CHAPTER III
THE CHURCH OF CULTIVATION

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AUSD HT 2022
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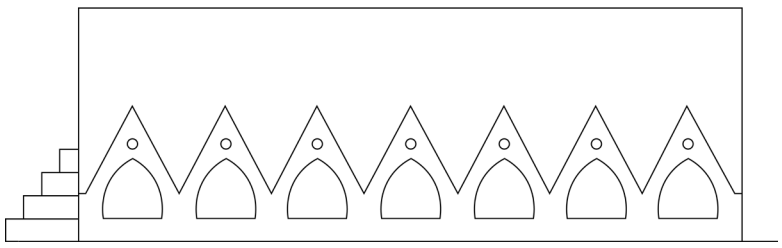


Julianna Smith
My approach towards this design challenge is to explore knowledge, development and skills through design in different scales. To be able to view the minor consequences and challenges within the bigger picture. My aim is to let my creativity free whilst adapting my own touch to the design work.

Chapter 3 - The church of cultivation
The proposal consists of social cultivation landmarks that at the same time works as a caretaker for excessive rainwater. The design is adapted to the scheme as a part of the new proposed infrastructure in order to deal with current and future climate change within Gothenburg.

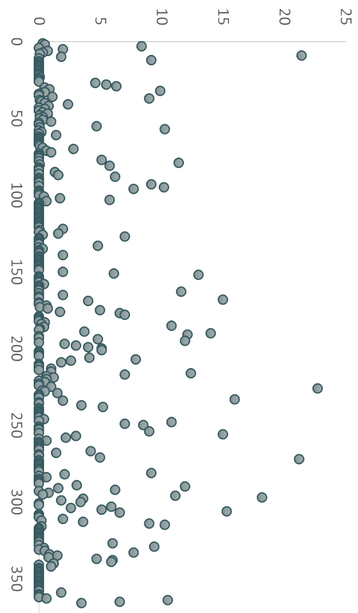
By looking closer into the human scale and community of the project, the system of a social cultivation became a natural part of the scheme for me. By initiating the project in small scale the outcome became a tangible part within the larger designed urban scheme. Part of the project aim was to apply the cultivation system to the hydrosocial terrain and thereby create a clearer represented vision of the scheme.

PART I
SOCIAL CULTIVATION

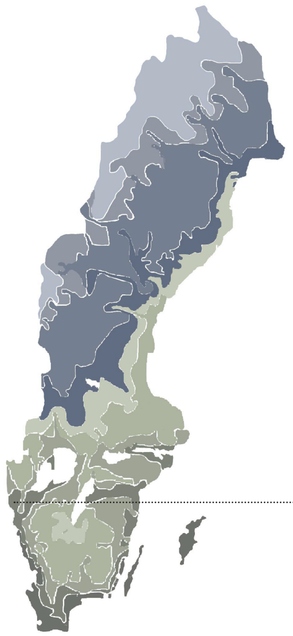
In Gothenburg's urban landscape today there is a distinct barrier between nature and urban. How can I, as an architect create a more transparent border of what is urban and what is nature? Through part 1 of this individual project, I aim to explore the system of social cultivation and thereby invite wildlife and social communication into our strict urban system.

MICRO-CLIMATE

The site data provides information in regards to climate and where there is most lit and dark on site. What type of cultivation and where to place it is important in this type of landscape.



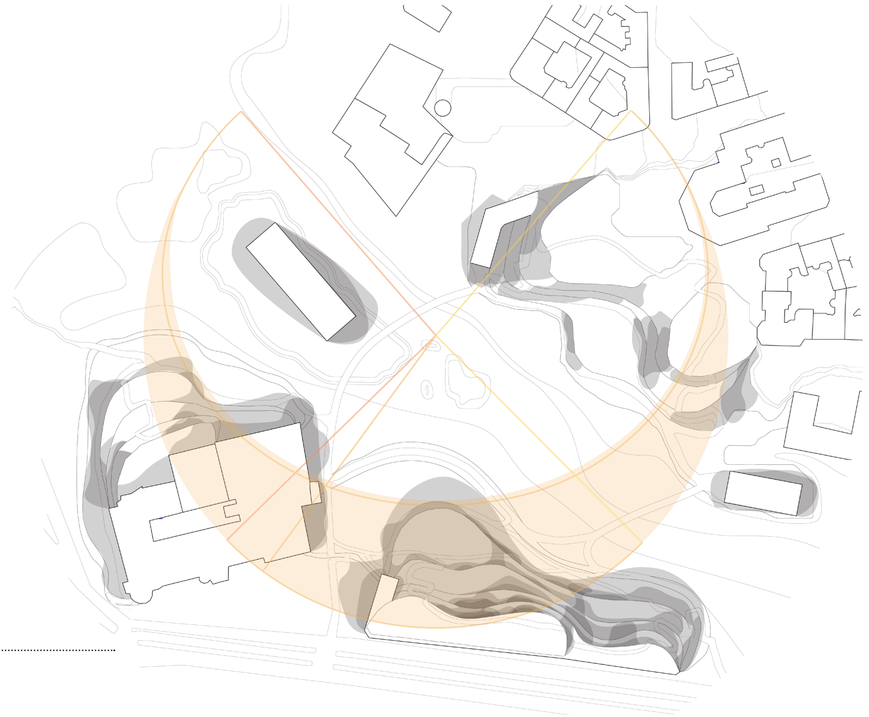
Rainfall data of Gothenburg (SMHI, 2022)



Map of planting zones (Riksförbundet Svensk Trädgård, 2022)

AVERAGE TEMPERATURE
All year: 9 °C
Summer: 18.5 °C
Winter: 1.25 °C

AVERAGE SUNLIGHT HOURS
All year: 4.3 H
Summer: 7.7 H
Winter: 1.5 H



Sundiagram over siteplan, enhancing light and dark areas on site (Suncalc, 2022).

FARMING HISTORY IN SWEDEN


Mällby Lantgård


Jakob Andersson on Röstorp farm

Traditional farming in Sweden does mainly conclude different types of grain, such as wheat. It also includes root vegetables such as potatoes, carrots and beets.

A farm that embraces the traditional farming methods is Mällby Lantgård, located on the island Tjörn outside of Gothenburg. The farm is producing solely organic products through both livestock and cultivation.

There are possibilities to cultivate more variety in crops in Sweden.

Nordisk Råvara is a company that strives for local farming of untraditional crops in Sweden. They focus mainly on beans and lentils in order to provide a further variety of crops to interested costumers. The nearest farm to Gothenburg is Röstorp farm in Lilla Edet and is driven by the farmer Jakob Andersson.

The aspect of creating a more varied farming supply is interesting for the community gardens.

500-1500 THE MIDDLE AGES
Almost every inhabitant was a self-provided farmer in Sweden. A negative consequence was that the earth became overgrown that made the harvests become smaller. A measure of this was to use 3 different lands where 1 always rested.

The 19th century: THE SWEDISH INDUSTRIAL REVOLUTION
Sweden went from being a agricultural society to an industrial one. Agriculture beame more effective due to maschines and of a more concentrated scale. During this era potato became the most important crop.

The 20th century: THE MECHANIZATION OF THE FARMING INDUSTRY
During the 20th century the agriculultural work became solely run by mechanicanised maschines instead of man and animal labour.

2022
150 years back 65% inhabitants in Sweden worked as farmers, fishers or foresters. Today, the number is only 2%. The agricultural production is effective and solely run by maschines.

TYPE OF CULTIVATION ON SITE


Currant


Rape


Wheat


Potato


Quinoa


Beans


Lentils

OUTSIDE FARMING
The climate on site allows for a combination of growing both Swedish traditional and modern types of species.

These are the types of plants that can be cultivated outside in the climate that the site provides throughout the whole year.


Tomato


Cucumber

INSIDE FARMING
Inside greenhouse-farming opens up for multiple opportunities of cultivation. These species are more such as fruit, vegetables and herbs.

During the summer the green house will not need any additional heating. However, if there weere to be farming to the same extent during winter, heating would be a matter to consider.


Lemon


Pepper


Basil


Lettuce

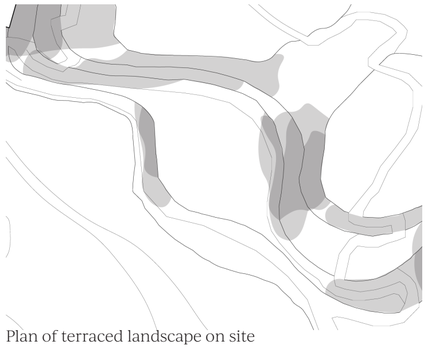
VERTICAL, TERRACED FARMING

During the pandemic Abdullah Almassri raised an interest for cultivation within his alotment on Södermalm in Stockholm. He specialized in tomatoes and has built a terraced system for best possible growing conditions of these. The tomatoes have been a success and his latest riped tomato came throgh in February last year.

Abdullah Almassri and his tomatoes

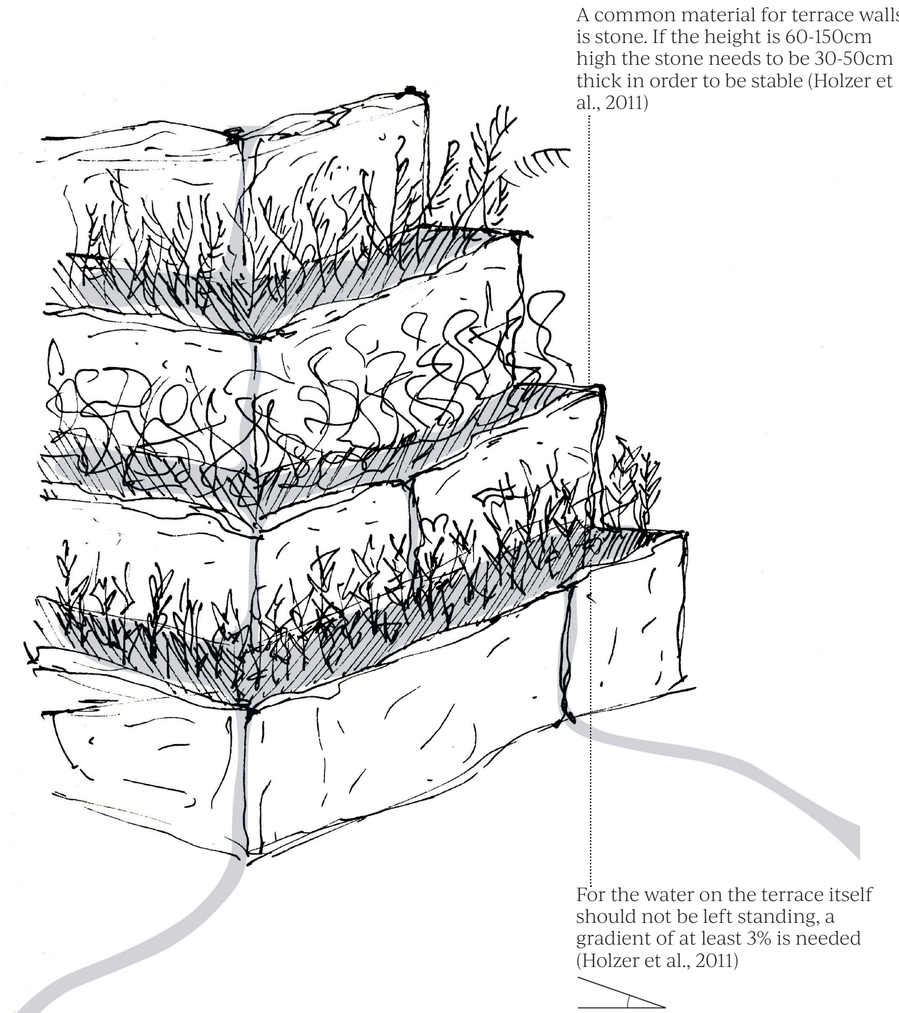
All types of crops can be grown on a terraced surface as it behaves the same way as a flat surface (such as a field etc.) but it makes the irrigation system more effeicient.

Growing on a terraced surface has many advantages when compared to growing on a slope: The water supply of the plants is better, because the water does not run off as quickly but is stored longer within the soil. The risk of erosion is therefore less. In addition, it is ergonomically more pleasant to work/cultivate on a flat cultivation terrace compared to working in a slope (Holzer, 2012). On terrace farms, you can create a favorable microclimate for the plants.



