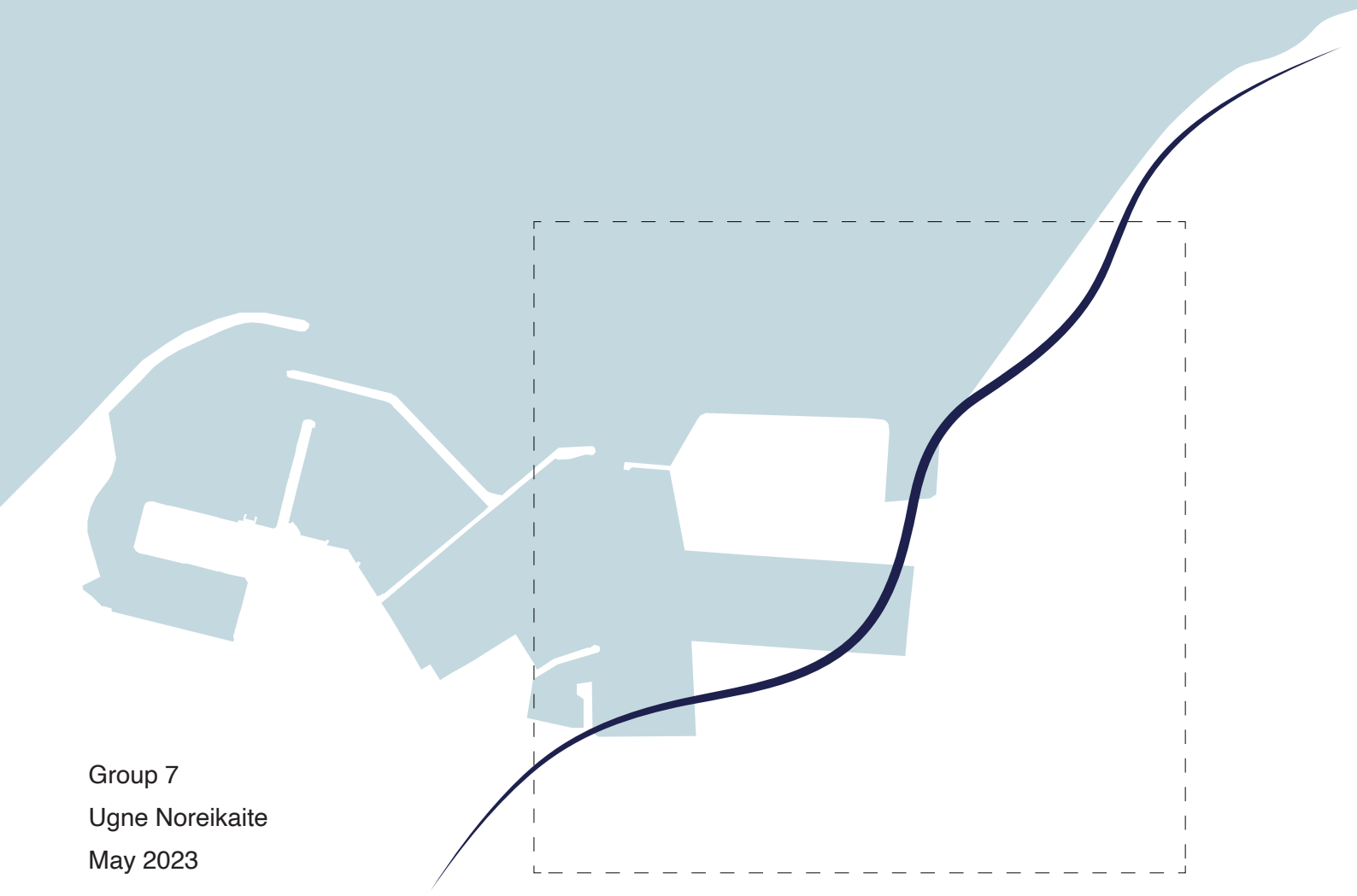
POST-INDUSTRIAL PORT REDEVELOPMENT



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Post-industrial port redevelopment is a design proposal with the masterplan for the transformation of the Struer Harbour.

I would like to thank my supervisor Ida Sofie Gøtzsche Lange for constructive criticism, lots of suggestions, challenges and detours in the design process - I am pleased to have had such engaged and inspiring supervisor. I would also like to thank Nicolai Steinø, Ole Jensen, Tina Vestermann and Hanna Mattila for thoughts and ideas at midterm criticism as well as express my thanks to Struer Municipality team Helle Baker, Claus Falk Petersen and Rune Asmussen for all the important information regarding harbour and Struer town.

Ugne Noreikaite

ABSTRACT

Nowadays we witness a time where ports reflect consequences of the past industrial activities that used to be one of the main economic sources to its cities. The inactive industrial facilities, water rise and harbour disconnection with the city are the examples of the post industrial activities that left the harbours to question its current purpose of existence. There are common patterns noticeable between ports and cities since their evolution is closely linked to the water activities, fishing and shipping industry. Port correlates with the period of time where historical events, economical and social conditions played a big role in harbour transformation. The pattern of historical processes is visible in industrial heritage, infrastructure and coastline developments.

In Denmark, the fishing and shipping industry used to sustain coastal communities and connect social identity (Ounanian 2016). After the diminished presence of these primary activities, harbours such as Struer, still reflect its industrial past. However, the harbour of Struer lost a part of its primary activities and became an example of post industrial place, not suitable for both formal industrial activities and social realm. How can this situation be changed so as to bring the activeness to the harbour? Today there is an ongoing municipality plan of how the harbour can be activized so that the human can experience it and engage with the city and nature that talks its historical past as well as can be transformed from primary industrial scale to a human environment. This project explores what a different approach to relinking the port to city and nature could look like when focusing on the biological, cultural and social values.

▲ Post-industrial Struer harbour

READING GUIDE

The report is built up on six chapters that concerns; *Introduction* to the project, *Analysis* of the site, *Theory* in relation to proposal, *Design process*, *Presentation of the design* and *Epilogue*. Additionally to the report is an appendix that consists of extended explanations of some of the themes in the report. The sources from appendix are referred in the report.

1. INTRODUCTION

The first chapter is based on introduction to the project, methods, initial problem, context and the history of the area. It also presents current and future municipality's plans and policies.

2. ANALYSIS

The second chapter attempts to unfold the context of Struer through different analysis methods. This part is the groundwork for further creative process of proposing the new design.

3. THEORY

The third chapter introduces the relevant theory that supports the design process and the choices made in the design proposal. It also unfolds the potentials that are not visible in the physical analysis of the site.

4. DESIGN PROCESS

The fourth chapter sums up the collected knowledge and turns it into objectives and actions that underlie a strong foundation of theories and analyses. It includes step-by-step introduction to the final design.

5. PRESENTATION OF THE DESIGN

The fifth chapter presents the final design proposal of this project including masterplan, sections, detailed zoning plans, visualisations, and supplemental texts.

6. EPILOGUE

The final chapter is used to reflect and conclude on the previous work and sums up the project. Through the report, sources will be referred to the Harvard style where name and year will be mentioned in the text and relates to the reference list at the end of the report.

The illustrations are made by the author unless it is specified under the illustration. Each illustration with an external source will have a number that relates to the illustration list.

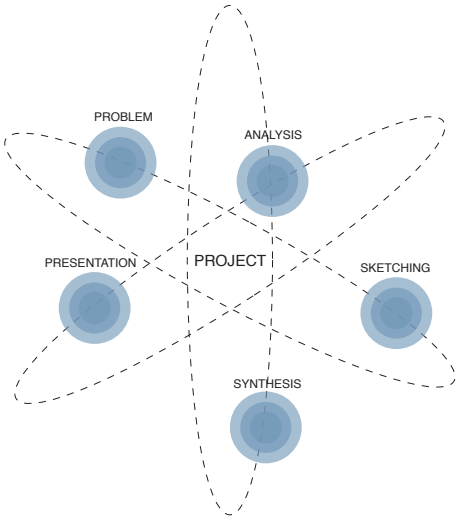
METHODOLOGY

Throughout the project, I have worked with various methods – different sketching tools, site visits, municipality visit and empiricism found through literature. The methodological approach used for this project is the integrated design process (IDP) (Knudstrup, 2004) . This design approach divides the process into 5 stages; problem (fomulation of problem statement), analysis (different kinds of analytic tools), sketching (bringing ideas for the project site to life), synthesis (bringing overall design together as an entirety to form the final design proposal) and presentation (demonstrates how final design solves the problem statement). The process is iterative and encourages to move back and forth between the different stages to provide the best possible design .

While sketching it has been a constant back and forth between different sketching tools (hand sketches, collages, digital drawings, model making etc.) and the main point has been to obtain the information from each stage to proceed further. An example of that is combining drawn plan with three dimensional model that allowed to get a clearer understanding of the terrain and spatial composition of the drawn plan which then led to further rearrangements and modifications.

There was a site visit performed where I had an opportunity to meet the members of municipality to get an understanding of the site more clearly, find out city goals and to get the sense of the place. Physically be there has been important in order to get a deeper understanding of Struer and its situation.

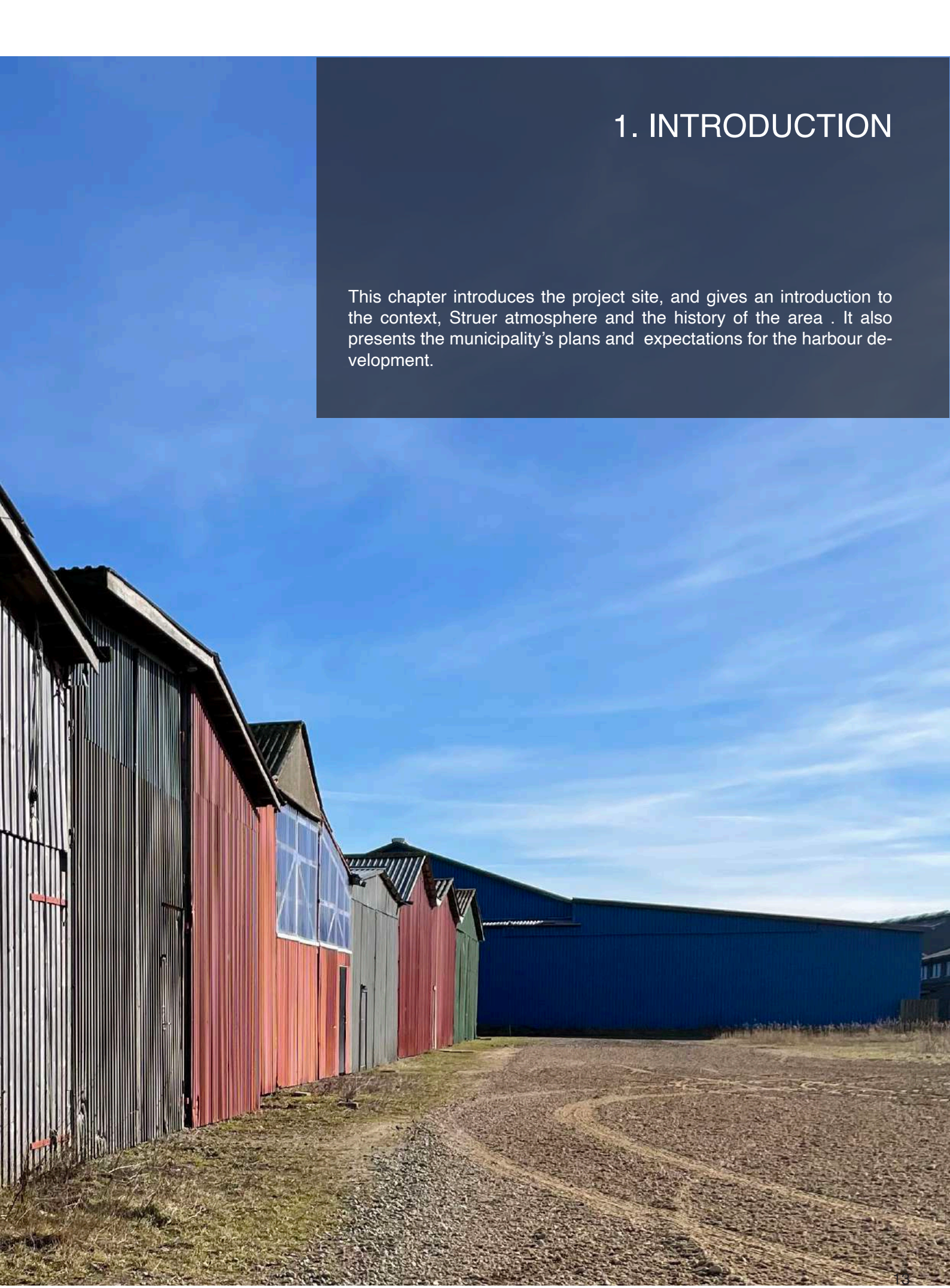
To be more engaged with design by references and understand spatial possibilities, during the project process, I have visited the other harbours in real life (Odense, Copenhagen, Antwerpen, Klaipeda) . The concepts of other urban and landscape architects' projects inspired my way of thinking and designing. The design strategies and technical details are also inspired by external sources from literature.



▲ Integrated design process according to Knudstrup (2004)

1. INTRODUCTION

This chapter introduces the project site, and gives an introduction to the context, Struer atmosphere and the history of the area . It also presents the municipality's plans and expectations for the harbour development.



INTRODUCTION

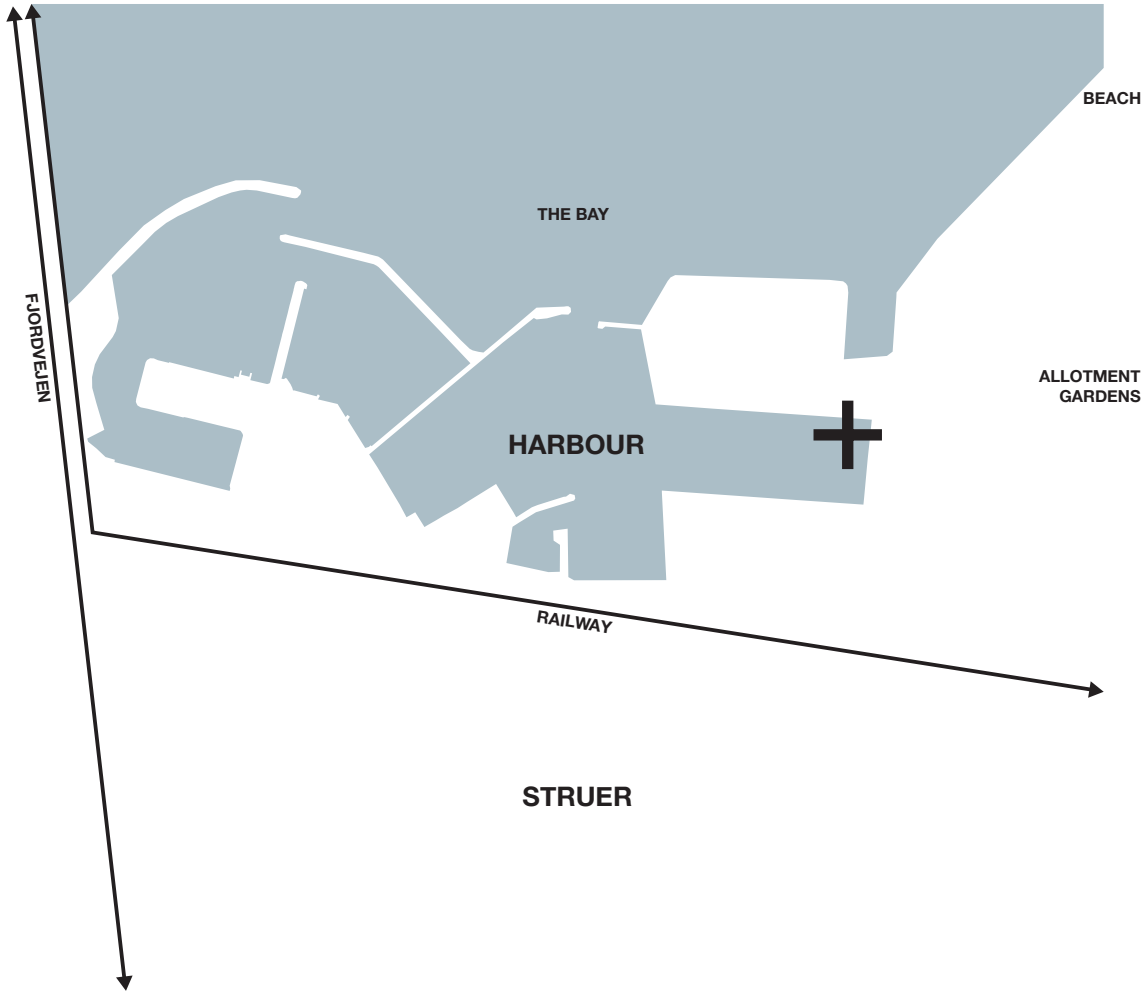
The project area is situated in the north-western part of Denmark placed scenic towards the Limfjord and previously identified as an industrial harbour town for the larger, nearby city of Holstebro. The municipality has a costal line of 147 km, which brings a vast amount of landscape qualities to the city.

Struer town is based on the former industrial activities and proximity to the water. Today still existing activities in the harbour are leisure-related associations, boat storage and handling. Some of the areas are leased for commercial port-related purposes such as shipping and oil (Kortlægning Struer Erhvervshavn, 2017).

Currently Struer harbour has leases from 1997-2049; half of the existing facilities' lease has expired or soon to be expired. This means that a large part of the harbour area will be left without function.

In this thesis, I will take into consideration the existing condition of the site such as active and inactive functions as well as municipality's goals. These will appear in the analysis chapter and will be an integrated part of the design. On the other hand, I would like to challenge the proposed plan by Struer municipality. This means that the municipalitiy's plan will not be integrated in my masterplan but rather draw my own proposal for the urban development instead. I will also give a short reflection on municipality's project in order to highlight the differences between the proposed project and my alternative suggestion.

Even though the approaches on how to deal with the overall harbour area will be presented in this thesis, I will mostly concentrate on the highest potentials that can lead to relinking the harbour with the city and surroundings.



▲ The project area is situated in between railway in south, and the bay in north, Fjordvejen in west and colony gardens in east.


FJORDVEJEN


ORTHOPHOTO
1:10,000
0 m
500 m
N
INDUSTRIES
INDUSTRIAL PORT
WAREHOUSES
SILO
ALLOTMENT GARDENS
MARINA
COMMUNITIES
RAILWAY MUSEUM
CITY CENTER
STRUER STATION
SCHOOL
CHURCH
STRUER


BRO-STRUER HAVN

MOTIVATION

This thesis idea appears from an interest in the transformation of a relatively post-industrial harbour condition. During the master studies I have worked a lot with projects in Aalborg and Brylle and I was therefore motivated to deal with different type of situations. Likewise, I was eager to work with a problem that is common in many port cities nowadays when the primary industrial activities leaving the harbour without a function and rising water levels making harbours less accessible with a questionable future. Since the larger cities like Aalborg has a lot of interest from developers that propose a vast amount of future developments, I saw a potential to work with a less popular area that needs a change and has a lot to offer. The concept of the city of sound inspired me to investigate the site more and challenge the soundscape and its abilities. I ended up choosing Struer Havn for the opportunity to combine topics as transformation of post-industrial areas, biodiversity, redefined identity and the opportunity to propose a plan in a long term.

Regardless the branding of sound by Struer town, the idea of incorporating soundscape to harbour came naturally. Here, sound became a part of the whole concept, where the nature and people activities provide the soundscape that can be even enhanced by digital solutions to attract wildlife species and stimulate human senses. Hereby my project focus moved from only activizing the harbour to investigate and explore the biological, social and cultural values that could be involved to give the strong identity of Struer harbour.

▲ Sound installation in Struer city center.

PROBLEM

The extinction of primary industrial purpose of the harbour has led to questionning of the current identity of the site. Rising water levels put the harbour at risk and lack of safety. Even if some of the functions are still existing in the site, in less than 30 years period all of the leases in the harbour will be ended, leading the harbour to an uncertain future.

This poses two main problems at site:

1) How can the transformation of the harbour enhance the potential for Struer Havn and create added value through urban planning?

2) There is a risk of abandonment in Struer harbour, leaving the area disconnected from the rest of the city and nature. How can the site be reconnected to its surroundings and the city?

AIM

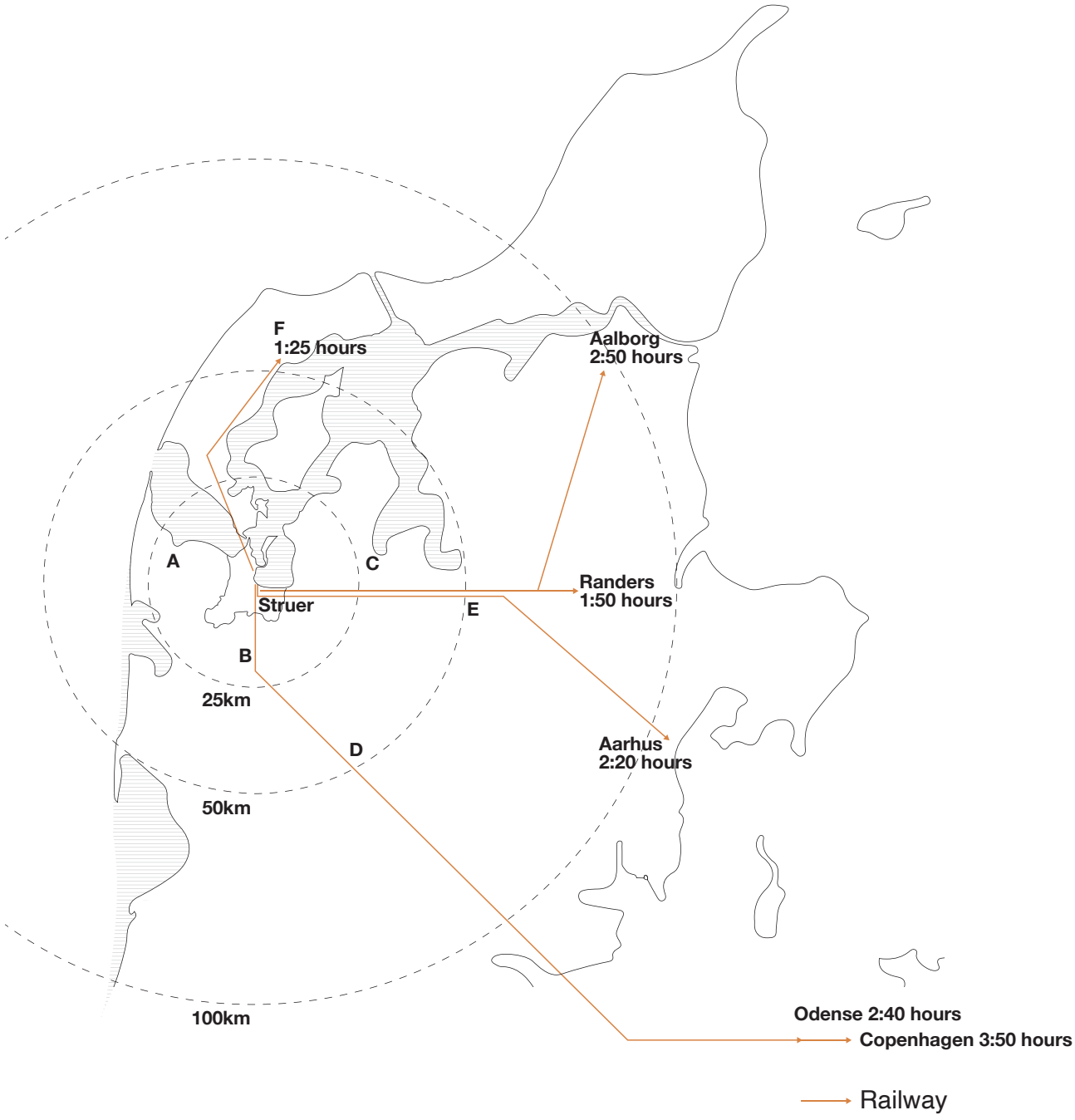
With the new proposal of the harbour transformation, I will investigate of how can the site gain a new value and become an anchor to the city rather than disconnected area from the rest of the city. I am willing to rethink the existing challenges such as abandoned structures, pollution and rising water levels and reconsider them as possible potentials. I also aim to find the alternative suggestion to the dynamic harbour transformation where man-made land and nature has balance, interweaves with each other and becomes a place for people and nature to meet.

STRATEGIC CONTEXT

Struer city is located in the north-western part of Denmark, Midtjylland region and has a close proximity with cities such as Holstebro, Skive, Lemvig and Viborg. The strategic location at Limfjorden creates a great connection to other port cities. Even being out of the main track of the larger cities, Struer is the node for rail traffic in the region (Network, 2019). It has direct routes to the biggest cities in Denmark such as Odense, Aarhus and Copenhagen which makes the town easy to access. Furthermore, it is well connected to the surrounded towns that has the necessary facilities Struer lacks.

Struer town center is strategically positioned towards the bay. Since the biggest part of the city is established on the hilly landscape, rainwater washes down to the harbour area (Struer Kommune, n.d.). The town is separated from the water by the railway embankment that can be crossed through the arches under the bridge. The main road *Holstebrovej* that crosses the town is located west from the harbour and is connecting Struer with a larger city of Holstebro.

▲ Harbour location.



Accesibility by car

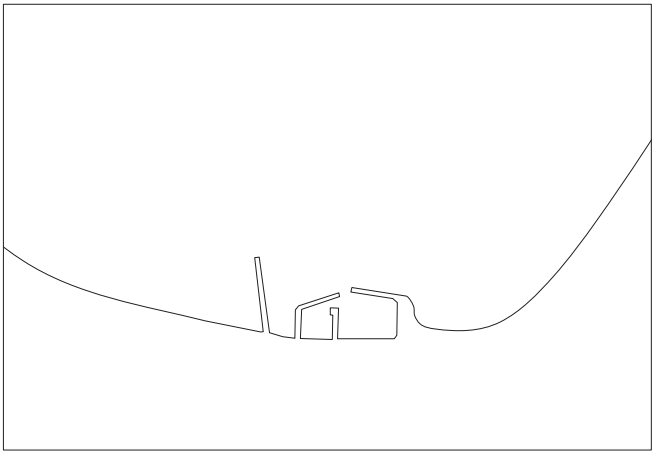
A	Lemvig - 20min	**D**	Herning - 40min
B	Holstebro - 20min	**E**	Viborg - 52min
C	Skive - 35min	**F**	Thisted - 1hour

▲ Strategic context.

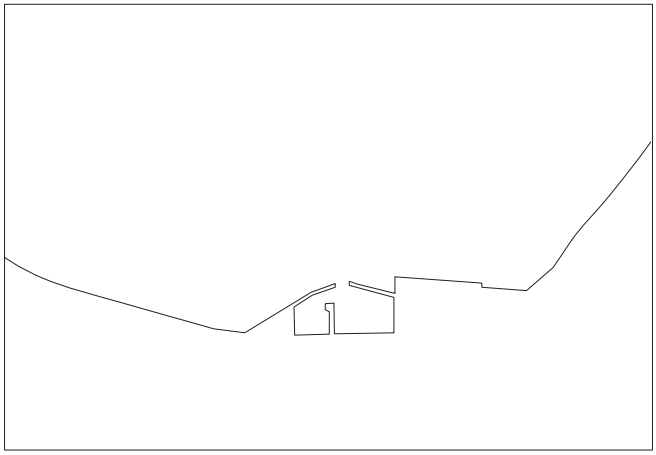
STRUER HARBOUR THROUGH HISTORY

Since Struer became a merchant town in 1917, the harbour has been undergoing constant development to handle new services and situations.

Due to Struer Havn's strategic location between other towns in Denmark, the close proximity allowed it to adopt shipping industries in the early stage. Around 1865, the railway connection to Skive was established and the expansion of the country roads was improved (Danmarkshistorien, 2012). That caused fishery and industrial establishments to be concentrated along the waterfront, while the city center was developed south from the railway, including main local facilities such as schools, church and housing. In 1925, Bang&Olufsen was established with headquarters placed in the city that did a huge impact on town's political and social life (B&O, n.d.). In 1941, the town developed into a trading town for Thyholm in particular. At the same time, the port started to become a new industrial port core. In the middle of the 20th century, the port was extended with the new companies settling in the area.



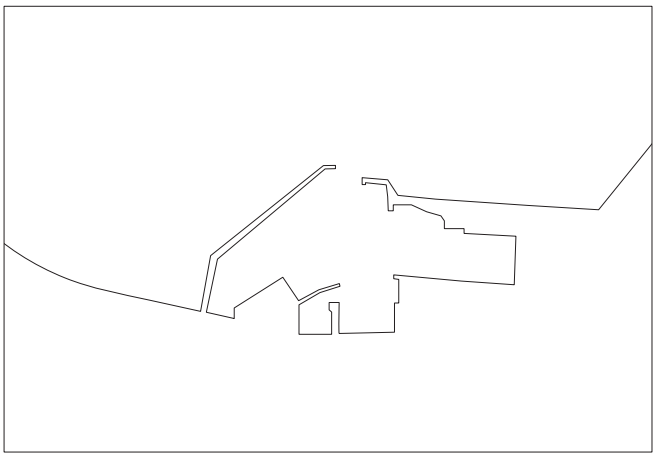
▲ The harbour in 1842, the year first warehouses were built.
1:15,000



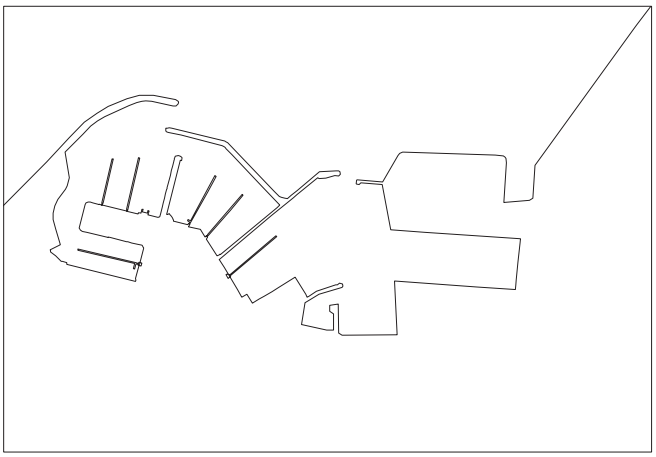
▲ The harbour in 1901. The harbour got expanded.
1:15,000

In the end of the 20th century, trade and transport in particular declined as an industry, while some of the sectors were still active. However, the town is mainly concentrated on the southern side of the railway, making it a barrier between the port and the city area. Today, most of the industrial facilities remain unused, covering the large area of the port. The city has been facing the situation when people move away from the city rather than moving to the city.

To find a cohesive way of connecting the port and its city is a potential development that Struer Havn is currently lacking. In 2019, the proposals for rejuvenating the area were started by the Struer kommune in order to activate the port and connect to the rest of the city (Byen til fjorden, 2020). It shows the evidence that the stakeholders are willing to redevelop the abandoned port areas to enhance its identity and activize for a new usage.



