

Inhabitants on Åstol & Dyrön

- The islands have strong communities and fantastic environments.
- They do not want to be the “new Smögen”. They want to be ordinary rather than extraordinary.
- Positive to no cars on islands.
- The fishing industry is in decline.
- They love saunas.
- Need more things to do on the islands.
- It has been affected by storms a few times.
- Hard to see the islands become more self-sufficient than they used to be.

Arne Algeröd

Lead Architect of the floating hotel “Salt och Sill”, Klädesholmen

- The biggest challenge with the floating hotel was the weight of the construction.
- One has to design so that when the water strikes, it can drain out.
- The structure is anchored to the jetty with iron beams (diagonally) and the rest of the structure floats.
- It is difficult to calculate strong forces from the ice.
- There are projects built in wavy environments that have been helped by breakwaters.
- One is not allowed not build on eelgrass.

Åsa Jönsson

Head of the planning department, Tjörn municipality

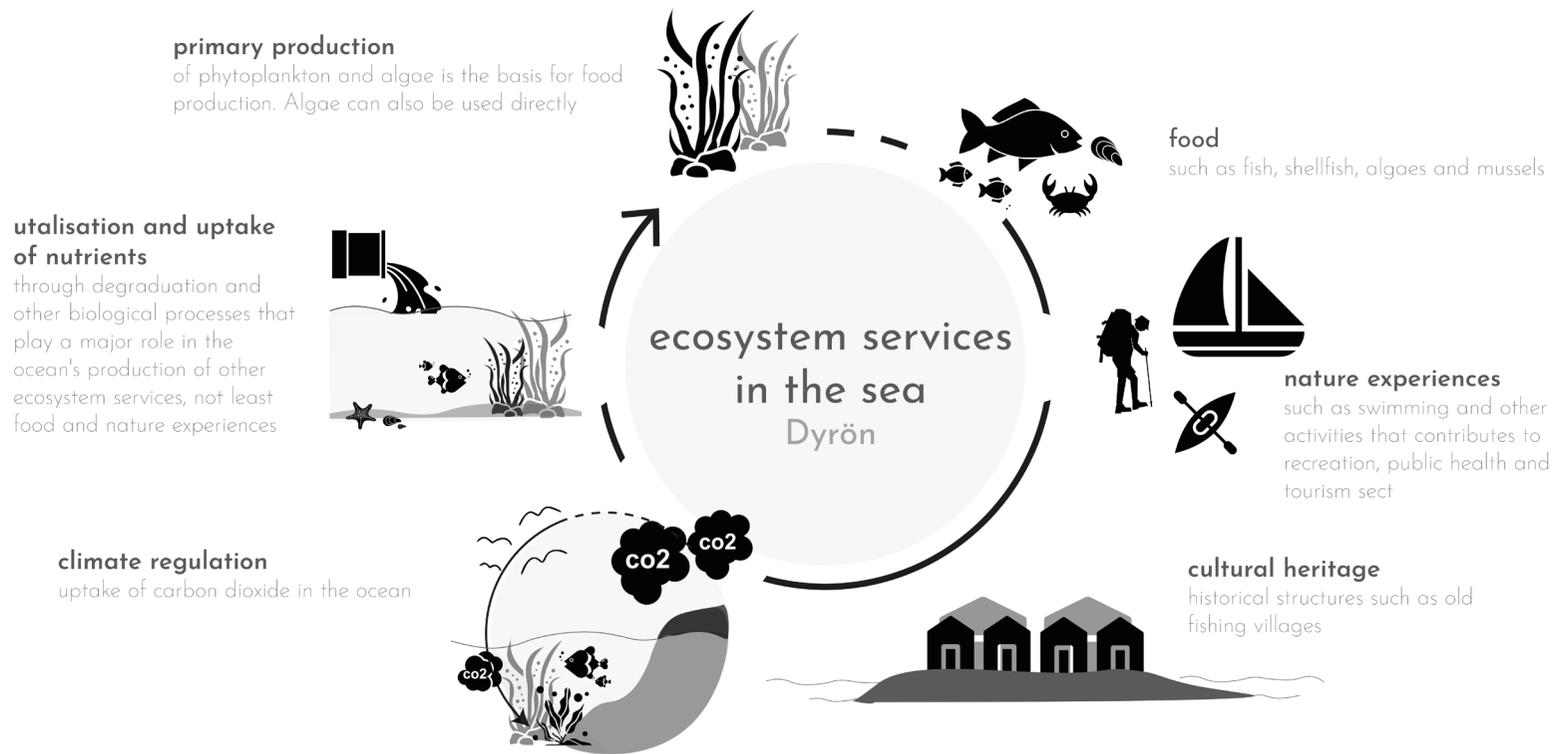
- For a possible realization of the project, it is necessary to make an environmental impact assessment and also analyse the impact of the project on the seabed.
- One also has to investigate the consequences of the implementation of water and sewage at the site.
- A detailed plan needs to be drawn up in order for this project to take place (for the water and area around the water).
- *I believe it is important that the project has different target project groups in interest.*

Jonatan Gerrbo Nordic Seafarm,

- The first step in algae farming is to pick mother plants that will be grown in a lab.
- When the plants are 2 cm in size, they are laid out on thick ropes in the sea.
- They are placed back in the sea in the autumn and harvested in the spring.
- The pliers weigh 1 ton per rope (200m).
- Nordic Seafarm has permission to expand its cultivation from 8 to 10 hectares.
- Could be interesting to look into contract growers.

Ecosystem

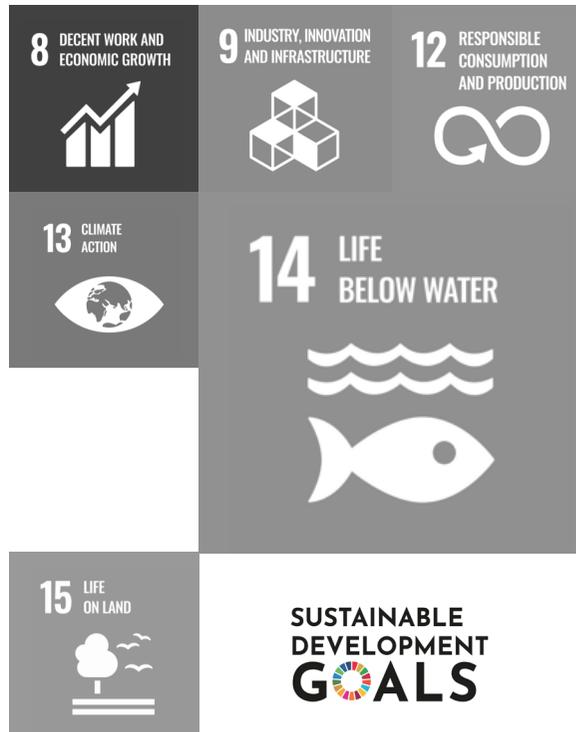
An ecosystem is a delimited area in nature that we have chosen to consider as a system, in order to be able to study it more easily. (NE, 2021).



Marine ecosystems are multifunctional and contribute to several different socially important functions, such as food production. The more visible ecosystem services affect and are dependent on the others that are not as visible as the uptake and degradation of nutrients and toxins (Havs och vattenmyndigheten).

Sustainable development

We highlighted six of *the Global Goals for Sustainable Development* for our project to meet.



The Global Goals for Sustainable Development, are part of Agenda 2030 for sustainable development. The 17 global goals aim to achieve socially, environmentally and economically sustainable development worldwide by 2030 (United nations, 2021).

GOAL 8 & 9

The project creates job opportunities and can expand over time and adapt to meet future changes. It can also be applied to other coastal communities. The seaweed industry is also a sustainable industry for generations to come as it benefits both animals, plants, humans and the planet as a whole.

GOAL 12

The structures are meant to be built by local actors and parts of the structures can be reused and recycled. Seaweed is also circular by nature and has a minimal waste footprint. In the long term, can it also compensate our building footprint.

GOAL 13

Seaweed farming stores carbon dioxide which helps the whole planet to deal with climate change. Our project also contributes to more independent and resilient local communities.

GOAL 14

Seaweed farming will contribute to the restoration of coastal and ocean zones. Our buildings will hopefully have a little impact on the site and benefit the local ecosystem over time.

GOAL 15

Farming in the ocean replaces fossil-fuel fertilizers and poisonous pesticides on land which benefit both animals, plants and humans. The project has also many social benefits as it creates spaces for people to meet and interact which has proven to have a positive impact on people's mental health.

In-depth masterplan

A summary of the overall desirable goals from the in-depth master plan by the municipalities Tjörn and Orust, which has formed our project (Adolfsson et al., 2019).

- Living societies for all phases of life where people can live and work all year round.
- Use the sea in a wise way and strive to keep ecosystems in balance.
- Uphold attractive coastal areas that offer the hospitality industry outstanding nature experiences.
- Increase knowledge and safeguard of marine cultural values.
- Collaboration between ocean farming, the processing industry, commercial fishing and renewable energy production could strengthen the local connection to raw materials.
- Increased accessibility to the sea and coastal areas.
- Small-scale projects can be used by other coastal municipalities as inspiration.



Values to consider

according to the previous stated in-depth masterplan

Nature and Culture

The sea at Tjörn contains great natural values and species-rich environments. Protecting the strong traditions and significant cultural values linked to the sea and coast and archipelago that exist on Tjörn contributes to a strengthened local and regional identity and to the hospitality industry.

Outdoor life and the hospitality industry

The tourism industry is a land and water-demanding industry. The master plan recommendations are intended to create conditions for people's access to the sea and outdoor life and the hospitality industry.

Marine industries

Handling food from the sea has a long history at Tjörn. Utilizing the existing tradition and experience and combining it with today's knowledge of the sea makes marine food areas with significant development potential.