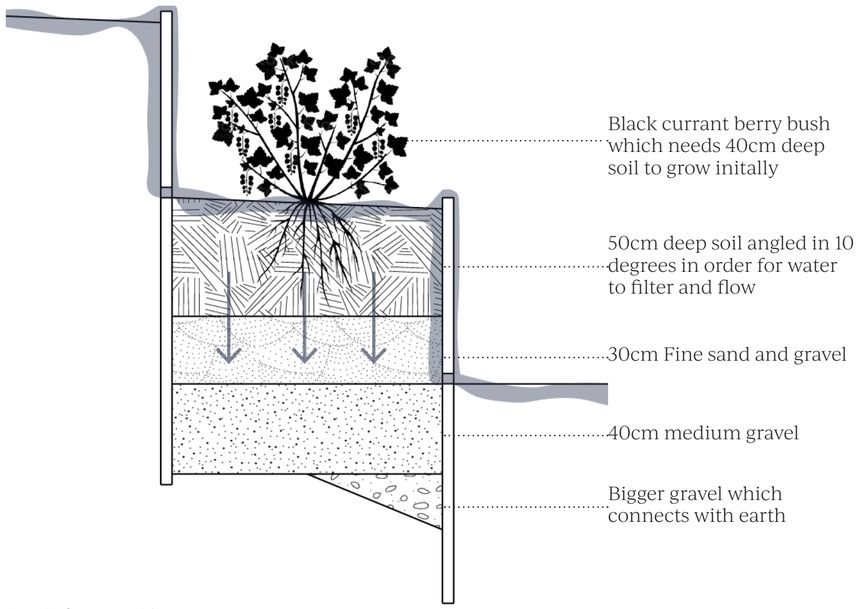
Plan of terraced landscape on site

The system of planting in terraces mirrors the idea of overall terrain within the site.

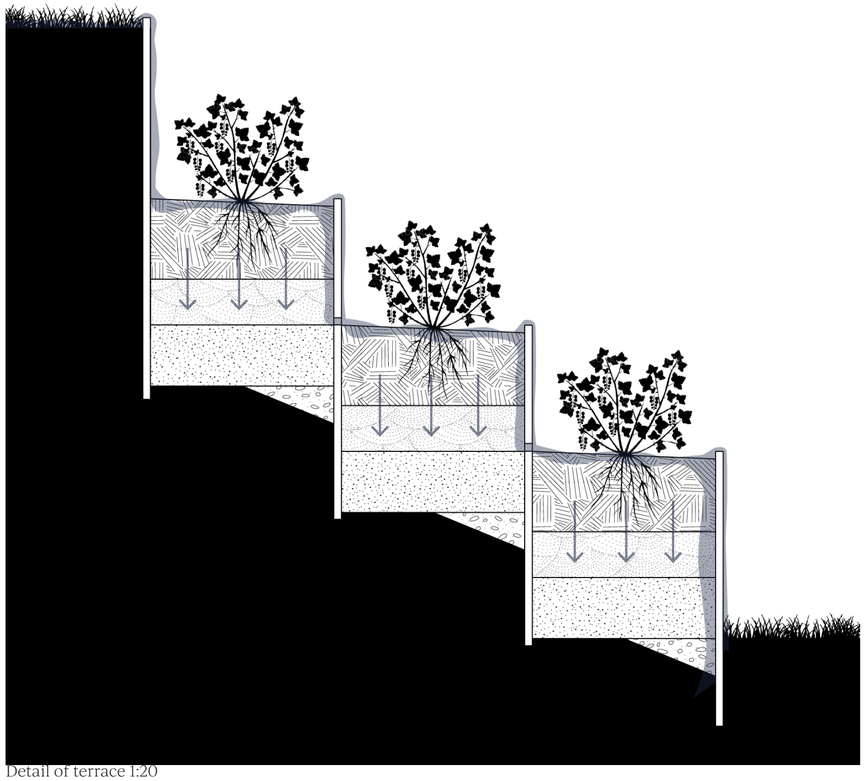


Diagrammatic sketch of important aspects of how terraced farming in smaller scale works.

THE HYDROSOCIAL SYSTEM OF IRRIGATED TERRACE BEDS



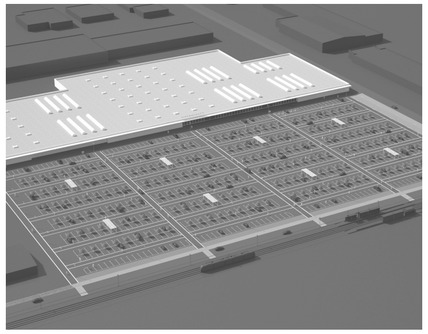
Detail of terrace 1:20

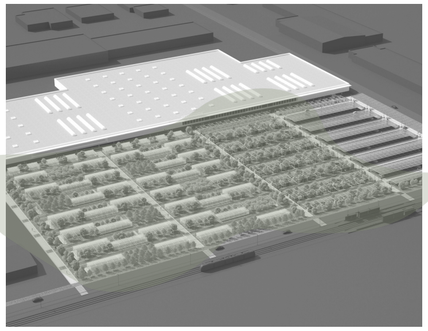


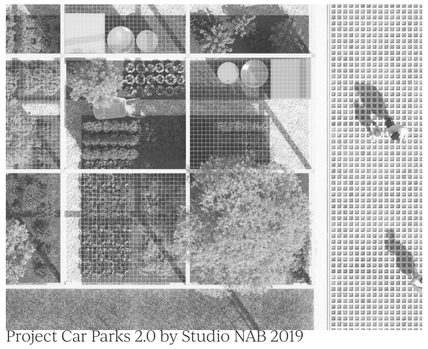
Detail of terrace 1:20

The beds are adapted to farming of bushes, edible crops and flowers. The soil depth for a bush is minimum 40cm which leaves 10cm marginal in this type of model. The terrace is angled 10 degrees in order to lead the water running through. The water will filter throughout all of the terraces and work as an analog irrigation system.

THE HYDROSOCIAL SYSTEM OF COMMUNITY URBAN GARDENING





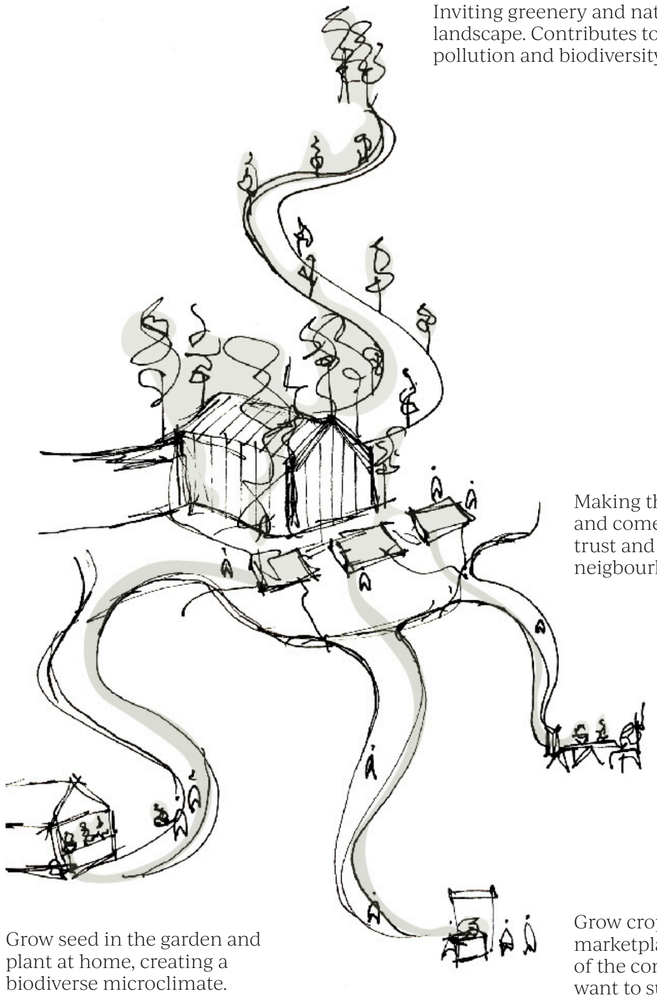


Project Car Parks 2.0 by Studio NAB 2019

Studio NAB has developed an ecological parking project called Car Parks 2.0 , a proposal that aims to offer an alternative solution to the abundant areas of parking spaces that occupy our cities, transforming them into more sustainable and human spaces.

These types of transformations - turning a place that originally is deutilised for people into a public, communal area contributes severly to the social life of the surrounding community.

The idea of turning something designed for an unsustainable purpose into a place where social and environmental sustainability take place is very inspiring.



Diagrammatic sketch of how communal famring contributes to the surrounding are in terms of social and environmental impacts.

PART I
CONCLUSION

Due to the research accomplished within part I, I have now grown an understanding of farming within a northern country and what crops are manageable to cultivate in our climate; both large and small scale. By doing research on vertical farming terraces I have come to the conclusion of using this method; not only due to its advantages regarding farming but also as a complementation to the larger scaled designed terrain.

PART II
FESKEKôRKA

By researching historically valued dwellings on site in chapter II, the building Feskekôrka ("the fish church") reached my interest. Feskekôrka has been a marketplace within Gothenburg since it was built in 1874. By including the building in this project the aim is to keep the place as a meeting point for social interaction as well as trading local goods. Feskekôrka will stand as a starting point for the system of social cultivation on site.

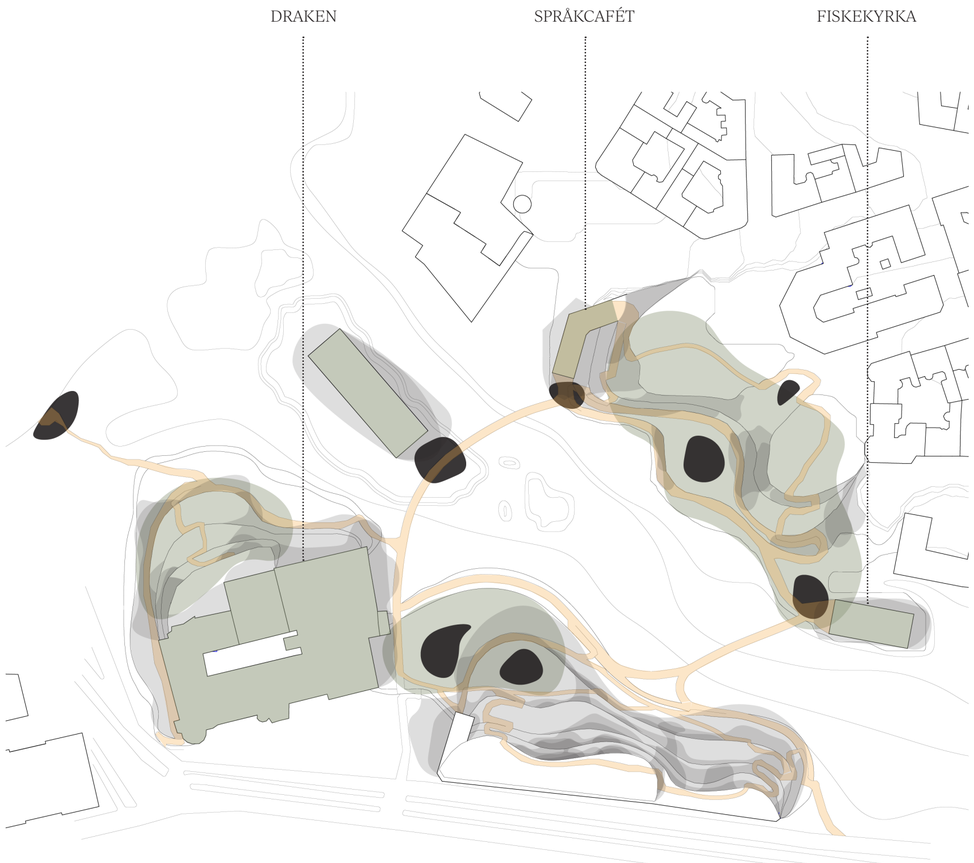
EXPLORING SITE OPPORTUNITIES

Existing architecture on site that is relevant to the potential cultivation is the historical buidlings Draken, Feskekôrka and Språkcafét. To involve and reuse one of these historical buildings into a new purpose of housing farming, markets or other social aspects is interesting.

Feskekôrka

Draken

Språkcafét



Diagrammatic map over intense public points on site in combination with pedestrian people flow. The darker areas are shadowed areas at some point during the day both summer and winter. Interesting poinst for cultivation is marked in yellow.

EXISTING RELEVANT ARCHITECTURE ON SITE
INTERESTING AREAS FOR CULTIVATION
PUBLIC MEETING POINTS
PEOPLE FLOW
DARKER AREAS

FESKEKôRKA


Feskekôrka during renovation (Hogia, 2022)


Feskekôrka interior 1953


Feskekôrka 1902

Currently, Feskeôrka is owned by Higab and is being renovated by White Arkitekter. Recreating the construction and interior space by creating a food court/market place as well as a restaurant.

Feskekôrka has high cultural value to Gothenburg and a long history of being the central marketplace for fish in the city. When utilising Feskeôrka within this project, its heritage is something to deeply consider.