▲ The harbour in the 1950's. Struer coastline developed into stony harbour with growing industries.
1:15,000



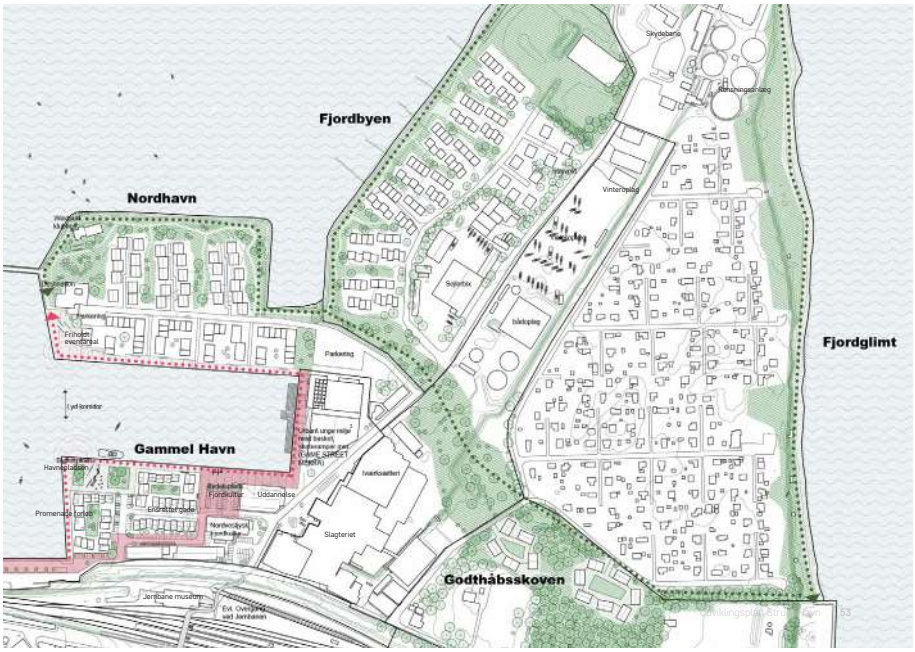
▲ The harbour in the 1990's. Trade and transport declined, while crafts and industry remained as important sector. The harbour got expanded.
1:15,000

STRUER HARBOUR IN PLANS

For the last few years Struer municipality has been working on harbour transformation where urban planners CFBO with the help of SeTilSiden and Mette Lis Andersen has proposed the concepts of how can the industrial harbour be transformed. Struer municipality vision is to develop a unique district with new opportunities that could strengthen the harbour connection with the city and offer residential, commercial, cultural and leisure landscape (Struer Kommune, 2020).

One of the main problems that municipality identifies is young people moving away due to the lack of workplaces as well as the lack of leisure activities for tourists to visit. Based on that, the new masterplan offers a new district by the water that could bring people to the harbour.

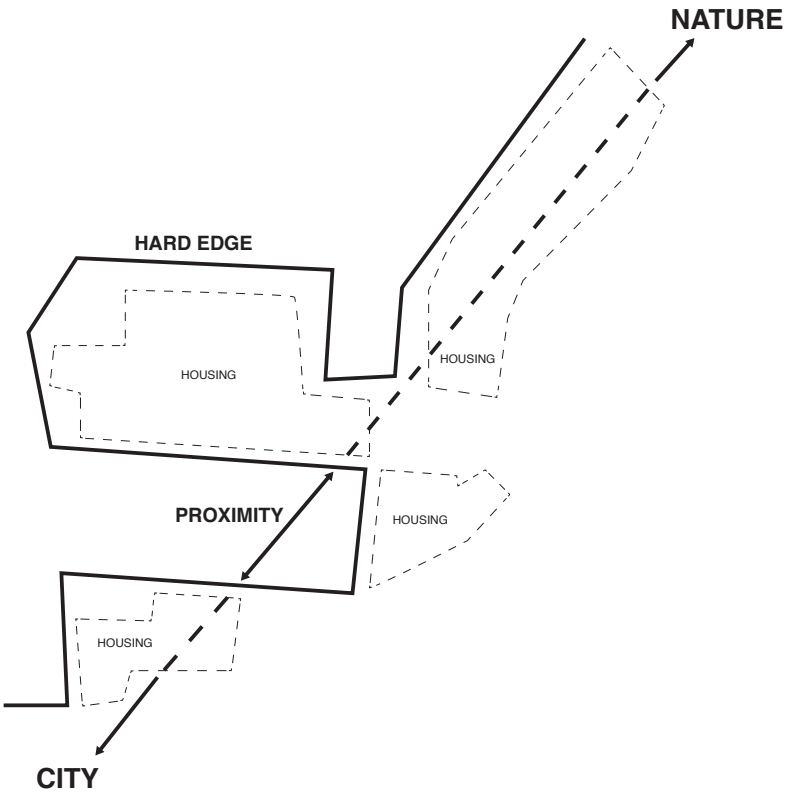
The masterplan is following the *Inside and Out* strategy, where the primary development area *Gammel Havn* is a starting point from which the other redevelopment areas can follow (Struer Kommune, 2020). The strength of this proposal is taking harbour transformation in steps, giving time for the city to adapt with the new harbour and get use to the new habits. The design is characterized extending the green wedge from the north and east to the harbour as well as providing a cultural access from the city. The new housing areas are concentrated along the quay edge.



▲ The masterplan by CFBO - not in scale.
(Illustration 1: Udviklingsplan for Struer Havn, 2020)

On the other hand, this might also be the weakness in the project. One point of critique is that the language of volumes does not add the value in the sense of changing the way you experience walking along the coast and the contact with the water is not much improved. Actually, the proximity to the water, which is one of the most significant features of the harbour, is lost. The proposal is designed outside the shoreline, leaving the existing concrete edge work as a barrier between the water and land. Another point is that the dense housing structures in *Gammel Havn* and *Nordhavn* are blocking the views from the city entry to the nature area in the north. As harbour is a connector of the city and the nature, it could also be a place where you observe the surroundings.

However, Struer municipality is currently working on the volume study in order to find a more coherent solution for the harbour plan and ensure value for the local community and identity of the surroundings.



▲ Diagram for the analysis of CFBO masterplan that shows how new housing is blocking the proximity between the city and nature.

THE CITY OF SOUND

Since 1925 when a famous speaker-company Bang&Olufsens established their headquarters in Struer, the town was branding themselve as being the 'City of Sound'. It had a large impact on the city's businesses and development and has resulted in Struer using the sound as a theme within different frameworks of their planning strategies (Struer City of Sound, n.d.) All around the municipality the installations of art has been established where sound plays an important part. The idea of using the sound in Struer is used to aid the elderly and those suffering dementia, and it is also used in the treatment of psychiatric patients (Struer City of Sound, n.d.). The aim of using the sound has also arised from the positive influence on the quality of life where both visitors and residents can engaged with the sound and take activities to the next level (Struer Lydens By, 2018). The identity of sound has spread in Struer through different installations around the city:

A - The bench of sound under one of the archers of the railway provides a place to sit and rest in surroundings of sound that resonates in the arch.

B - Tuning forks, located right in the center of the city are inspired by the intuitive tuning fork and is an interactive installation that invites people play together.

C - Amplified view is meant to relate to the surroundings and enhance the natural sounds.

D - B&O exhibition is a museum that tells the story of B&O and has an exhibition of historical devices that B&O made.

E - 'Wind and Water' sculpture consists of three standing elements and functions as an instrument that produces tones.

On the other hand, how can the sound be brought to the harbour so that 'The city of sound' could become 'The port city of sound'? Can the city have the sound itself which is the natural sound from everyday activities that people engage with? One of the challenges for this project will be to discover the natural existing sounds in the harbour while artificial tools could be not the main focus point but an instrument that helps to enhance the natural sounds.

Foundation in Struer, 1925

A Sound bench

B Tuning forks

C Amplified view

D B&O exhibition

E 'Wind and Water' sculpture

▲ Sound installations in Struer 1:20,000

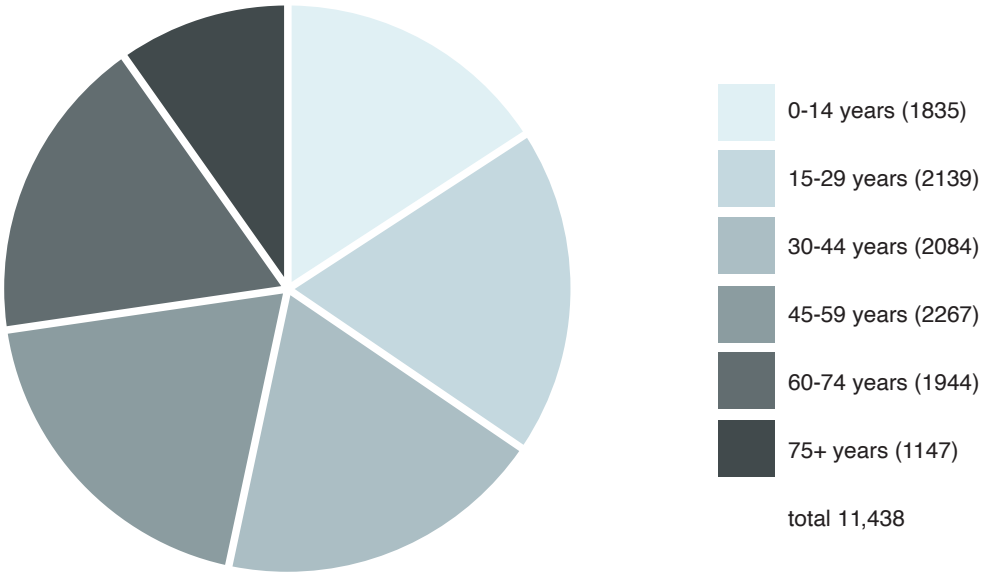
2. ANALYSIS

This chapter focuses on the analytic work of the project. The analysis is the groundwork for the further creative process and is presented together with potential implementations that have been discovered during this analysis.

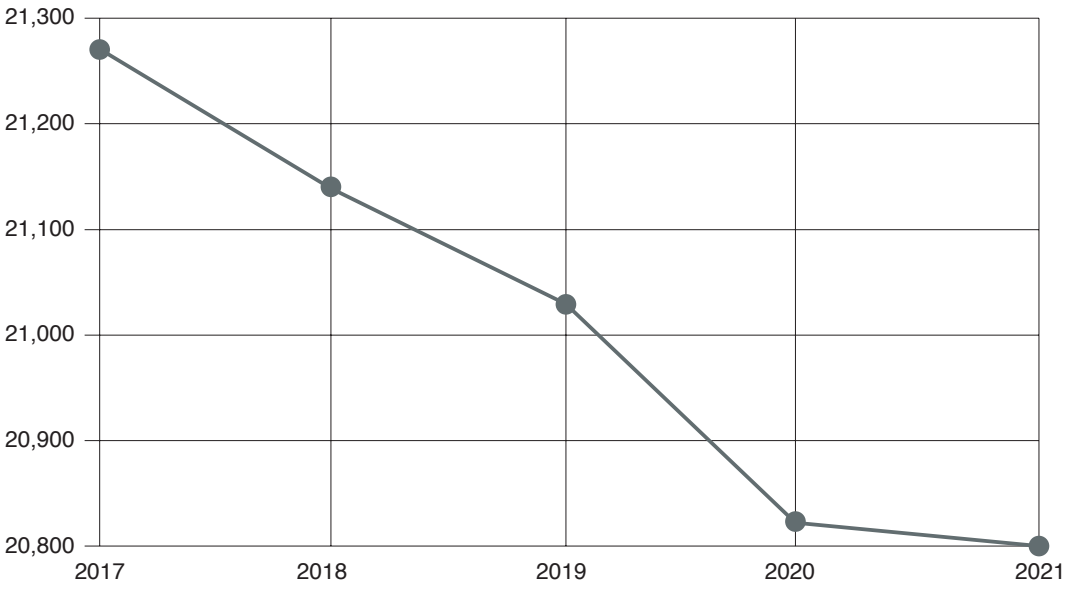
DEMOGRAPHY

Due to the increasing concentration of citizens and businesses in larger danish cities, the trend of declining inhabitat numbers in small and rural cities become a common issue that the towns are dealing with. It can be seen that the population in Struer has been continuously decreasing and the current number of people in Struer kommune is around 20,800 inhabitats (ugeo.urbistat.com, n.d.). During the meeting with the municipality, the members expressed the issue that if there will be no action taken of how to attract people to stay or come back to their town, it can lead to negative development in Struer. The current age distribution is quite similar between all age groups, however, the young people are moving away to get their education or job and not returning back. Hence, it is important for the municipality to focus on finding the solution of how can the town be developed into a place where young generation feel comfortable to move back and settle down. Struer municipality has already produced several strategic plans within the city by turning old buildings and parking lots into new public spaces, but it is necessary for improving a connection between the city and the harbour to make it function properly. The harbour of Struer has a potential to be developed into a unique environment that provides new work places, housing and exciting activities for not only young adults but also for the rest of the town.

Struer town - current population



Inhabitants trend in Struer kommune



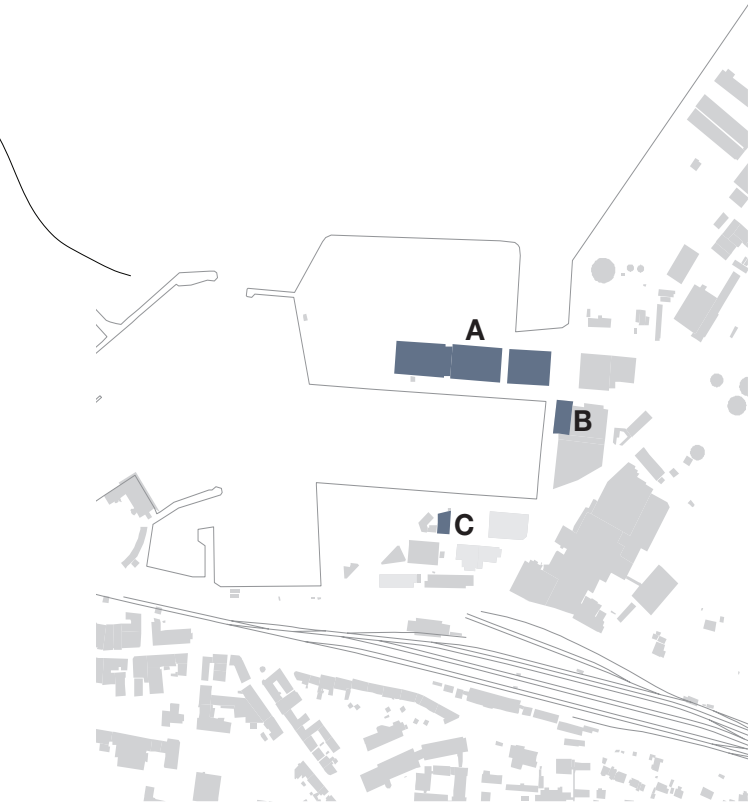
▲ Demography

BUILDING STRUCTURES

Struer is a town with both classic residential neighbourhood, industrial areas and institutions. Struer city center has a dense blocks of old structures with courtyards and narrow streets that mostly contain commercial purposes and institutions. The residential areas vary in building typology from small detached houses with private gardens to larger apartment buildings. While there are different functions the city can offer, the whole harbour area contains industrial facilities which makes a visible contrast between the harbour and the city. This brings a challenge of how can the transition from the city to the harbour be balanced in order to provide a public flow between different functions. Most of harbour facilities are inactive today and are on sale or expired lease (see Appendix A). The leases in harbour expire between 1997-2049. The owners of the harbour varies between private, public and semi public where the considerable part of the harbour is owned by Struer municipality and Holstebro-Struer harbour (see Appendix B).

▲ Building structures in Struer 1:20,000

The industrial identity of the harbour has the historical value where industries were the main purpose why harbour got expanded. Here, some of the buildings are worth preservation that talks its historical past and has potential to become a new cultural objects.



A
Yellow brick warehouses - spatial to accommodate new activities (youth center?)

B
Silo - landmark of industrial harbour, possibility to integrate offices or music hub

C
Wooden warehouse - possibility to give space for community to gather together

▲ Structures worth preservation

STAKEHOLDERS

Even though the harbour former industrial activities are not functional nowadays, there is a variety of existing stakeholders that has influence for the future of the area. Most of the harbour stakeholders are allotment garden owners with its allotment society, boat owners who keep their boats in Struer harbour, Norvestjysk Fjordkultur and its members who restorate boats(C), Conformo that creates customized constructions (B) and global wind academy that are training people of how to work with windmills(D). The significance to the harbour also has Kunst på Kajen (E) that offers courses working with glass. In a close proximity to industrial harbour, Cable Fun Struer (A) has the importance for future developments as well since they offer one of the main peninsula activities during summer time such as wakeboarding, paddle boarding and water skiing.

▲ Stakeholders 1:10,000

A
Cable Fun Struer

B
Conformo

C
Nordvestjysk Fjordkultur

D
Global Wind Academy

E
Art by the Quay

▲ Stakeholders

INFRASTRUCTURE

The infrastructure in Struer is characterized by the diked railway and the train station that is the node for rail traffic in the region (Struer Kommune, 2019). Even if the railway is a valuable element in Struer, it breaks the connection between the city and the harbour. It means that the public flow is disconnected too where the pedestrians and drivers do not have a visible connection between city and harbour while crossing the railway. Most of the parking lots are placed in the central area with close connection to the main roads. It provides a comfortable position for drivers to leave the car and reach the surroundings.

There are entry points from the city to the harbour under the railway bridge, although there is no a clear pathway that would be a safe walkway for pedestrians. Here it is important to stretch that the site lacks of a proper road hierarchy for cars, cyclists and pedestrians. The car road from the railway to the harbour continues towards the north and stops where the wildlife starts. The road was established to accommodate industrial surroundings and is still used by the active organisations in the site.

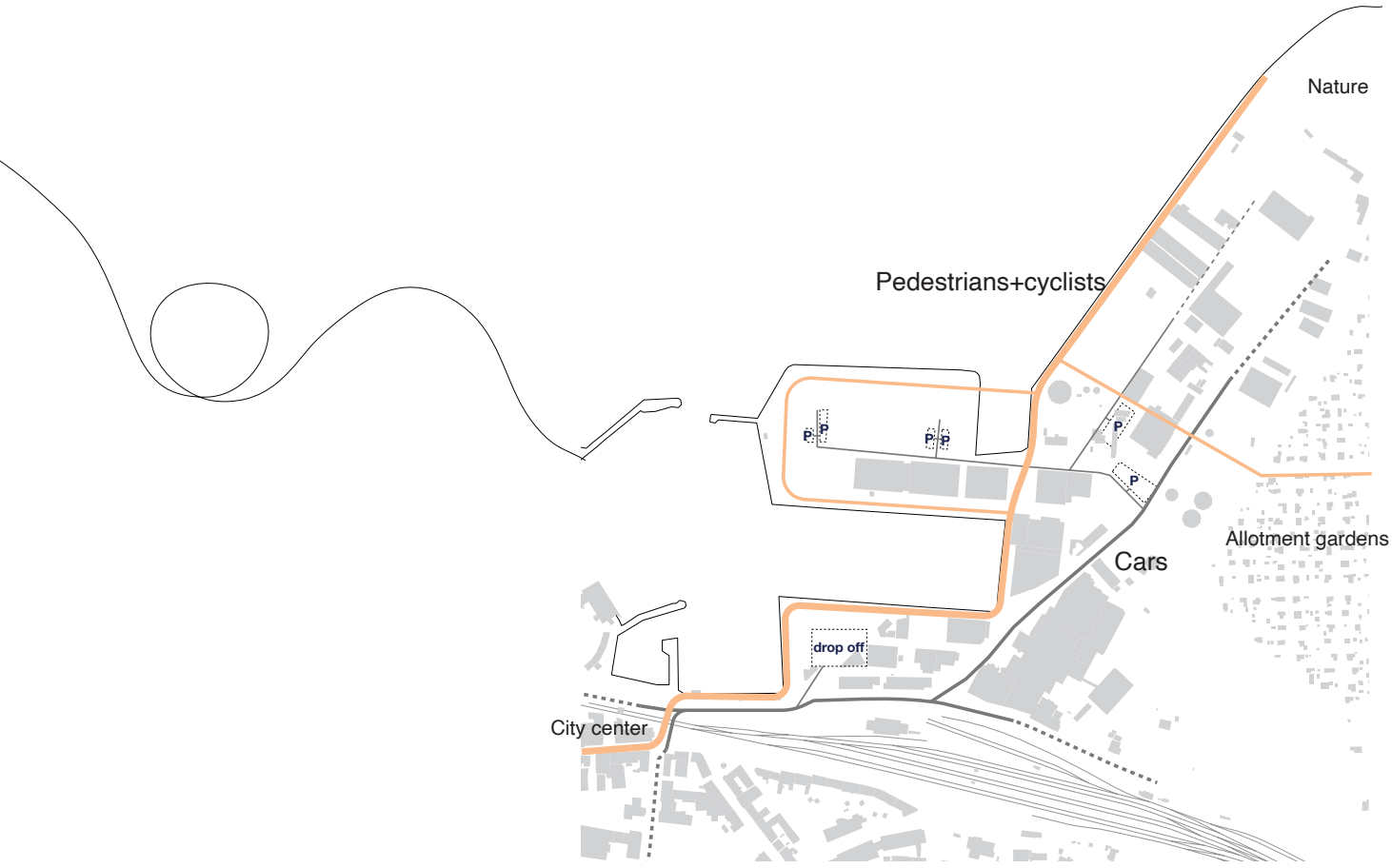
▲ Existing infrastructure in Struer 1:20,000

Here the aim is to encourage the walking experience in the site. Due to this, only the most important roads to access buildings for the cars should be kept. The main road access is a continuation of the existing location of the road since it goes in between the harbour and allotment gardens where every direction can be reached.

To encourage car-free harbour, there is a possibility to place drop off area right at the beginning of the site. The drop off can also be a flexible zone where markets can be held during good weather conditions.

The pedestrian and cyclist path has a potential to be established along the waterfront. In that sense, the cars and pedestrians will be separated and best views of the harbour can be dedicated for walking around.

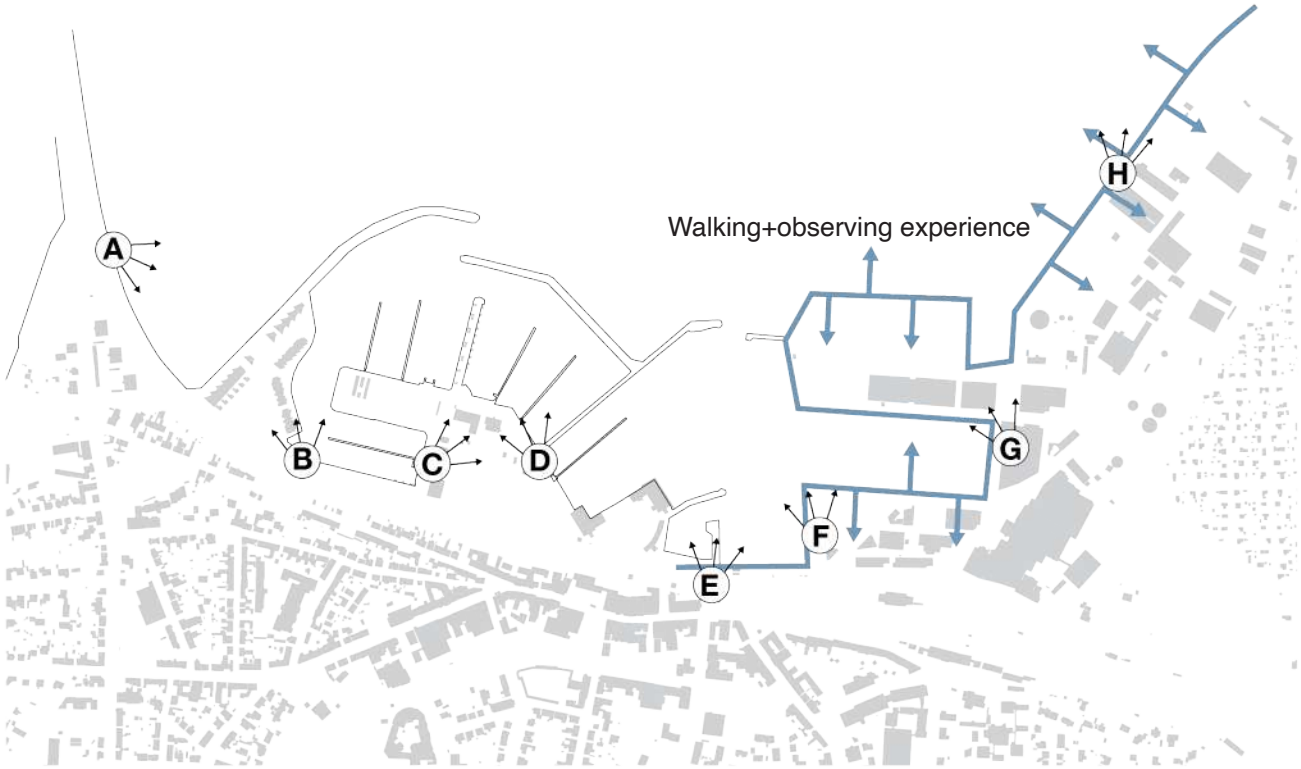
Due to the lack of connection between the harbour and allotment gardens, the path for pedestrians can be established between the allotment gardens and the harbour area.

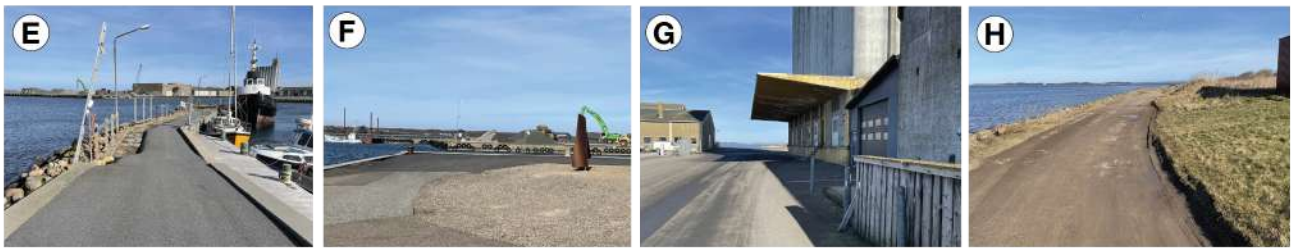


▲ Possible implementation of road network

VIEWS TO THE WATER

It is a fact that the water is one of the most significant quality in Struer. The perimeter from the highway in the north-east to the beach in the north-west consists of a variety of different experiences with the water. The view from the highway (A) opens up to marina and the industrial harbour. View B provides the living by the water experience where the new residential district was made. Views C and D are directed to the recreational part of marina where activities are mostly held in summer time. View E is the main point that you see entering from the city center through the arches under the railway bridge. The large area (F) is an entry point to the industrial area where the overall harbour can be seen. View G is surrounded by industrial facilities along the hard edge between the water and land. Following this road to the north, the walkway transforms from asphalt to a sandy path that continues to the beach area. However, some of the experiences are not well-developed for pedestrians. The former industrial part consists of heavy vehicles road that people currently use for a walk. The sandy path to the beach gets swampy during the rainy weather. By developing the harbour it is important to consider what pathway implementations can be done in order to enhance human experience of the water regardless the weather conditions and smoothen the transition from the industrial harbour to nature.





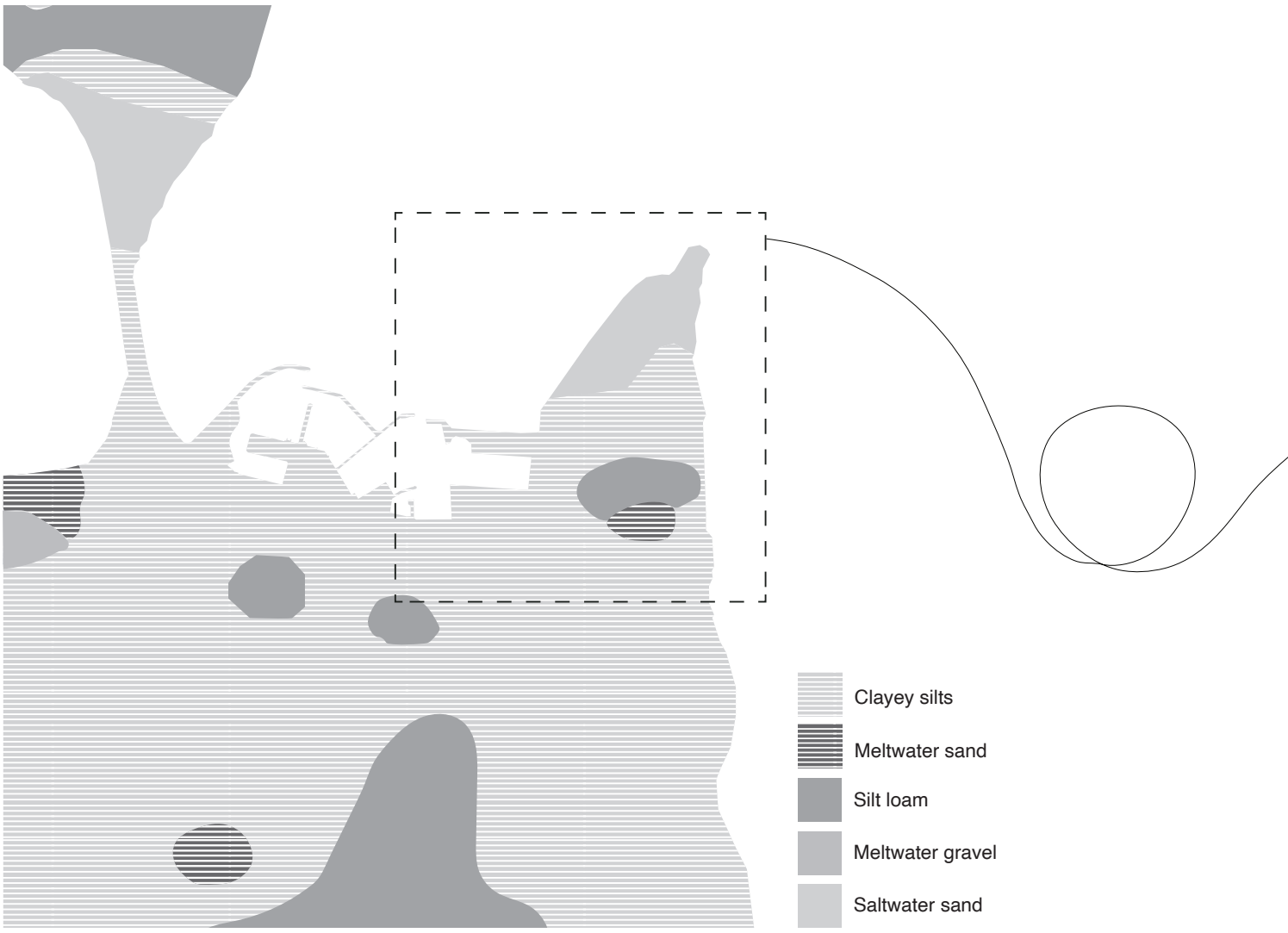
▲ Views from the highway in Struer

LAND USE

The map shows soil types in Struer (GEUS, n.d.). It can be seen that clayey silts contain a considerable amount of Struer. Around the port there are various environmental conditions in connection with the development of the port areas. The documentation shows that the industrial harbour area contain known contamination (see Appendix C-1). In relation to future use of the harbour area, it will be necessary to consider possible solutions for cleaning the soil.