Shoreline protection

The shoreline protection is there to strengthen the right of public access so that everyone can get down the water. It is also there to protect plants and animals. At Tjörn, beach protection generally applies 300 meters up on land and just as far out into the water. The municipality or the County Administrative Board decides if you can get an exemption for doing something in a beach-protected area.





“Seaweed is one of the few truly scalable solutions for addressing the CO₂ problem”

- The seaweed company

Seaweed farming

Nordic Seafarm is the largest company in Sweden that is farming seaweed. We got an interview with Jonatan Gerrbo at the company who explained to us how the process for growing seaweed works (Nordic Seafarm, 2021).

The first step is that Nordic Seafarm picks local “mother plants” from the place where the seaweed later will grow. The mother plants are placed in a lab where they multiply and when the plants are about 2 cm big, they are placed on thicker ropes in the sea. The seaweed period starts in the autumn when the water is cold and is harvested in April before the water gets too hot. The seaweed weighs about 1 ton per rope when harvested in the spring. Thereafter, the seaweed later gets transported to a large factory where it’s boiled or dried and then sold.

Today, Nordic Seafarm has the capacity to grow more seaweed than they do and the reason they don’t grow more is the lack of demand. At the moment, the company is working hard to market seaweed as an alternative food. Today, the company is responsible for the entire process, but in the future when Nordic Seafarm has maximized its permits, a new type of process will be needed.

“Contract growers” are something that could be relevant in the future and that’s the scenario we have for Dyrön. Contract growers mean that Nordic Seafarm sells 2 cm big seaweeds on

ropes to Dyrön. The inhabitants on the island have their own rig on which they release and farm throughout the period. When it’s time for harvest, the islanders are responsible for this, and later on, Nordic Seafarm buys the seaweed back and takes care of the cooking or drying process.



Key references

We picked three references for the project. Two floating hotel projects with similar ideas to what we want to create when it comes to accommodation and designing for different floating functions. We also got inspired by Naturum as is offers great exhibition spaces and use design in a fun way to teach others about important matters regarding nature.



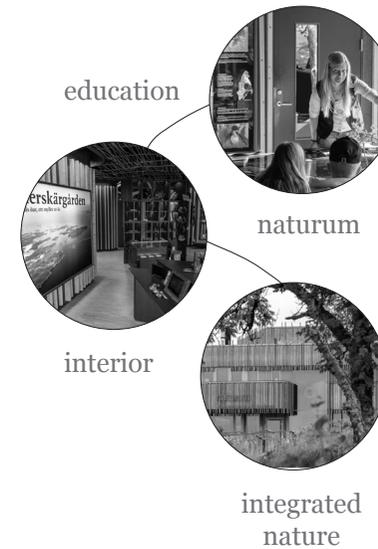
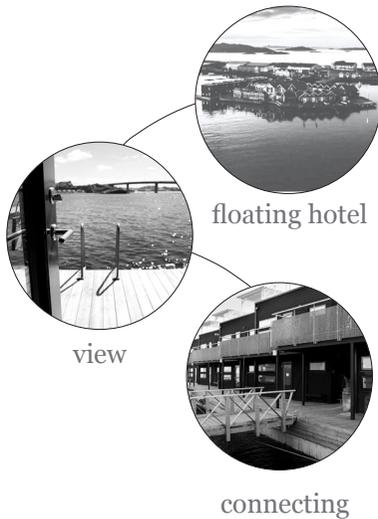
Floating hotel Salt & Sill,
Klädesholmen, Tjörn

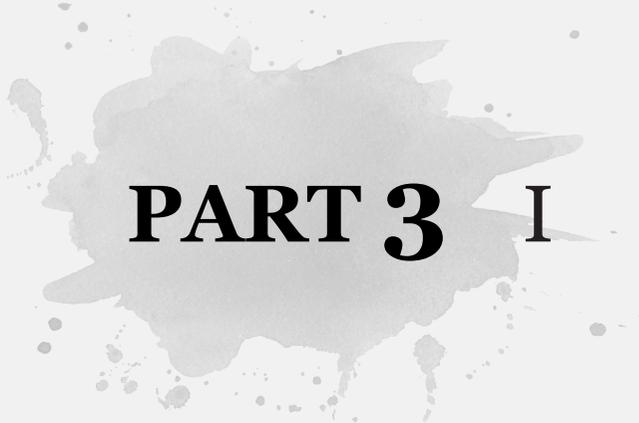


Spa-hotel Arctic Bath
Harads, Luleå

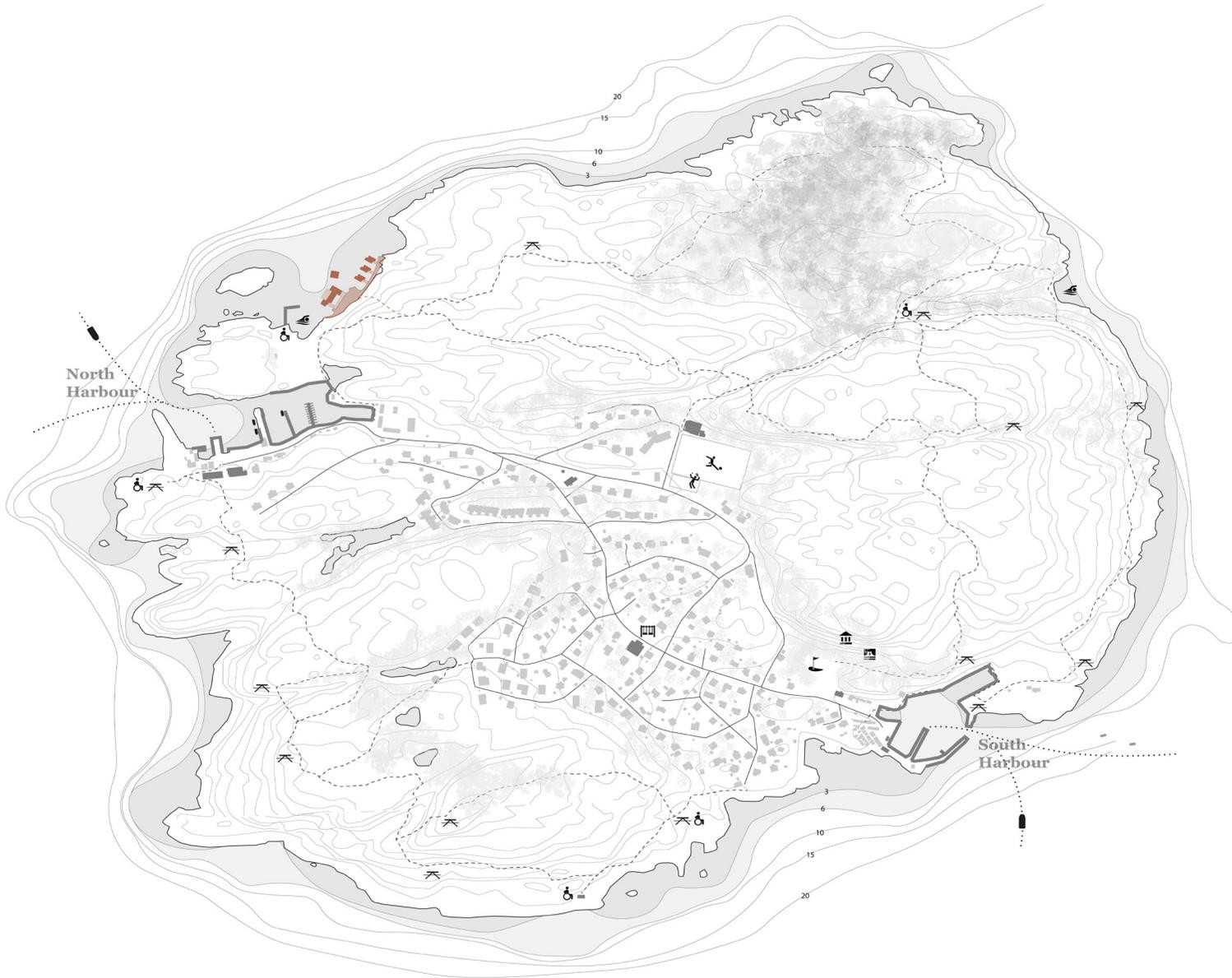


Naturum Victoria huset
Läckö, Lidköping





PART 3 I PROJECT PROPOSAL



- Private residences
- Public buildings
- Jetty
- Streets
- Hiking trail
- Ferry
- Ferry
- Fisherman's boat
- Private boat
- Wheel chair friendly
- Beach
- Picnic table
- Tennis court
- Soccer field
- Playground
- Gallery *Backeberget*
- Open stage
- Mini golf
- New Jetty
- Project Afloat*

Site *Dyrön*

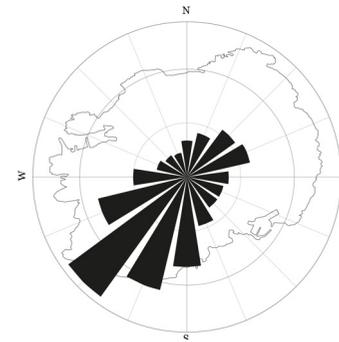
The site of the project is chosen based on accessibility and water conditions.

Accessibility

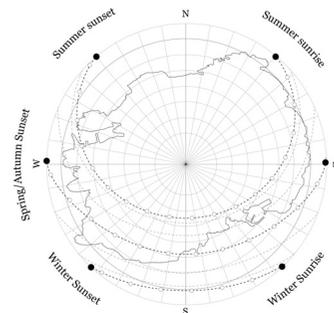
Most people arrive with the ferry in the North harbour. This is also where you can find a restaurant and a soon-to-be hostel. The local fishermen and their storage is also located here. To be able to collaborate with all three of the actors mentioned, the project is favourable to be placed in close proximity to these.

Water conditions

The floating structures will be heavily impacted by the waves. Therefore, the site is in one of the most secluded areas around the island most of the year.