1871 Gothenburg city decided that a marketplace for fish was needed and a budget of 75'000kr was donated by Renströmska fonden in order to build Feskekôrka

1873 The drawings were finished by architect Victor von Gerfelt

1874 Feskekôrka was built

1878 proposal of building extention was raised and denied

1886 proposal of building extention was raised and denied

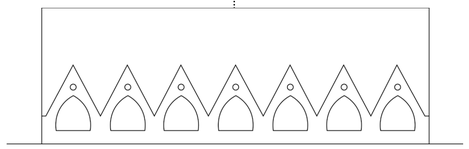
1931 Major interior renovation

1963 Major Interior renovation

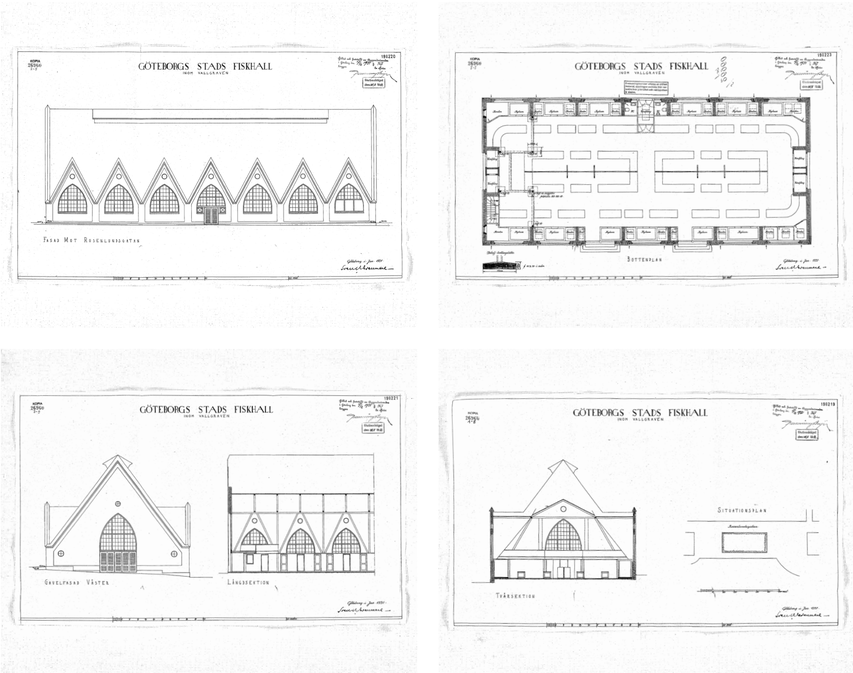
1989 Major Interior renovation and addition of a restaurant inside by B&B Lindström Architects

2013 Feskekôrka became an official building of cultural value in Gothenburg

2022 Feskekôrka is currently being renovated and opening in 2023



THE ARCHITECTURAL ASPECT OF FESKEKôRKA

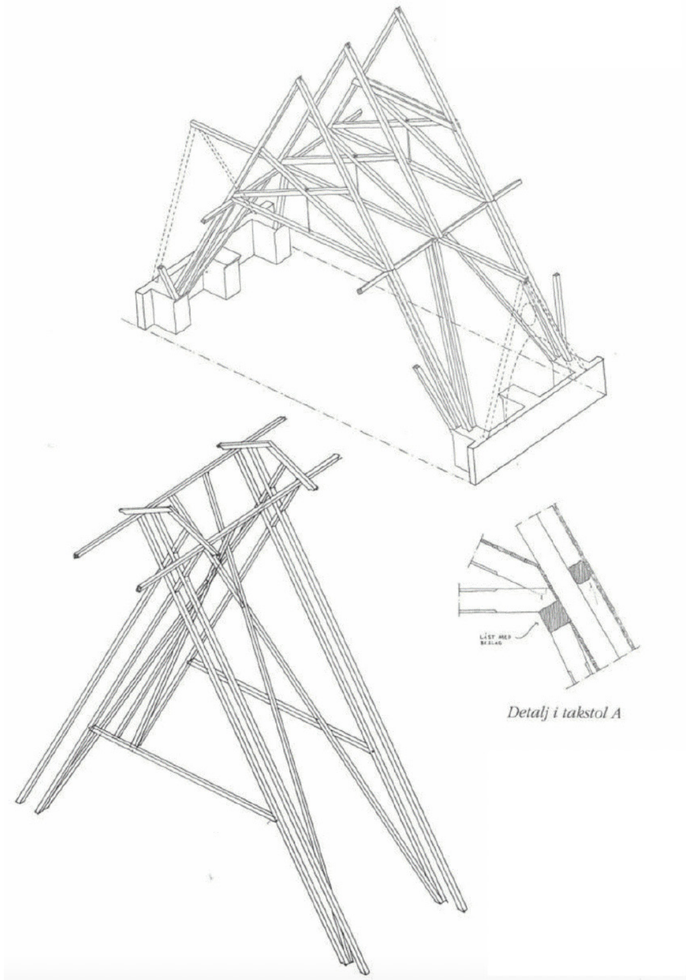


Original drawings of Feskekôrka by Victor von Gerfelt (Stadsbyggnadskontoret, 2022)

Hopperstad Stavkyrka in Norway

The architecture and construction technique of Feskekôrka is influenced by Old Norse architecture as well as Gothic.

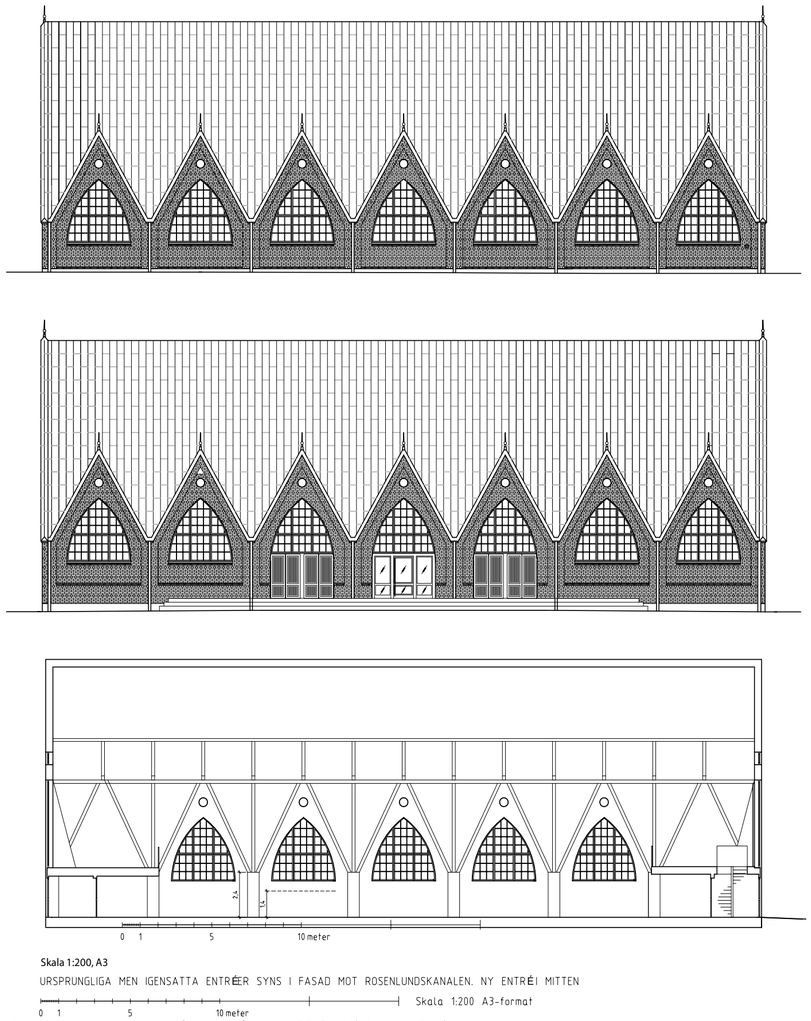
Hopperstad stave church was built in the 12th century on the same spot where the stave church stands today in the small village of Vikøyri.



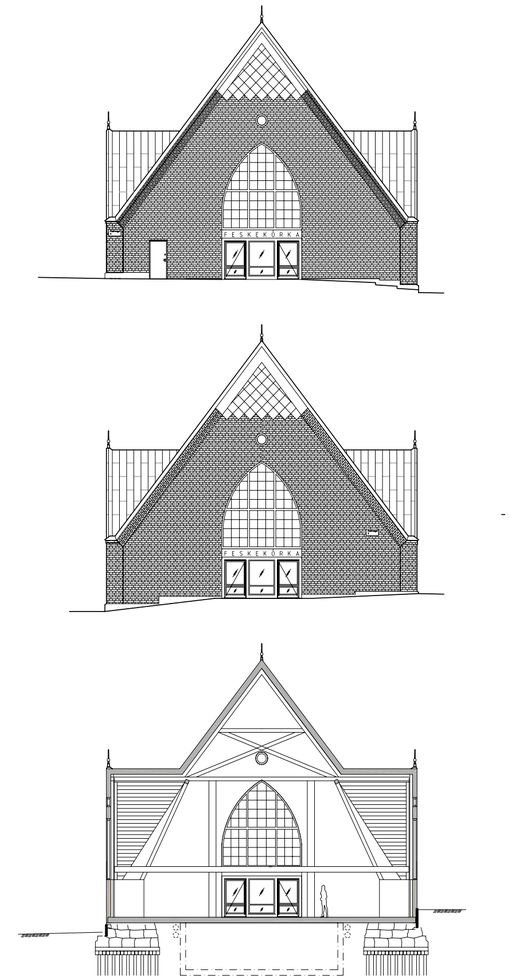
Drawing of the rod triangular system of Feskekyrka by Peter SJöman, 1874

The construction of Feskekôrka is highly inspired by norwegian stave churches and Gothic churches. The roof construction is called rod triangle system and follows the principle of stabilising a traingular shaped roof by using several triangular shapes.

THE ARCHITECTURAL ASPECT OF FESKEKôRKA



Elevations in sections of Feskekôrka 1:200@A3 (Hogia, 2022)



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Elevations in sections of Feskekôrka 1:200@A3 (Hogia, 2022)

FESKEKôRKA AS A STARTING POINT

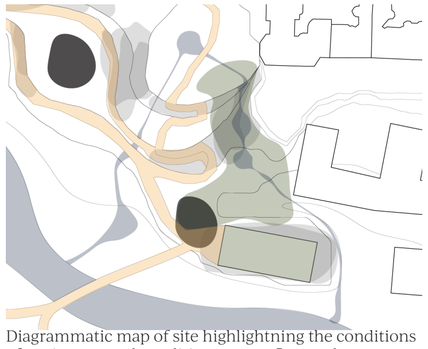

Feskekôrka interior 1953

The buildings cultural history and value is something inspiring and a starting point for a further development. Inspired by the aspect of a market selling locally sourced products.

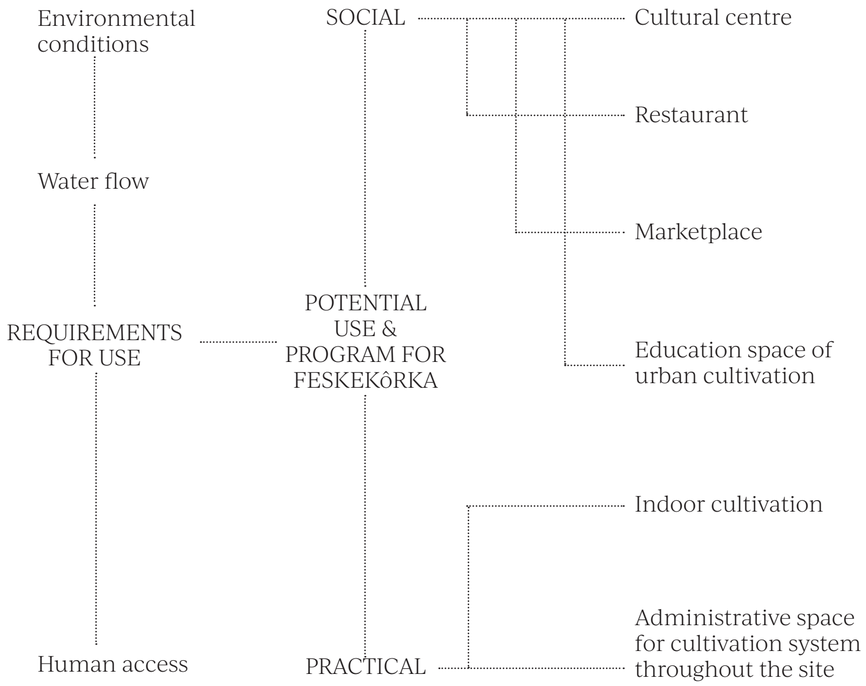
The space has potential of being a highly social space as there has been botha market place and a restaurant for people to gather and socialise.


Interior render of Feskekôrka by White Arkitekter

The current restoration of Feskekôrka, by White Arkitekter, is done with care to the cultural history of the building. It will contain a market place and a restaurant, as before.