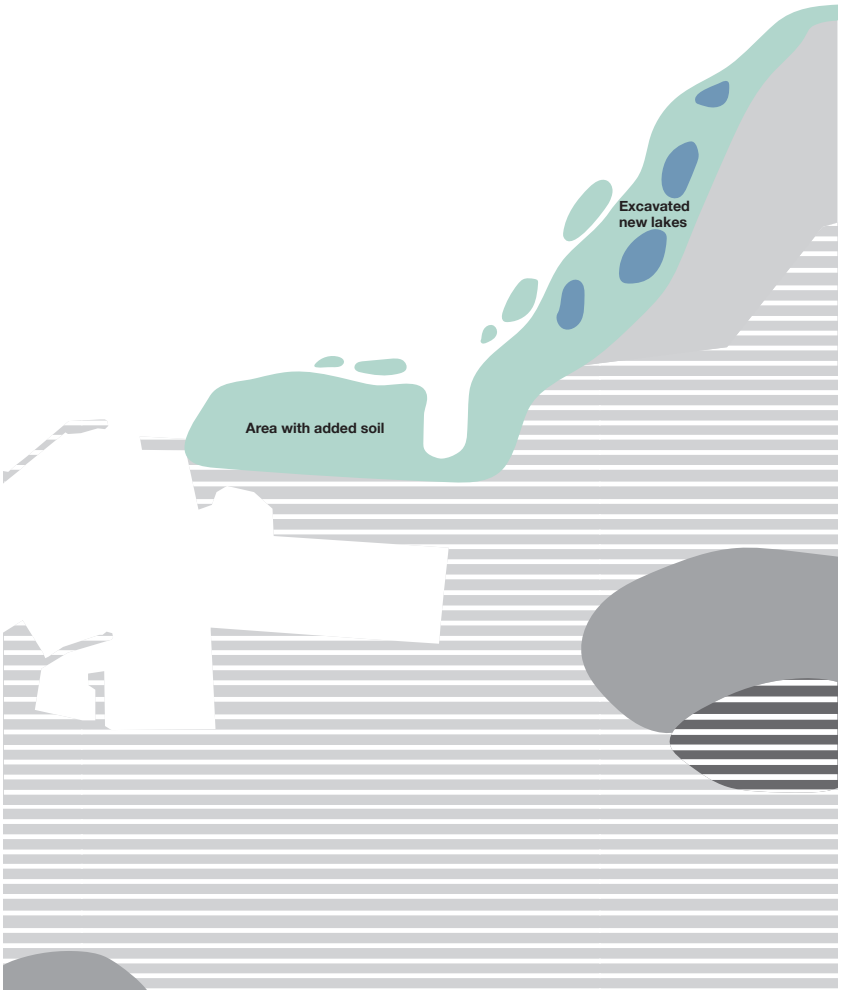
Groundwater:

It is noted that groundwater rises in connection with sea-level. The current groundwater level in Struer can be found at 0-1 meters below the surface (Miljø- og Fødevareministeriet and Miljøstyrelsen, n.d. b).



▲ Land use in Struer 1:20,000

As an example, area naturalization by introducing phytoremediation (usage of living plants) can be the way to degrade or remove toxic residue from the soil and would also reduce the need for heavy machinery or additional contaminants. Also, treating the surface by providing infiltration basins can be the way of dealing with groundwater level and manage stormwater runoff as well as prevent flooding.



▲ Soil diagram

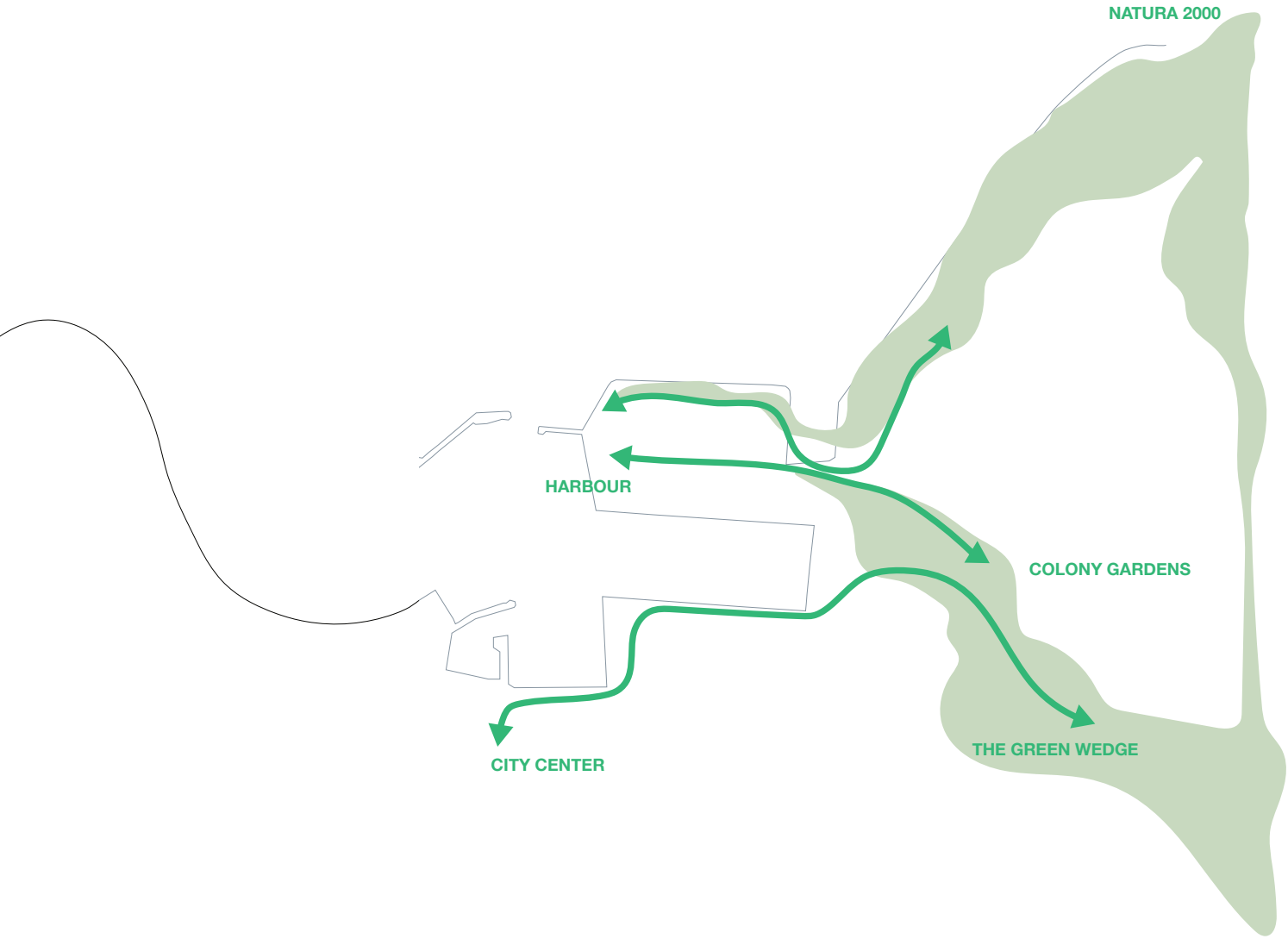
GREEN STRUCTURE

The access to nature is one of the reasons why people choose smaller towns to live. Struer has a variety of green areas around the city that shifts between open areas and enclosed courtyards, the wetlands and the dry grassland. There are several recreational paths along the beach and marina that provide attractions and a close proximity to the nature. These paths has a future potential to improve such as providing continuation from marina to the beach where currently the industrial harbour divides them apart.

Most of the greenery close to the city center is structured such as public parks, cemetery area and private courtyards. The largest public green cluster is located in the middle of the town in a more residential district, close to the city center. The areas along the beach and railway perimeters has grown naturally where the highest biodiversity can be found.

▲ Blue and green structure in Struer 1:20,000

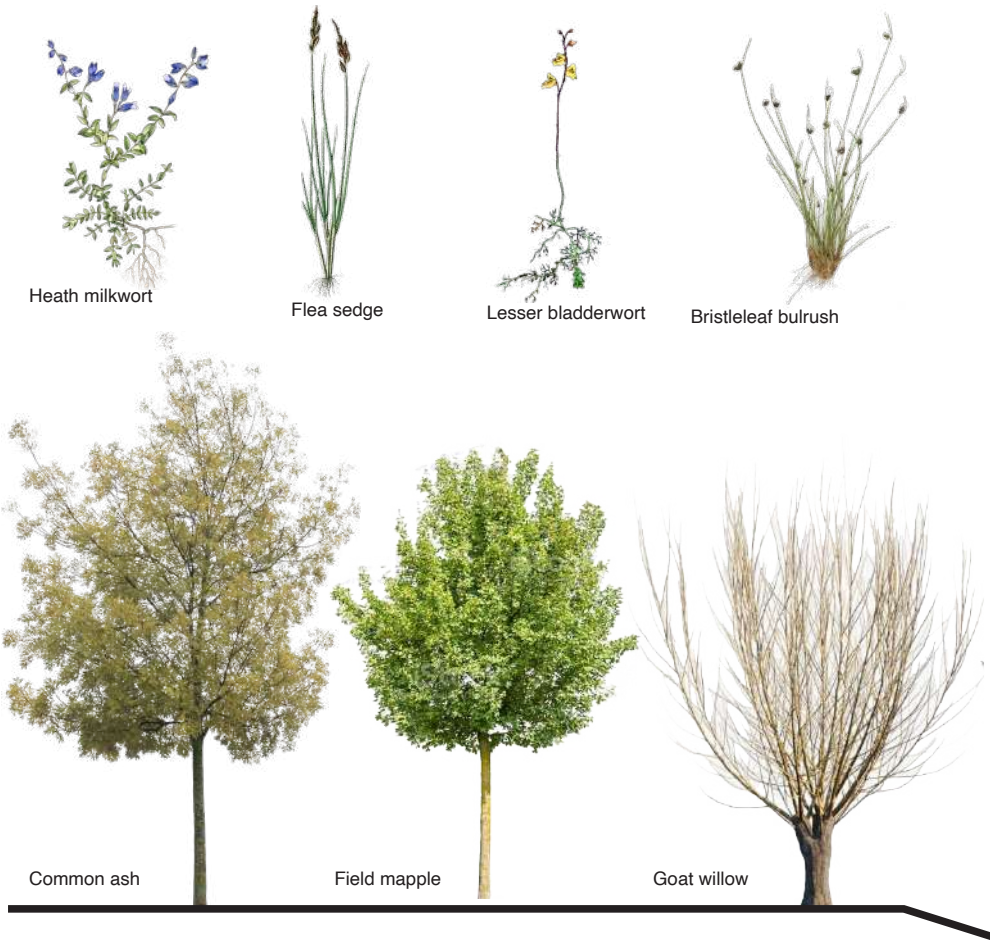
Due to missing connections to the existing nature areas in the north and east of the site, the harbour can create a coherent network of green infrastructure that unites rather than separates. Introducing soft scape with variety of plantings to the site would help to balance green and built environment where people and nature contribute positively to each other's coexistence.



▲ Green connection

VEGETATION

Even if the industrial part of the harbour is a man-made land with a small amount of vegetation, the surrounding areas along the railway and the beach are to a high degree characterized by variance in vegetation. The plants differ from herbs to low trees. In the driest area on the grassland, the greenery is mainly herbs and shrubs while on the salt meadow closer to the water, the typical salt meadow herbs can be found. The southern area from the harbour contains low trees, bushes and shrubs. In 2017, BioBlitz event was held in Struer to identify as many animal and plants species as possible over a short period of time - 24 hours (Struer Kommune, 2017). The most common noticed plants were heath milkwort, common butterwort, lesser bladderwort, flea sedge and bristleleaf bulrush. During the site visit it was also noticed that the most common trees in the area are field maple, goat willow and common ash.



▲ Vegetation in Struer harbour

NATURA 2000

In Denmark, 250 Natura 2000 areas have been designated where special guidelines apply in processing plans and projects in order to protect species and nature types (Miljøstyrelsen, n.d.). The area north to harbour has been included as one of Natura 2000 protection area that is indicated as N62 Venø, Venø Sund (see Appendix C-2). This area is pinpointed as natural habitat and birds protention zone.

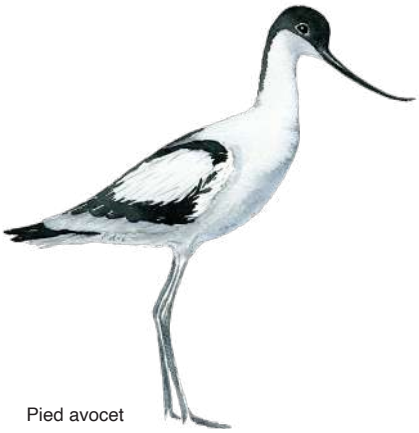
Indicated nature elements of Natura 2000 in Struer kommune are bay, dune, sea plants, salt meadow, heath, perennial plants, beach meadow, harbor seal, twaite shad and reef (Miljøstyrelsen, n.d.).

Indicated birds of Natura 2000 in Struer kommune are common goldeneye, brant goose, red-breasted merganser, little tern, pied avocet and arctic tern (Miljøstyrelsen, n.d.).

Due to the climate change, nature and living organisms are in danger of extinction. Rising water level and increasing temperature leads to unavoidable damage for ecosystems. In this project it is important to think what the solutions could be that are biodiversity-friendly and can improve the living environment for not only human, but also nature species.

Twaite shad

Brant goose



Pied avocet

Little tern

Red-breasted merganser

Common goldeneye

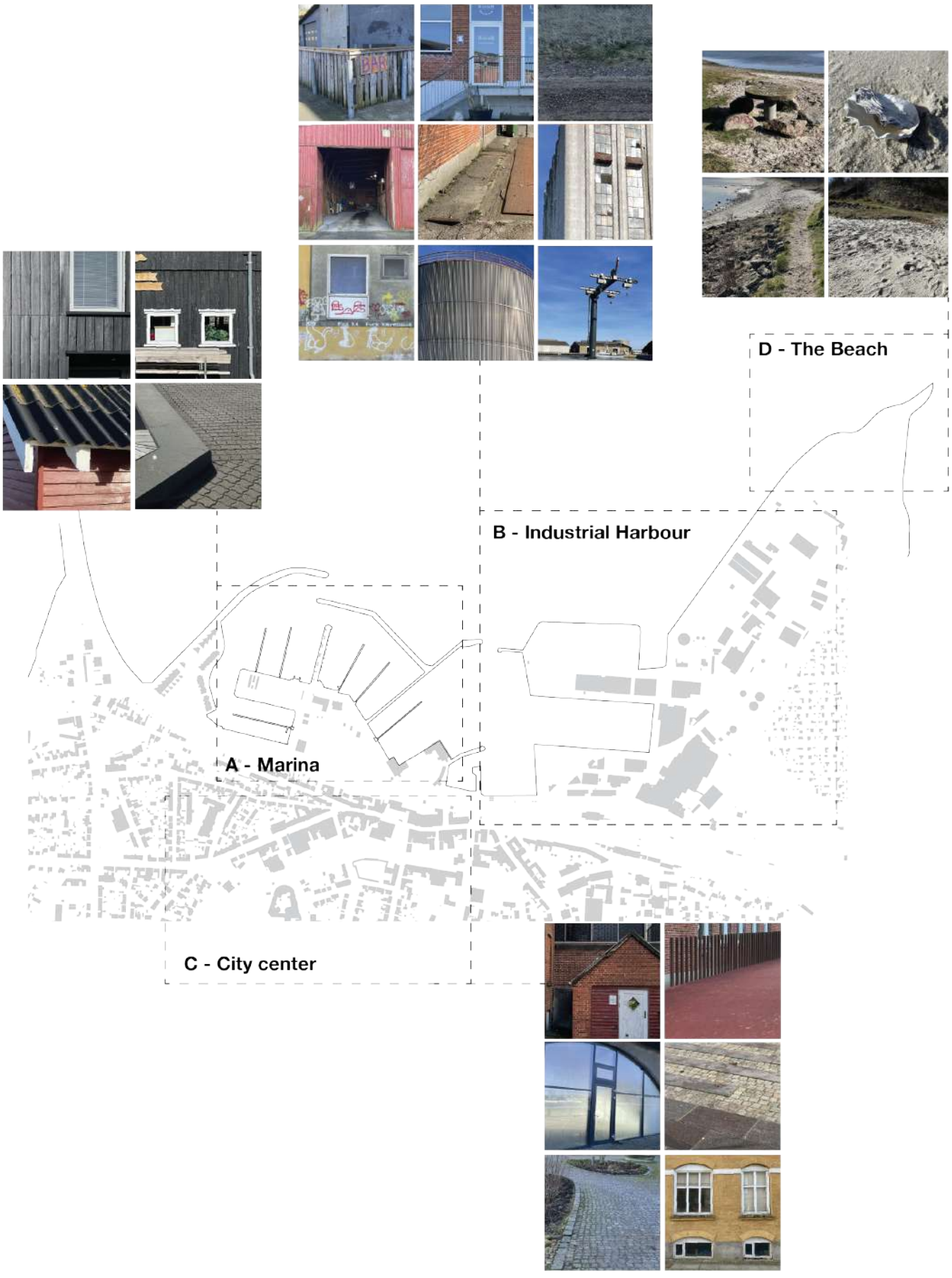
Harbor seal

▲ Living species in Struer protected area

MATERIALS

The materials in the harbour and its surroundings have an overall pallete of light tones. The harbour reveals industrial atmosphere where the concrete, metal and bricks are the main representative materials. Opposite to harbour, the beach is a completely natural area where the sand, plants and shells are the only materials that site contains. The marina area to the west from the industrial harbour reflects the wooden textures that are similar to fisherman's houses. The city center is a mixture of bricks, stone and concrete and elements of green landscape.

In order to balance the industrial harbour, the new materials for the development should reflect the areas around and within the site. This can help to transform area to a more human scale but still keep the historical identity of the harbour.



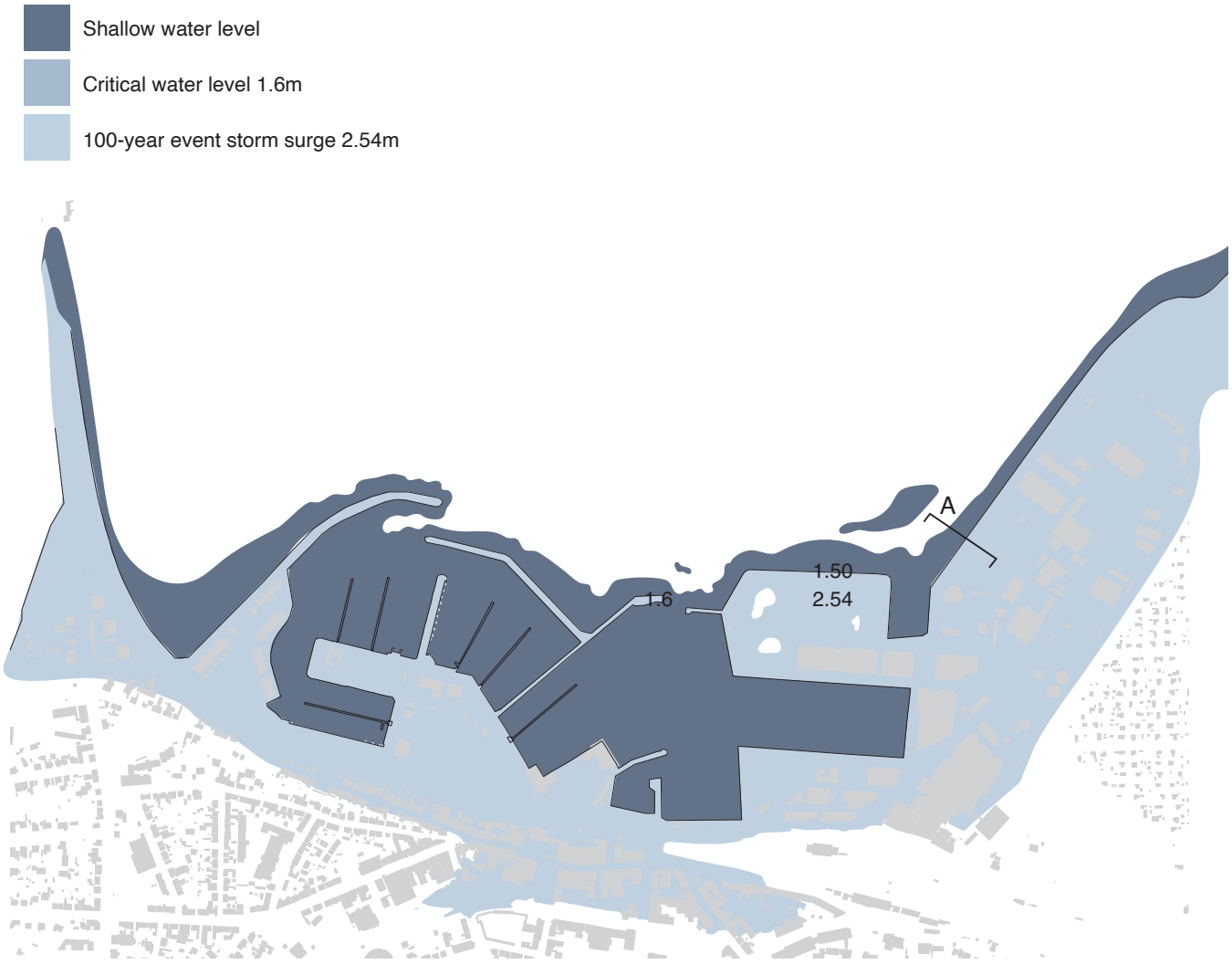
▲ Materials of Struer 1:10,000

WATER LEVELS IN EXTREME WEATHER EVENTS

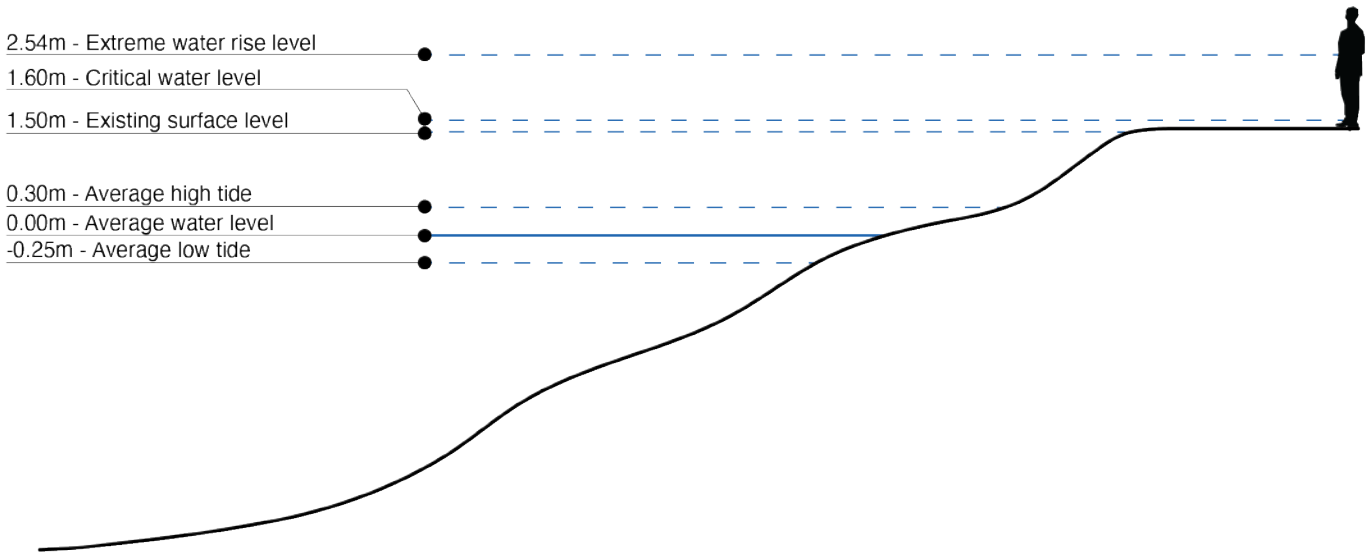
In Struer harbour, the height of tide represents a change of 0,55 meter between high and low tide (DMI, n.d.). Still, due to the wind situation, the water level can rise up to 1,60 meter which is 0,10 meter above the existing land surface level. The main cause of this issue is waves during the storm situations and that can cause flooding of the land. The simulation of water level rise in Struer harbour has been done in Scalgo to understand it more visually (see Appendix C-3).

The climate changes and rising sea level will affect the existing conditions in Struer harbour. It is estimated that in a 100 year the water level may rise up to 2,54 meters (DMI, n.d.) but this is more a prediction, with no accurate calculation of how exactly the water will rise in a long term. The sewer systems may also be affected by such situation and that can lead to issues of lack of sanitation and contaminated water. in Scalgo, the rain flow analysis has been done to see what is the network of water flow into the harbour (see Appendix C-4). However, it is important that the solutions against flooding would be taken into consideration for the new developments in the harbour area for at least 1,60 meters of critical water level that can occur in the near future.

The diagram below shows the harbour in different weather events. Ranging from the everyday situation in year 2050 to a 100-year event. In an everyday situation the water level varies between - 0,25 and + 0,30 meter. In a storm situation the water level may rise to 1,60 meters. In a 100- year event the water will rise to 2,54 meters which means that the whole harbour area will be affected by flooding.



▲ The map (1:10,000) shows the current critical water level (+1.6m) as well as an extreme event situation (100 year interval event) where the sea level can rise to +2.54m. The map also shows the shallow water level there is a potential of landfill.



▲ Diagrammatical section A of water levels

SCALE COMPARISON

In order to understand the scale of the site, the different reference projects which are well known are chosen out of various sizes. From this comparison it can be seen that the project area is huge. The total area of transformation size is 150,000 square meters.

▲Scale comparison

A
Roskilde Havn, Denmark

B
Faaborg Havn, Denmark

C
Kolding, Denmark

D
Wibroe Plads, Helsing¿r

E
Marht Place, Bruges

F
Havnebadet, Copenhagen

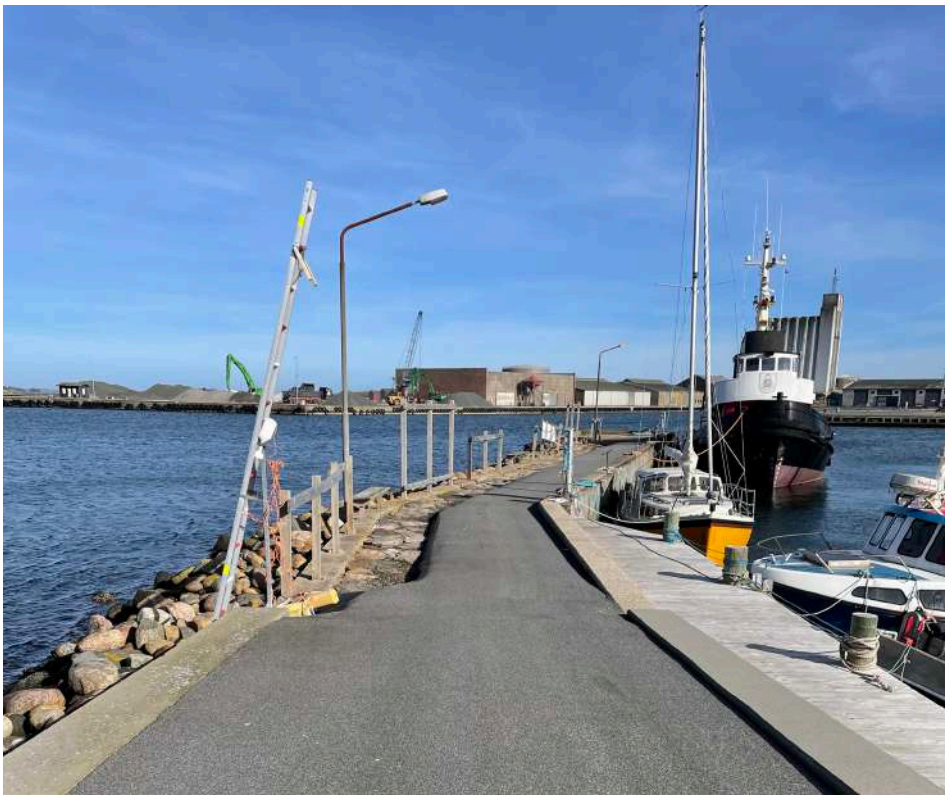
G
BO01, Malmo

FINDINGS

To sum up the Struer harbour has been in a constant development since the beginning of industries over 100 years ago. It has changed from being a fiord landscape to a port for facilitating shipping and crafts purposes. Now the post-industrial scale remains in the area as an identity of the site that formed the harbour as we see it right now. The existing railway bridge provides the important connections to other cities of Denmark, however, it became a barrier between the city center and the harbour where the access points are not well defined and lack of connection between the areas that railway divides. The harbour is an unsettled neighbour in extreme weather events but in an everyday situation the height of tide only represents a minor change and the general wave high in the Struer Havn is relatively small. The coastline shifts between having a hard stone edge and soft edges as the beloved beaches. There are several groups of summer houses in the neighbouring area in north and allotment gardens in the east from the harbour that is a popular destination for people in Struer. This means that there are quite a few tourists in the area and mostly locals that spend their free time in the surrounded areas. The recreational path that runs along the beach area stops at the edge to the industrial harbour making the path difficult to reach. There are quite a few succesful organisations in the harbour that keeps the spirit of community, but they are not well-integrated into the site and act more as a single houses distributed in the post-industrial harbour area.

Struer has experienced ups and downs in its economical and social environment but today the declining population, younger generations moving away and lack of recreational activities and work places does a negative impact for socioeconomical balance. Now the municipality is working on how to develop the harbour in order to provide a more coherent connection to the city and establish new work places as well as busineses for tourists. Municipality's proposal on providing economical value to the site has a potential to be investigated further on finding long-term solutions and reaching the balance between nature and built environment.

