



# Lines to the landscape "Stad-Wad"



Design proposals for a stronger connection  
between cities ("stad") and Waddencoast ("wad")  
Lund University - Sweden  
june 2021



## INTRODUCTION

# Lines to the landscape, in search for a rural urbanism

It becomes more and more necessary to connect the rural countryside to the urbanised area's around. In Fryslân a relatively low densified part of the Netherlands, the 11 cities have always been well connected to the surrounding landscape but this system is under pressure due to new transitions in both the countryside and the urban area's. The challenge is to connect these different systems and find new ways to synthesize them in times where we are in need of new energy-sources, new ways of living and other ways of transportation. In Fryslân, land behind the dike, people have always dealt with the presence of water and now with the climate changes ahead, this creates the overall challenge of dealing with it in creative ways, using the water for transportation, floating villages and innovative agricultural landscaping.

The north of the Netherlands is surrounded by the Seadike . This creates both possibility to live there but also a barrier . Our second expedition creates a line trough the landscape from the city of Leeuwarden towards the dike in the north.

The student proposals create new sections of a future inhabited landscape , a living landscape where visionary transitions can take place , without disturbing the typical spatial qualities of the north . To connect the city of Leeuwarden and Dokkum and also the villages to the Waddensea new possibilities to inhabit the landscape arise , barriers becomes new connections for the future of the area.

*Alex van de Beld  
June 2021*

*Photo left page: satelite image of the "Blue Delta"*

## INTRODUCTION ON THE ASSIGNMENT

### Imagining “Stad-Wad”

Leeuwarden/Friesland has taken the initiative towards 2028 to emphasize urgent transitions that will take place in the landscape and in the cities. Being part of the region ‘north’ in the Netherlands, specific qualities are in focus, such as open landscapes, variety of water, the Waddenarea with the islands and a cluster of small and medium size cities in close relation to this landscape. In 2022 a cultural manifestation in the city will follow up on 2018 where Leeuwarden was cultural capital of Europe, and in 2023 the Landscape-triennale will visit the province around the Waddenarea. ‘Lines to the landscape’ is a long term design-research programme and can be a major LAB- programme organised around the upcoming manifestations.

In the North of the Netherlands the amount of inhabitants living there is only 20 % of the whole population in the Netherlands. It is peripheral both in density and in mindset of the inhabitants even though the Randstad is only 2 hours away. The similarities with ‘Skane’, the biggest

province in the south of Sweden is striking. The relatively big cities Malmö, Lund and Helsingborg are similar in size as Groningen, Leeuwarden and Assen. Even though the number of inhabitants per km<sup>2</sup> is somewhat less than in the north of the Netherlands, the area has also always been peripheral in relation to the capital of Stockholm. The province of Skane struggles like The North of the Netherlands with the rise of the (sea)waterlevel, agricultural transitions in the landscape and the threat of natural areas and the decrease of biodiversity.

The initial results of ‘Lines to the landscape 1’, where the city of Leeuwarden is connected to the surrounding landscape of the Veenweiden, through a layered system of circularity, (local, regional, national and global) is a research programme that tries to deal with the future tasks in new living environment (Spoordok and Hegewarren). Changing circumstances can be visualized through ‘speculative architecture’ and spatial narratives in the changing landscape, dealing with the Sustainable Development Goals in a fluid academic research.



The “terp” of Hegebeintum - the highest terp in Friesland

The idea behind the research is that it will not only take place on paper but also in real time/space with urgent tasks and programmatic issues. This first expedition in the series ‘lines to the landscape’ with the students architecture/urban design of Lund university took place in winter 2020. 10 proposals were created for spatial and social connections of new food/energy landscapes in Hegewarren to a future development in a new city centre of Leeuwarden.

#### *Lines to the landscape 2*

In the second expedition of lines to the landscape 2 (taking place spring 2021), Leeuwarden will be ‘connected’ to the Waddensea area. Turning the idea of a ‘shrinking region’ into provocative scenarios for the future of villages and landscape. Could Leeuwarden be located once more at the Middelsea as a learning city for the future? Could Dokkum be the main city in a cluster of villages on the edge in the coastal cityscape of new “terpvillages” and temporary housing?

#### *The expedition ‘Stad-Wad’*

‘Lines to the landscape’ as a research programme, contributes through speculative research in the field of spatial and social planning in order to build a ‘resilience cityscape’ for the future. Fryslân like the region of Skåne (Lund/ Helsingborg /Malmö) can become an example for a healthy living environment and a wide prosperity for all. Europe needs

examples for foundation of future regions as an alternative for global urbanization.