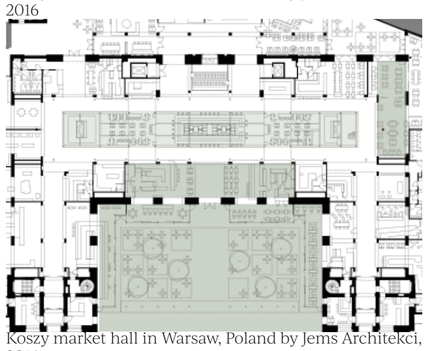

Diagrammatic map of site highlightning the conditions of environmental conditions, water flow and access

Requirements of using the site of Feskekôrka are
- Environmental conditions for cultivation
- Water flow
- Human access and communitation



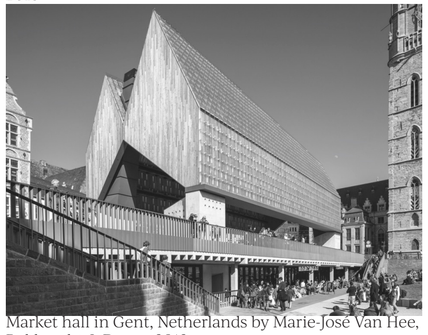
INTERIOR DEVELOPMENT OF FESKEKôRKA

Koszy market hall in Warsaw, Poland by Jems Architekci, 2016



Koszy market hall in Warsaw, Poland by Jems Architekci, 2016

The Koszy market in Poland is a restoration project of an indoor market hall. The retail spaces within is located both in the middle and along the sides. It contains of both restaurants, cafés and food markets. The floor plan solution is interesting due to placing of restaurants and retail.



Market hall in Gent, Netherlands by Marie-José Van Hee, Robbrecht & Daem, 2012

New construction of a market hall in Gent is inspiring due to its architectural solutions and forms. Having a marketplace below ground and the roof working as a pavillion public space.

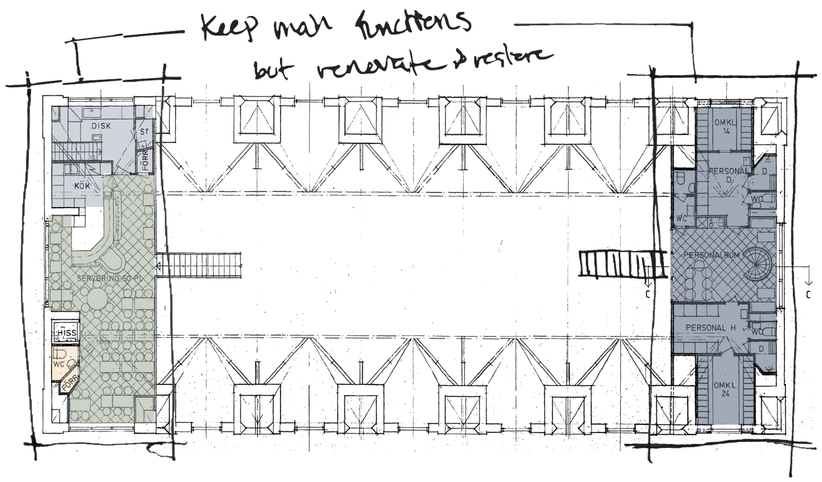
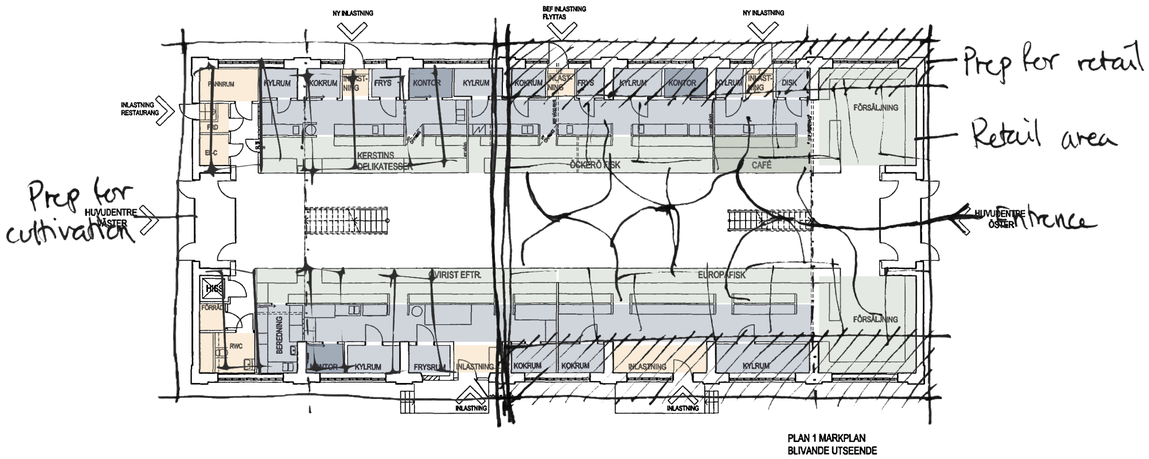


Fig. ground floor plan of Feskekôrka before restauration 2003 (Stadsbyggnadskontoret)



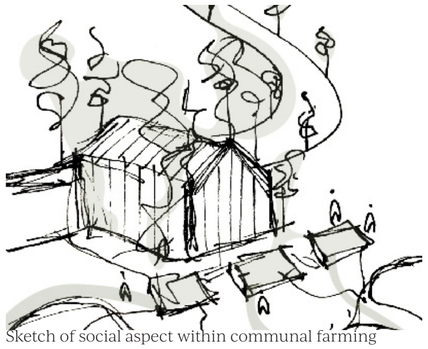
Second floor plan of Feskekôrka before restauration 2003 (Stadsbyggnadskontoret, 2022)

CAFE/RESTAURANT
RETAIL
KITCHEN AND NECESSITIES
ADMINISTRATION
FACILITIES

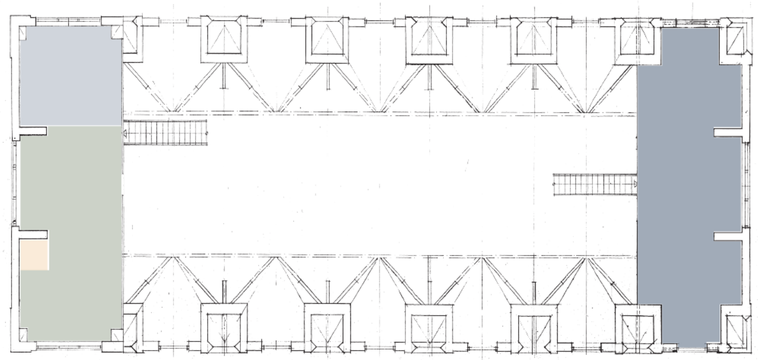
INTERIOR PROPOSAL OF FESKEKôRKA

Pre-cultivation system

The method of pre-cultivation during winter helps the crops to mature to a stage where it can survive outside during the summer season. By introducing this to Feskekôrka the aim is to create another social and communal space for the inhabitants to trade and bond over their crops.



Sketch of social aspect within communal farming



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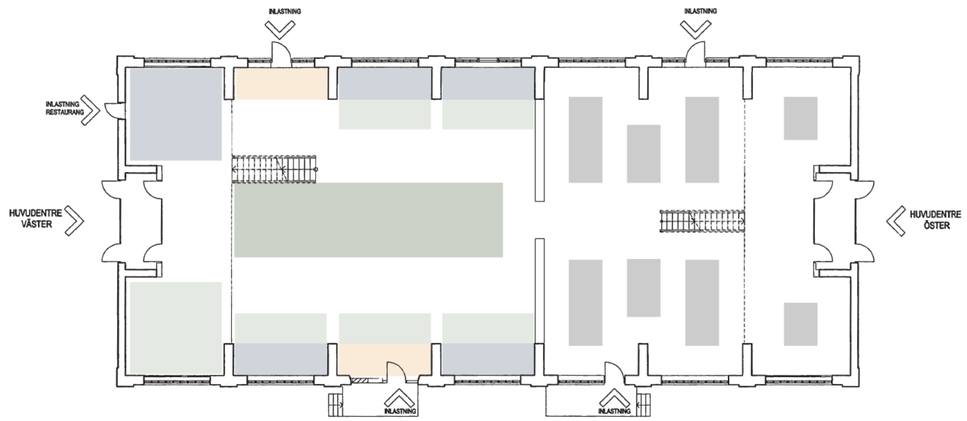

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CAFE/RESTAURANT
RETAIL
KITCHEN AND NECESSITIES
ADMINISTRATION
FACILITIES
PRE-CULTIVATION

THE CENTRUM OF FESKEKôRKA - REQUIRED ASPECTS

ENVIRONMENTAL CONDITIONS FOR CULTIVATION
WATER FLOW
HUMAN ACCESS AND COMMUNICATION

PART II
CONCLUSION

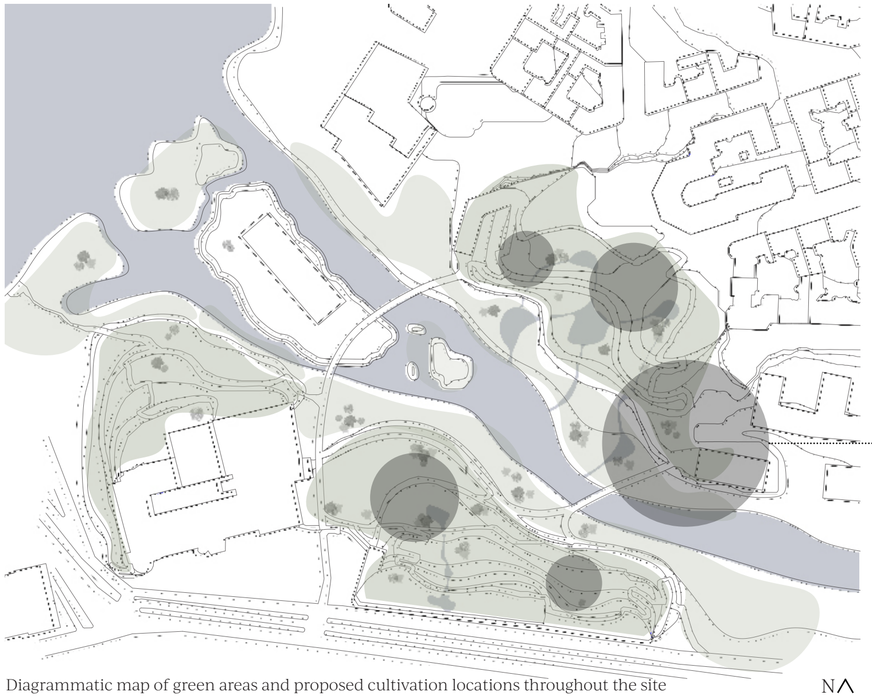
The interior proposal of Feskekôrka suggests a pre-farming area as well as an indoor marketplace for local residents to trade and sell their crops. This creates a meeting point for the residents interested in social cultivation throughout the whole site. The system has a strong gathering point within a larger scale system makes it tangible and grounded within the society.

The purpose of Feskekôrka partly changes in order to support the cultivation system but it keeps the intent of being a marketplace for the local residents.

PART III
CULTIVATION SYSTEM AS A DESIGN

The cultivation system of vertical farming in terraces will be adapted throughout the site. Adapting the placing of the cultivation spots towards the water irrigation system, will efficiently slow down and take care of excessive water flow throughout the site. The system aims to adapt to the site as well as contribute to it. Through an extensive design, a proposal will be formed to become a landmark where the hydrological system of cultivation will take place.

CULTIVATION AS A SYSTEM

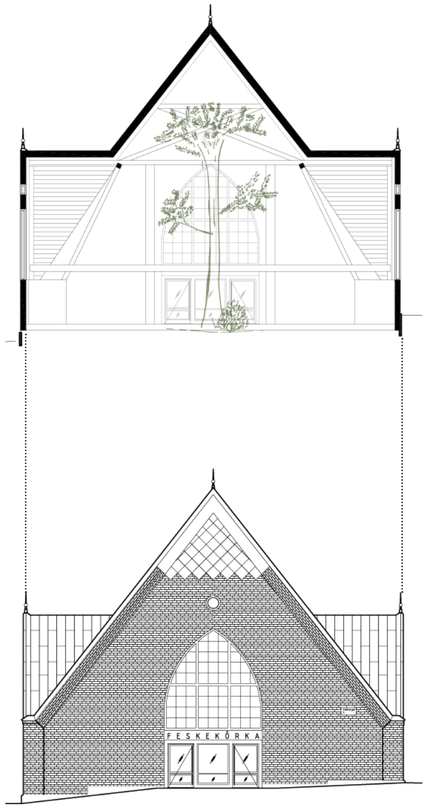


Diagrammatic map of green areas and proposed cultivation locations throughout the site

PROPOSED GREEN AREAS ON SITE
PROPOSED MAIN LOCATION FOR CULTIVATION
WATER IRRIGATION ON SITE

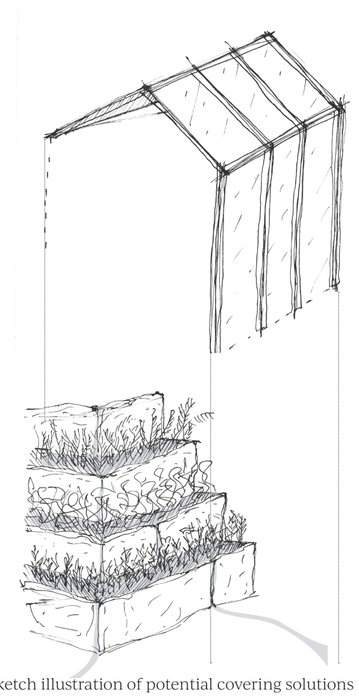
Taking the advantage of using Feskekôrka as a meeting point, the cultivation will take significant space within this area. The proposal will be able to take over smaller areas and work as a type of sheltering system, wihtout harming the cultivation opportunities. For the proposal to work as a systematic proposal, it will be adapted throughout the whole site.