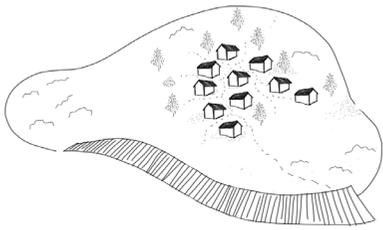


Windrose chart

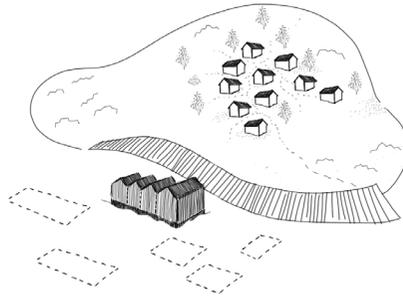


Sun path chart

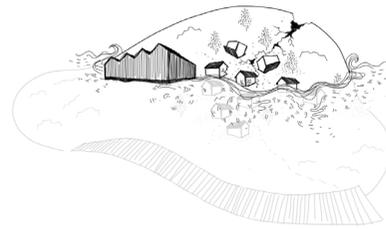
Why floating?



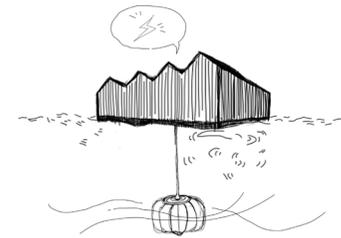
Accessibility to the shoreline



Flexibility of location and development



Adaptations towards climate challenges



Opportunity for alternative energy production

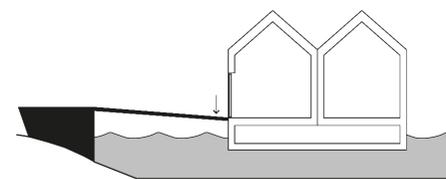
What is flexible?

The structures are flexible.

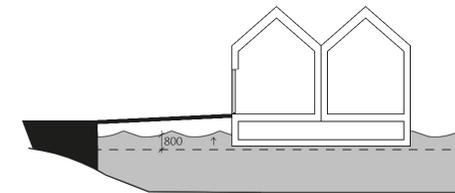
It ensures adaptability towards future climate challenges and societal changes and can create an exception in the jurisdiction about shoreline protection

The accessibility ramps that connect the structures to the jetty, are also **flexible**. This is because the need to be able to easily adapt to the fluctuation of the water conditions and allow the structures room to breathe.

The jetty, on the other hand, needs to be **fixed** as the floating structures have to be anchored to something fastened. The choice of not anchoring to the seabed and instead of the jetty, was made as we wanted to protect the surrounding ecosystem.



Now



Future



Siteplan & section

The siteplan showcases our project site and how it is connected to existing and future infrastructures as the harbor, the hostel and the restaurant “Trålverket”.



Our proposal

in three parts

Tångeriet



In the first part, we propose a floating structure similar to a *Naturum* we chosen to call *Tångeriet*. This structure could be considered a cultural service as it offers knowledge about the sea in form of exhibitions, workshops and other events. The aim is to increase awareness and raise discussion about the importance of our seas and inspire for future innovations. It also acts as a social space, where one can meet, work or hang.

Cabins & Sauna



The second part includes short-term housings in form of floating cabins and also a floating sauna. These structures will be a complement to the future planned hostel at Dyrön and therefore enables more accommodation options. The cabins and sauna also offer extraordinary nature experiences that will attract tourists as well as locals. A place to enjoy the coastal archipelago in a very special way and being closely connected to nature.

Seaweed farming



In the third part, we propose a new type of activity in the sea around the island: seaweed farming. We see the potential of this activity is a “provider service” as it could give raw materials such as food, energy and textiles. Seaweed farming has also other great benefits as it creates job opportunities and helps us fight climate change by storing carbon dioxide.

WHO?

Target groups

Groups of people the project will help and benefit.

Locals

Needs

- local job opportunities
- Indoor public meeting places
- Coworking
- Meeting rooms

Potential in our project

- Indoor public meeting place
- Coworking
- Meeting rooms
- Accessible shoreline
- Experience

Tourists

Needs

- More overnight opportunities
- Experiences

Potential in our project

- More overnight opportunities
- Destination with extraordinary nature experience
- Can adapt for future needs
- Gives potential for all year round tourism

Schools

Needs

- Education about the sea and how it functions is crucial for future generations

Potential in our project

- Teaching others about the importance of the sea, ecosystems and climate change
- Potential to be a destination for educational purposes

Conference groups

Needs

- More conference opportunities

Potential in our project

- More over night residents
- Destination with extraordinary nature experience
- Increase the number of building and adapt to meet future needs
- All-year-around tourism

Project actors

Tångeriet

Owner & maintainance:

Tjörn Municipality

Exhibition

Information and research can be provided by Universities or experts in the fields, such as Nordic seafarm. The exhibitions on display can come from workshops being held at tångeriet, Designers, Architects, school projects made from people of different ages and fields.

Store

Nordic Seafarm and other suppliers who have products linked to Seaweed.

Workshops

The workshop is at the disposal for educational purposes in all forms. So the actors arranging the activities can change.

Some examples are Schools, associations with different interests, food unions, designers, the building sector, restaurants etc.

The sky is the limit!

Cabins

Owner & maintainance:

The local hostel owner,
(Private sector)

Seaweed farming

Actors:

Local fishermen & Nordic Seafarm

On Dyrön, there are a local actors who work with commercial fishing. The seaweed farming can act as a collective asset.

Nordic seafarm will provide the baby seaweed to the fishermen and then collect it and refine it.

Sauna

Owner & maintainance:

The local sauna association

Potential projects actors

Tjörn Municipality

Strengths

- Contact with local business
- Contact with other municipalities
- Good knowledge about resources, events and future local plans
- A bridge between politicians and inhabitants

Potential in our project

- Take the role as a role model for other municipalities.

Private sector

Strengths

- Investor and key actor in order to realize the project

Potential in our project

- Local investor with Dyröns best interest
- A key and a bridge between officials and inhabitants
- Potentially strengthen the relationship between officials and the private sector

The local sauna association

Strengths

- Bastuföreningen is very active
- Many islanders has an interest in the sauna and is part of their community

Potential in our project

- They can get other sauna they can rent out. It is moveable so it could also be a way to connect to other islands or locations

Schools

Strengths

- Education about the sea and how it functions crucial for future generations

Potential in our project

- Teaching others about the importance of the sea, ecosystems and climate change
- Becoming a destination for educational purposes, inspiration and a fun way of learning. Hopefully it can make people more aware and interested in what the ocean has to offer.

Contractors

Strengths

- Cutting edge knowledge within traditional building techniques and local material
- To contribute with knowledge regarding local materials and building techniques both from a cultural perspective and a more long-term building perspective.

Nordic seafarm

Strengths

- Create job-opportunities
- Produce raw material for different uses
- Benefit the sea environment around Dyrön
- Store carbon dioxid

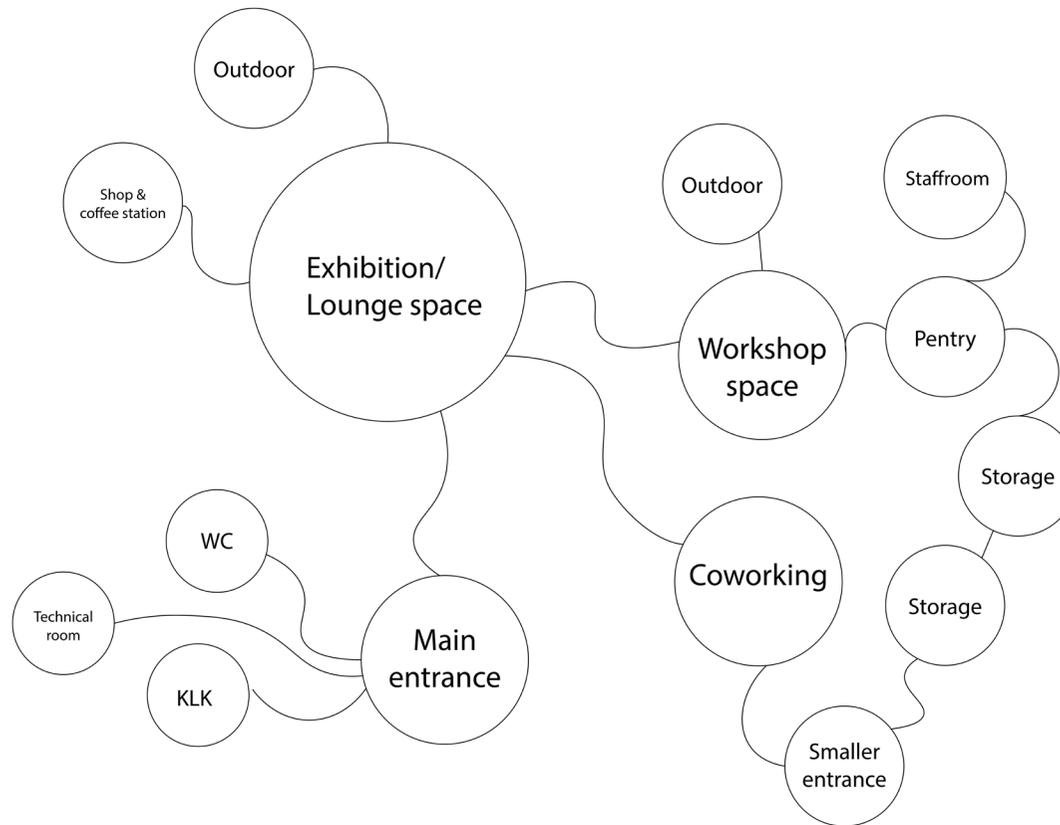
Potential in our project

- Contributes with knowledge regarding ocean farming
- Potential future business partner which creates new local job opportunities.
- It could also lead to new raw material that could be used in different ways such as food, fuel & plastic.