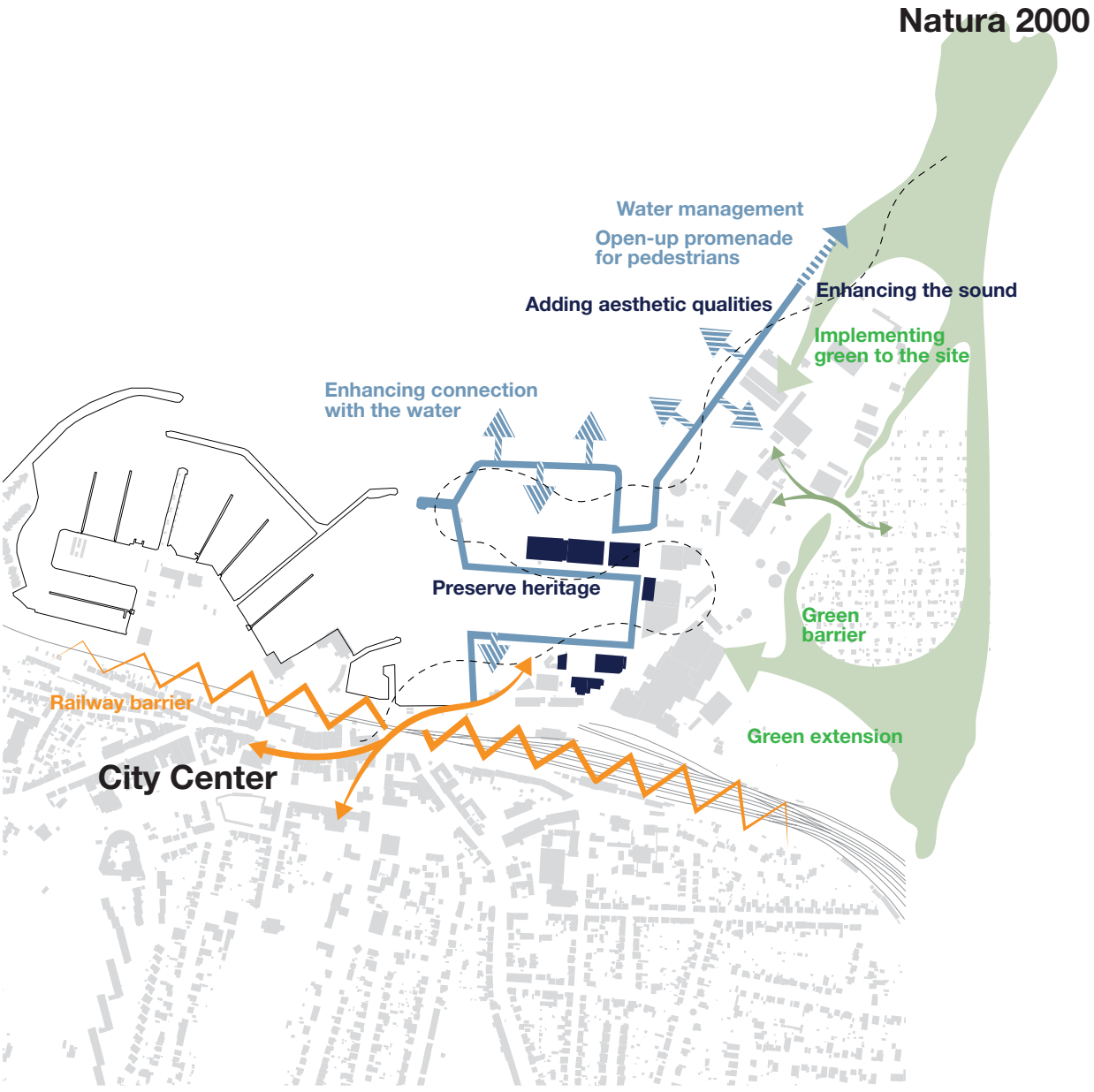
All these findings have formed the understanding of Struer and the project area. In the following part, the design process and the relevant theory for the proposal for a transformed situation is given. It is based on the challenges mentioned above also taking into account the inherent qualities and opportunities of the area such as proximity to the water, existing wildlife and alternative usage of mobility network.



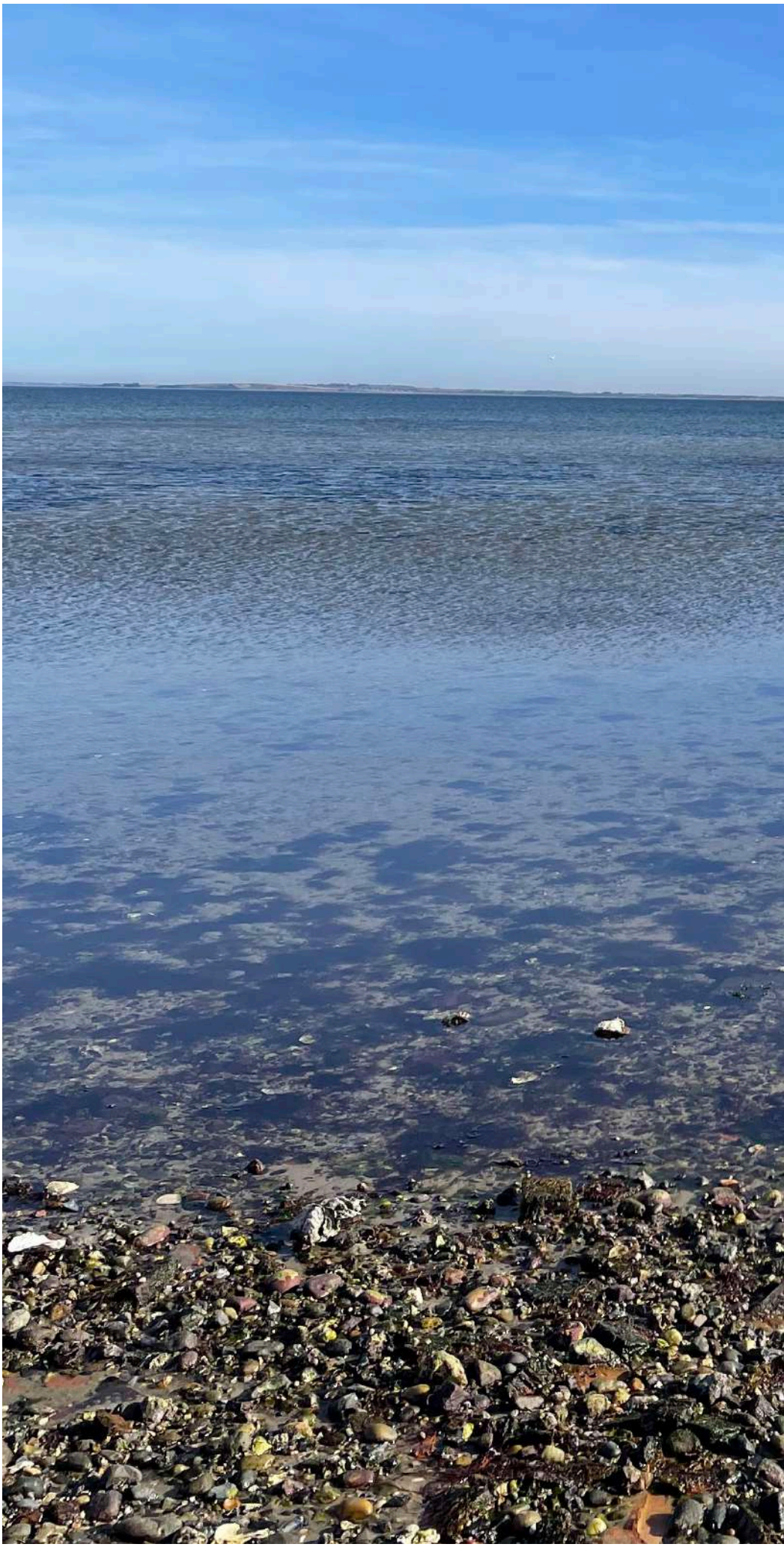
▲ Struer harbour pier

ACTION PLAN

Action plan is formed to represent the possibilities of improvement:
-Improve connections from the city center, nature and colony gardens.
-Industrial cultural heritage to be preserved and transformed for new purposes
-Uptake and reuse of the water resource, flooding management
-Creating a balance between aesthetics and practicality
-Implementing sound into the harbour.

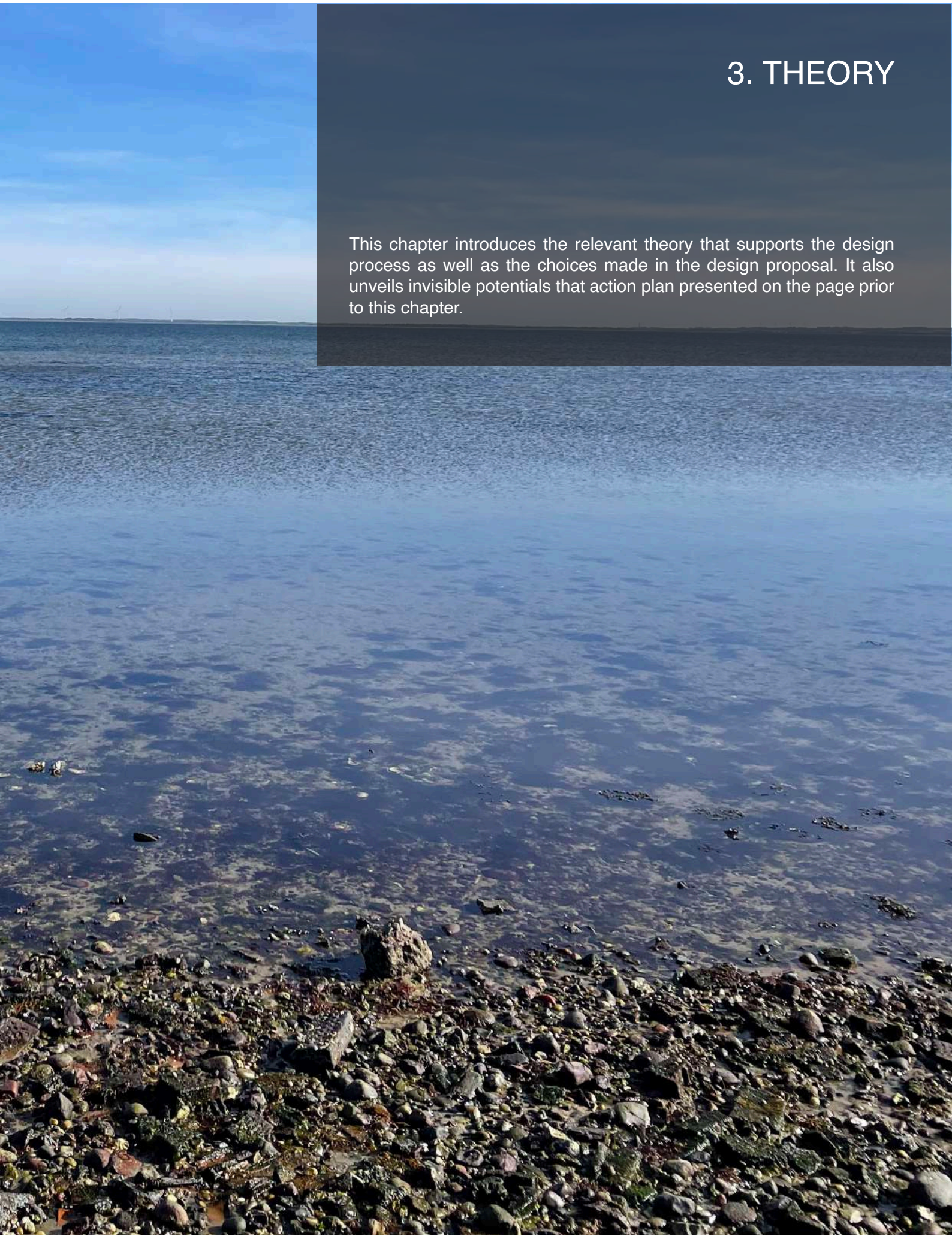


▲ Action plan



3. THEORY

This chapter introduces the relevant theory that supports the design process as well as the choices made in the design proposal. It also unveils invisible potentials that action plan presented on the page prior to this chapter.



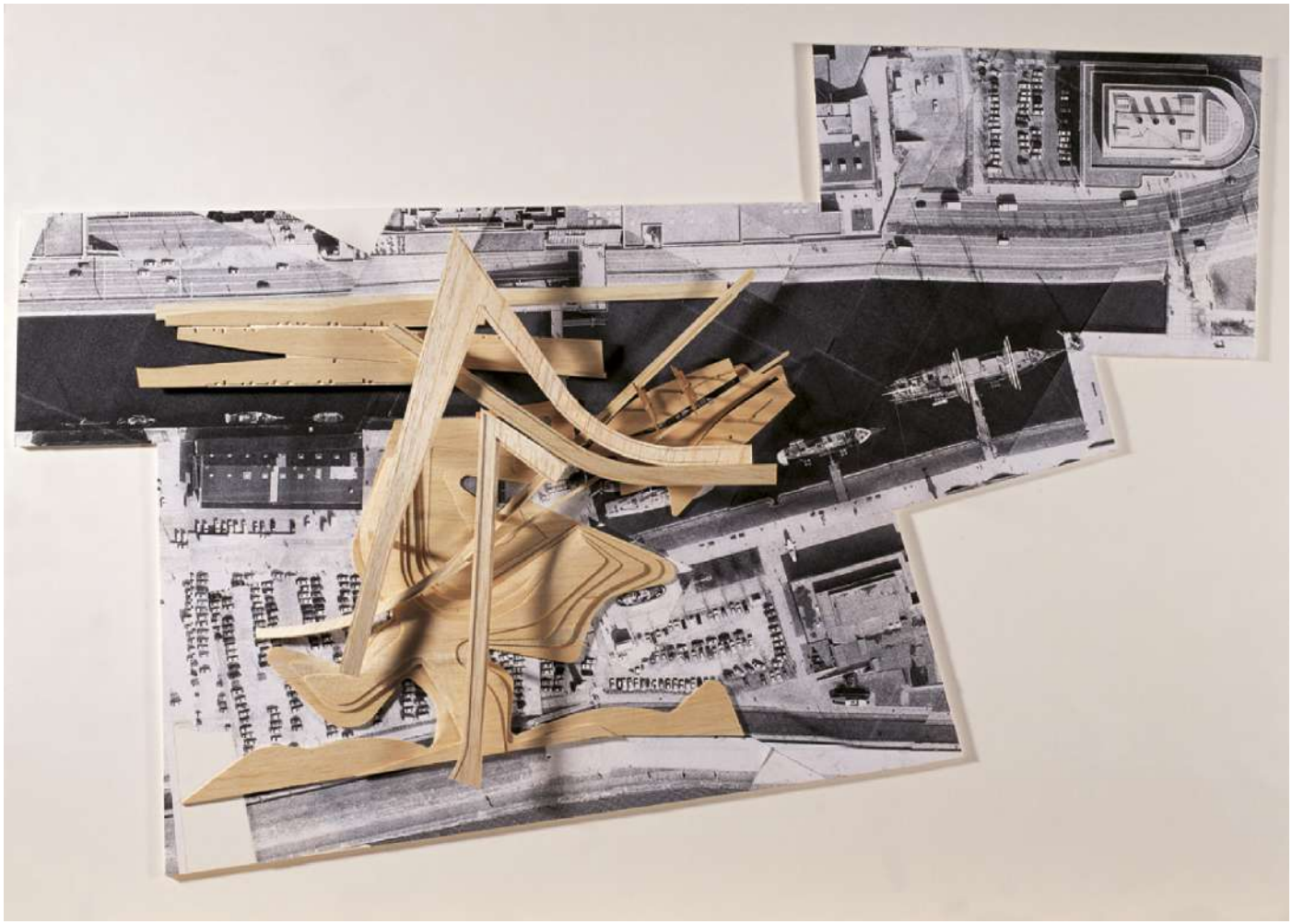
INDUSTRIAL FIELD AS A NEW CULTURAL HERITAGE

The project work has been influenced by a range of themes and approaches that are making up the framework of my understanding. When dealing with an area in transformation as the harbour in Struer, heritage becomes one of the most relevant aspect. In the book 'Beauty Redeemed', Ellen Braae stresses the post-industrial urban landscapes and industrial leavings as a form of cultural heritage: "Industrial leavings as cultural heritage lie in determining what social, spatial, aesthetic and culture-historical values we can create out of each individual site" (Braae, 2015, p.76). The existing industrial facilities, ferry berth and coastal landscape that are suggested as a potential transformation points in this thesis all act as part of the cultural heritage of the place and maintain significance of the Struer harbour. Here it is important to stress that the project is not a complete area transformation on a post-industrial vacant site but rather a proposal for the next step of the area development, working with the existing elements on the site that has a potential in usage and quality increase.

However, dealing with the different elements in the area it is important to find the balance between the heritage layers in order to provide a new cultural track that could bring the activeness to the site. As an example, Bremerhaven project in Germany that was completed in 1994, proposed to create a circulation between the inner city and inactive harbour space: "The aim was to encourage movement and exploration in order to bring an old harbour space into play in a new way, opening up for support of existing programmes but equally for the development of new ones" (Braae, 2015, p.171). Based on this example, it is important to understand the potential of the past activities that can still attract people as well as find the way to continue on adding new layers into it so that the value of the site could be enhanced and create new energy, experiences and opportunities.

NATURE REHABILITATION

Inspired by the area and the surrounded characteristics, the proposal is to reintroduce green shoreline, naturalizing the brownfield and minimizing the tension between the city and the beach area. The aim is not to go back to the past but to create a new situation or landscape, interweaving the nature, harbour and the city. According Thomas Juel Clemmensen, nature does not return to an original state, but instead evolves into new nature (Clemmensen, 2014). "Nature" can have a variety of concepts and be understood differently, depending on which concept we are reffering to.



▲ Illustration 2. Enric Miralles & Benedetta Tagliabue architects brought a dialogue between old harbour and the city lying behind it. The model unites all elements and demonstrates to what extent movement and linking are important between city spaces. (Photo: Fundacio Enric Miralles, 2015)

From this point of view, indicating the primary natural coastal landscape and accepting the secondary built nature - man-made industrial land, the third step of nature is being introduced that is connecting both natural and man-made natures. As Clemmensen sees it, humans are not disconnected from nature, and thus, there is no need to hide, or to erase, traces of human interventions in order to create nature (Clemmensen, 2014). Creating a new (third) nature, the interventions can help to transform the harbour area into a new urban settlement that can bring the people and biodiversity together.
This concept of third nature also links to the garden theory. The landscape historian John Dixon Hunt describes the first, second and third nature in 'Greater Perfection, The practice of Garden Theory' : The first nature as the primary state of nature - wilderness, the second nature - agriculture and urban development that human transforms into. The third nature Hunt emphasizes as the garden that human creates in order to enhance the aesthetics and get back the feeling of being in nature. The garden, even being man-made, is the way to engage with the first nature and at the same time accommodate the environment for humans. Reffering to the garden theory, in my project, I work with the site as it is a garden - a place where nature is in contact with the human activities.

THE BALANCE OF AESTHETICS AND PRACTICALITY

It is quite common to begin solving the technical issues of the project and not giving enough attention to visual expression. However, aesthetics is equally important since it provides a character to a place and pleasure for people to be in. Gehl described Siena's Piazza del Campo as a place full of gracious geometries that shaped people's behaviour by inviting them to come together and to linger (Montgomery, 2015, p.153). Referring to Gehl, aesthetics is directly connected to space usage and people's movement. Connecting technical and aesthetic together can give a balance between them. As an example, High Line Park in New York City, created by James Corner's firm, turns an old railway track into a green pedestrian walkway. It shows that aesthetic qualities have obviously been revelant for the design of the green park as well as practical solutions such as transformation of primary railway track to a pedestrian access. Here, human and biodiversity have a balance in space.

RETHINKING THE NOISE

Another important aspect found in the sources of inspiration is rethinking the noise in the surrounded environment. The everyday definition of noise is described as unwanted, disturbing or harmful sound (Sanne, Mansell & Lund, 2021, p. 37).

▶ Illustration 3. High Line Park in New York City. Where aesthetics and practicality meets. (Photo: Rudi van Etteger, Ian H. Thompson & Vera Vicenzotti, 2016)

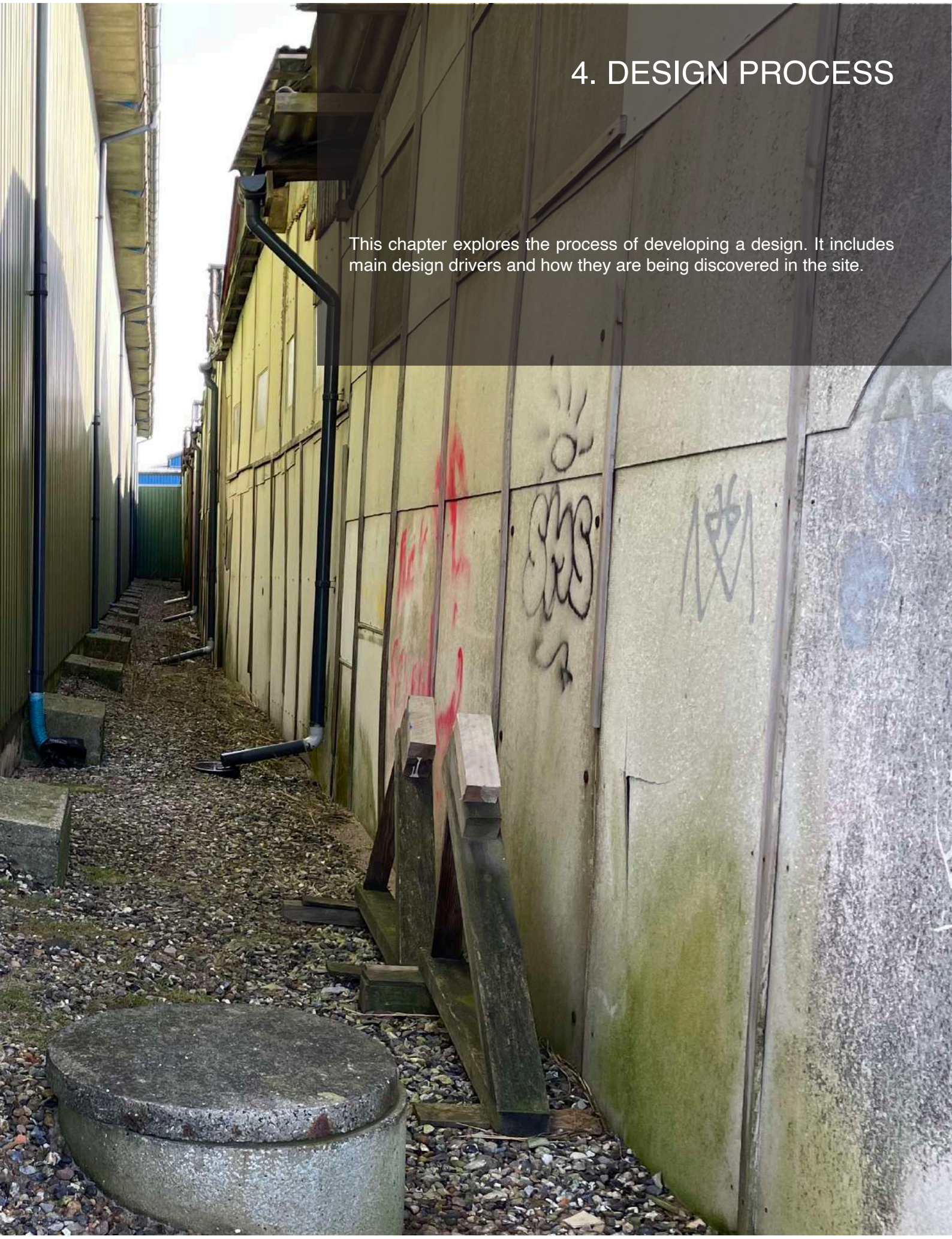
▶ Illustration 4. Murin-an soundscape garden in Kyoto. (Photo: Gunnar Cerwén, 2019)

However, it is just the primary understanding of what the noise is. In fact, the noise plays an important role in day-to-day life and can have an importance for human well-being. It was shown, for instance, that access to nearby green areas could have an effect in reducing long-term noise annoyance, along with other positive health effects (Gidlöf-Gunnarsson & Öhrström, 2007). Daily communication through speech, sounds from children playing, music, natural sounds in parks and gardens are the examples of sound as being the essential satisfaction in everyday life. In 1993, Keiko Torigoe designed a soniferous garden in Japan, based on the concept of soundscape (Hiramatsu, 1993), for a memorial house for japanese composer Rentaroh Taki. The design was based on various considerations such as design for natural biotopes and sounds of human activities (visitors of the site). In the project description, Torigoe proposes an expanded framework for design based on four aspects: sounds of sound-producing devices, sounds of human activities, sounds of nature and sounds in memory/imagination. Melissa Mayntz, book author and environmentalist who analyses natural sounds, did a research on what kind of sounds can attract various species. She realised that the birds are attracted of water splashes, insects and bird chatters (Mayntz, 2020). Based on these findings, the potential of incorporating digital sounds that could mimick natural surroundings could become a tool for attracting birds, insects or animals in order to enhance the natural soundscape.
As being the city of sound since the foundation of Bang&Olufsens in 1925, Struer has a potential to be reconnected with its harbour through the soundscape aspect. This brings to question if the harbour can provide a new soundscape that would come from the human activities and natural biotopes? Knowing that the soundscapes are formed by place and its sound environment and people that interact with the sound, Providing the new type of soundscape in Struer could transform the post industrial site to new experiences for people and animals. One of the ways to approach soundscape design is to identify the function of the environment and its potential users (Sanne, Mansell & Lund, 2021, p. 69).Giving the function to the harbour, the existing industrial facilities, shoreline and nature elements in the project have a potential to bring a new form of sound in the area and enhance the experience of the site.

All these examples framed the working process to some extent and been sources of inspiration for unveiling site's potentials.

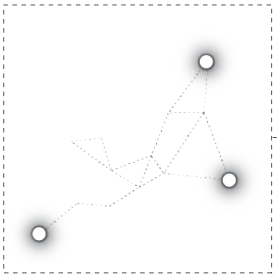
4. DESIGN PROCESS

This chapter explores the process of developing a design. It includes main design drivers and how they are being discovered in the site.



DESIGN PARAMETERS

The parameters of the design form the actions to be taken into consideration for making new design of the harbour.

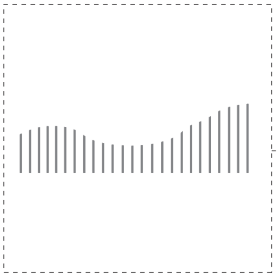


SITE IDENTITY

preserve industrial cultural heritage to act as activity generators

SUSTAINABILITY

implement sustainable choices and adaptable design solutions that can provide resilience in the future



SOUNDSCAPE

design that creates a healthy living environment and attracts with its soundscape.

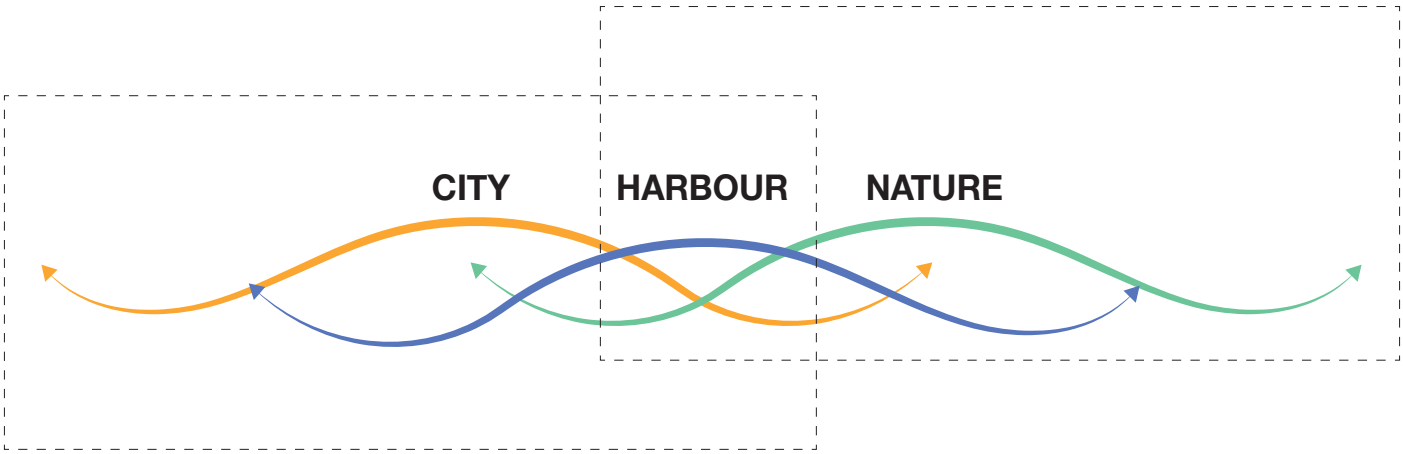
▲ Design parameters and actions

PROBLEM STATEMENT

How to activate and connect the harbour to the city and nature and create a vibrant urban DNA using industrial cultural heritage and soundscape as important site-specific characteristics?

DESIGN AIM

One of the occuring problem in this site is industrial harbour disconnection from the city and nature. The main design aim is to provide this missing connection.



▲ Design aim

APPROACH

Being a huge area, harbour redevelopment should be considered in prioritizing the aspects of transformation. The main approach is to develop a pedestrian promenade that will go through the harbour from the south to the north. This will connect the harbour to the city and nature. The promenade will start with the inviting entry area where the passenger will be welcomed to the harbour. At the end of the promenade, the passenger will be leaded to the observation area, an anchor of the site.

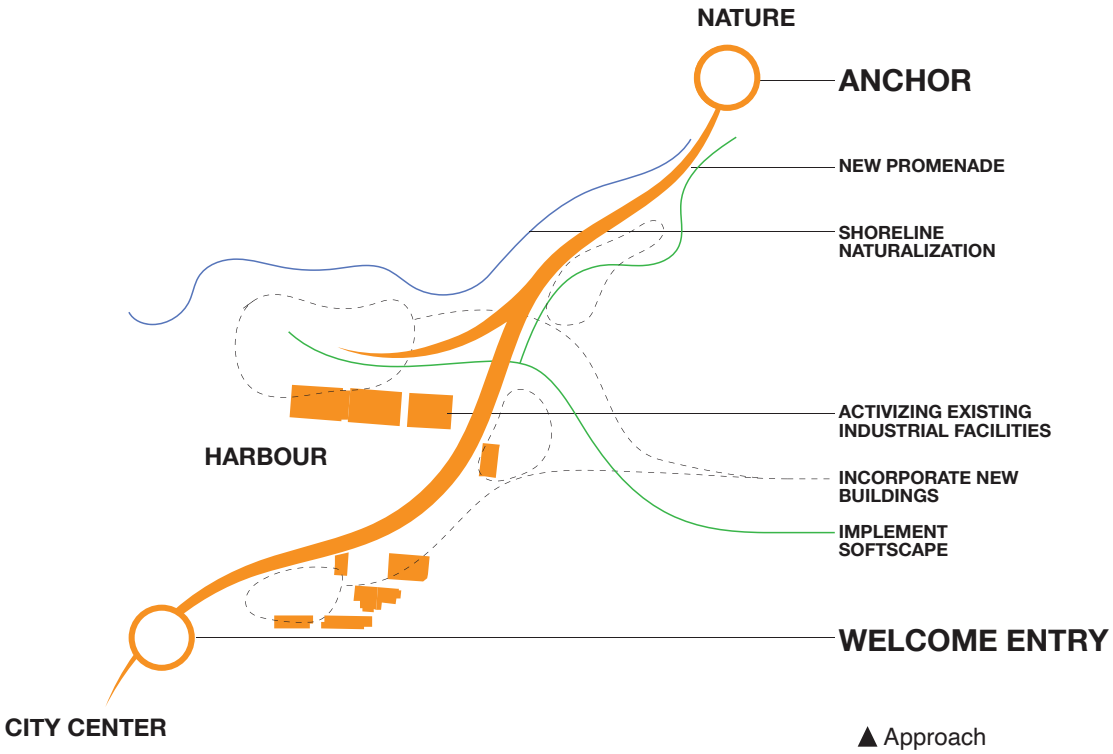
Besides the main development of the promenade, different approaches are introduced that can be a strategy for the future development in the harbour area:

-Naturalization of the shoreline (to increase biodiversity and manage water level rise)

-Activize existing industrial facilities (to preserve the post-industrial character of the site).