DESIGN STRATEGY



The design strategy for this proposal is to create a landmark for local, social cultivation within i larger context and thereby create a system. The proposal does not strive to become a solid structure but a space where people gather, learn and create social interaction with each other and the wildlife surrounding them. Invited into a piece of nature within an urban grid.

THE ASPECT OF GREENHOUSE SOLUTIONS



Sketch illustration of potential covering solutions

There are many solutions for small and large scale farming. The concept if verticality is significant and the solutions are to be mirrored by this. An important aspect of this is the method of covered or open cultivation - exploring the qualities of using green houses.

Open air market and garden in Cornerstone, Sonoma, USA

Exploring the properties of an open green house with easy access for the social community and perhaps being used as a passage on walkways

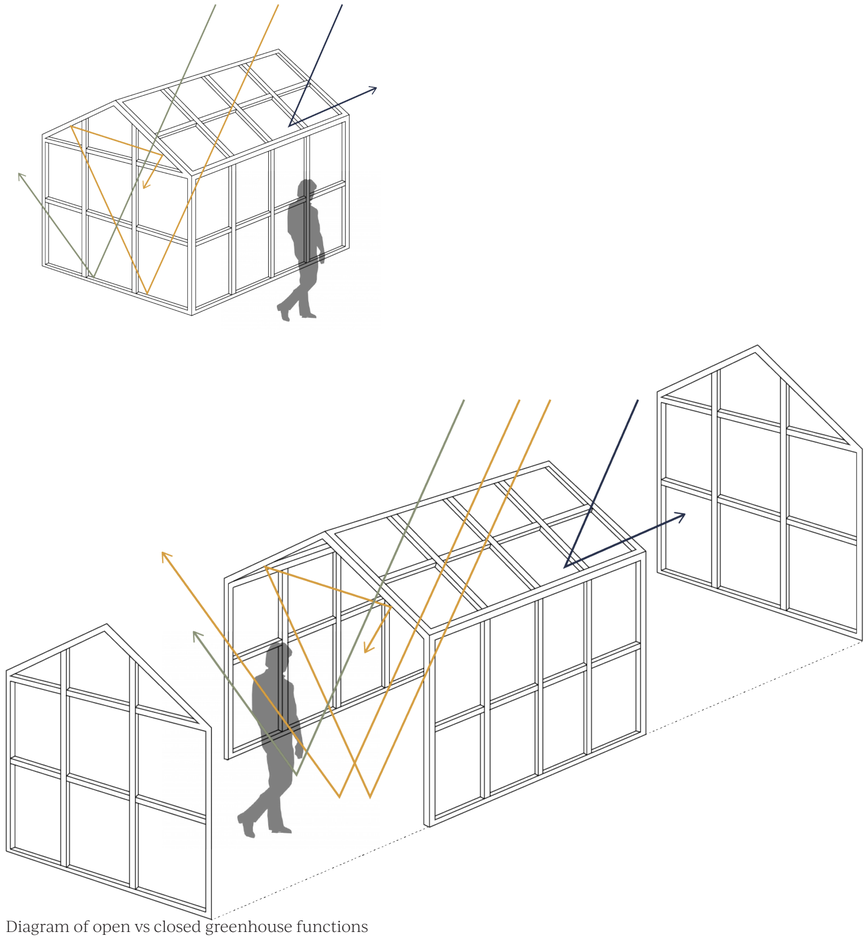
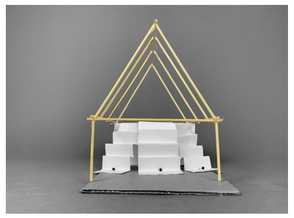
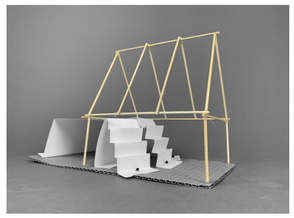
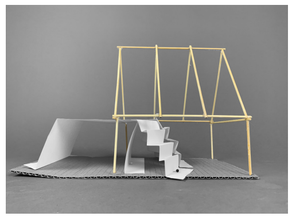


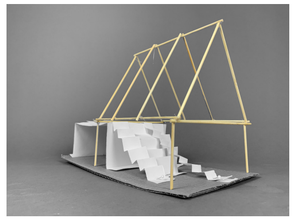
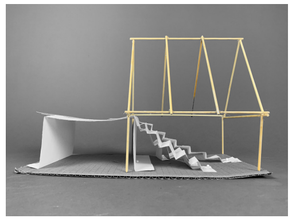
Diagram of open vs closed greenhouse functions

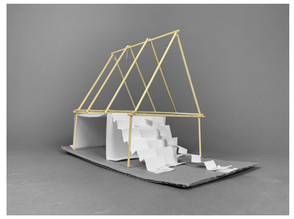
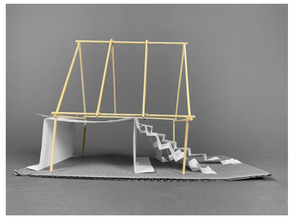
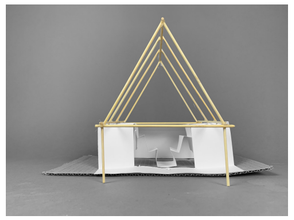
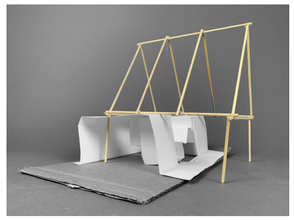
What will be the effectivity of greenhouses if 2 sides were open? The structure becomes more simple - more like a windshield that captures occasional sunrays, heating up the space underneath during warmer days. The space has more potential to become a social space as it invites for both pathing and pausing underneath.

VISIBLE LIGHT
SHORT-WAVELENGTH INFRARED LIGHT
LONG-WAVELENGTH INFRARED LIGHT

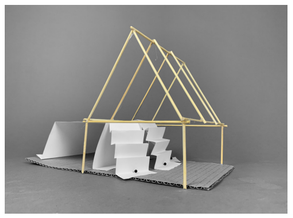
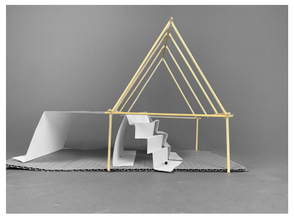
STUDY MODELLING OF CULTIVATION TERRACES AND SHELTER

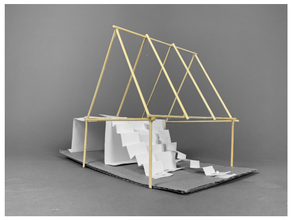
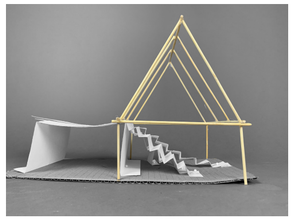
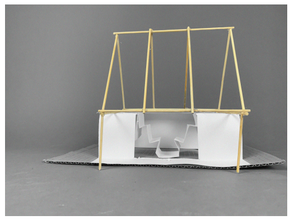
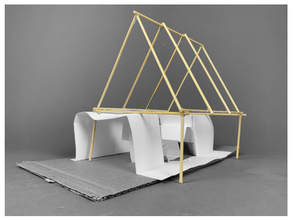
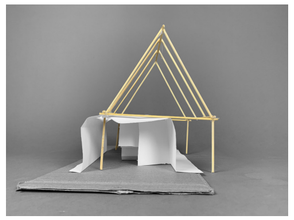




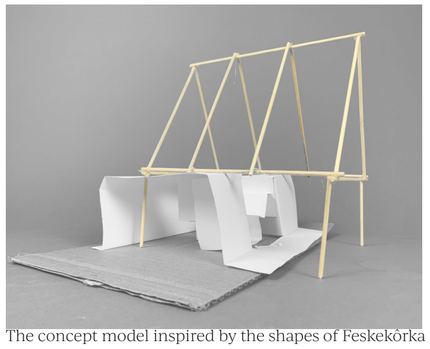







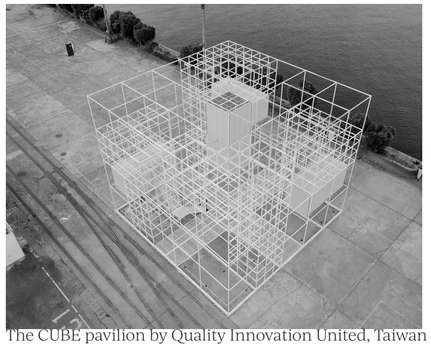



DESIGN DEVELOPMENT SHELTER

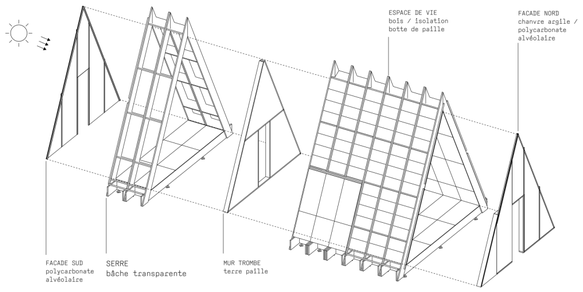


The concept model inspired by the shapes of Feskekôrka

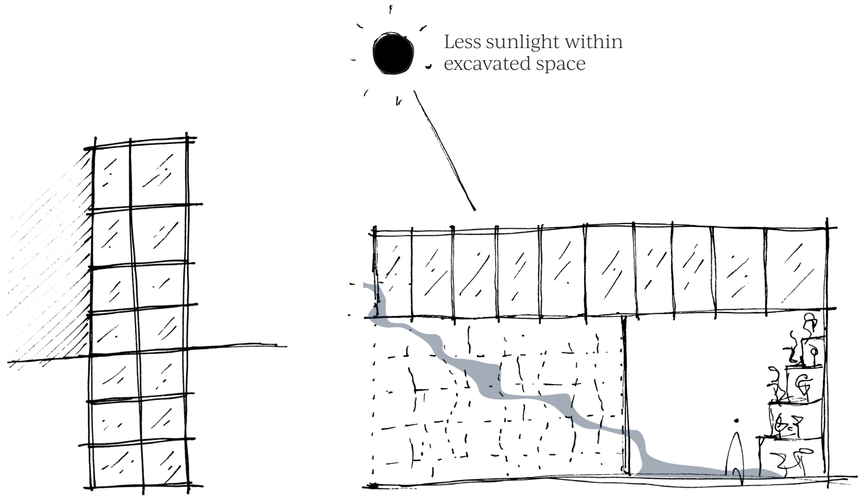


The CUBE pavilion by Quality Innovation United, Taiwan 2021

Taking inspiration from different shaped shelters and pavillions in order to develop the design of a covering for the shelter of small scale cultivation around the site.



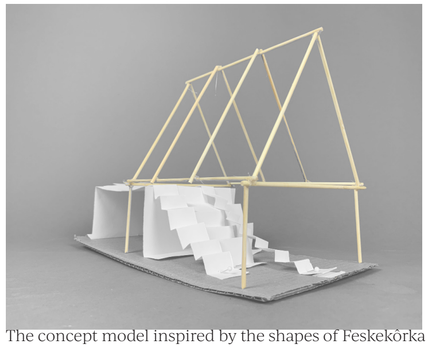
A day shelter for young migrants by Atelier Craft, Paris 2021



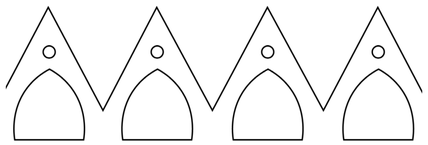
Sketch development of concept model

The sketch development contributes to the procedure of further testing and problematising the conceptual ideas. This type of solution will create a lack of sunlight within the excavated space for the terraces. Perhaps a solutions for this could be benefitial from some plants more than others.

DESIGN DEVELOPMENT SHELTER



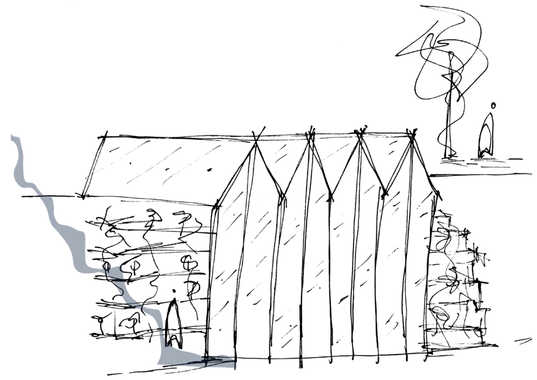
The concept model inspired by the shapes of Feskekôrka

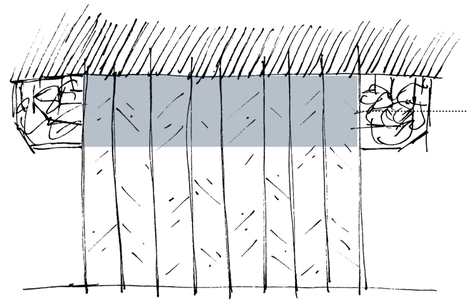


Sketch of Feskekôrka

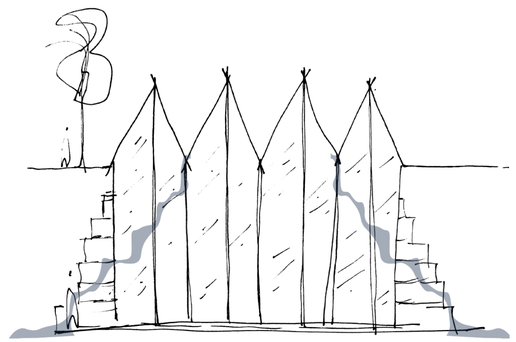
Design concept sketch

Developing the sketches mirroring the sides of Feskekôrka adapted to the terraces - creating a green corridor within a shelter.