Tångeriet

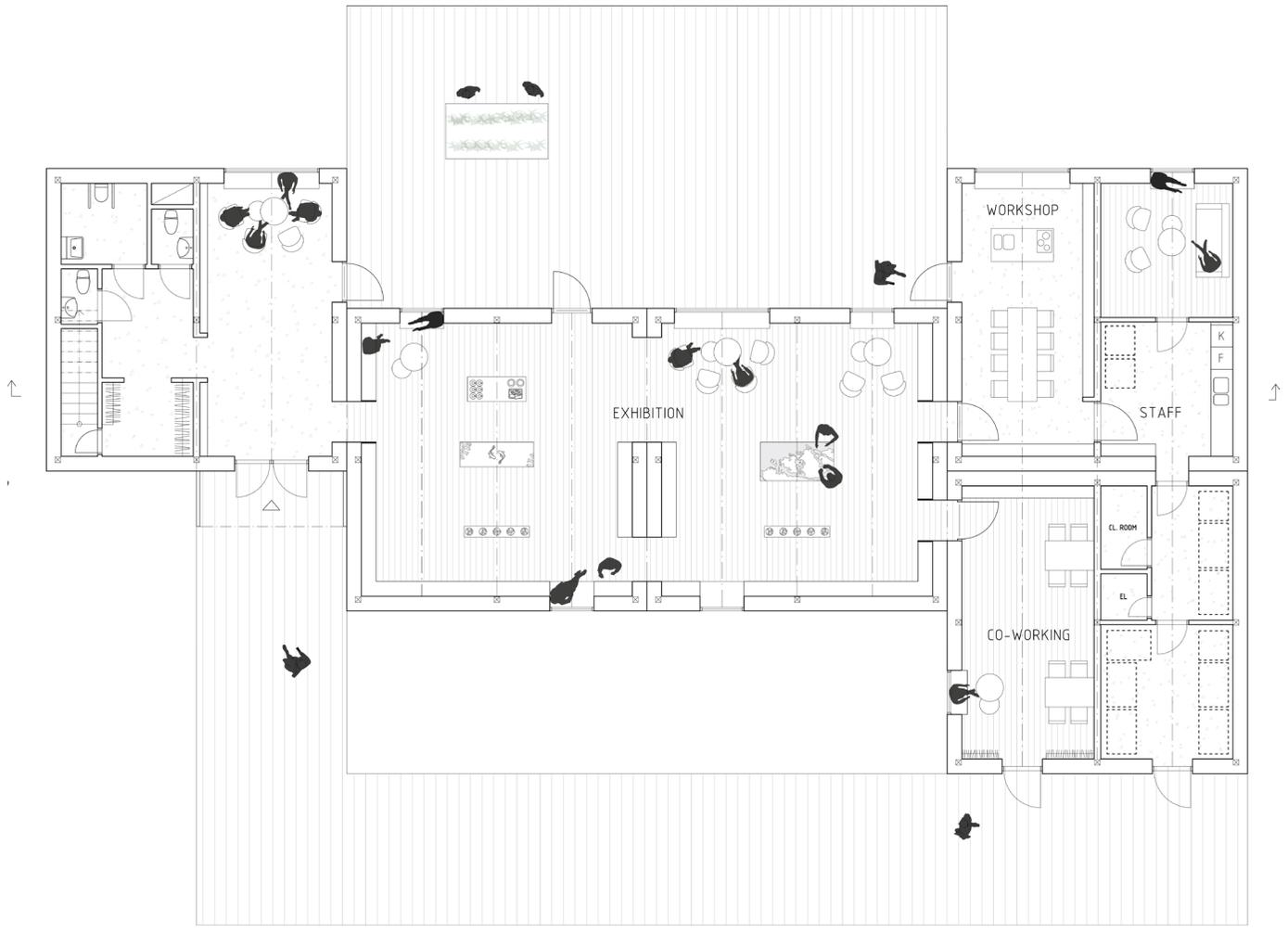


Visualisation of the exhibition and lounge area inside of Tångeri

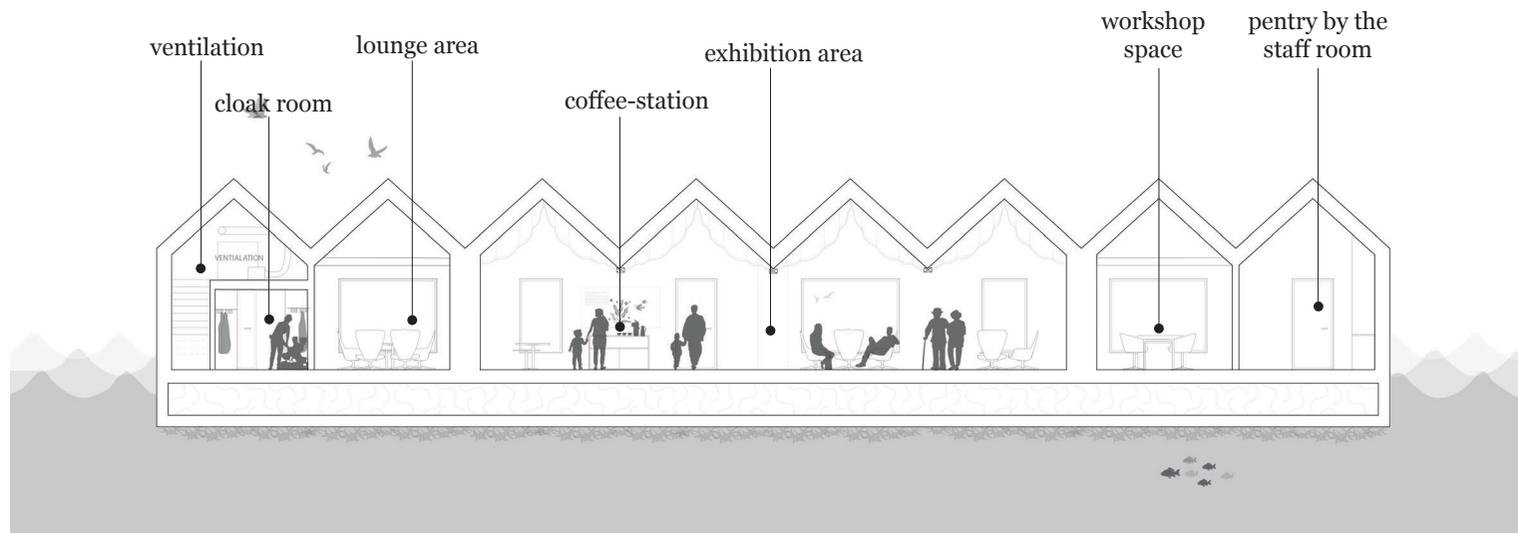


Program

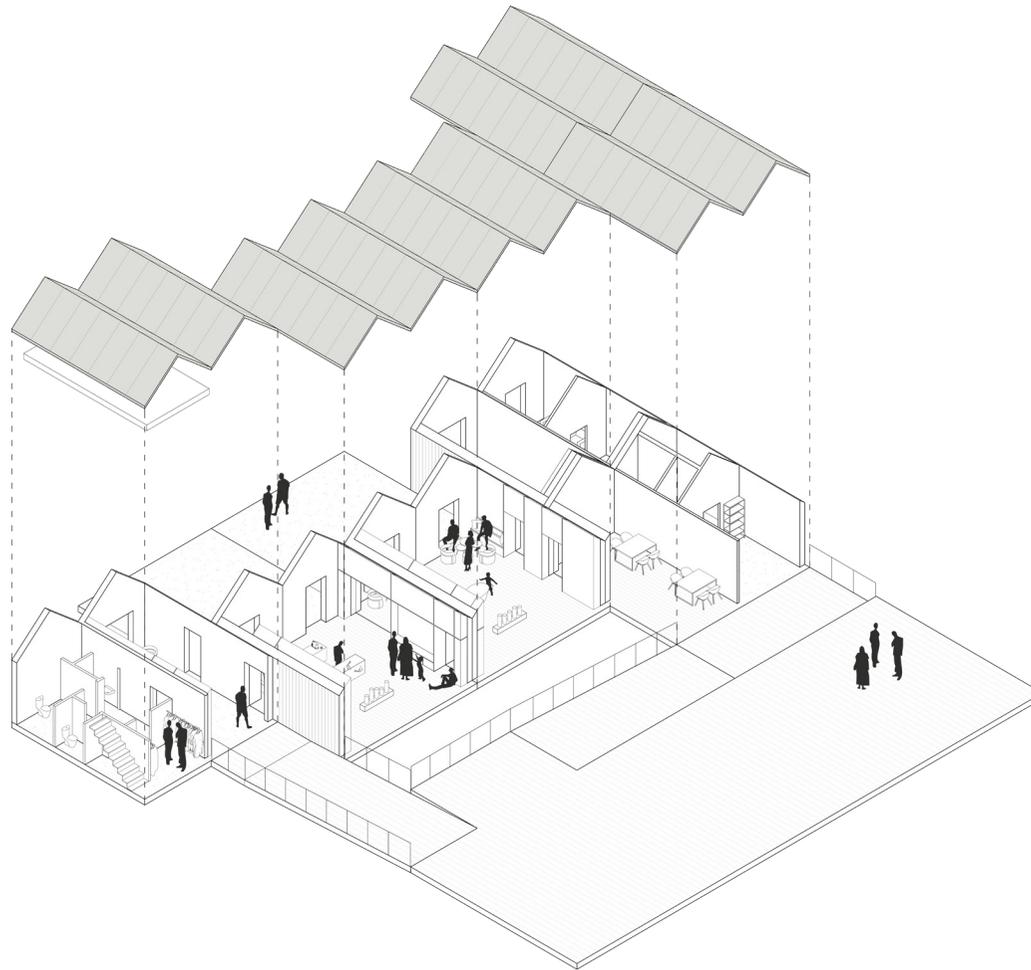
Program of Tangerangiet with functions and how they are connected