-Introduce new buildings (to provide more working spaces and inhabit people in the harbour area)

-Implement softscape in the site (to balance hard and soft landscape, connect greenery to surrounded nature and provide a better water evaporation into the surface)



▲ Approach

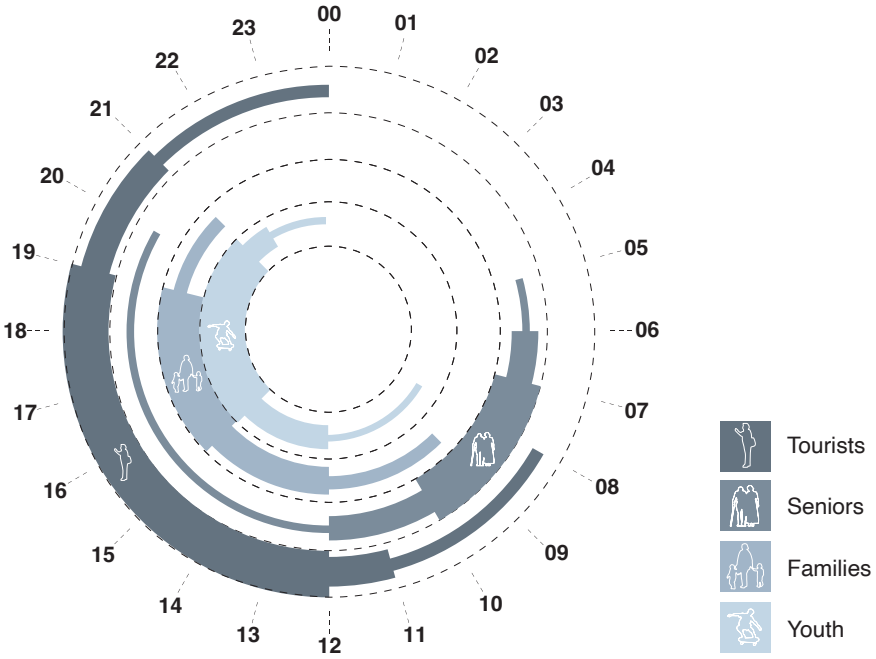
ZONING AND USERS

After the site analysis was conducted it became obvious that the project area has a lack of active users throughout the day. The site visit showed that some of the people are crossing harbour to reach the nature area for a walk, others are community members from Norvestjysk Fjordkultur and Wind Academy where activities are generated at the beginning of the site. However, in order to reach the nature, people need to cross the harbour where currently not much of walking experience can be found that the users could engage with. While creating these experiences, potential user groups were analysed such as youth, families, seniors and tourists;

Youth has a lack of activities in Struer after school. The existing warehouses can be transformed into playgrounds for sports and leisure. Here, youngsters after the school can gather together and spend their afternoon.

Families and **seniors** will not have to go far to look for a spot where nature, water and activities allow them to have their leisure time. Families will be able to enjoy their afternoon with the kids and stroll along the new promenade while seniors will have a safe access to the beach where they can have a walk in the morning and enjoy the nature and surroundings.

Tourists will get an opportunity to explore western part of Denmark through the sound, nature and recreation.



▲ User groups

In order to activate the site for all-day usage, there was a need to think of what kind of identities it has that could be enhanced and become visible. The new urban zones derives from the existing built conditions where the existing buildings, quay edge and infrastructure defines the shape of each zone. It allows to not completely change the site but rather build new elements on top of existing. Each zone communicates with surroundings and has its own identity that connects all zones to a new vibrant urban DNA as continuous body.

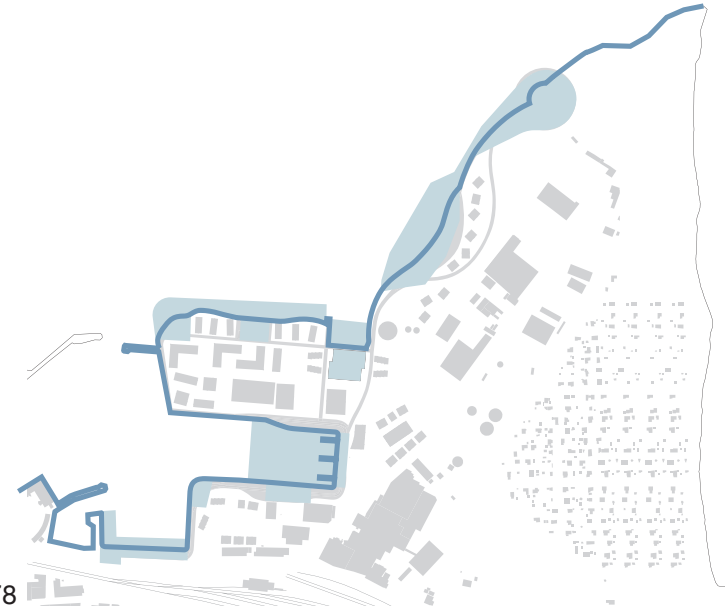
▶ Identities 10,000

GENERATING PUBLIC SPACES

Connectivity: the system of public spaces shall weave Struer harbour together with blue, green structures as well as cultural heritage and new built volumes. The woven urban spaces combines social, recreative and ecological flows where city and nature starts collaborating with each other.

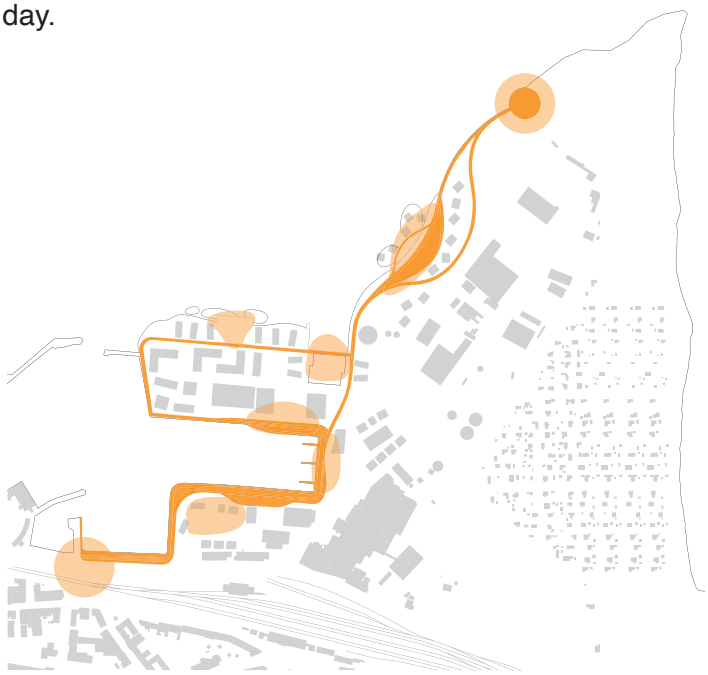
◀ Connecting surroundings through new urban spaces network 1:10,000

Access to water: in order to enhance the connection between human and water, the waterfront will be designed to allow people access the water through different public spaces along the shoreline.



◀ Access to water 1:10,000

Public plazas along new promenade: the pedestrian circulation is designed from and for enriching the walking experience. Key public spaces work as meeting points that are designed in regards of proximity to the water and the site where people can feel comfortable and safe to stay. Each of the public space is programmed to be active throughout the day.



▶ Public plazas 1:10,000

Industrial heritage as public places generator: the new urban spaces also derives from the industrial and cultural heritage that forms important nodes in the heritage area and reuse old infrastructure to create a vibrant urban DNA. New cultural plazas is a well-integrated harbour part.

▶ Industrial heritage as public places generator 1:10,000

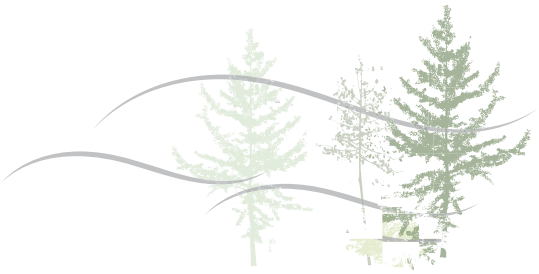
DESIGN OF THE SOUND OF NATURE

The concept for public spaces design is based on natural sound experience that is created by water, plants, animals and people gathering. The specific pavement materials and planting will help to interact with the wind, water splashes and human movement so that visitor could feel the place and have a close connection to the surroundings (sketches of the process see Appendix D).

▲ Natural soundscape 1:10,000

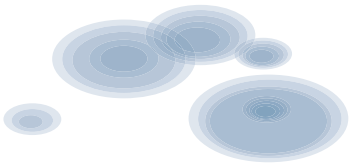
Elements of natural sound in the harbour

SPLASHING WATER



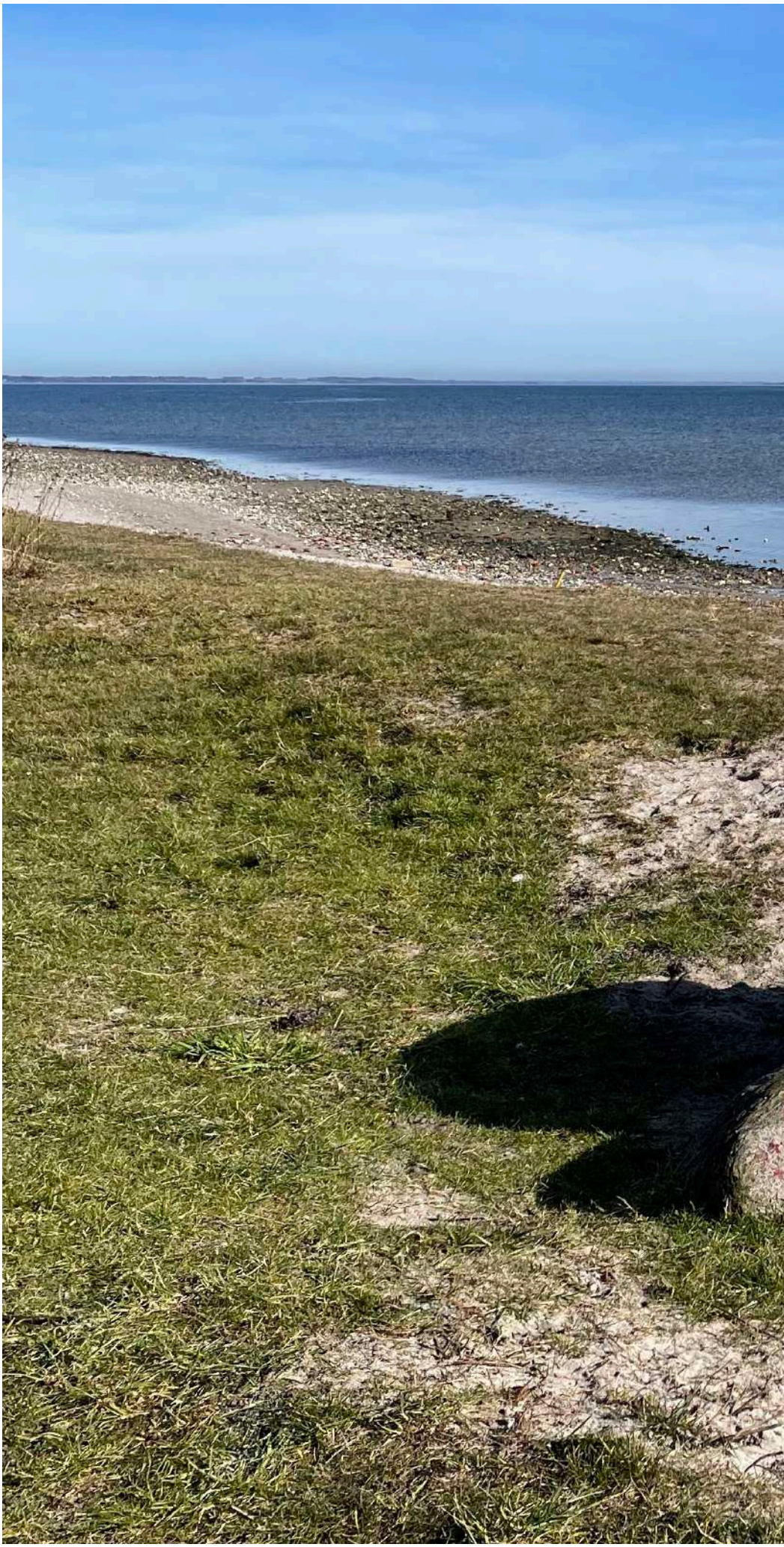
RUSTLING TREES

DRIPPING RAIN



SINGING BIRDS

PEOPLE PLAY



5. PRESENTATION OF THE DESIGN

In the following chapter the design proposal will be presented via relevant means of illustration, including plans, diagrams, sections and other forms of visual representation, starting with important diagrams that link to the masterplan of the project.

INTRODUCTION

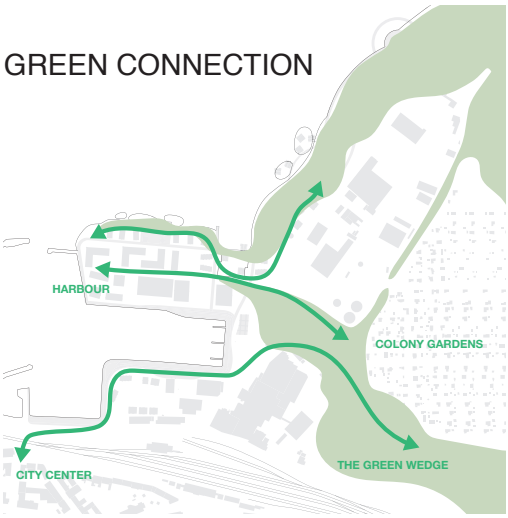
This chapter presents the final design proposal for the project site. It consists a variety of presentation materials such as masterplan, sections, detailed axonometrics, visualizations and more.

New harbour development is an ambitious project making the most of the huge potential to combine natural and man-made materials, enhance historical site's value, develop mixed use, infrastructure and implement design towards climate adaptation and biodiversity. The important aspect in this proposal is not to get an easy solution but one which has value for many years and can solve more than just technical issues. The focus here is to create an attractive and interesting urban design that provides a smooth transition for people to pass through as well as be in (process sketches see Appendix E). New harbour is a place with its own character where technical issues are being solved together with aesthetic and biological point of view.

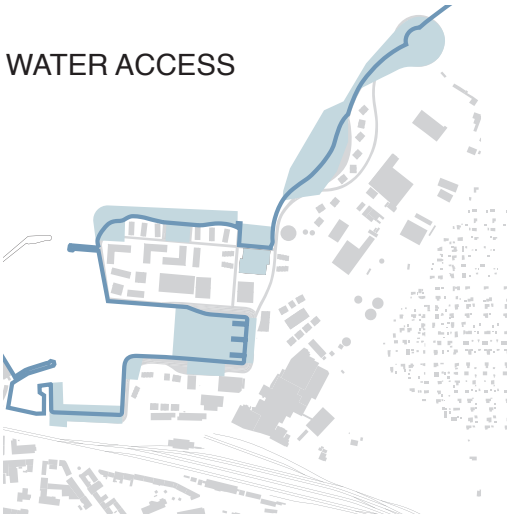
The project site is proposed as a diverse landscape where water and land interweave with each other (for sketches see Appendix F). The naturalization of the shoreline is inspired by the form of natural language of the beach that was a primary state of the harbour (for sketches see Appendix G). This is not to just go back to past but also works as protection against floods where stones and water plants allow to avoid much erosion and increase evaporation of the water. On the closer side to the city, the harbour quay edge is proposed to be more a man-made design, that interacts with industrial atmosphere while at the same time allows stepping down to the water regardless its level.

With a well-defined urban structure, each neighborhood has the opportunity to stay true to it's heritage and specific conditions, creating its own identity and respond to their immediate surroundings - closeness to water, existing buildings, natural soundscape or to the green and blue urban potentials relevant to the area.

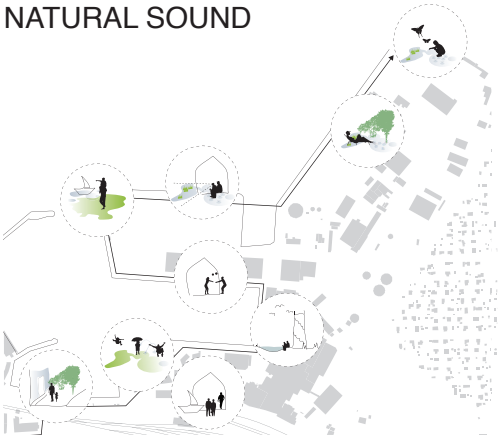
GREEN CONNECTION



WATER ACCESS



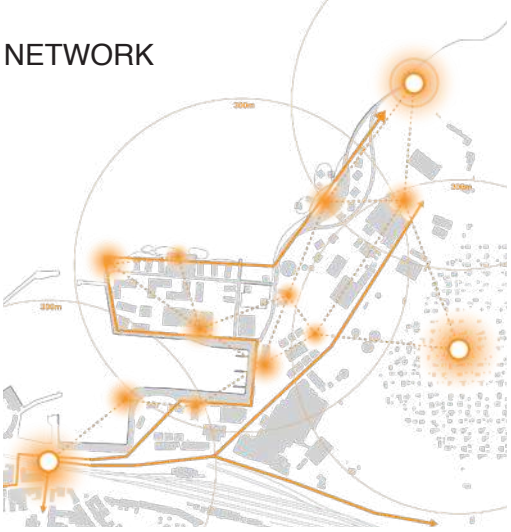
NATURAL SOUND



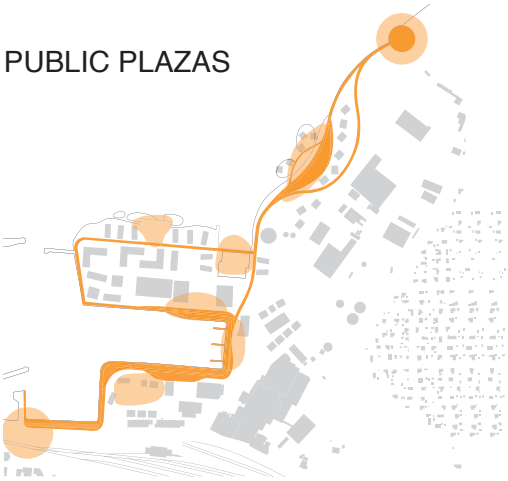
IDENTITIES

ROADS

NETWORK



PUBLIC PLAZAS

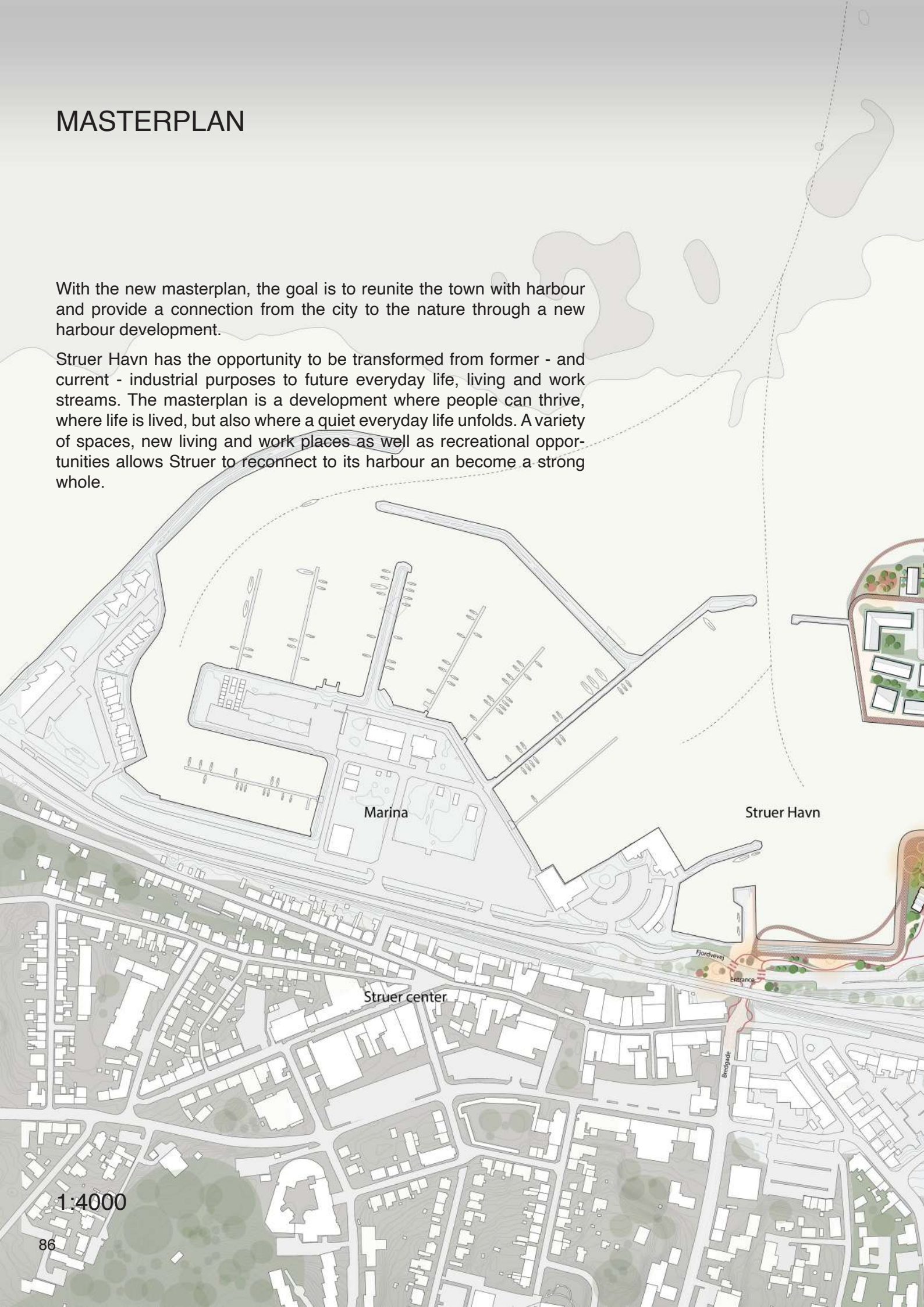


INDUSTRIAL HERITAGE

MASTERPLAN

With the new masterplan, the goal is to reunite the town with harbour and provide a connection from the city to the nature through a new harbour development.

Struer Havn has the opportunity to be transformed from former - and current - industrial purposes to future everyday life, living and work streams. The masterplan is a development where people can thrive, where life is lived, but also where a quiet everyday life unfolds. A variety of spaces, new living and work places as well as recreational opportunities allows Struer to reconnect to its harbour an become a strong whole.

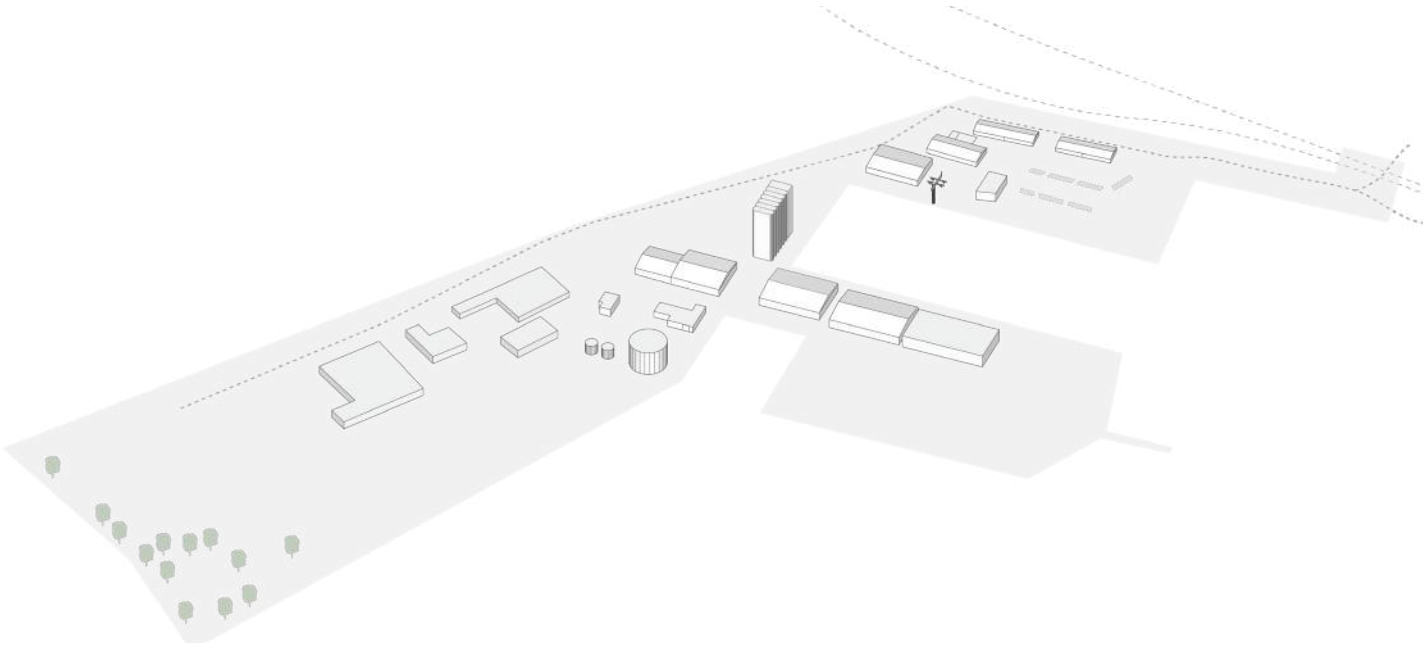


1:4000

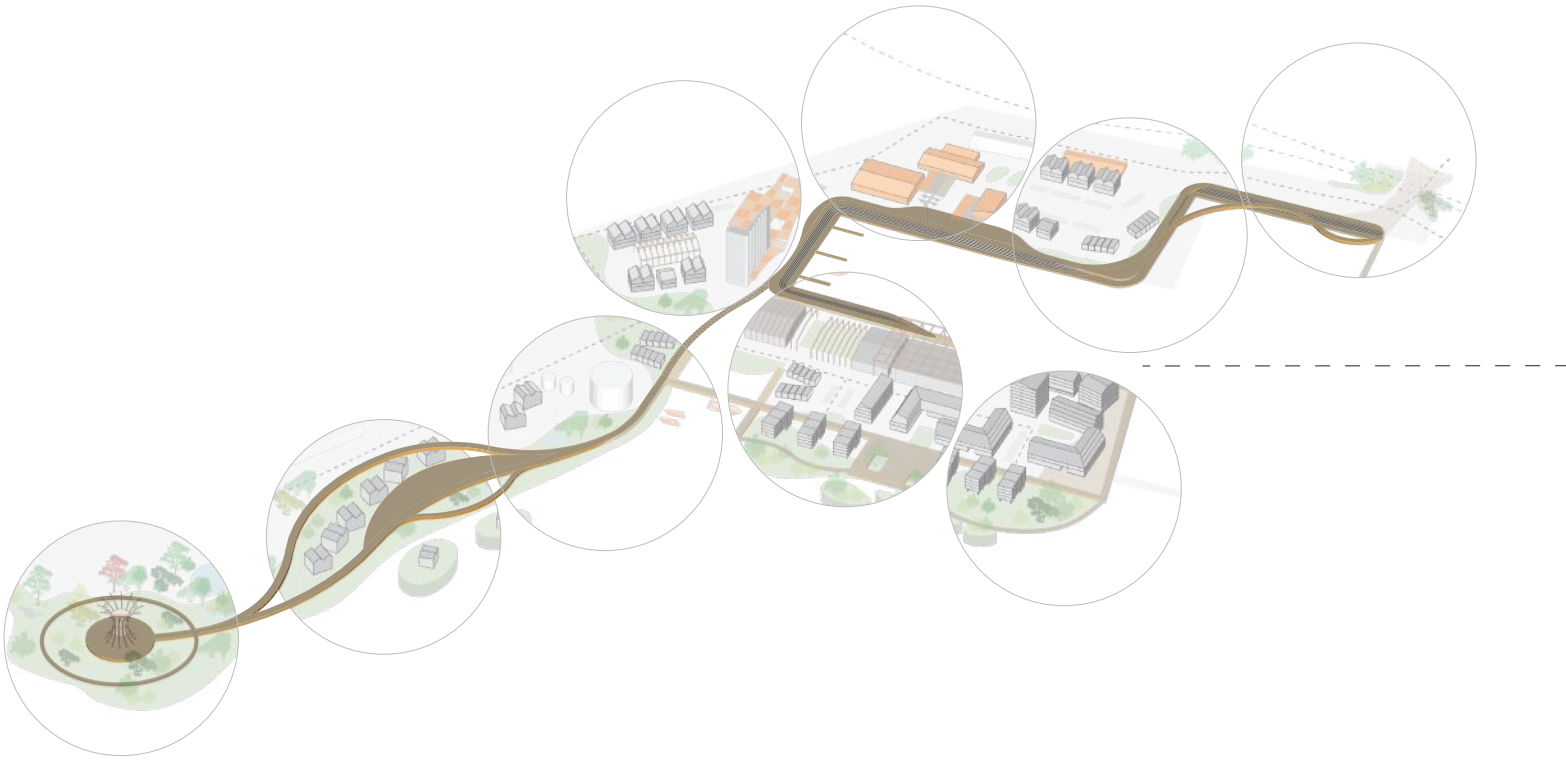

Natura 2000
Struer bugt
Tower
Winter bathing
Hostels
Housing
Plaza
Housing
Kajakhotel
Kajakhotel
Wellness
Cafe
Wellness
Youth center
Offices/ Workshops
Silo offices
Havnevej
Vralden
Vralden
Crane
Shophouses
Cafe
Wind academy
Parking/ Drop off
Workshop
Kolonihavevej
Jernbanemuseum
Godthabsvej
Struer station

DEVELOPMENT PLAN

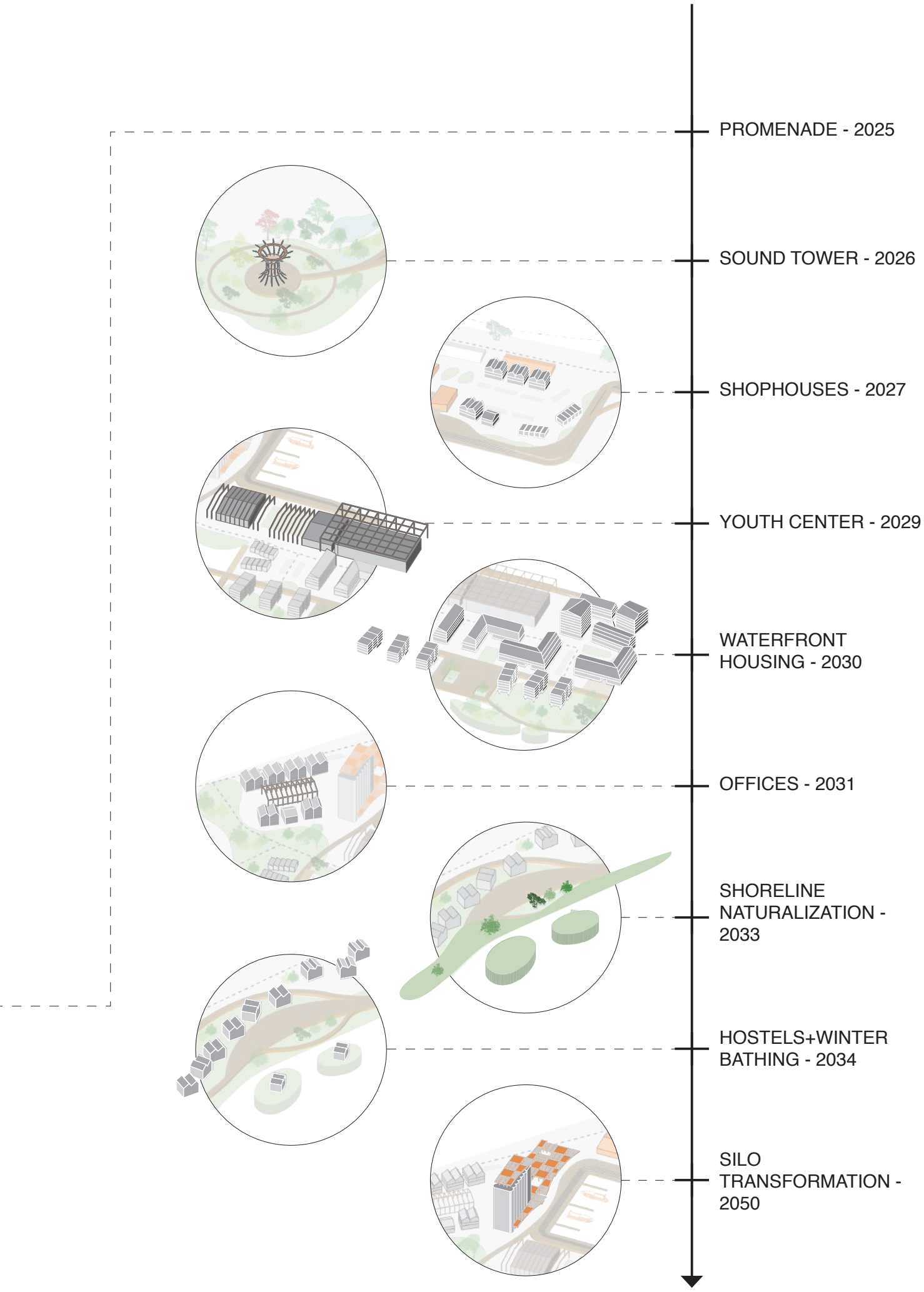
A suggestion for the approximate timeline of the development.