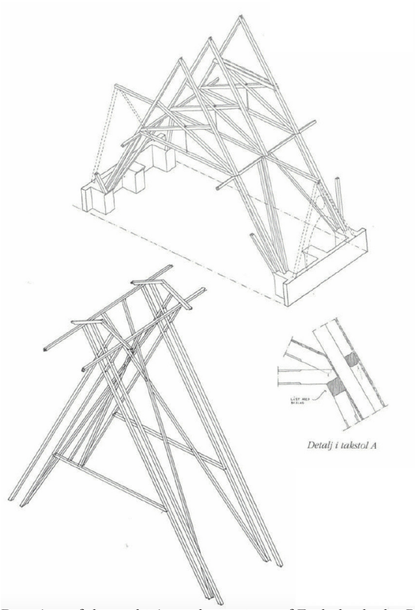
Idea of creating wholes within roof to let rainwater through



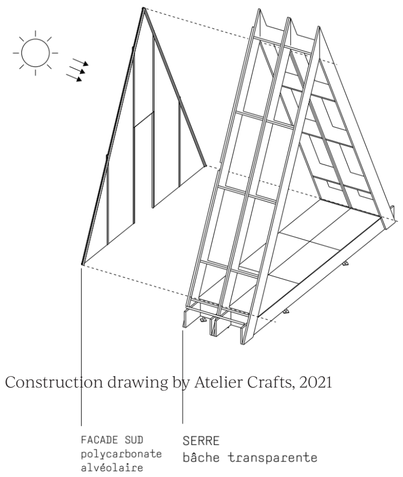
Design development sketch

This type of solution of a convex cultivation system invites more sunlight and growing opportunities for plants in need of this.

MATERIALITY STUDY

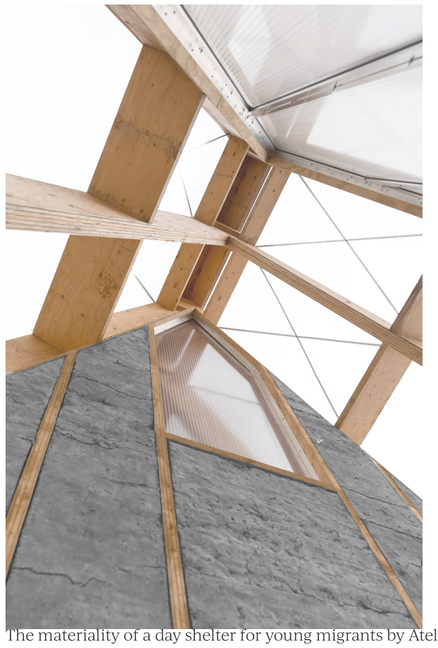


Drawing of the rod triangular system of Feskekyrka by Peter Sjöman, 1874



Construction drawing by Atelier Crafts, 2021

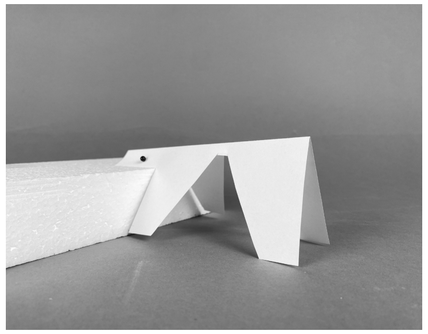
The triangular construction is to be adapted to the design of the cultivation shelters.
The 2 different triangular constructions are interesting as they use timber as construction material.

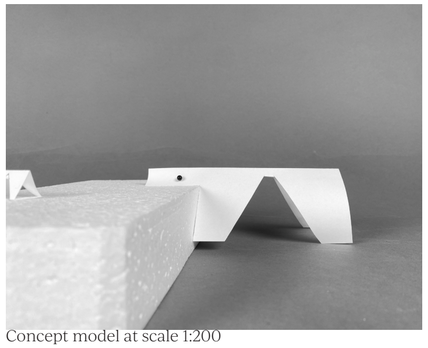


The materiality of a day shelter for young migrants by Atelier Craft, Paris 2021

The materiality of the project contains, earth, timber, and polycarbonate. This type of material lets thrpugh sunlight but has less environmental impact than glass. The shelter is community built.

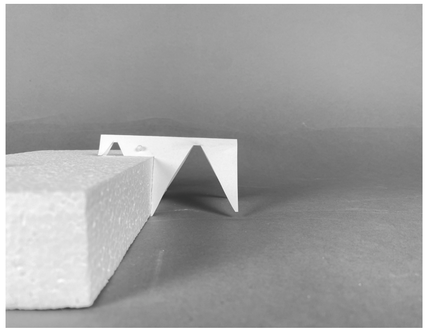
DESIGN DEVELOPMENT PHYSICAL MODELLING

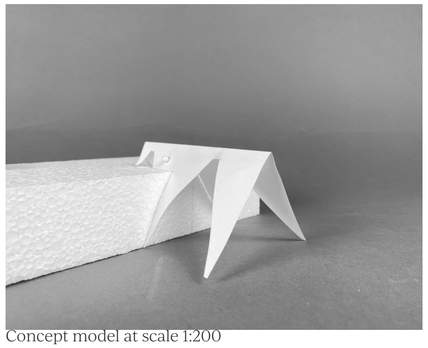




Concept model at scale 1:200

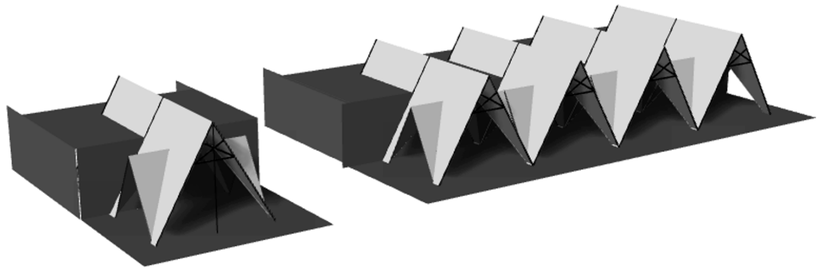
By testing different kinds of folds towards a wall representing a terrace there are clear considerations to be made due to the connection between structure and surface. Is the structure purposely cutting through the surface or leaving it be? By further exploring the shape of an A-frame the conclusions are drawn through the process of modelling and testing.

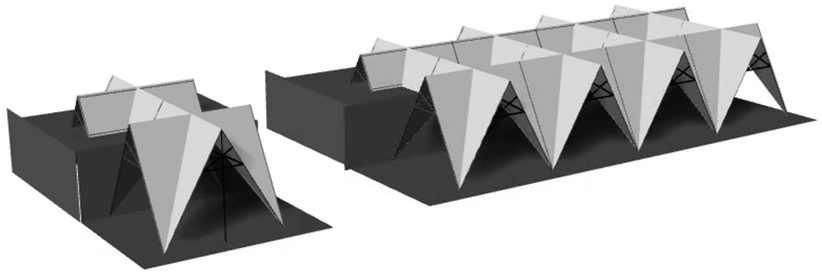


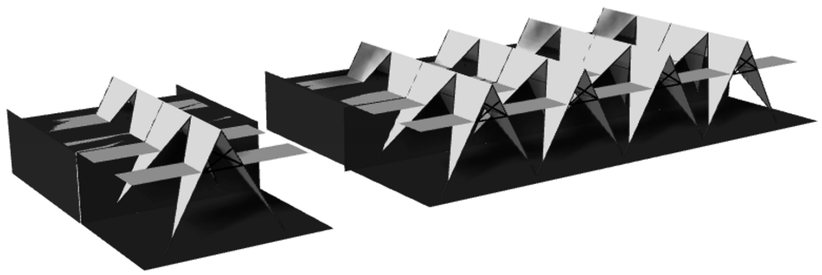


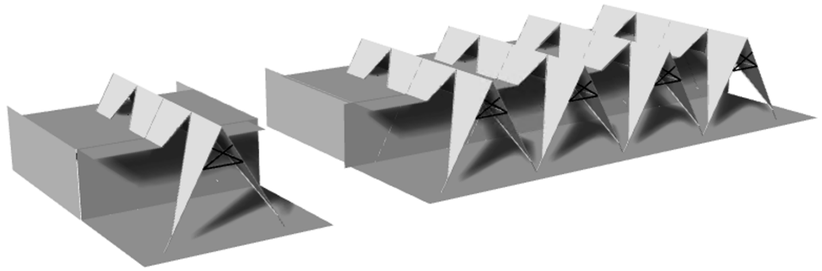
Concept model at scale 1:200

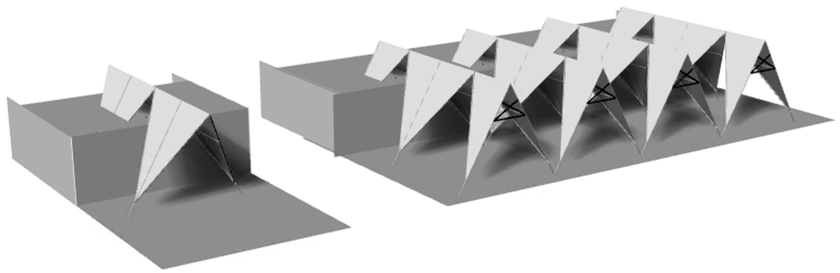
DESIGN DEVELOPMENT DIGITAL MODELLING





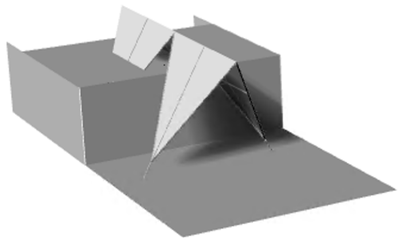






Testing different shapes of the design made me problematisize the design and developed several iterations which culminated in the final design. Through digital modelling the versions are easily manageable in larger and smaller scale.

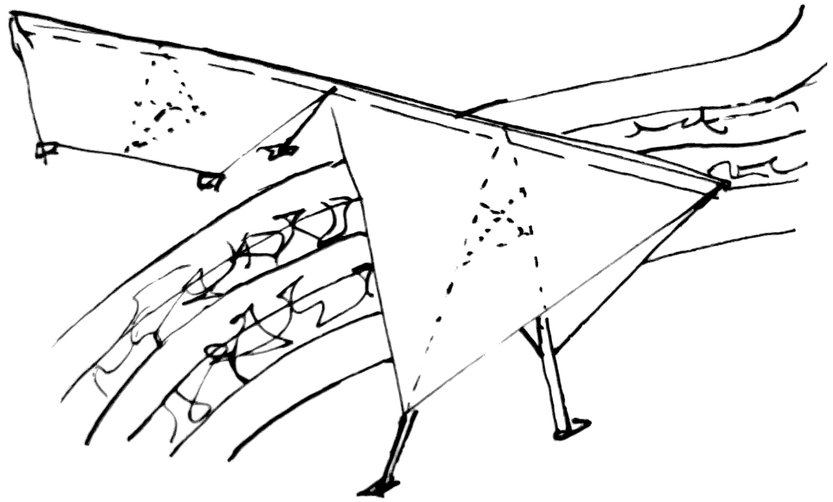
DESIGN DEVELOPMENT CONCLUSIONS



Feskekörka 2022

Avoids cutting through the cultivation terraces underneath

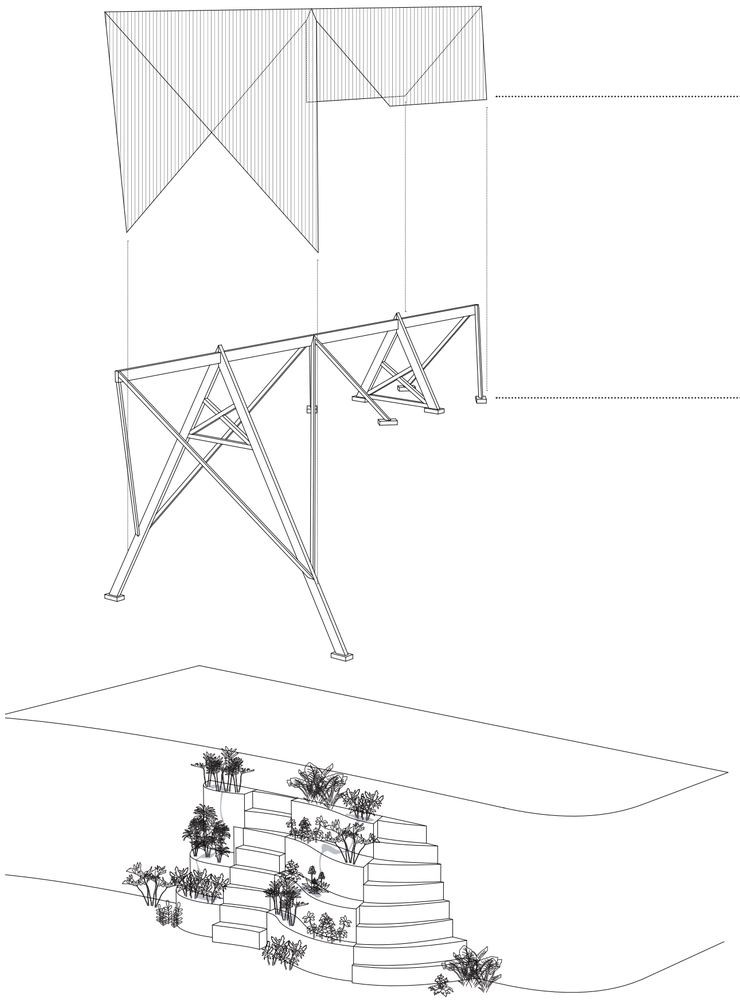
Becomes the smaller scaled detail within the larger scheme