Tångeriet Plan 1:200

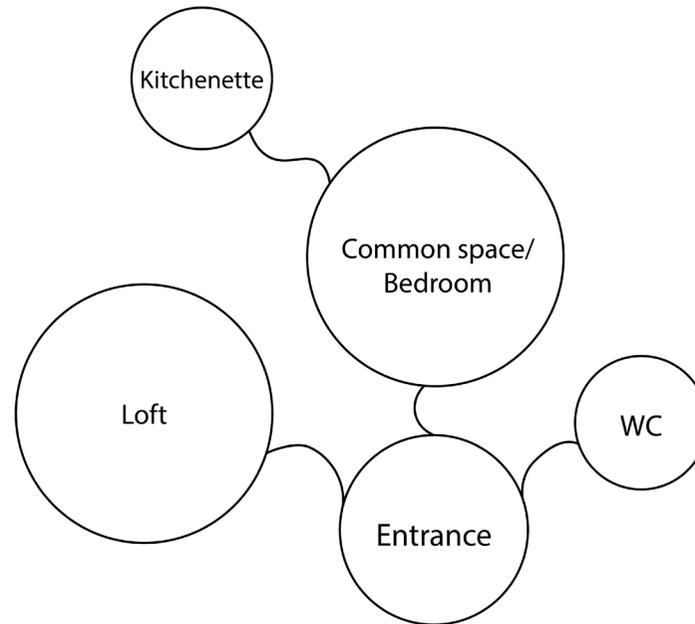


Tångeriet Section 1:200



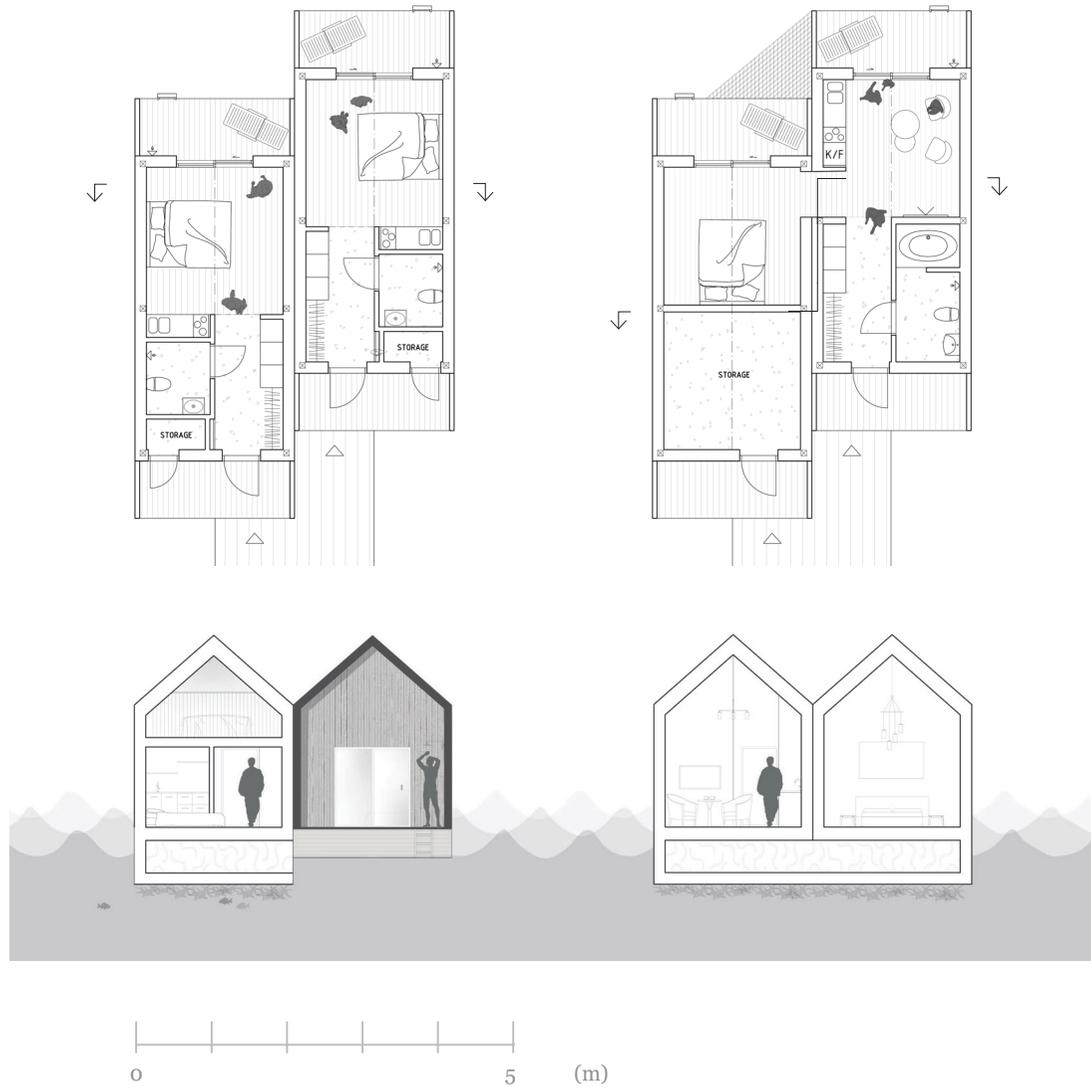
Tångeriet Axonometric projection

Cabins & Sauna

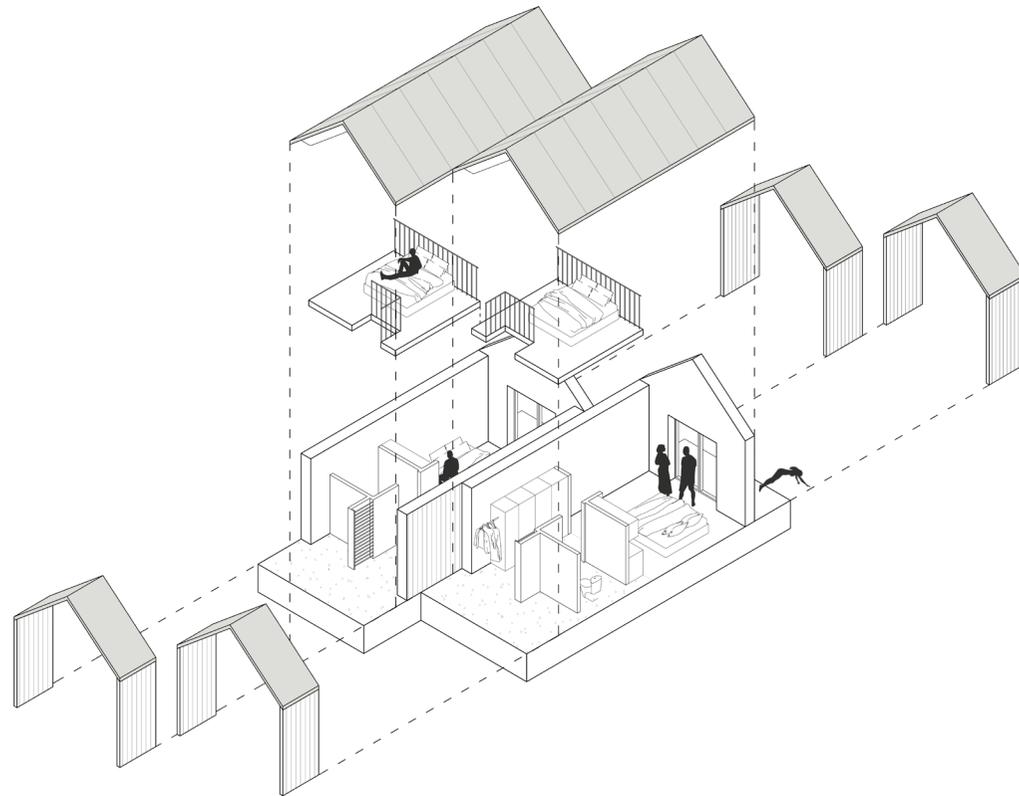


Program

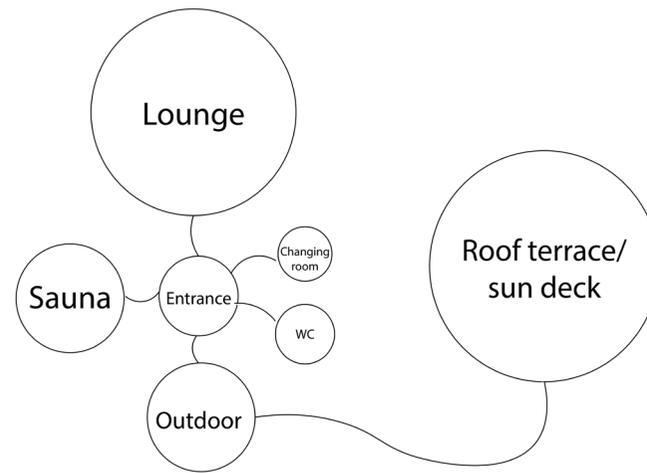
Program of Tångeriet with functions and how they are connected