▲ Existing site

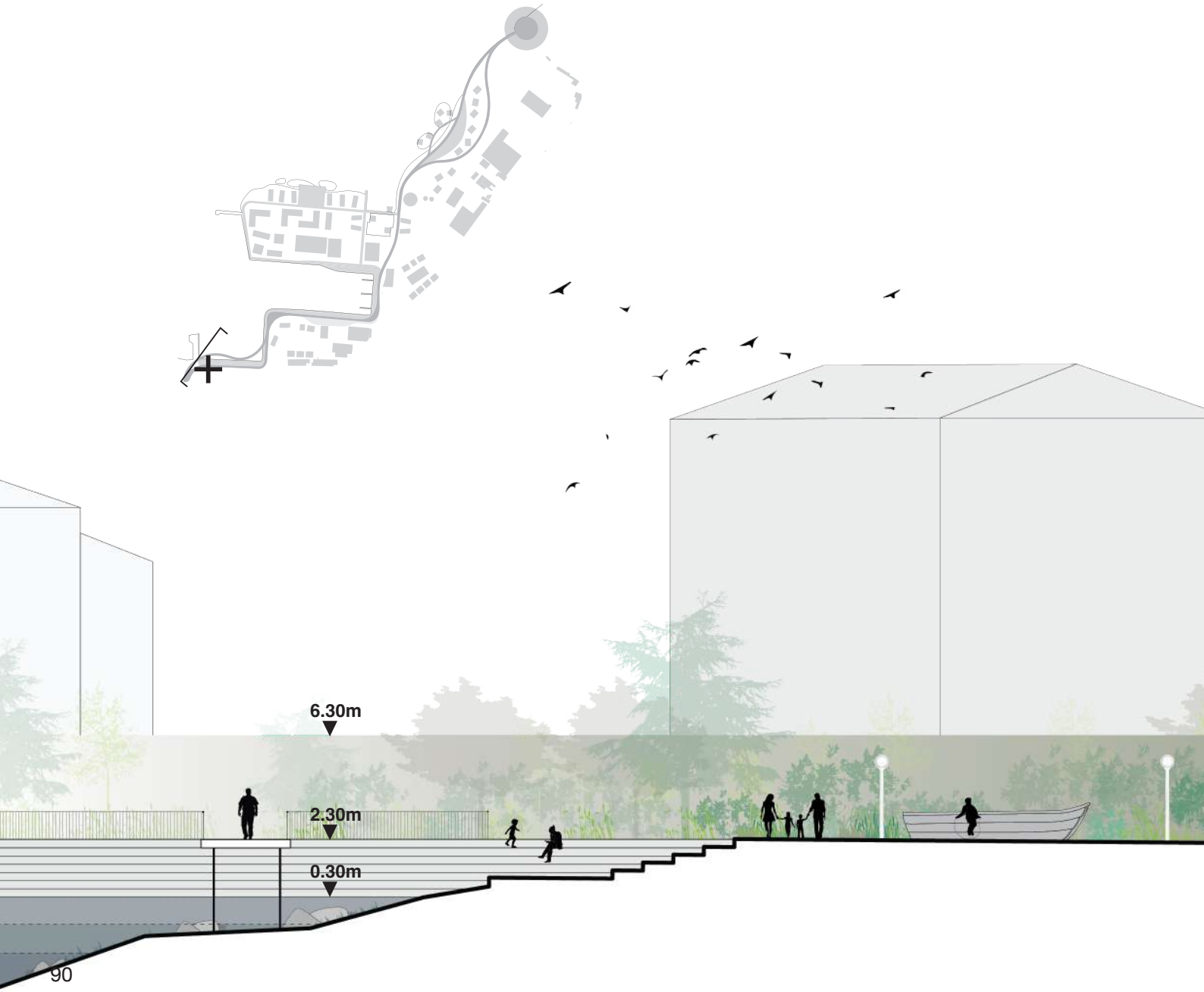


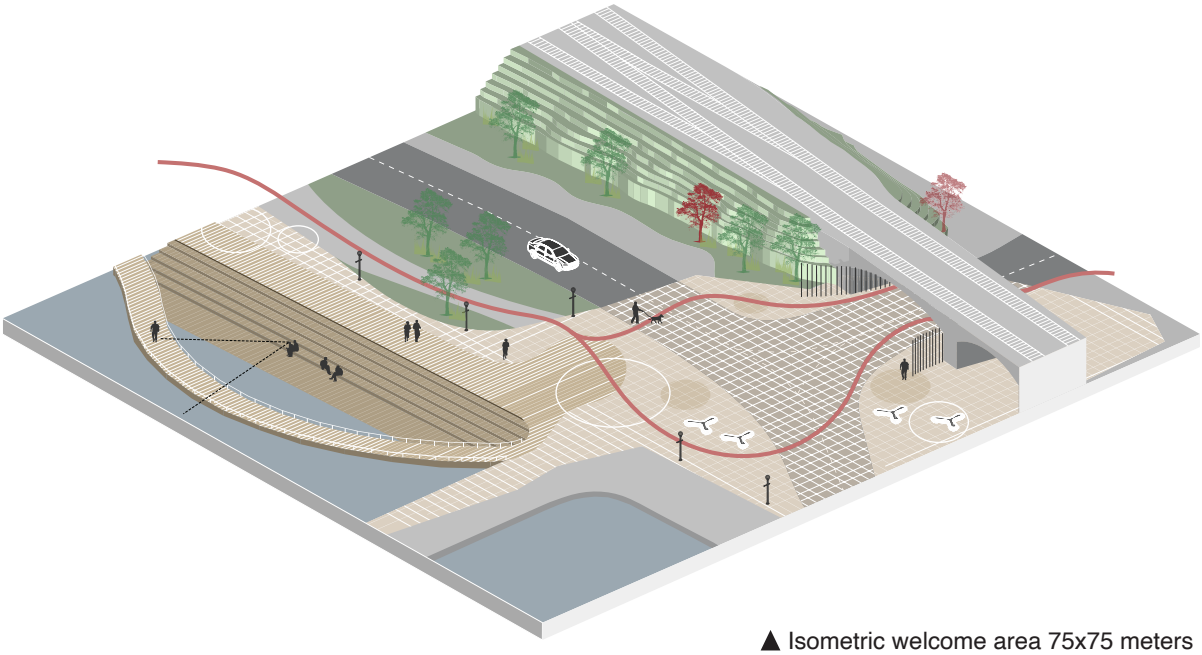
▲ Proposed connector


PROMENADE - 2025
SOUND TOWER - 2026
SHOPHOUSES - 2027
YOUTH CENTER - 2029
WATERFRONT HOUSING - 2030
OFFICES - 2031
SHORELINE NATURALIZATION - 2033
HOSTELS+WINTER BATHING - 2034
SILO TRANSFORMATION - 2050

WELCOME ZONE

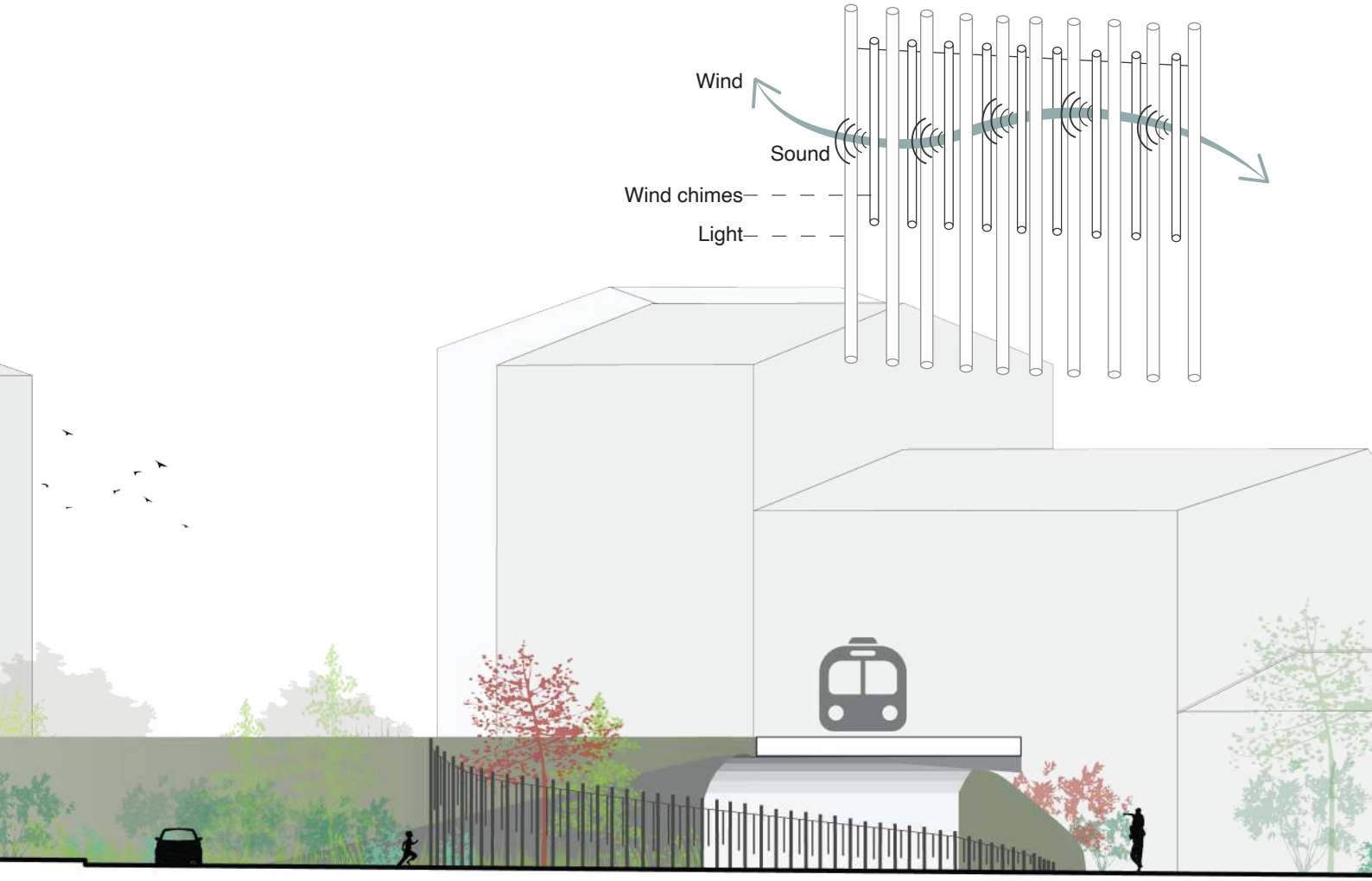
Welcome zone is a key public space for entering the harbour from the city center. It is a transition from one space to another but at the same time a meeting point where people can feel comfortable to stay. In order to enchance the welcome feeling when entering the site, elements such as different pavement color, special trees, lightning art and stairs to access the water was created. Furthermore, it is a place where the walking experience starts. The paths for pedestrians, bikes and cars are designed to be a clear way finding towards the harbour.





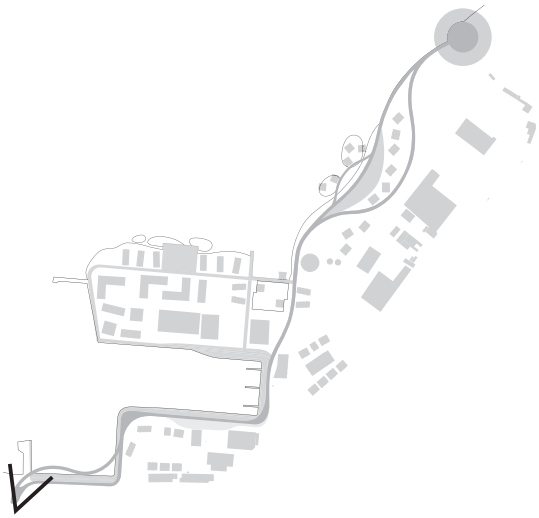
▲ Isometric welcome area 75x75 meters

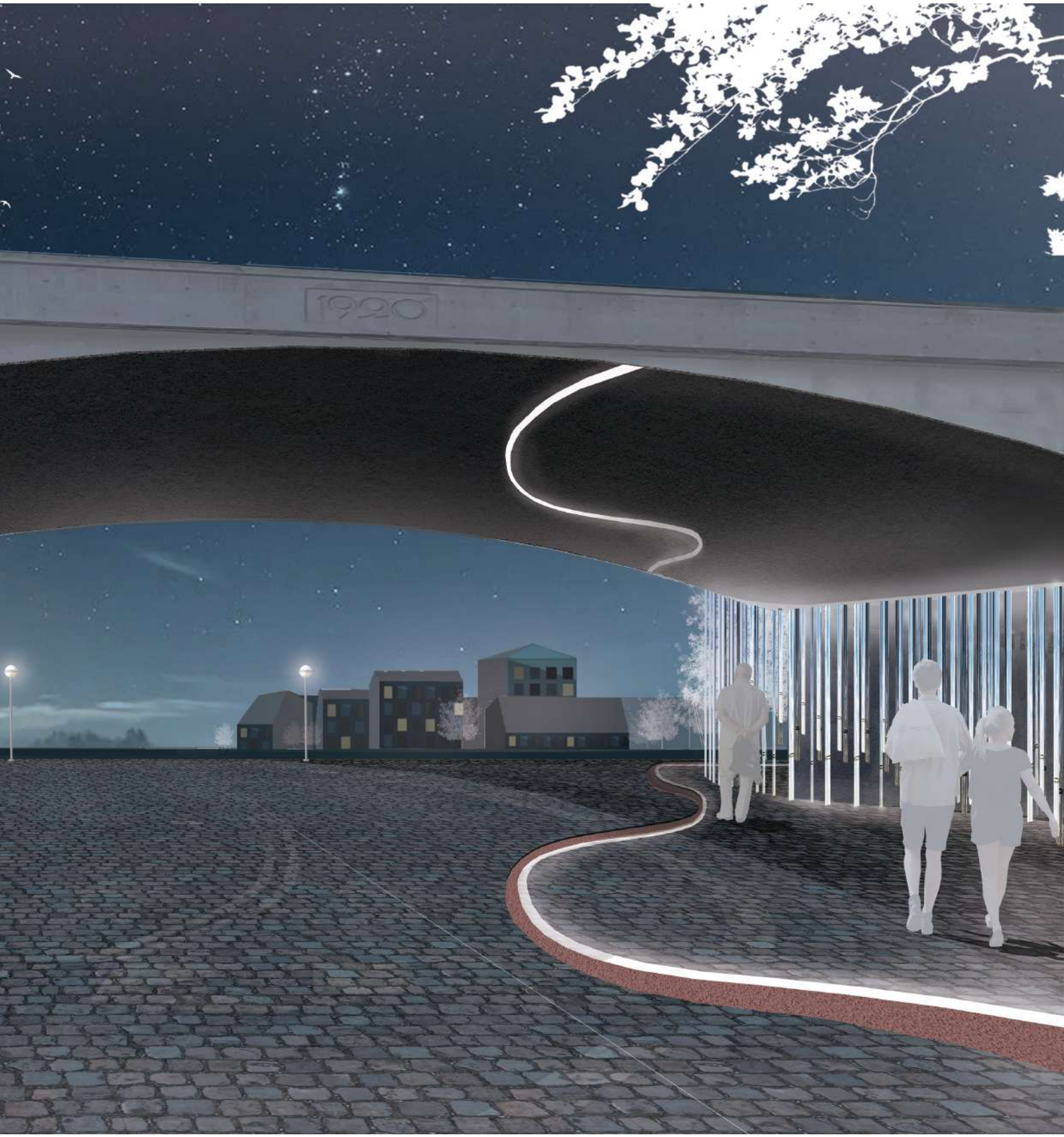
The installed metalic tubes in the tunnel will provide a soft sound when the wind blows and at the same time provide lightning during the night.



▲ Welcome area section 1:200

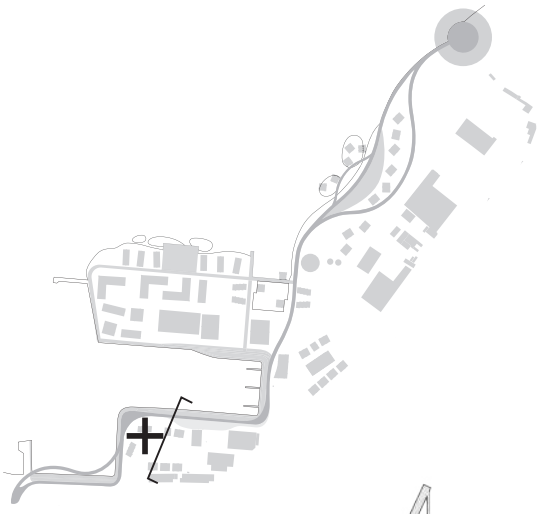
WELCOME ENTRY VISUALIZATION



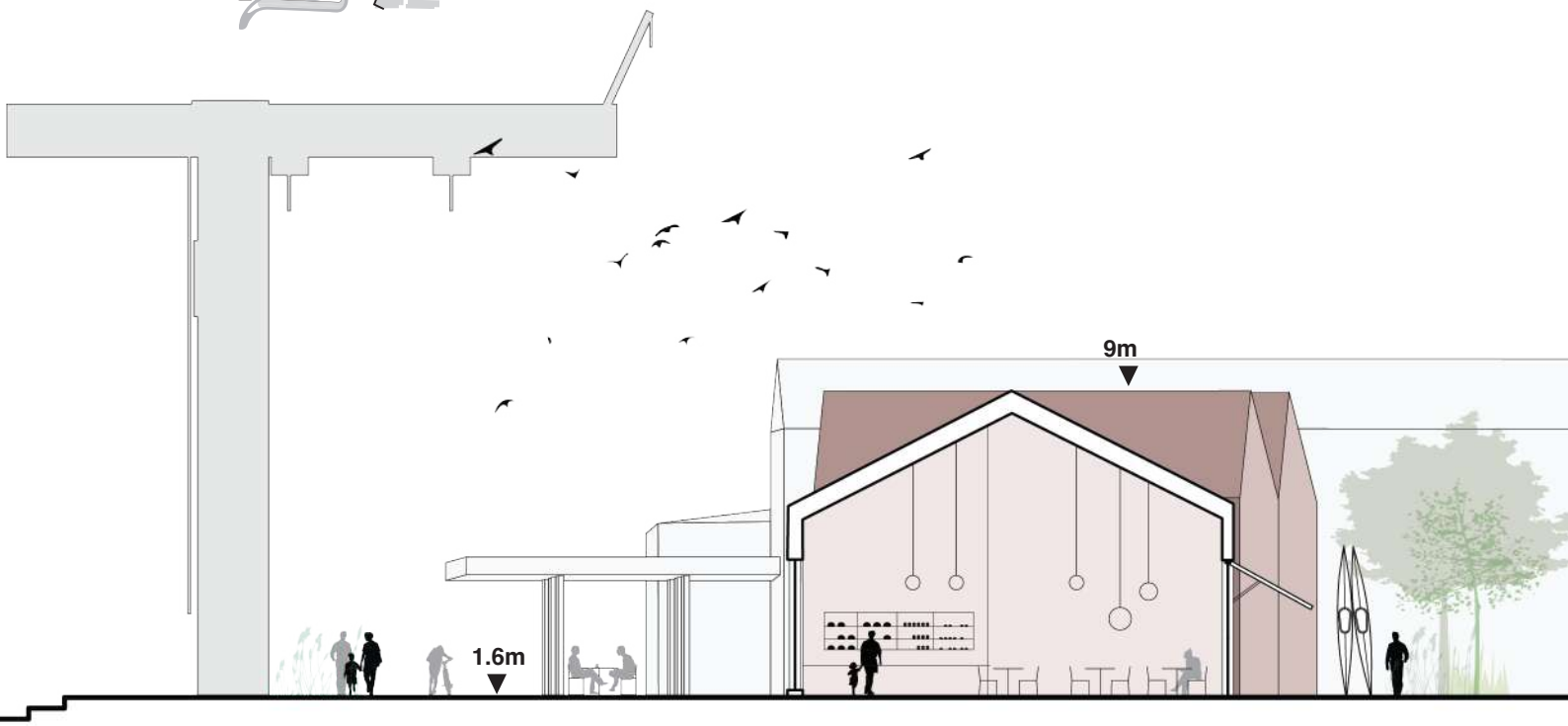

1920

FLEXIBLE DROP OFF

At the beginning of the harbour a new drop off zone encourages to leave the car and experience harbour by walk. Besides the primary function as vehicle parking, drop off will have flexibility to be used as a space for mobile market, car share meeting space or a waiting zone. The surrounded one-storey shophouses of 100-160m^2 (full list of new building sizes see Appendix H) will deliver smaller business purpose such as waiting lounge, cafe, boat storages and boat galleries. The existing boat workshop community will have extended facilities where they can exhibit their work. New buildings are made of timber as the existing timber warehouses on the site.

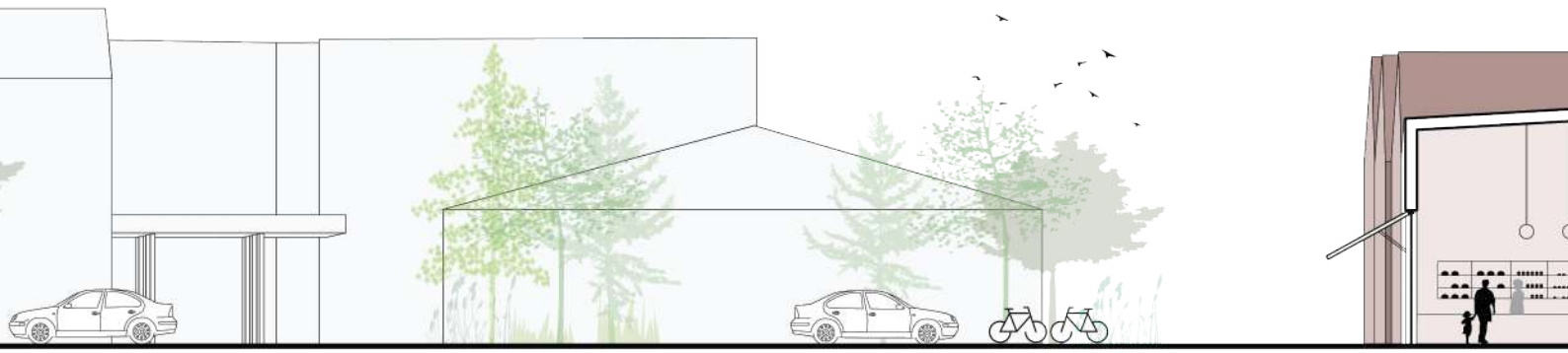


▲ Existing timber warehouses on the site



▲ Isometric drop off - daily event 75x75 meters

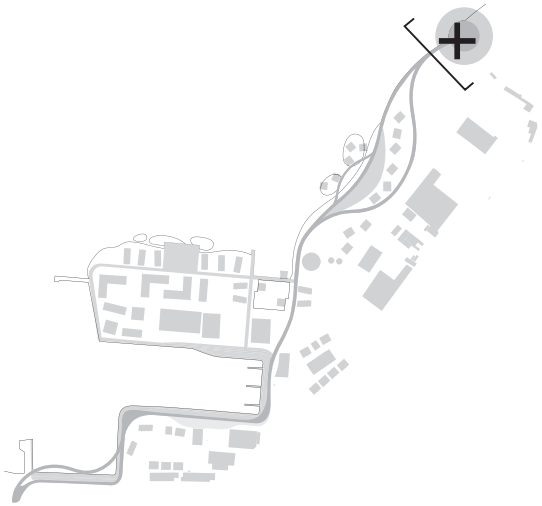
▲ Isometric drop off - market event 75x75 meters

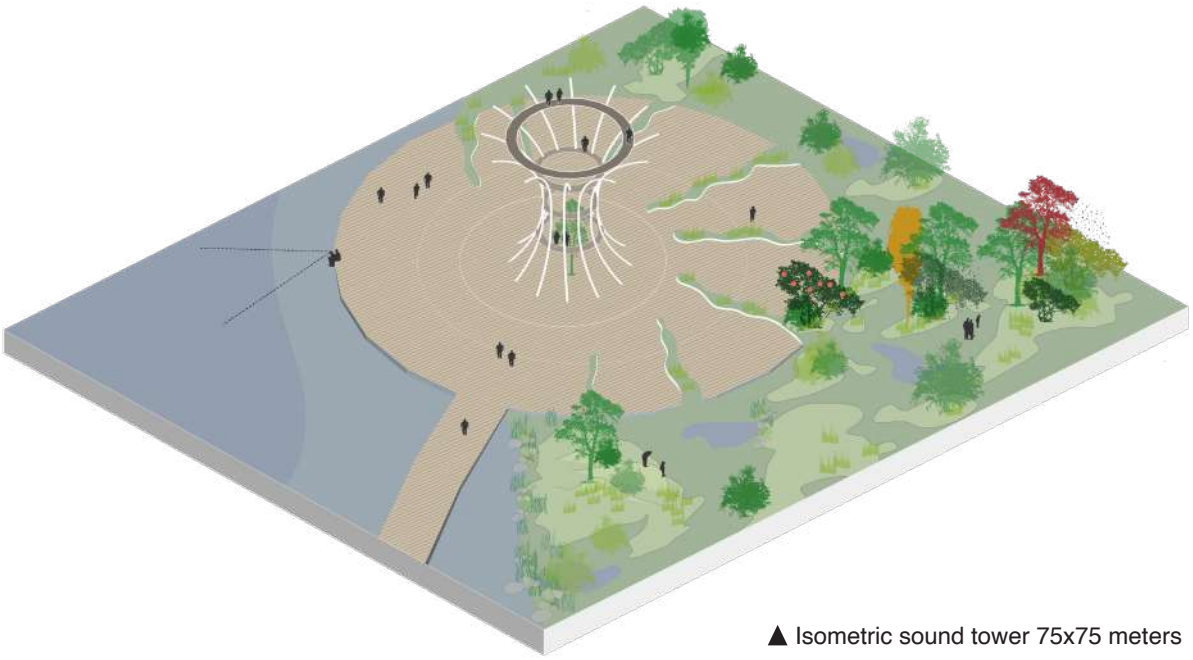


▲ Drop off section 1:200

SOUND TOWER

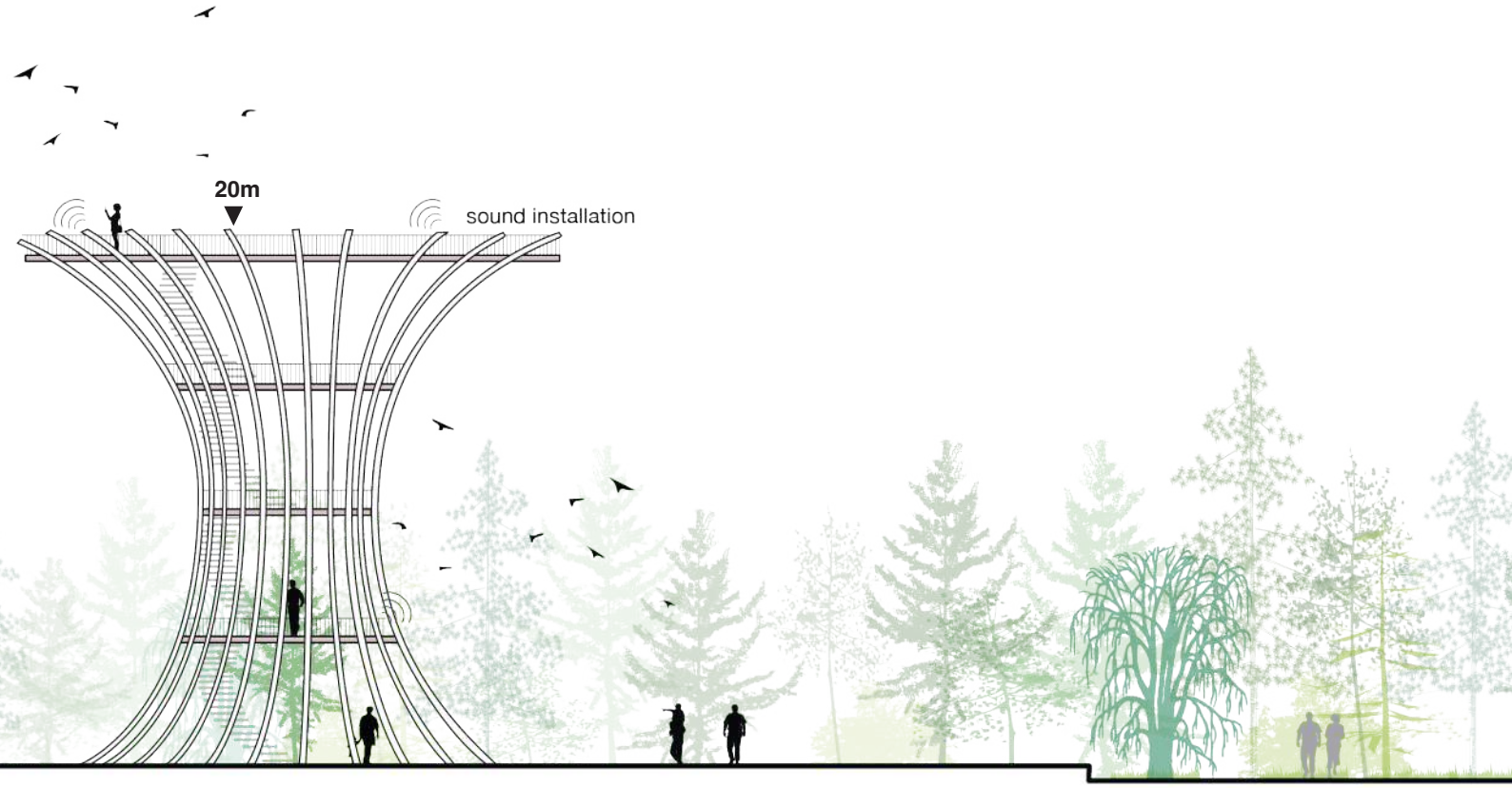
The sound tower is placed with views to the harbour, nature and city and at the same time sheltered from the streets by the trees behind it. The sound tower is an anchor of the harbour and connects the overall surroundings that can be observed and sensed. This recreational spot invites the citizens and tourists to stop and enjoy the nature they are present in. The tower can be reached by the pedestrian path along the water that runs from the entry to the city towards the nature area.