Has embraced and emphasised the A-fram structure of Feskekörka

A roof structure that does not shade or harm the cultivation underneath extensively

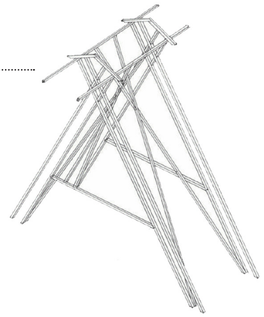
TECHNICAL MODEL OF CONSTRUCTION



POLYCARBONATE ROOF

Project Viggsö, 2016 by Arrhov Frick

TIMBER FRAME



Construction drawing of Feskekôrka

CONCRETE FOUNDATION

Reference of simpler foundation solution for the timber a-frame

PART III
CONCLUSION

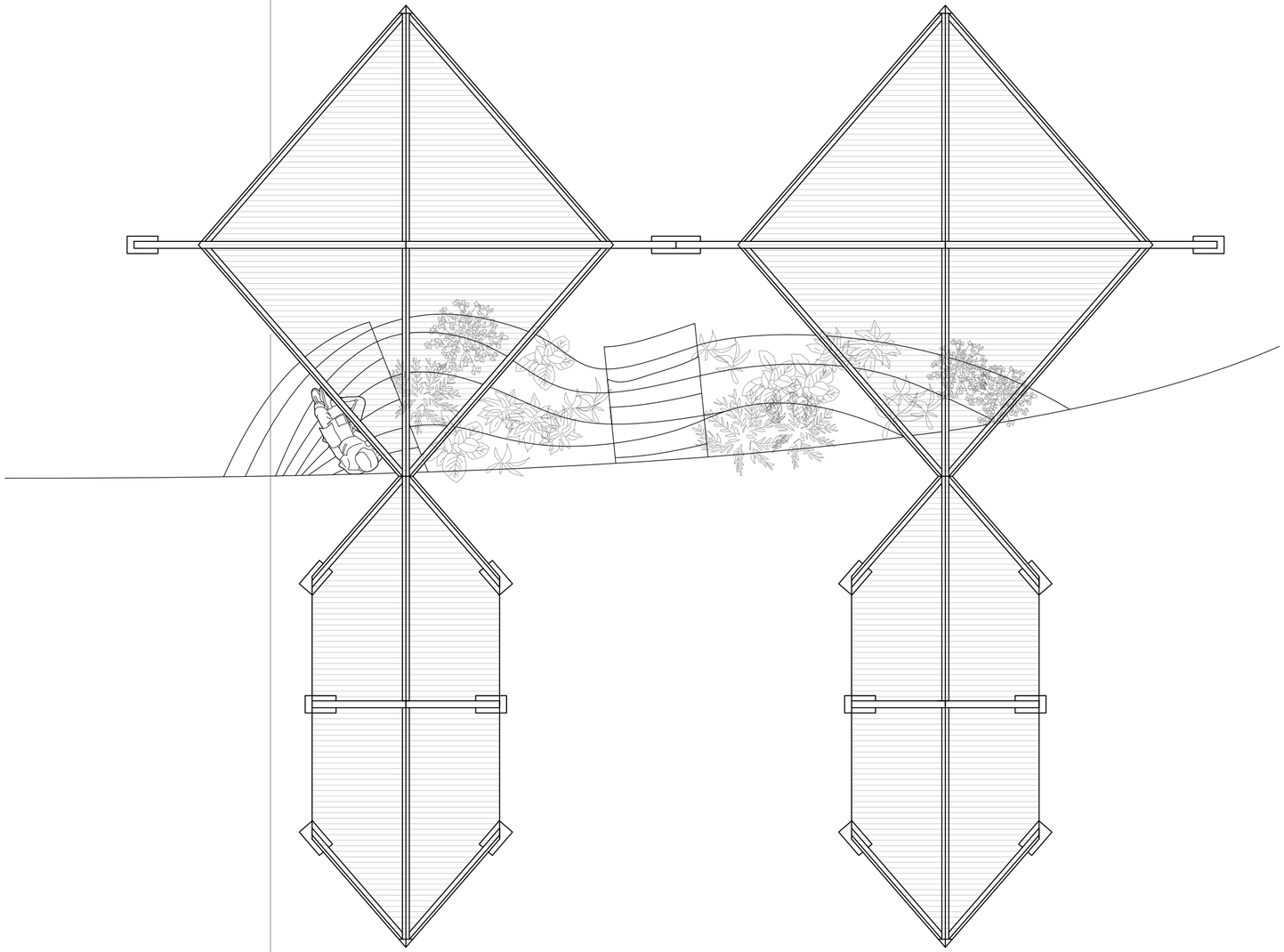
By exploring a small scaled structure within the larger system the design has a neat and lightweight final outcome. It is tangible and easily adapted around the site due to its systematic design of being able to multiply itself with simple connections. Through this design method, the smaller system becomes refined and precise as it grows from a larger hydrosocial system of water, cultivation and gaining the community.