Cabins Plan & section 1:100

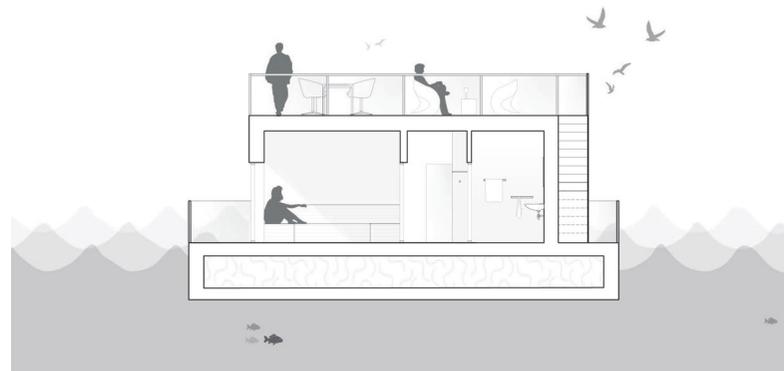
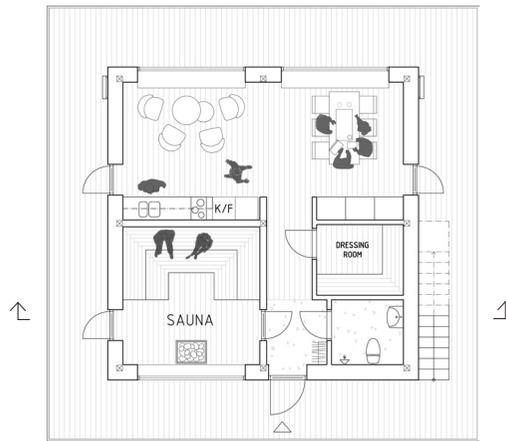


Cabins Axonometric projection

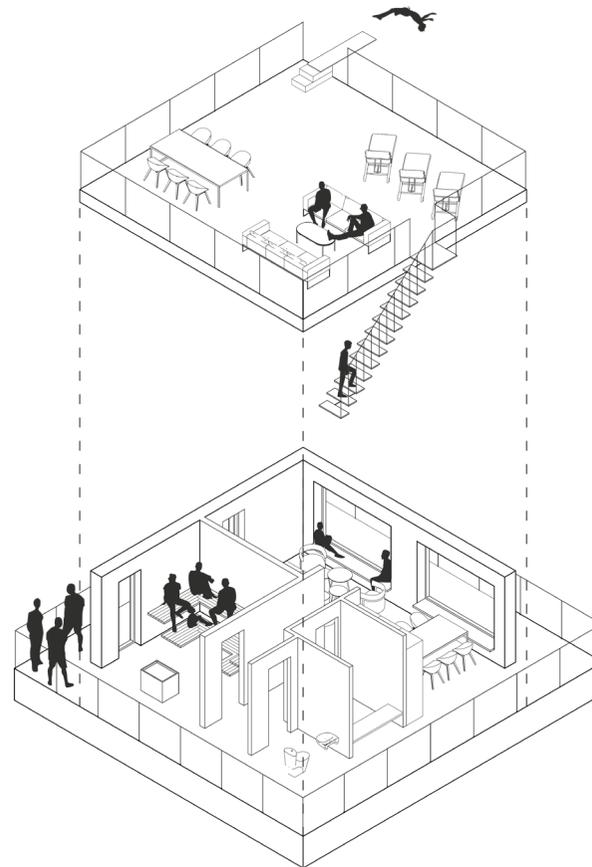


Program

Program of the Sauna with functions and how they are connected



Sauna Plan & section 1:100



Sauna Axonometric projection

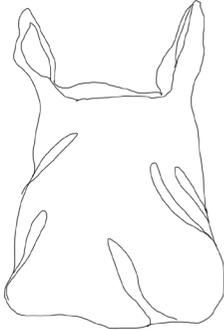
The Seaweed

Seaweed could be used...

...as food source



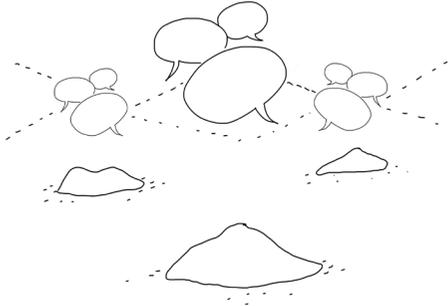
...as sustainable products



...as low carbon crop & sea regenerator



...as community developer



Seaweed could be used ...

as food source

For humans

*High quality, high nutrient food.
Great source of calcium, iron,
magnesium, potassium & iodine*



For animals

Cattle feed made from seaweed reduces methane expelled from both ends of the animal

For plants

Seaweed contain powerful growth-stimulating hormones, they stimulate seed germination and nutrient uptake while protecting plants from infections.



as Sustainable products

Seaweed as many properties that can be developed as sustainable alternatives

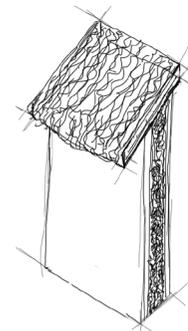
Bio-plastics



Bio-fuel



Building material



Sustainable colouring of textiles



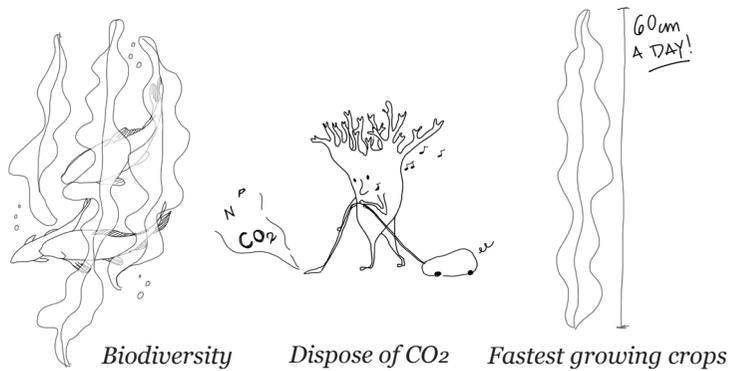
Seaweed could be used ...

as low carbon crop & Ocean re-generator

Ocean seaweed farms have none of the major downsides of land farming:



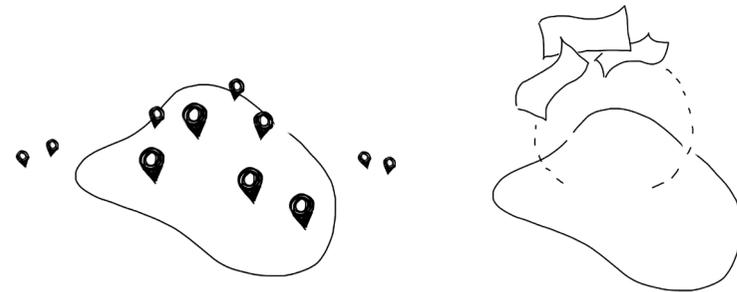
to mention some of the positive aspects of seaweed farming..



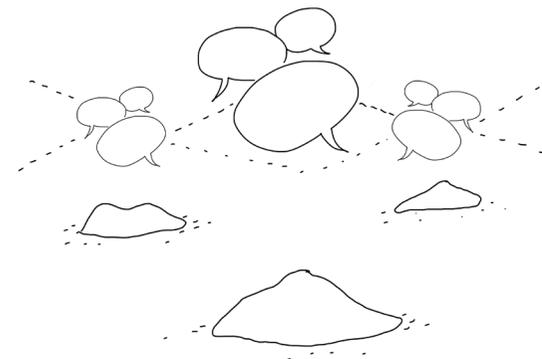
as Community developer

Creating more job opportunities in close proximity of the island

A way to generate an economic income beyond tourism



Being a part of a bigger community of sharing of knowledge, resources and the collected force of environmental change.

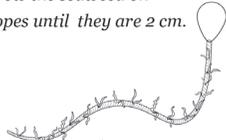


The Seaweed chain

The origins of the seaweed and to its destination

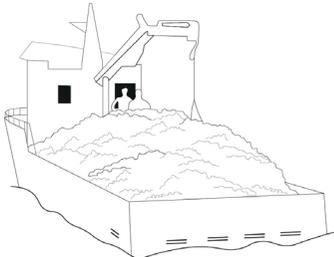
Nordic Seafarm

grow the seaweed on ropes until they are 2 cm.



Fishermen plant the seaweed in the sea in November

Fishermen harvest it in April



Research Biofuel Restaurants Cattle feed Natural fertilizer Medicine Cosmetics

Nordic Seafarm receives the seaweed

Nordic Seafarm refines them by drying or freezing them



95% go elsewhere

5% stay on Dyrön

Natural fertilizer Gardening

Trälverket (Restaurant) Dry, cook and serve dishes with seaweed

Bakery in local food store Bread with seaweed (Fresch/Crisp)

Bioplastics
Vitamins
Building materials

Seaweed salt
Seaweed Chips
Crisp bread with seaweed



Vitamins
Products made of bioplastics
Seaweed Chips
Seaweed salt

Products for sale

Workshops

Maybe even begin working at Nordic Seafarm?