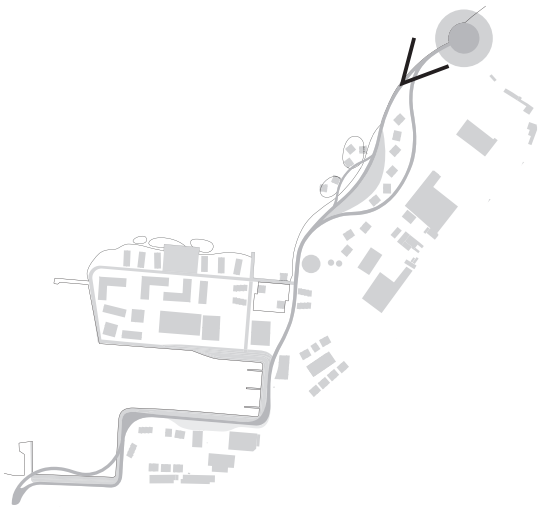
▲ Isometric sound tower 75x75 meters

At the sound tower, human is invited to sense the natural surroundings. The digital installments detect movement and release the sound that mimicks the nature that not only allows the human to interact with nature but also attracts species such as birds. The installed devices release the sound of wind, trees, waves and warbling birds.



▲ Sound tower section 1:200

SOUND TOWER VISUALIZATION

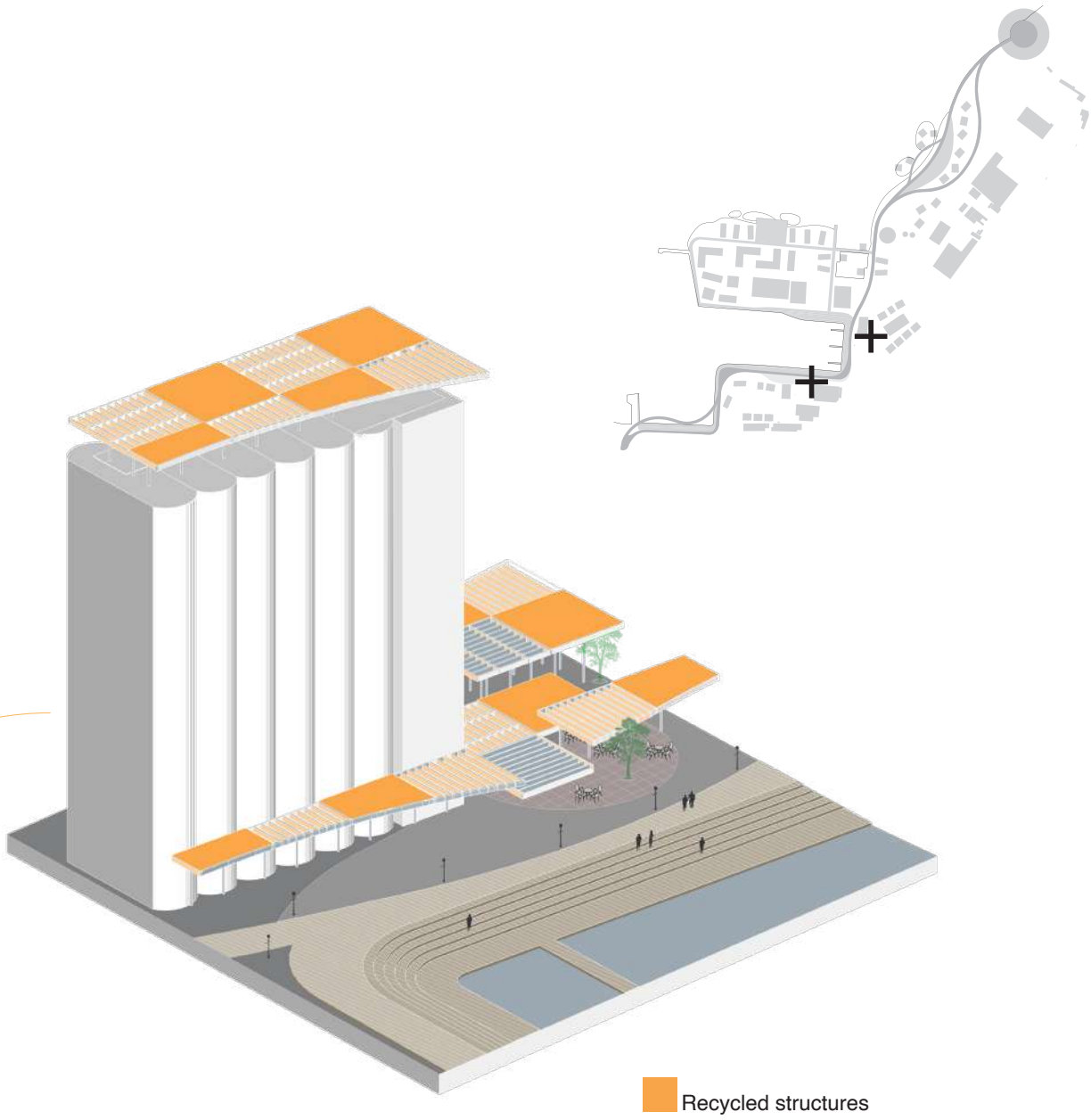


CIRCULAR MATERIALS

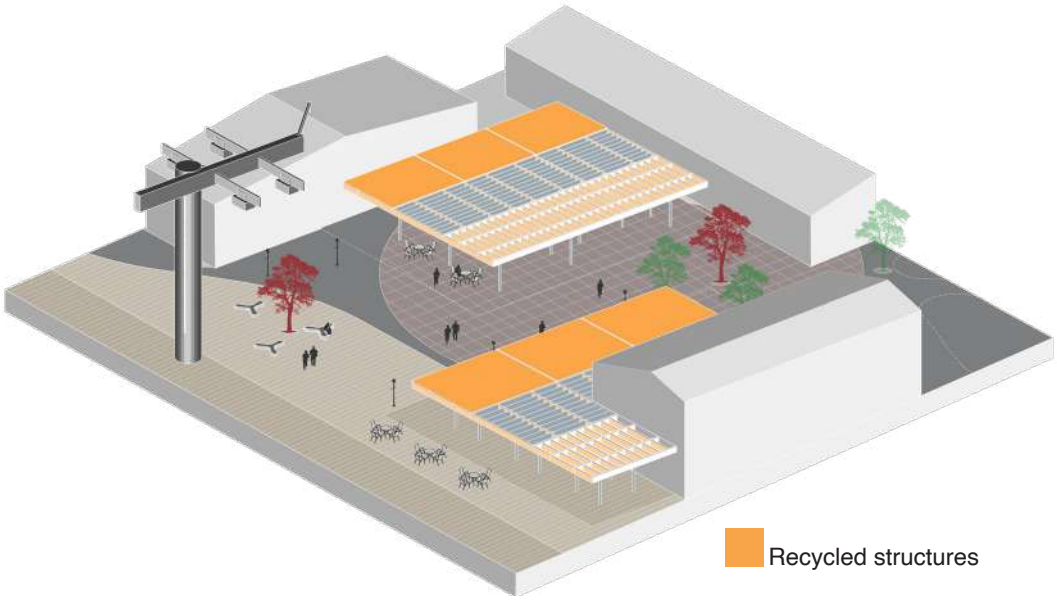
Due to the harm for the environment and climate change problems there is a need to reconsider of how we build. As a solution for minimizing new material usage and taking a step towards greener future, material reusage is being introduced in this development. The materials from demolished buildings on the site can be examined and evaluated to what extent they can be reused. The structures will be used to build canopies and shelters in public spaces that are lightweighted and easy to assemble.

As an example, in recent years 'Circle Bank' has been working with circular solutions with the cases around Denmark. It is a digital platform developed by CB Nordic ApS, which collaborated with both commercial and market partners towards the innovative solutions (Circle bank, n.d.). They are interested in sites that contain built structures and investigates their potential of being reused. One of the ways for Struer Havn identity to remain is consideration of old structures be brought to a new life.

▲ Buildings to be reused 1:10,000

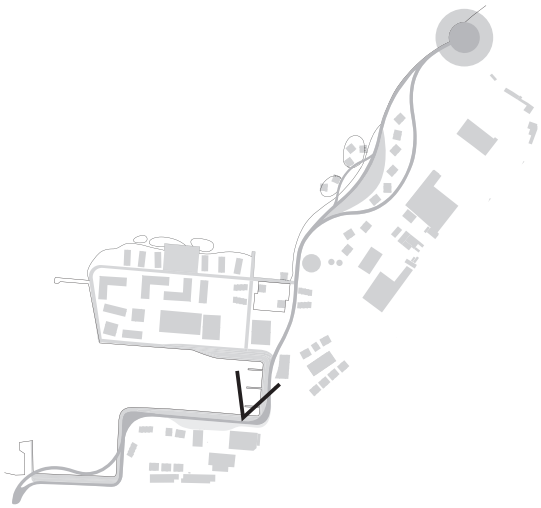


▲ Isometric culture plaza 65x65 meters



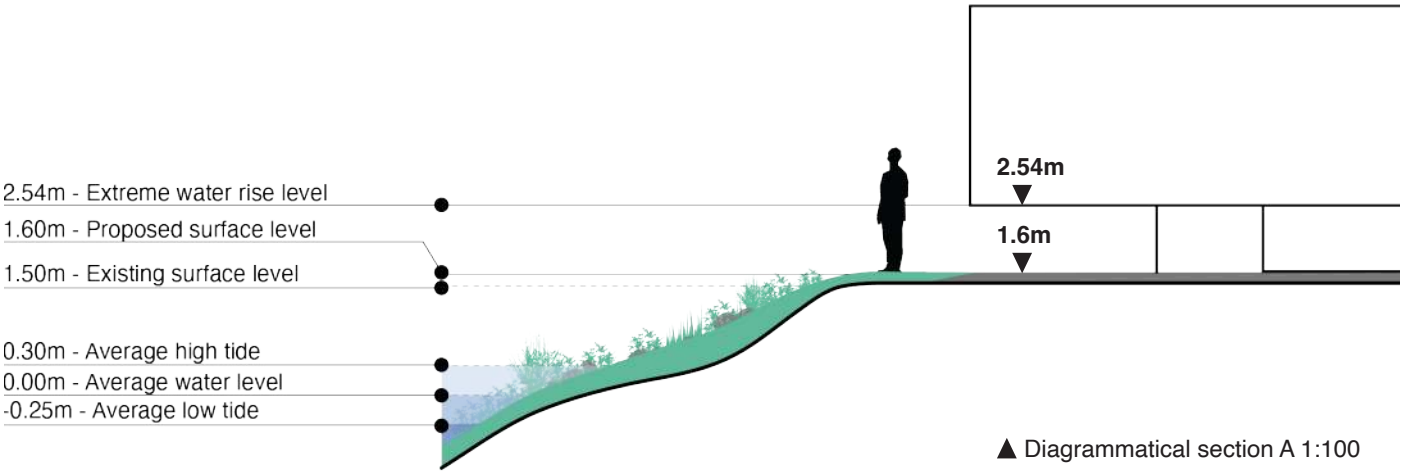
▲ Isometric community hub 65x65 meters

HARBOUR VISUALIZATION



WATER MANAGEMENT

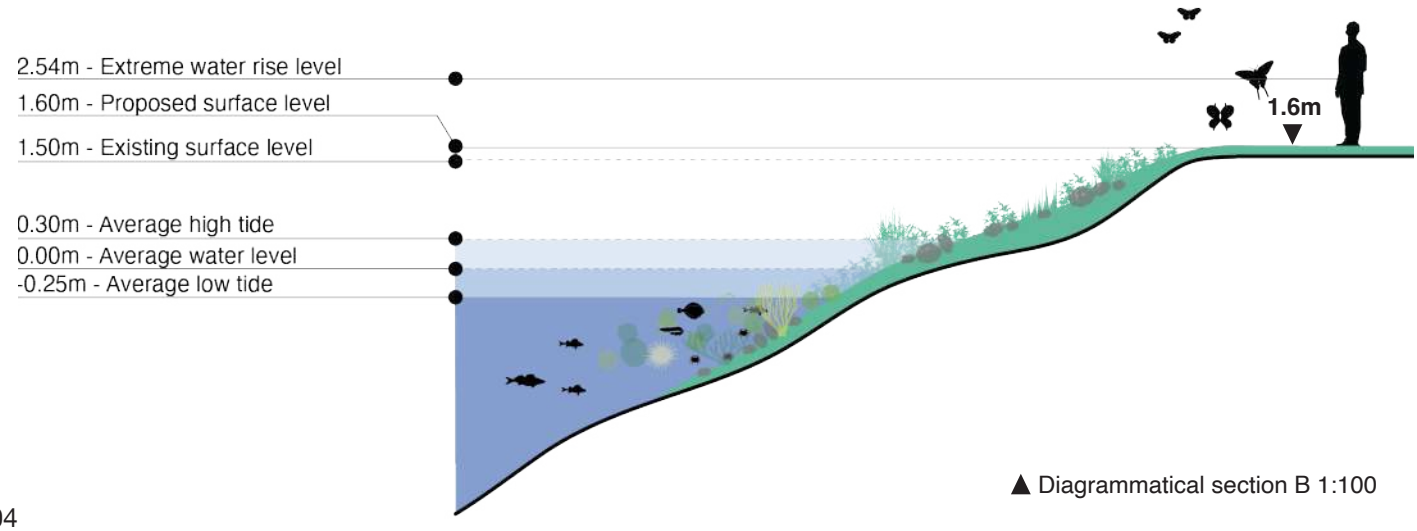
The flooding mitigation strategy on the site is to raise the competition area to +1.60m to be able to proof the site against rising sea levels and critical water level. Additionally, the proposal is to elevate the building's ground floor level and other critical infrastructure to +2.54m to be able to handle an extreme 100-year event). Basements will equally be designed to handle same flooding level.



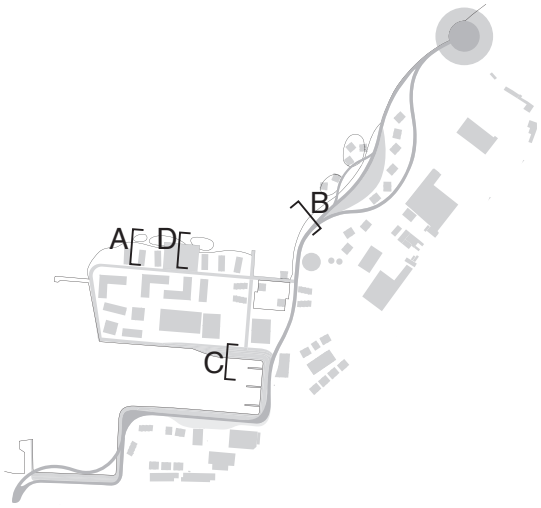
▲ Diagrammatical section A 1:100

The shoreline naturalization along harbour quay edge gives space for a new green landscape with biotopes and increased biodiversity that is inspired by the original and natural coastline using endemic plants species to restore wildlife above and below sea level.

NATURALIZATION

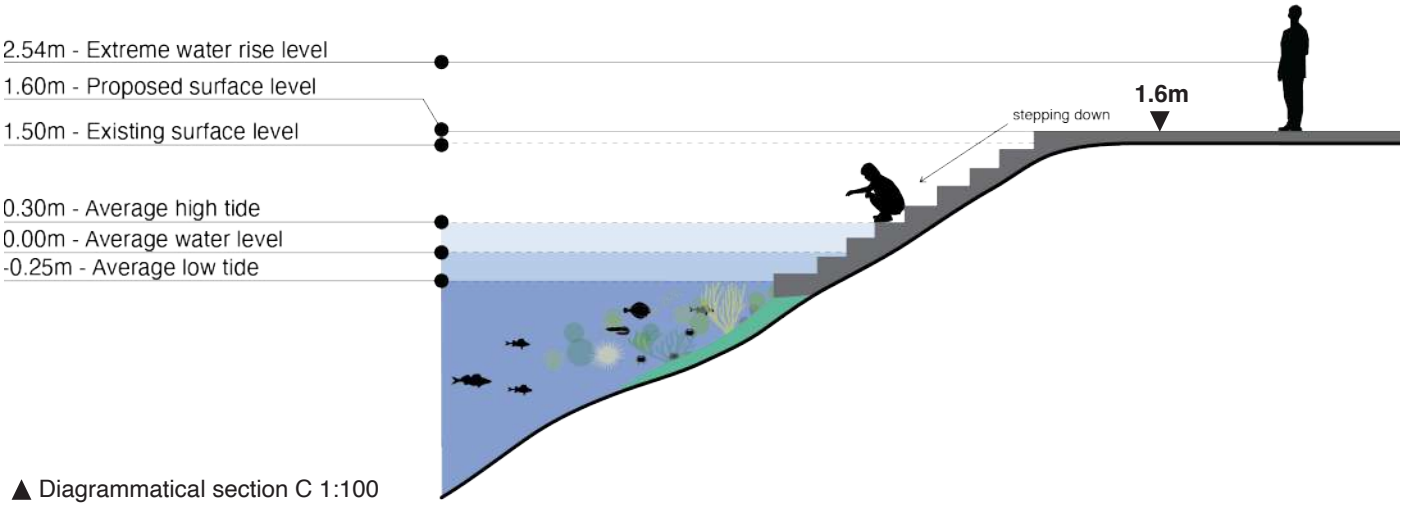


▲ Diagrammatical section B 1:100



STEPPING DOWN TO WATER

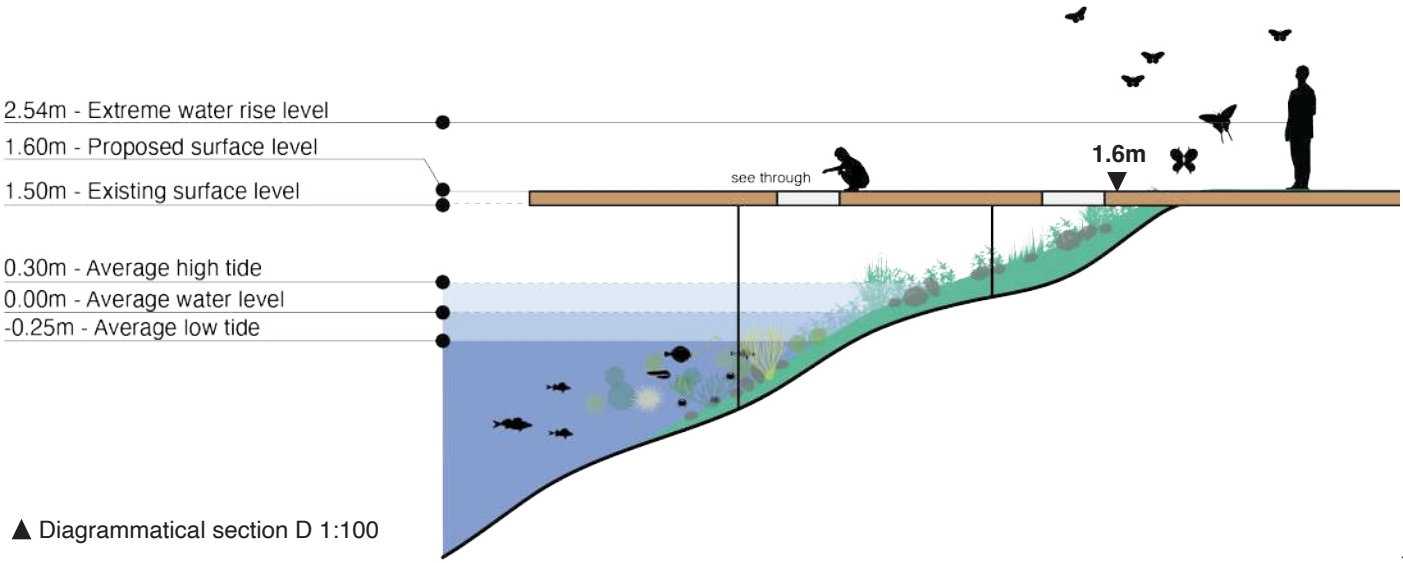
The public spaces along the promenade are designed as stepping down that softens and increases the access to the water as well as allows to walk along the promenade regardless the level of sea rise.



▲ Diagrammatical section C 1:100

WOODEN PROMENADE

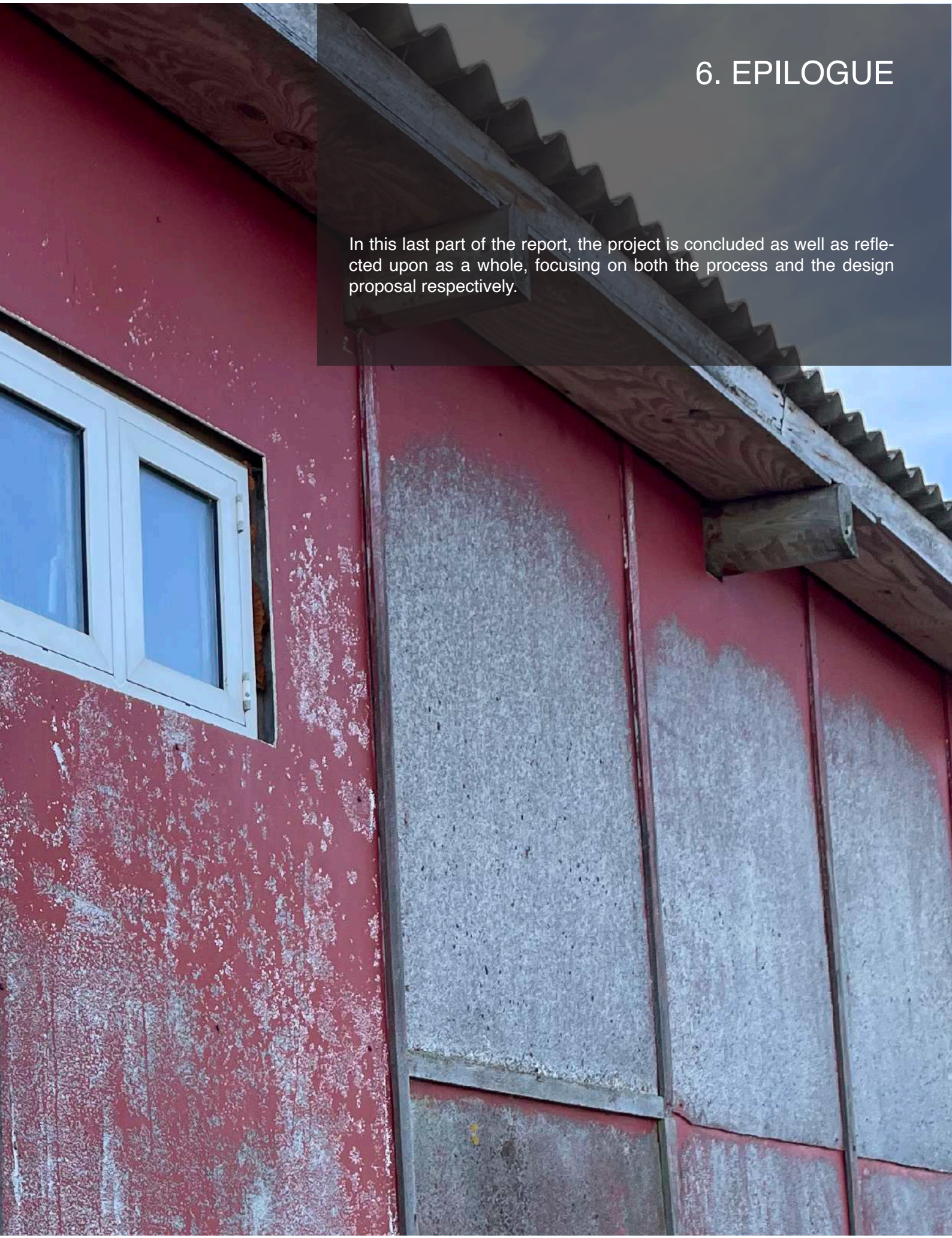
Rised wooden deck along the waterfront at 1,60m height ensures walking experience even at critical water level. To ensure a non slip decking, timber softwood gripdeck is installed where grooves on each timber plank works as brakes and has resistance from slippery.



▲ Diagrammatical section D 1:100

6. EPILOGUE

In this last part of the report, the project is concluded as well as reflected upon as a whole, focusing on both the process and the design proposal respectively.



CONCLUSION

In this thesis ”Post-industrial port redevelopment”, a suggestion of relinking the port to city and nature is presented. The finding of this project is that by basically creating a pedestrian promenade along the shoreline from the city to nature, this hereby also extends the experience of the harbour and provides a linkage to the surrounded areas. By challenging the straight coastline, the invitation for a meandering walkway is created. The other part of the aim is to investigate how existing cultural heritage can become an asset for Struer harbour and make it a destination for itself. The interaction with the sound of nature has been an important design driver that connects the harbour to surroundings by not only physical design of the promenade, but also through the experience of the natural sounds such as wildlife habitats, wind and water. Here the finding of planning the connection between the city and nature together with the activized cultural heritage and enhanced soundscape gives the place meaning and a clear purpose. A purpose as a livable place that invites to pass through and stay in.

Different theories and thematics have been selected in order to gain relevant knowledge to apply in the design process. The famous projects has been selected as sources of inspiration in order to gain even more creative approach (see Appendix I). Moreover, a visit to the city and meeting municipality members has contributed to the local understanding of the place. The design is presented as a masterplan where the main design element promenade is supported by strategies of how the whole harbour area can be developed around the promenade. Land use has changed, new buildings were added and green surfaces were implemented to make the site livable. This new vision can hopefully inspire us to be ambiguous and creative when dealing with climate adaptation and revitalization of the area. Taking the chance to propose an innovative solution, this project gives an opportunity to give back a multifunctional and inspiring harbour that collects us together and invites to have a conversation with the water and land, invites to move around, stay and live. This is the environment of the place that Struer harbour could be.

REFLECTION

As architects, urban designers and planners, we have a huge responsibility to create cities where people can live a productive, healthy and sustainable life. However, there is no succesful recipe of how can this be done. This report was inspired by Jan Gehl's methodology of placing public life issues at first. He believes that observing people and their use of public spaces helps to understand the issues in the area that needs to be at the forefront of urban planning. In Struer, harbour disconnection from the city and nature is the key problem that this design proposal tries to solve. Here, public life ends at the edge between the city and the harbour. This report focuses on relinking the post-industrial harbour with the surroundings and transforming it to a connector instead of barrier between the city and nature.

The project has been challenging in many ways but especially due to the ambition on working with the huge size of the project site. The large scale of the site leaded to a variety of ideas that was a challenge to tie them all together. This resulted of leaving some of the ideas behind and making priority to the ones that are the most important for the site.

The redevelopment of the harbour creates a connection through the project site. The masterplan shows an overall strategy of what implementations can be done, however, it is open for changes in a smaller scale. For example, it does not specify the use of furniture or vegetation as this was too detailed for such a large project site. Still, the more detailed areas of the main strategies are presented in this report. This is due to explain the main vision and ideas on a more detailed level. The focus is on the entry from the city area that is a starting point of connection, the sound tower area, that is an anchor of this connection and drop off area, that has a potential to become a meeting point and a place from where the harbour can be experienced by foot.

The project report answers the municipality's vision to some extent. Their proposed plan worked as a guideline in planning and design process. It was also helpful in order to understand the main focus points of the municipality. For instance, the choice of creating a pedestrian promenade was made in order to develop this missing connection with the city and nature that municipality strives for. Also, implementing sound to the entry and the tower will help to spread the idea of sound to the harbour area.

From the other hand, the idea of working with sound occured to be a challenge in this project as well. The primary idea was to work with revealing and enhancing the natural sounds in the harbour. This, however, leaded to adding man-made elements such as wind chimes at the entry and movement detectors that release the sounds of nature at the tower. Only natural sounds might not be visible with a naked eye and needed to be improved with adding artificial elements. If any implementation could be done for the concept of sound, analysing possibilities

to embrace the already existing sound can be even further developed.

One of the main learning points during the process was communicating with external collaborators such as municipality members. The expectations of the proposed municipality's plan seemed more compelled towards the realistic rather than the ambitious. To find the way of pushing the imagination further than only what is 'real' became a continuous process in this project. Our aim, as planners, is to push the imagination towards reality and provide the balance between them. Learning to communicate with people can be difficult but is essential in order to understand what the city actually needs. To strengthen the communication, a further involvement of town's community such as residents and important stakeholders would be a great tool to get a broader understanding of everyone's concerns. Furthermore, a more extensive observation on people's everyday activities can be another implementation for such a project. That might require more time and a variety of people from different fields (such as landscape or engineering) working on such a scale but can be helpful to discover more potentials of the site.

The overall process was strongly engaged with identity of the site (the value of industrial heritage), adaptability (consideration of adaptable design into the spatial constraints and mobility requirements) and integration (involvement of municipality's members and their expectations for the harbour development). At the end, the final result gave new experiences that will give a better understanding for future developments working with the site such as Struer harbour.

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ILLUSTRATION LIST

All images if not referenced are taken by the author.