PART IV
FINAL PIECES

CLOSER CONTEXT
FINAL MODEL 1:50

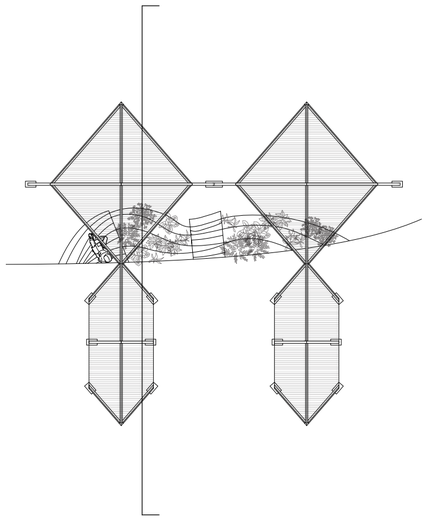
CLOSER CONTEXT
FINAL MODEL 1:50

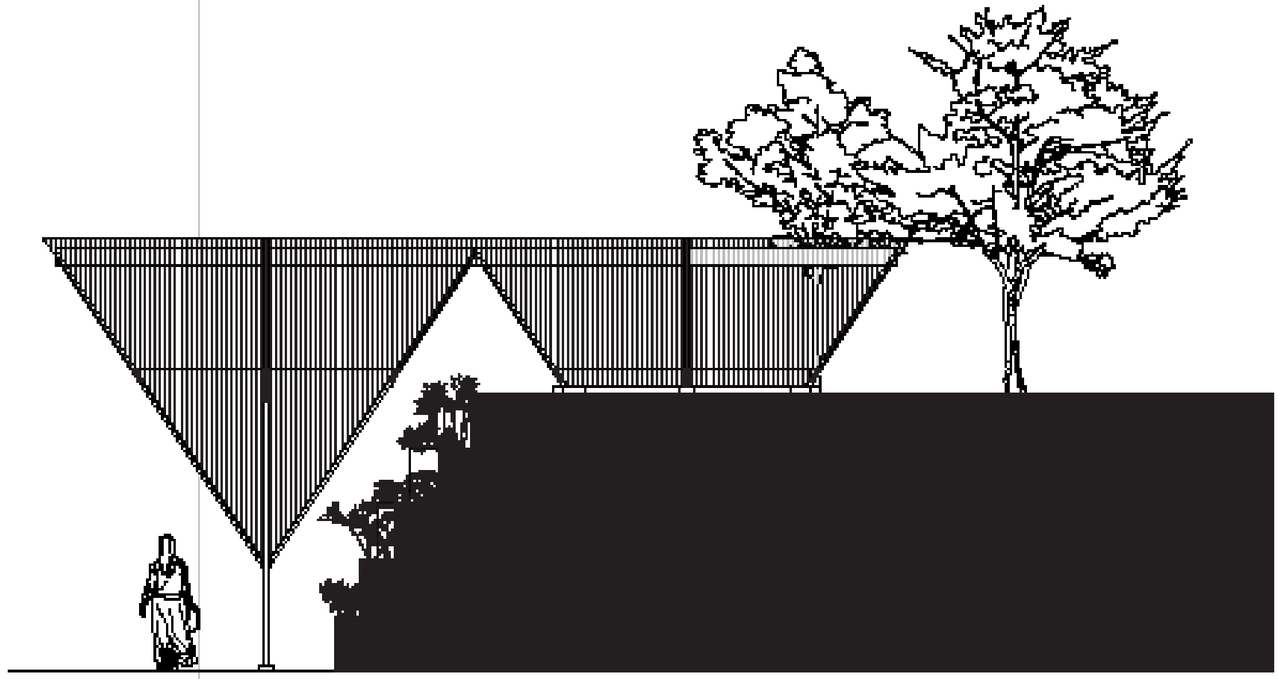
CLOSER CONTEXT



PLAN 1:50

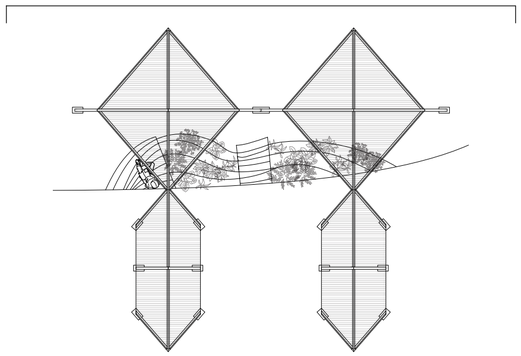
CLOSER CONTEXT

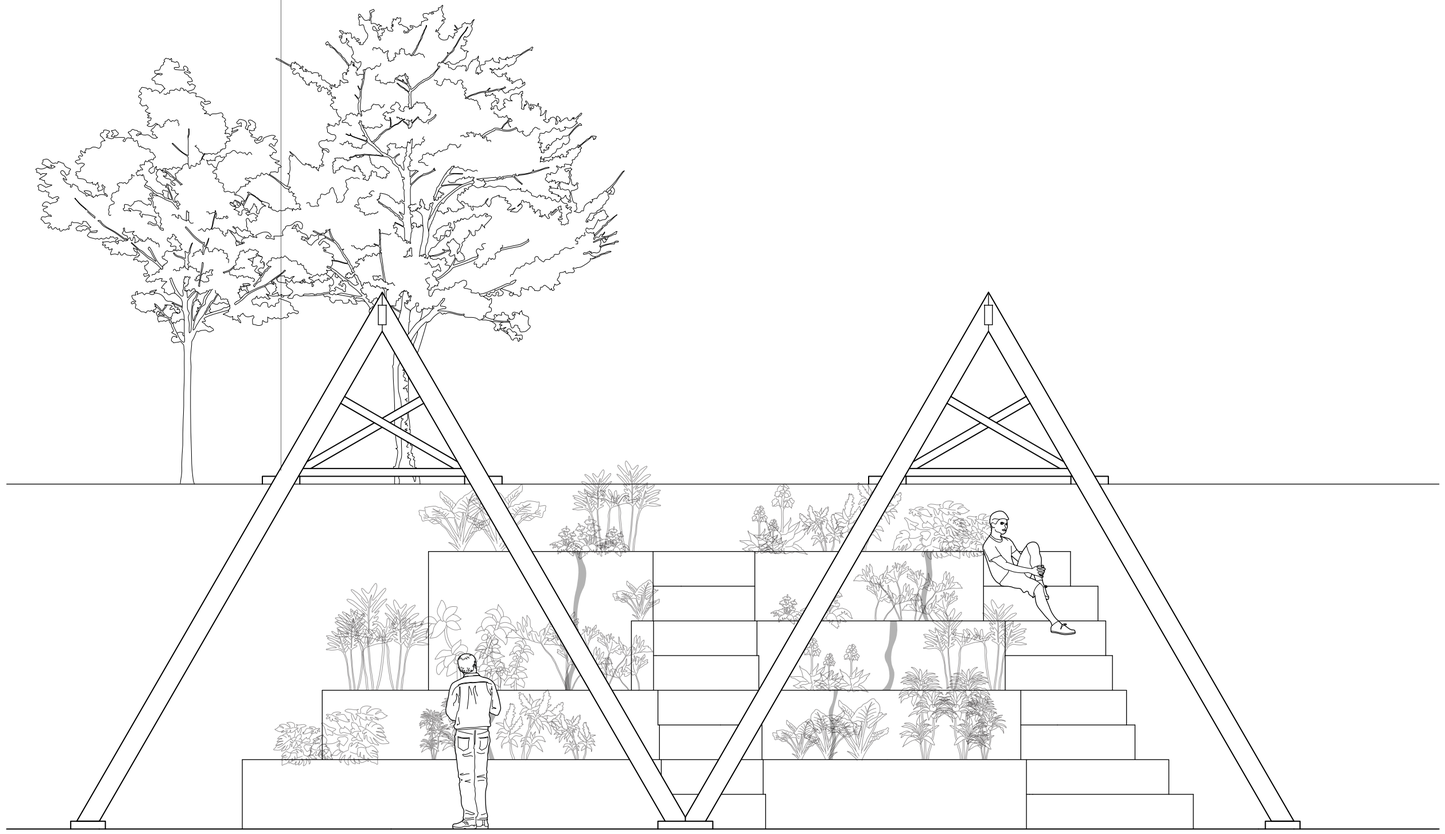




SECTION 1:50

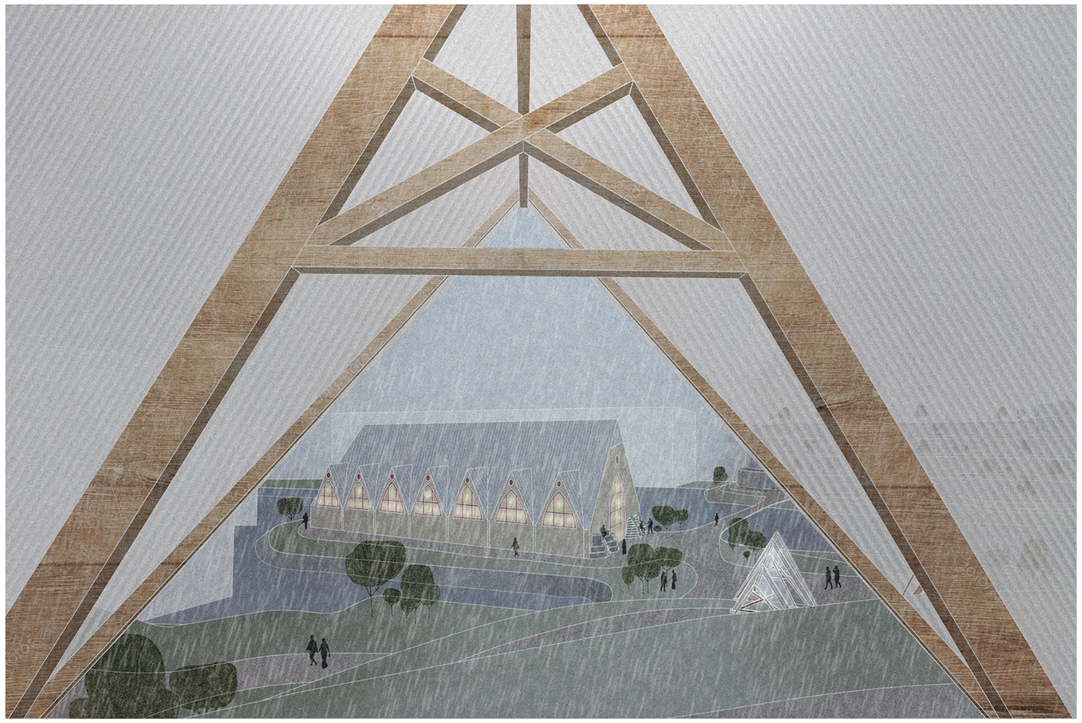
CLOSER CONTEXT

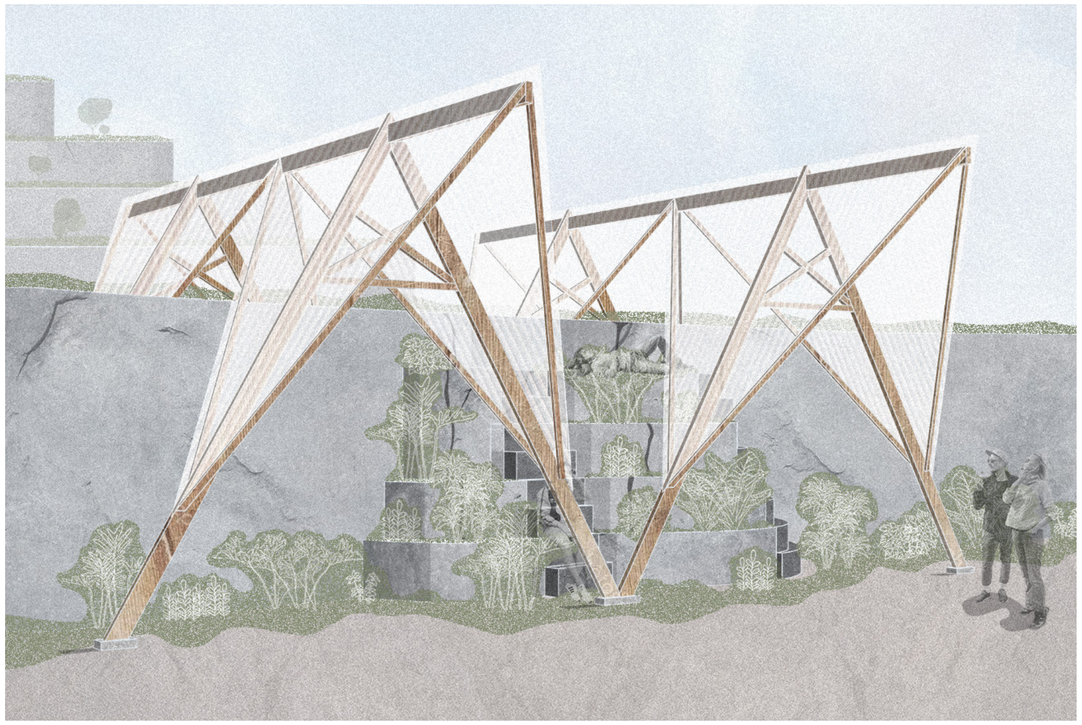




ELEVATION 1:50

CLOSER CONTEXT





WIDER CONTEXT

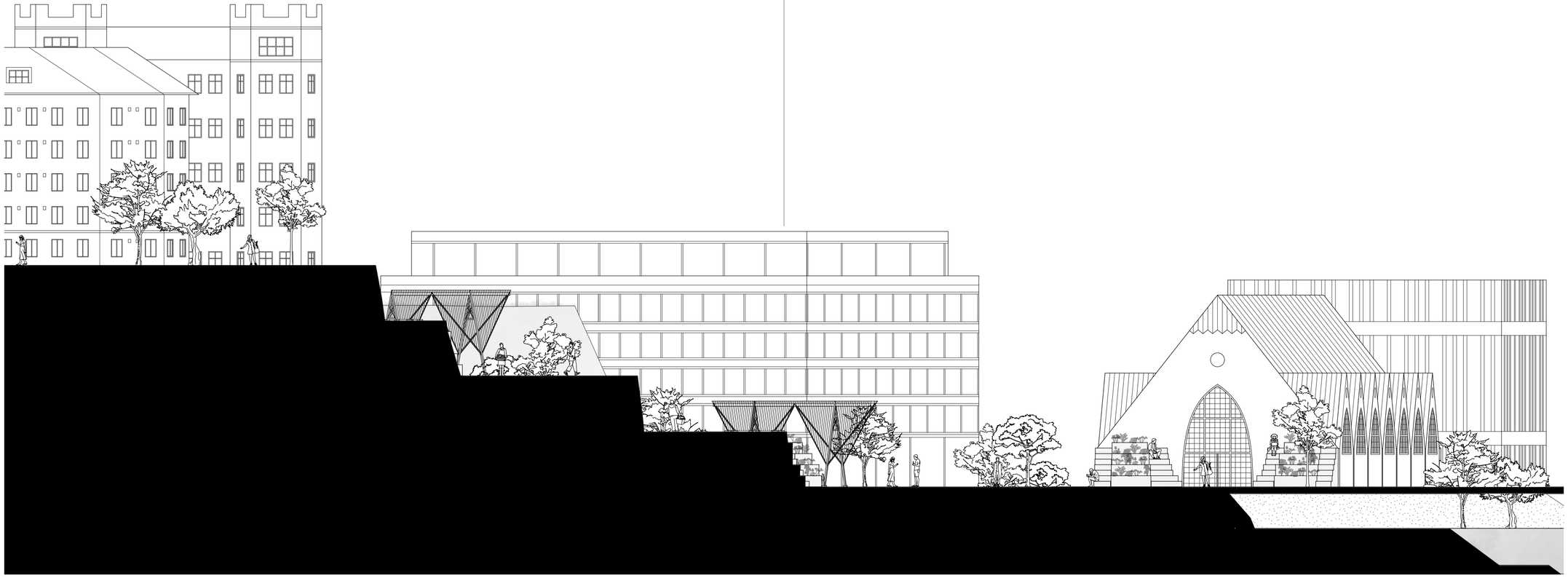
SITEPLAN 1:1000

20m N

WIDER CONTEXT

SITEPLAN 1:200

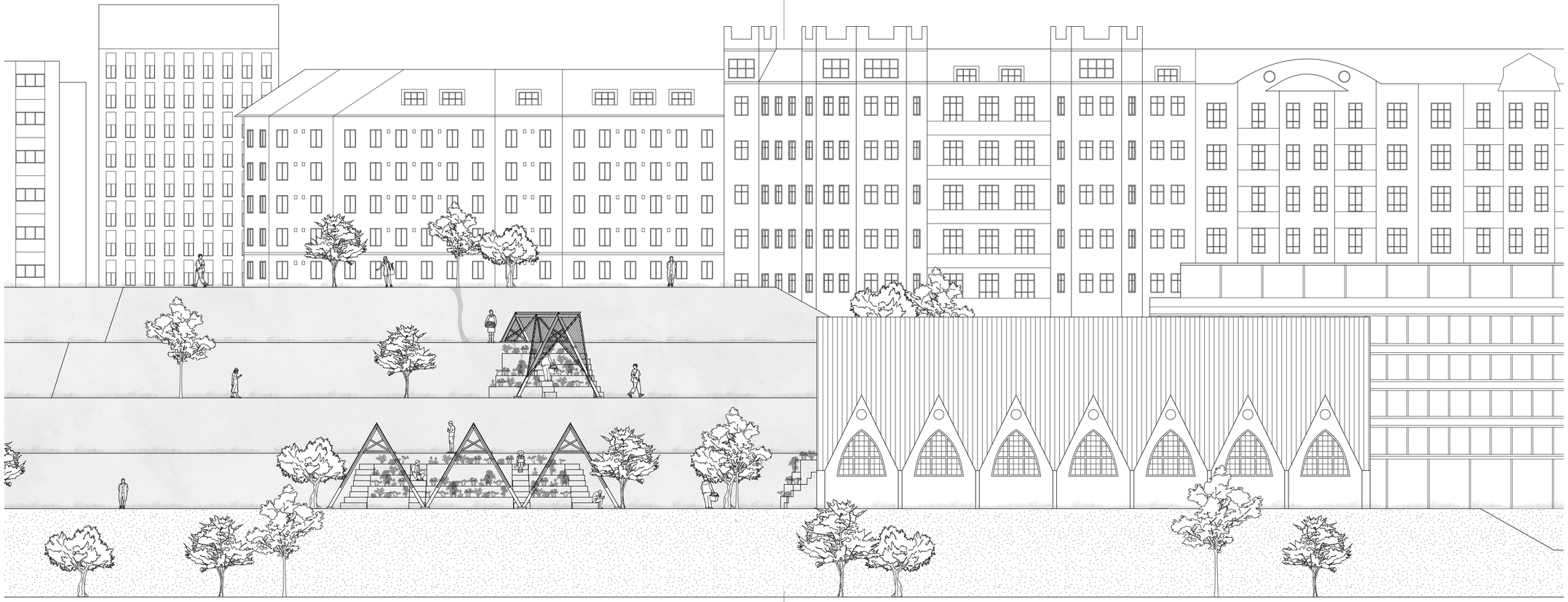
WIDER CONTEXT



A) SECTION 1:200

5m

WIDER CONTEXT



B) SOUTH ELEVATION 1:200

5m

WIDER CONTEXT

AXONOMETRICVIEW

Julianna Smith
AUSD HT 2022
Chalmers University of Technology