Spark interest and become a part of the cause

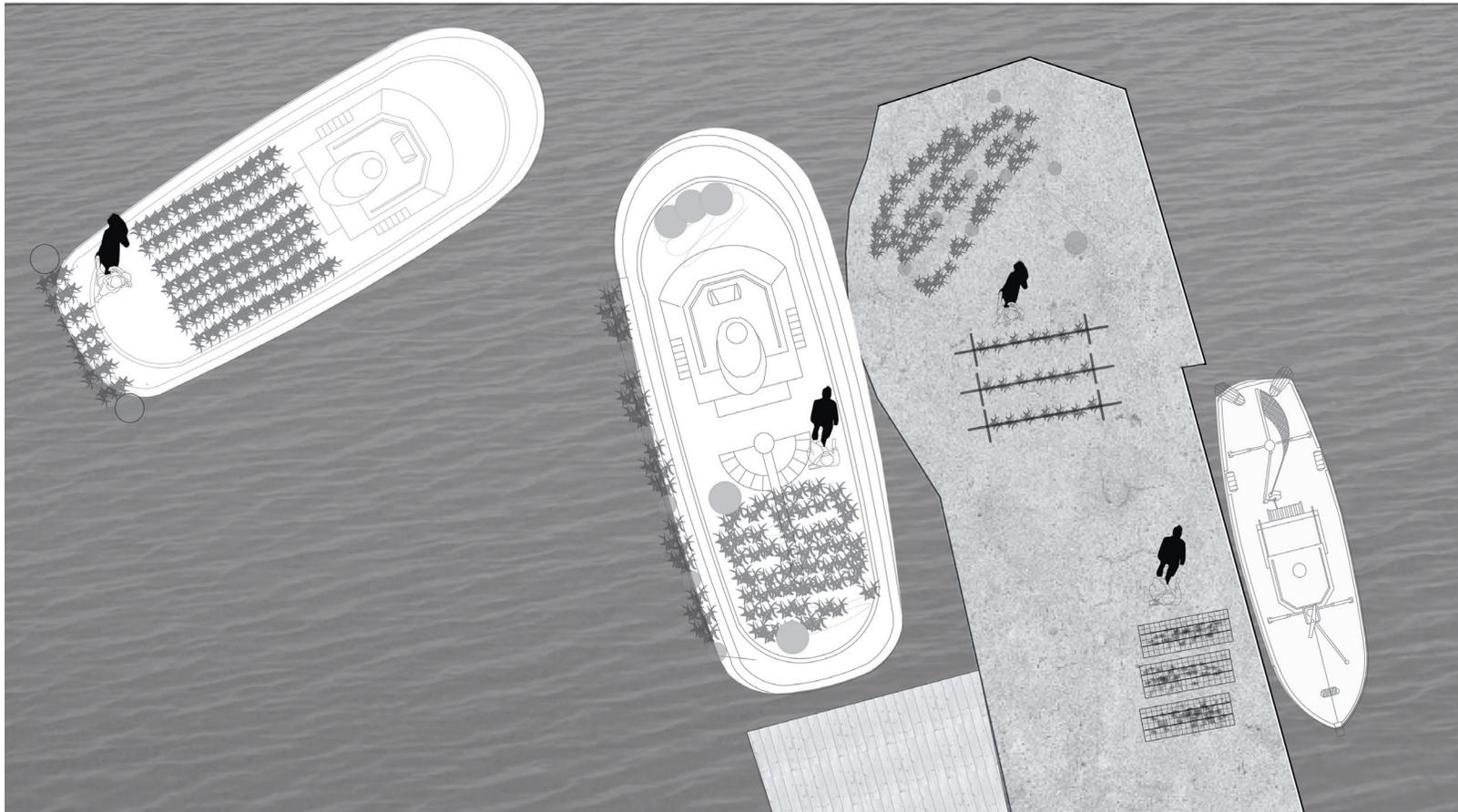
Learn about the life of the seaweed

What can we learn from ocean's ecosystem?

How to excel at using seaweed in cuisine

How to use seaweed in the building industry

How to use seaweed in design

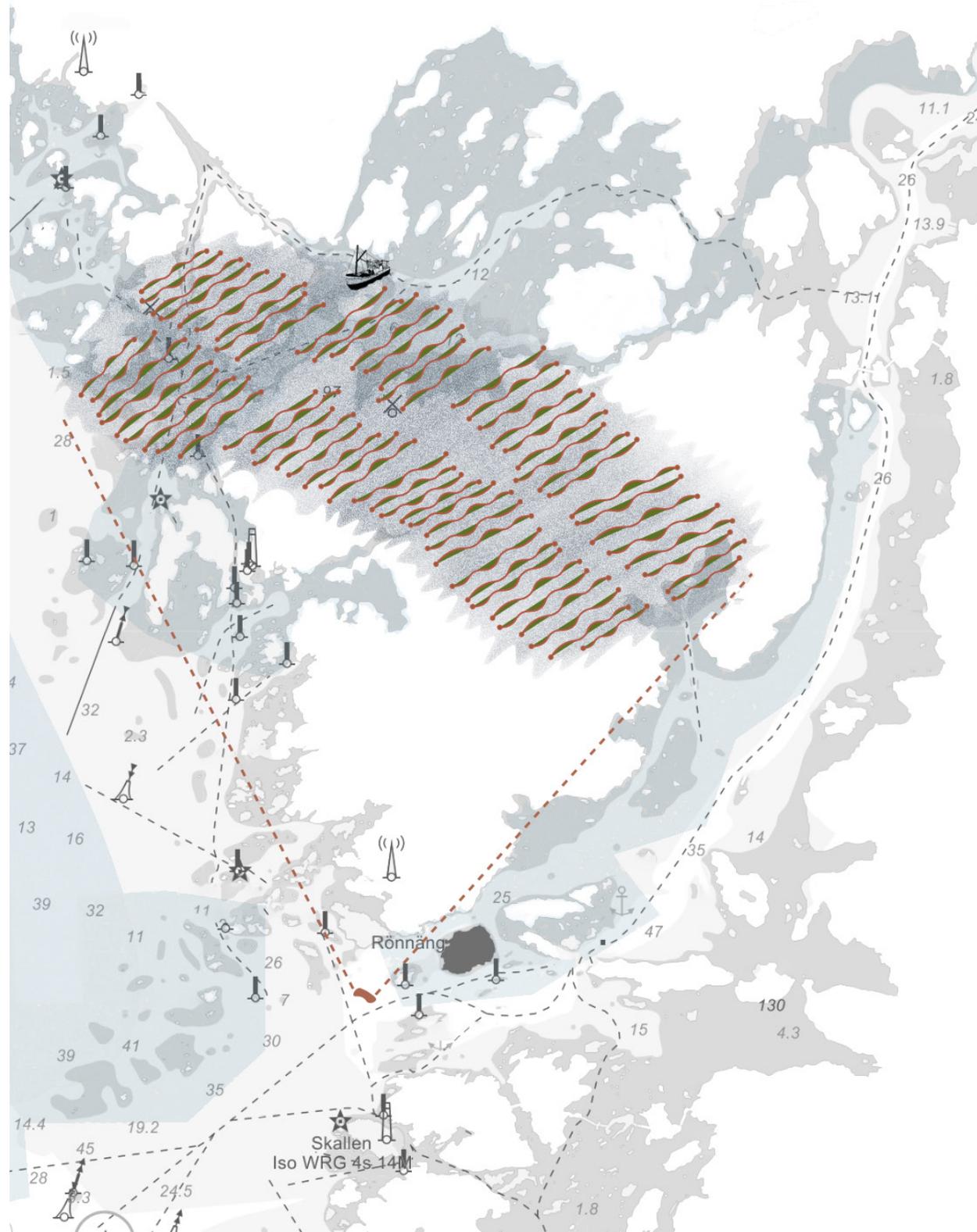


Zoom in of the management of Seaweed

A Proposal of placement for seaweed farming

The placement of the seaweed farm needs to take into account the statements made in the in-depth master plan as well as the optimum conditions for seaweed growth. It is important that the seaweed have a good circulation of water. Therefore can it not be located inside a bay but not too far from the coast either where the waves are too big.

-  Protected areas
-  Dyrön
-  Water depth: 10 meters
-  Water
-  Seaweed farming placement
-  Ferry connections
- 39 Numbers indicates water depths



Construction

Modular elements

How the structures are built and can be assembled.

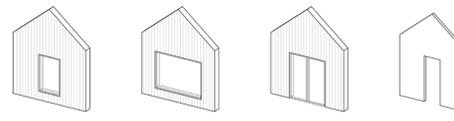
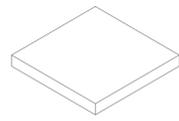
Roofing

Pontoon

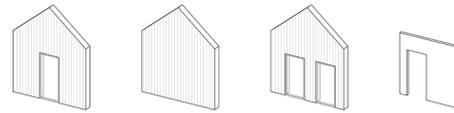
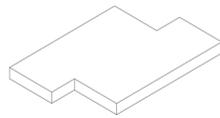
Exterior walls

Interior walls

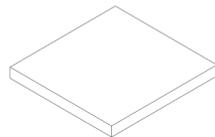
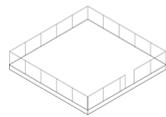
Assembly of modules



Tångeriët



Cabins



Sauna

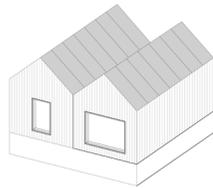
can be assembled of every type of pontoon