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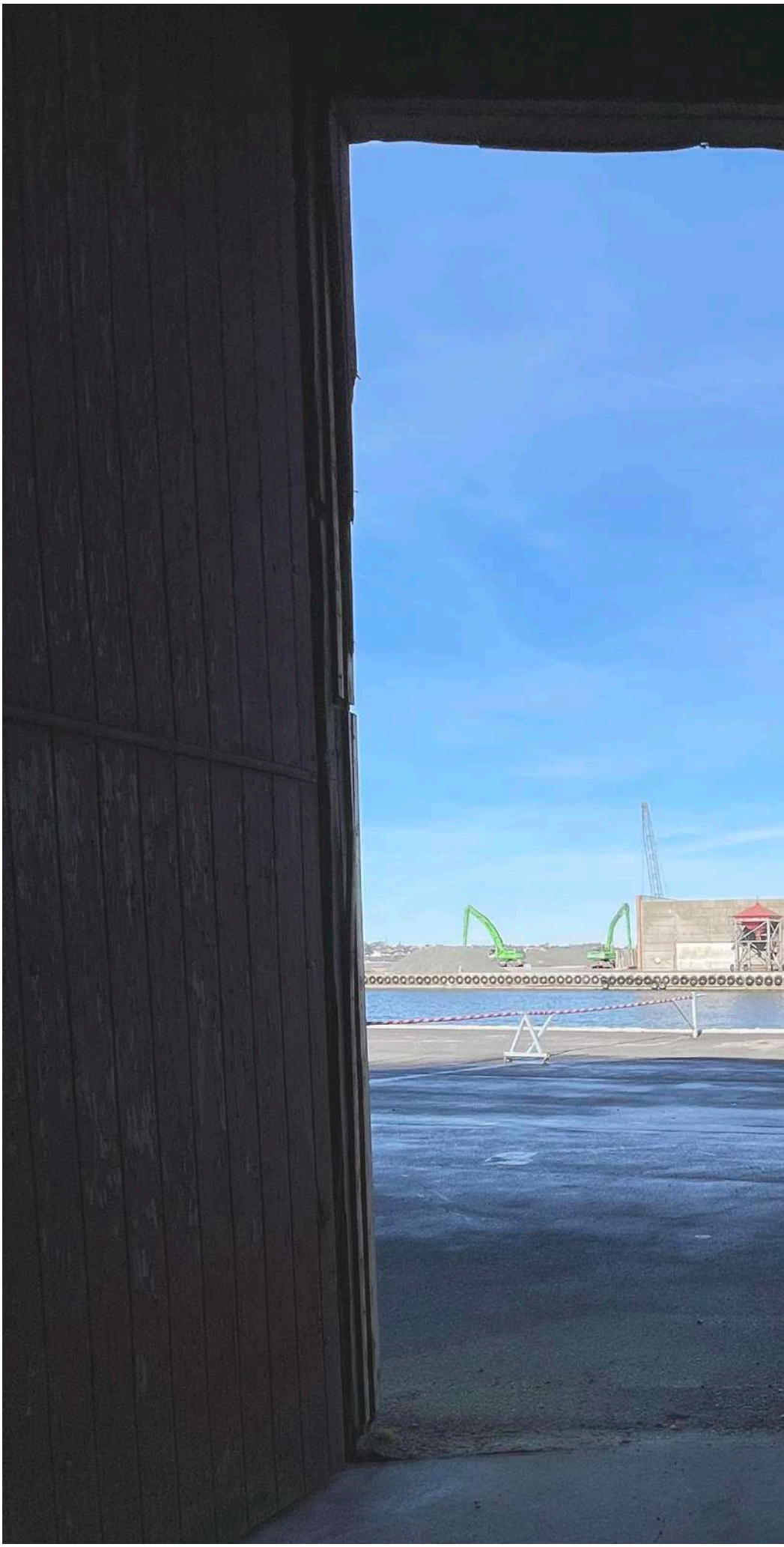
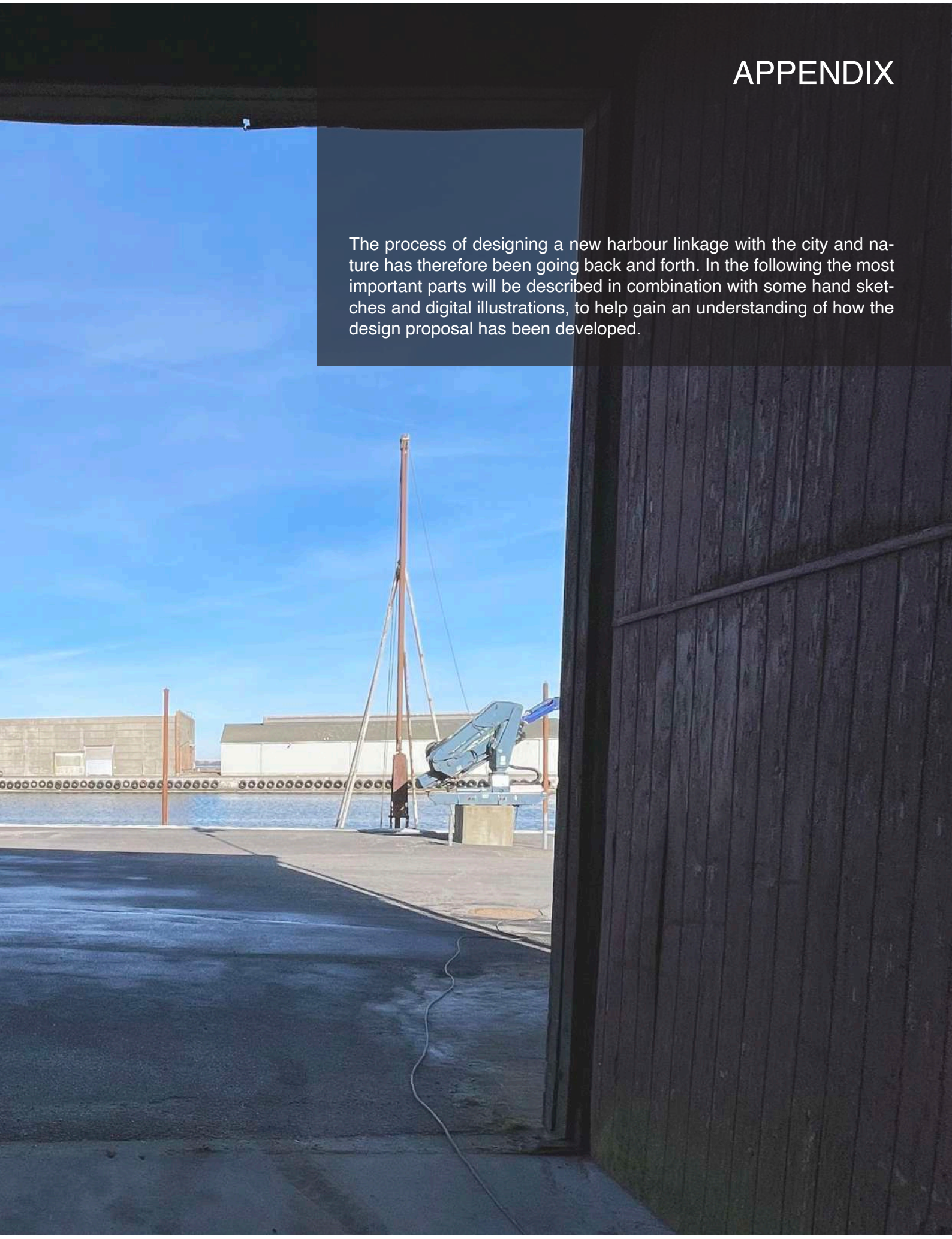


APPENDIX

The process of designing a new harbour linkage with the city and nature has therefore been going back and forth. In the following the most important parts will be described in combination with some hand sketches and digital illustrations, to help gain an understanding of how the design proposal has been developed.



APPENDIX A

RENTAL AGREEMENTS

▲ Harbour leases. Document provided by municipality.

APPENDIX B

OWNERSHIPS

▲ Harbour owners. Document provided by municipality.

APPENDIX C

ANALYSIS FROM SCALGO

APPENDIX C-1 (SOIL TYPES)

APPENDIX C-2 (NATURA 2000)

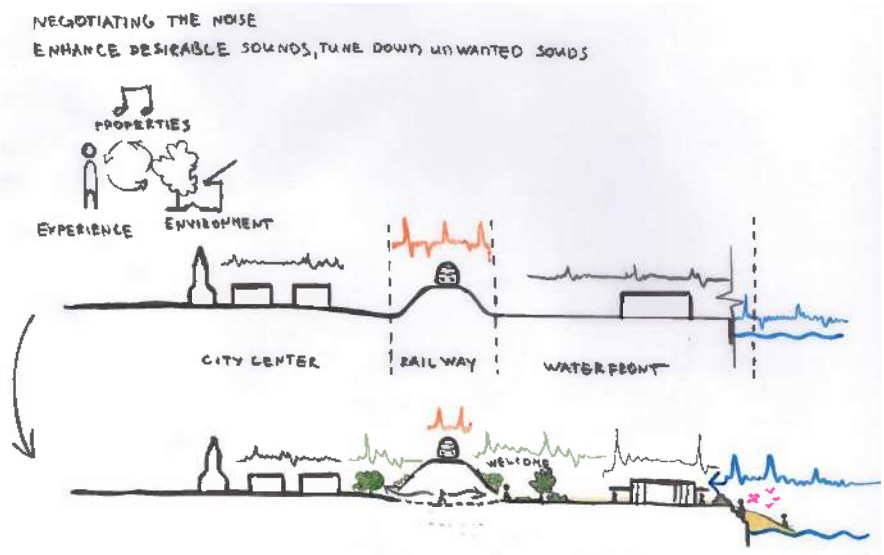
APPENDIX C-3 (RAIN FLOW NETWORK)

APPENDIX C-4 (SEA LEVEL RISE)

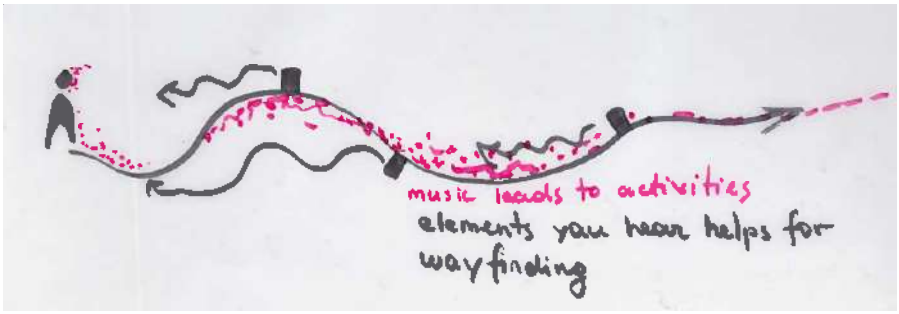
APPENDIX D

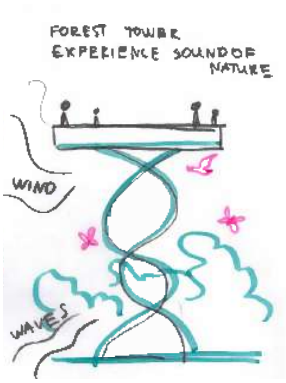
EXPLORING THE SOUND

To investigate the meaning of sound and what is the connection of sound with people.

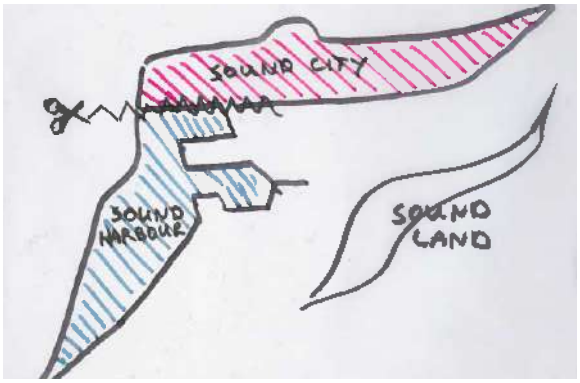


▲ The section between the harbour and the city. Providing different properties in the urban environment, the noise can be transformed into more pleasant and healthy environment to be.





▲Anchor of the habrour can become the place where the sound is experienced.

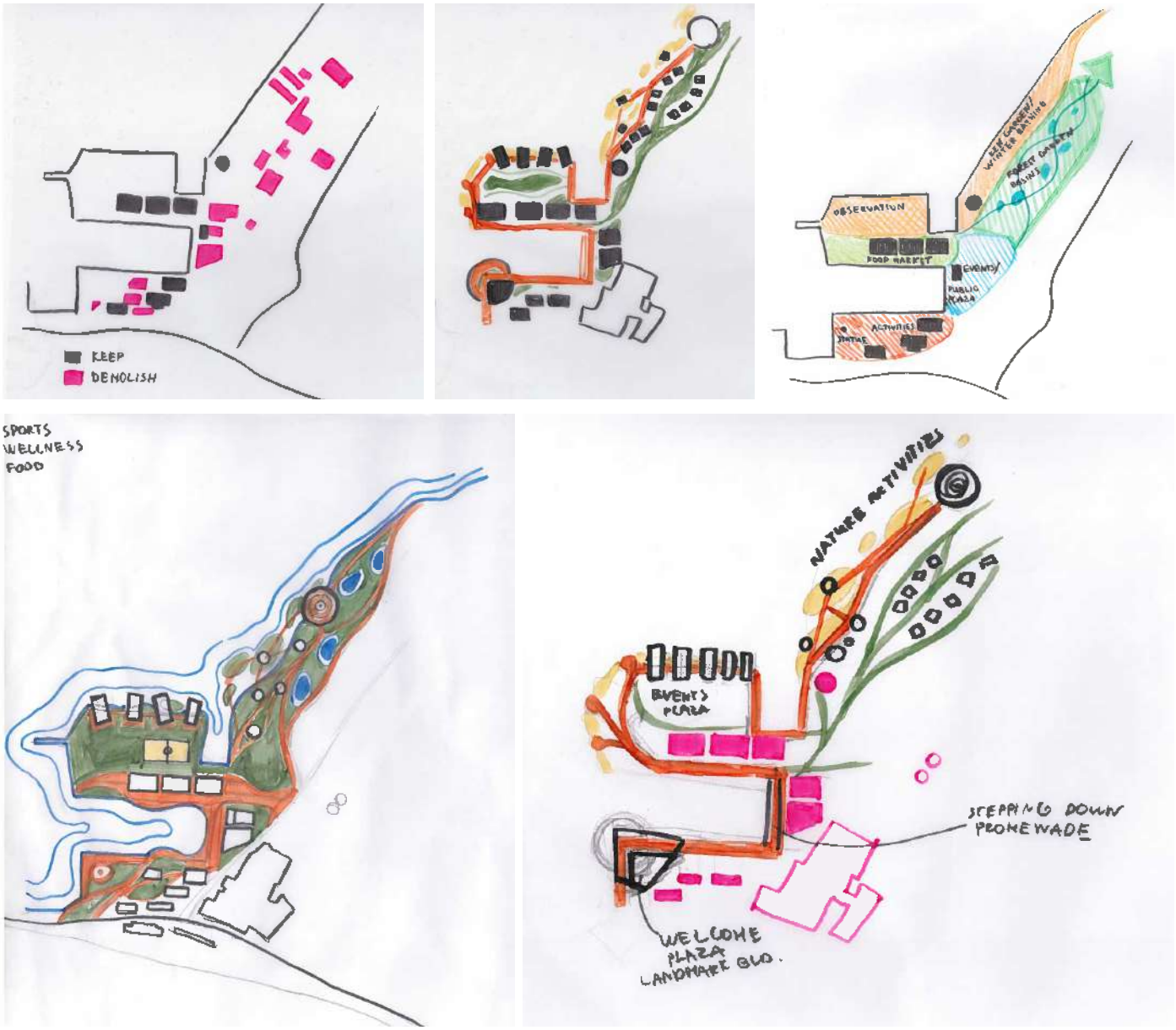


▲ Breaking the barrier between the city and harbour through the sound.

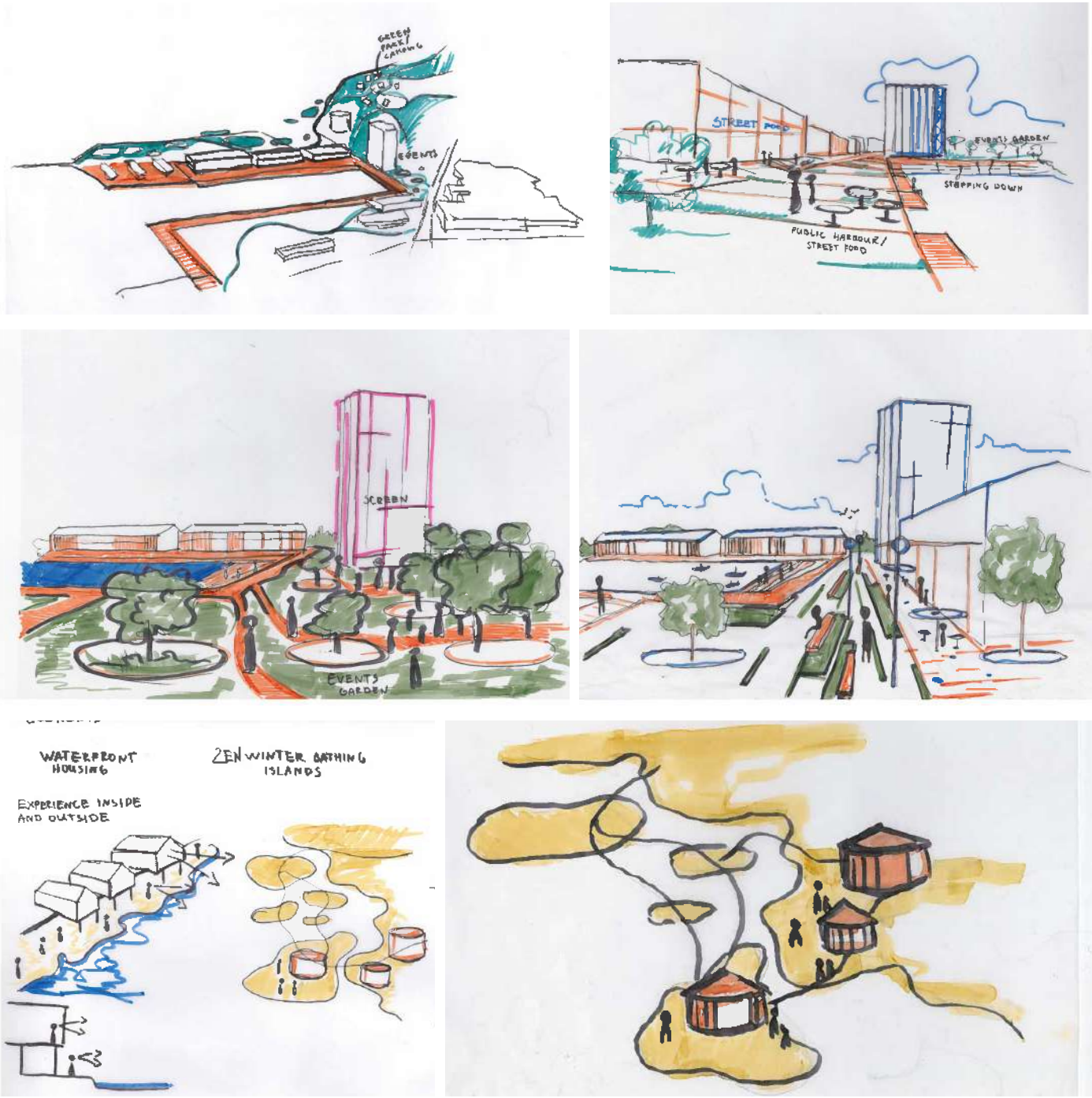
APPENDIX E

BUILT ENVIRONMENT

Processing possibilities of built environment and urban areas implementation into the harbour.



▲ Different iterations of building new and preserving existing.



▲ Atmospheres of urban spaces surrounded by industrial heritage.

APPENDIX F

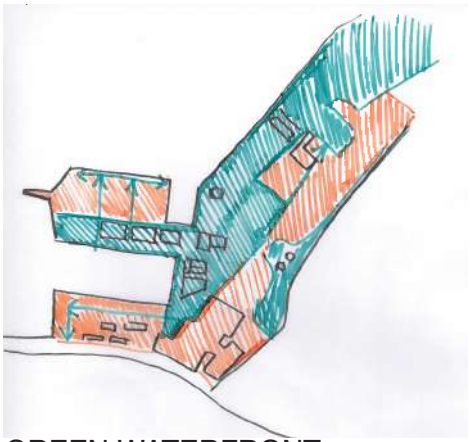
GREEN AND BROWN FIELD

Exploring the ways of balancing the existing brownfield by implementing soft surfaces into the site.

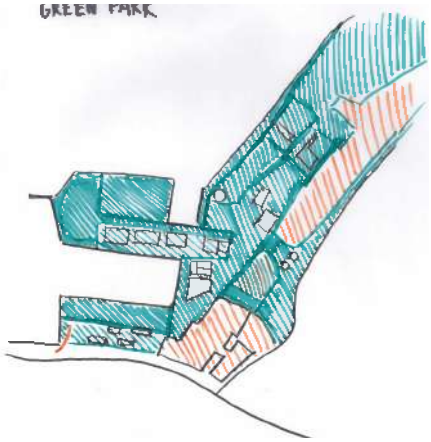
◀ Green infrastructure sketch

EXISTING SITUATION

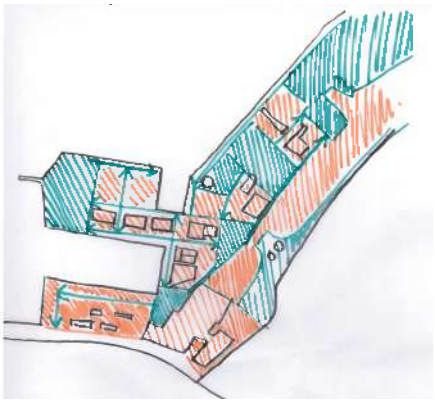
GREEN CENTRAL AREA



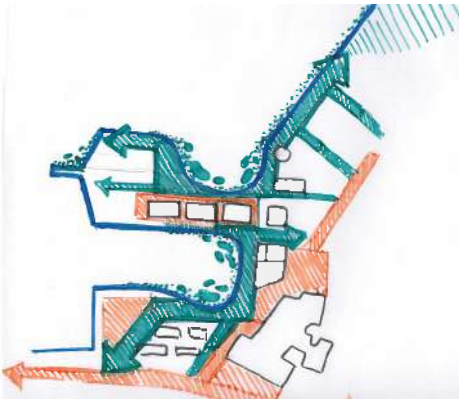
SITE AS GREEN PARK



GREEN SQUARES



GREEN WATERFRONT



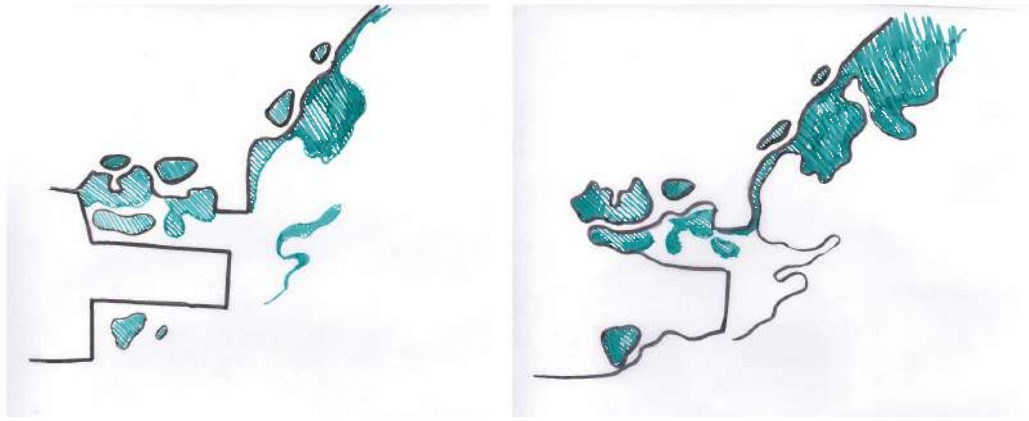
◀ Variations of hard and soft surfaces

APPENDIX G

SHORELINE NATURALIZATION

In order to find the way of providing shoreline that could handle rising water level and increase biodiversity, sevelar design solutions were taken into consideration.

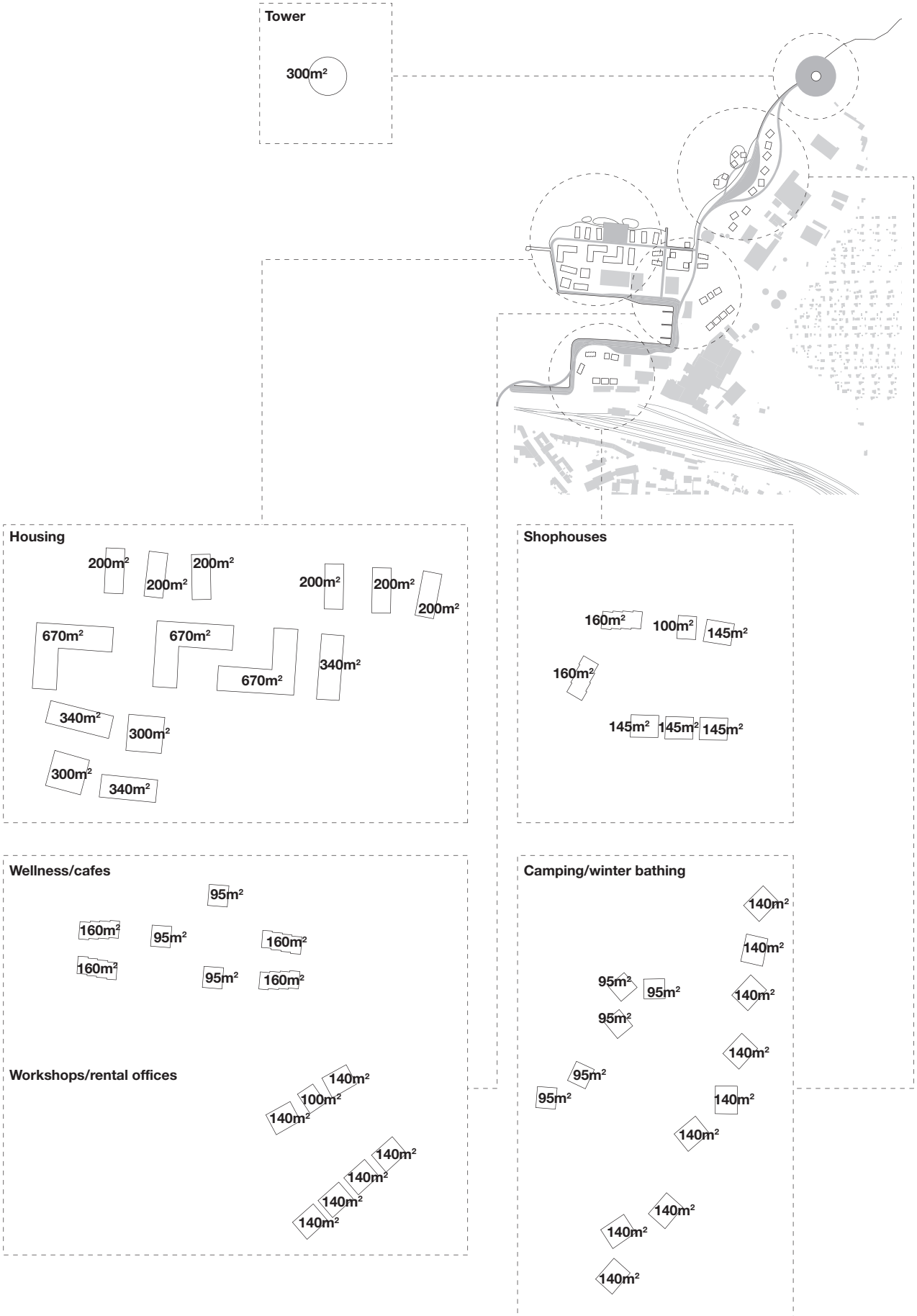
▲Sketch of the pedestrian path in connection to waterfront where green shoreline allows stepping closer to the water.



▲ Options of naturalization by following existing land relief. However, this solution might be too extreme to make and costly. The final version still provides natural shoreline but less extreme.

APPENDIX H

PRELIMINARY AREA SIZES FOR NEW BUILDINGS

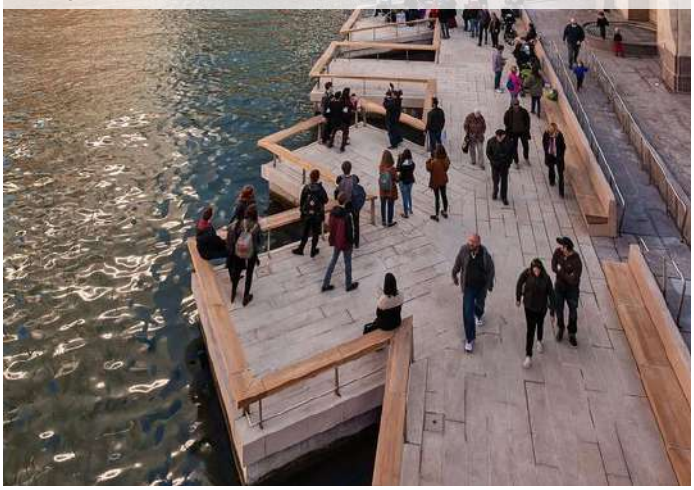


APPENDIX I

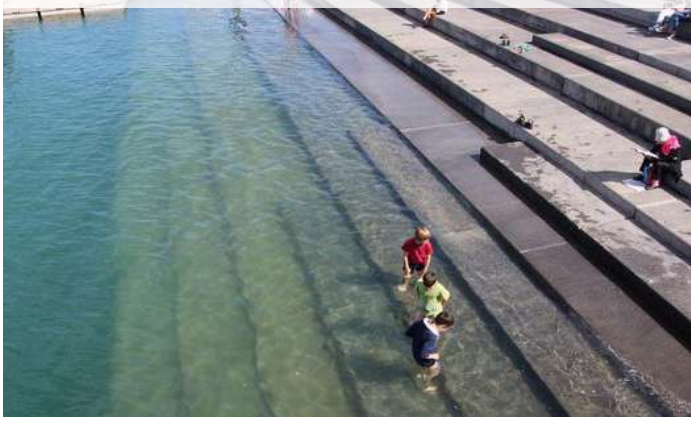
REFERENCES THAT INSPIRED

13th Avenue Design, Denver, Matrix Design Group

Chicago Riverwalk, Ross Barney Architects



Auckland Waterfront, Perry Lethlean&Scott Adams



Spruce Harbor Park, Philadelphia, Groundswell Design Group

▲ Promenade design

Floating Gardens, Vejle, Entropic

Wuxi Sansheng, Guangzhou, S.P.I. Design

▲ Green waterfront

Chimecco, Aarhus, CZWG Architects

ENEL pavilion, Milan, Piuarch

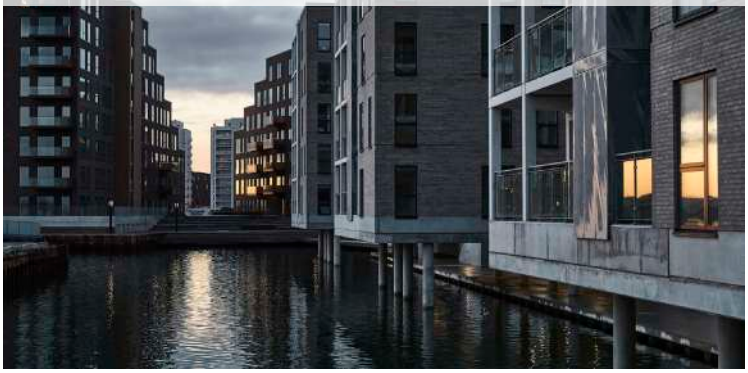
Japanese Garden

Sonic Mountain, Sonoma, Doug Aitken

▲ Sound

Japanese Shophouses

Jernlageret, RUM



▲ Living by the water

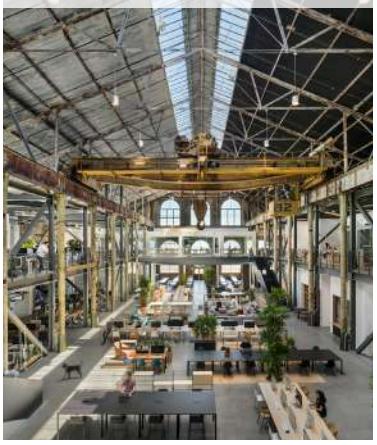
MOCAA, Cape Town, Seifen Architekten

Silo climbing wall, Omaha

Eidhoven, Atelier van Berlo

▲ Silo transformation

Distrito Oficina, MOV.IN Arquitetos



Streetmekka Viborg Build, EFFECT

Factory transformation, Bali, Jasmine Mariani

▲ Industrial transformation

Observation Tower, Xing Yuan, AM-

Forest tower, Rønnede, EFFECT

Jübergtower, Hemer, Birk

▲ Tower

Ugne Noreikaite