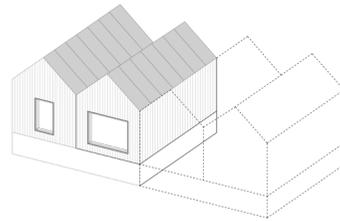
Adaptation of modules

How the structures can expand over time as needed

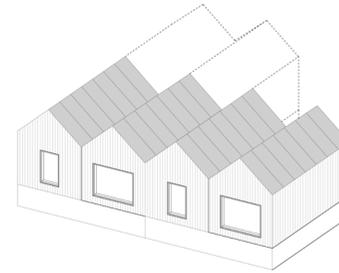
1



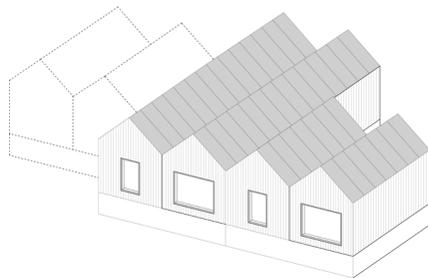
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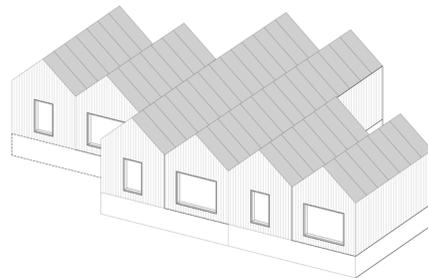
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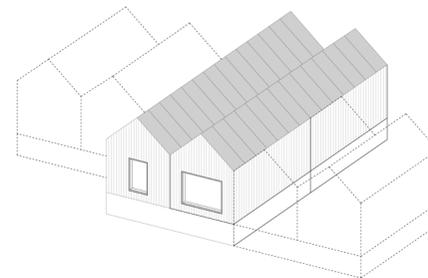
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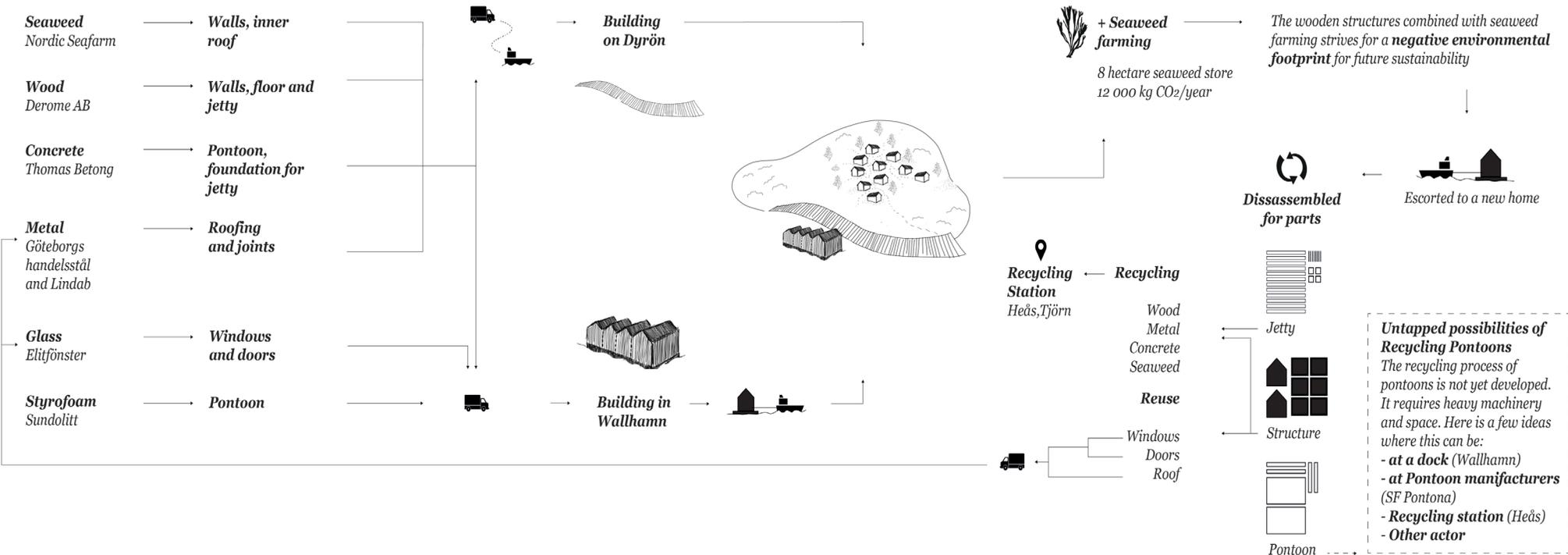


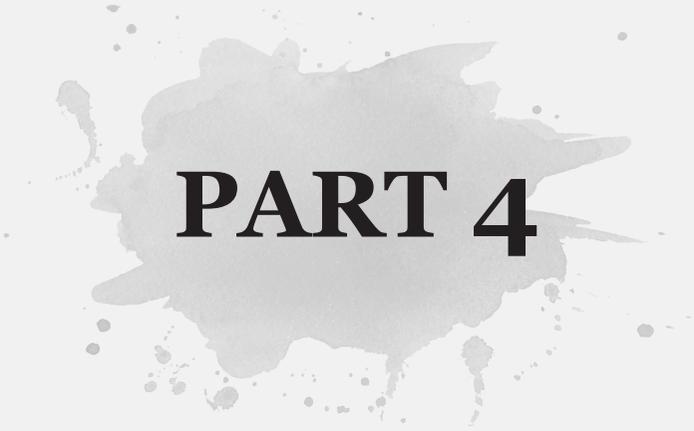
6



The building process chain

From beginning to end





PART 4

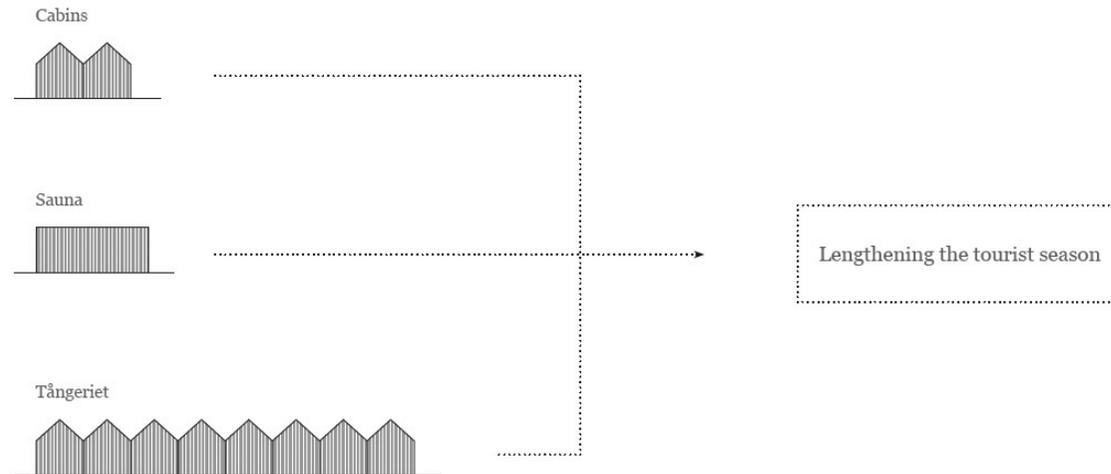
REFLECTIONS

What comes first?

The structures

The structures have a flexibility in implementation. It does not matter which structure arrives first on site, since they all will be a source of inspiration of alternative thinking on how to adapt to future societal and climate challenges.

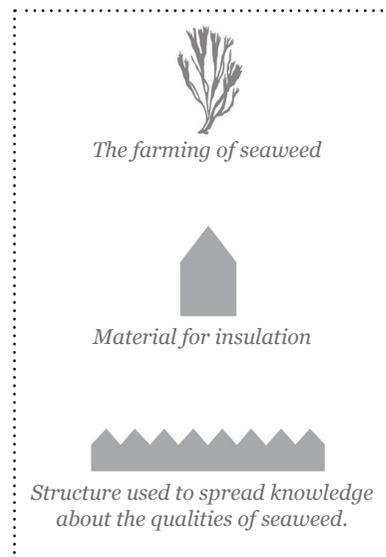
The structures can therefore work independently as well as together because they all still enable the path to the same goal - to lengthen the tourist season



The Seaweed farm



The seaweed farming can be integrated or separate from the structures.



There is an option that the seaweed used in the insulation of structures are grown by the fishermen on Dyrön and then shipped to Wallhamn for the construction.



The majority of the steps of the seaweed farming takes place unrelated to the structures. It is only present in the structure in case of workshops and exhibitions.

Final reflections

The community of Dyrön strongly identify themselves by their relationship to the sea and we wanted to strengthen that connection while striving for innovation. Our project aims to find a balance between man and nature in the coastal archipelago. Through our exploration we have found that the key ingredient is flexibility in order to design for sustainable development in this local context.

The urgency of adapting to climate change is pressing. The coastal areas biggest concerns are the rising sea levels, flooding as well as the health of the sea. We believe that Dyrön would be able to take the steps towards adapting to future climate challenges by the introduction of a new kind of typology (floating and modular), a new source of sustainable fishery and a platform to share knowledge and inspire minds. We believe that the flexibility in the architecture will allow the community to grow and be re-shaped by the neverending changes of societal needs and norms, and the space still be able to meet the spatial needs of its inhabitants. Therefore, it was important for us to design for predicted as well as unpredicted necessities.

We consider seaweed to be an untapped resource in Sweden that can play a crucial role for the

coastal communities to thrive. Incorporating seaweed farming in the current situation is a possibility by itself. Dyrön has the workforce, the tools and the storage units needed. Moreover, people can apply to use the surrounding water areas for seaweed farming as it is municipality-owned. They will only need to acquire knowledge and a relationship with Nordic seafarm to get it going.

It is important to acknowledge that this project is an accumulation of a variety of ideas based on a holistic approach. Therefore, there will need to be further investigations of detailed plan, ecosystem service analysis & soil mapping, ocean farming, suppliers and contractors, and financing before a possible realization.

We believe it will act as a catalyst of change, both for individuals, the community, and all who experience the project to nudge their behaviour to understand their impact on life under the surface as well as above. Therefore, we believe the impact will reach greater heights and excel beyond creating new job opportunities, more economic income, spaces to meet, the attraction of more tourists, and a healthier sea.

The work process

With the time-frame given, we took on ourselves an ambitious project. We focused a lot on creating a base of research to support our project. These are the major topics of consideration for us: Understand the meaning of the ecosystems, what this might look like in connection to Dyrön and how to design with them; Finding a way to receive dispensation in the shoreline protection in order to make the project feasible; The constructional elements of a floating structure needs to have how this should be anchored in order to make less harm to the ocean bed; The impact of waves on a floating structure; An understanding of the needs and wishes of the Dyröns community; The possibilities of seaweed farming in a local and a broader context as well as finding a proposal for the location of it.

After all this, we have realised that we do not know much at all and that there is so much more that can be explored.

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Åsa Jönsson. Head of the planning department, Tjörn municipality.

Jonatan Gerrbo. Nordic Seafarm, Innovative ocean farming.

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