#### *Inside the countryside*

How can Leeuwarden both physical and fysical be re-connected to the Waddensea, and therefore find again its place in the surrounding landscape. The challenge for the students is to re-connect Leeuwarden with the ‘terpenlandscape’ around Dokkum and to the south of the ‘seadike’. Through challenges of the rise of the seawater levels and agricultural transformations in the cityscape alternatives will be found for ‘future shrinking’ in a new syntheses between countryside and urban clustering. The 9 student proposals are putting focus on this multilayered questions by visualizing the possible transformation of villages in the countryside, by concepts of temporary housing, moving villages and new landscapes.

The results will be presented as a peripherama in the autumn of 2021: looking inward and outward at the same time. We will envision the connection between landscape into the city and the habitat of the ‘citizen’ to the landscape. Expedition 2, ‘imagining Stad-Wad’ will learn us about the potentials of living in a cityscape in a landscape below sealevel.



The study area in a broader perspective of the Waddensea World Heritage Site

## FRISIAN COASTAL AREA Landscape development

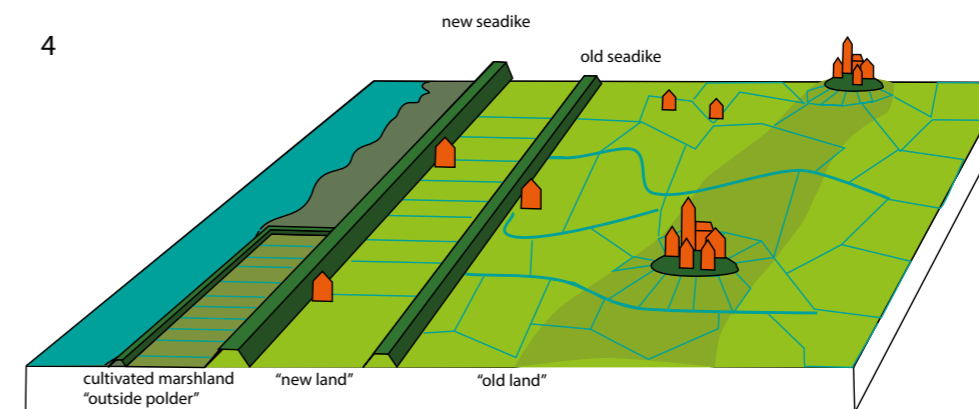
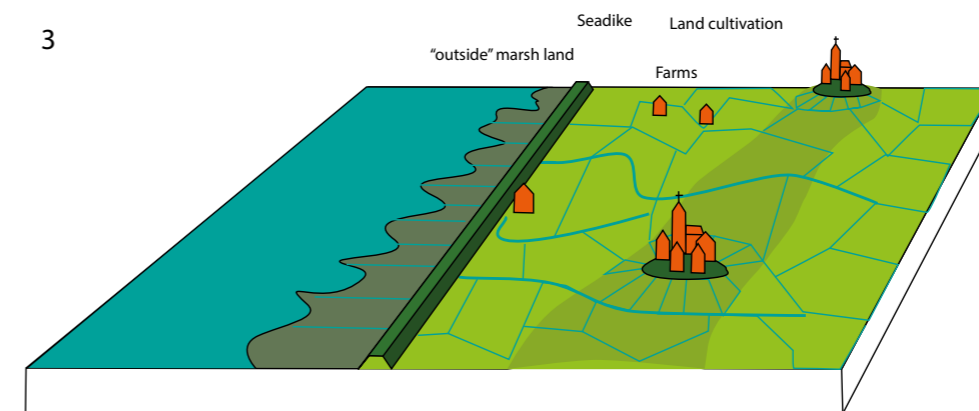
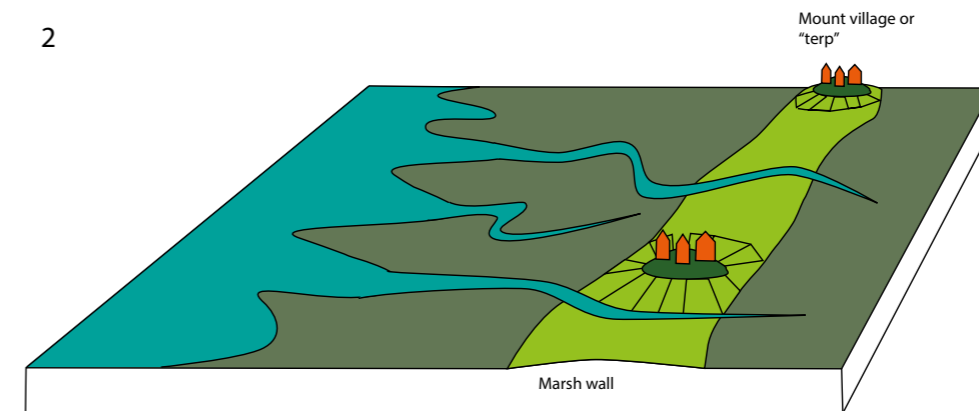
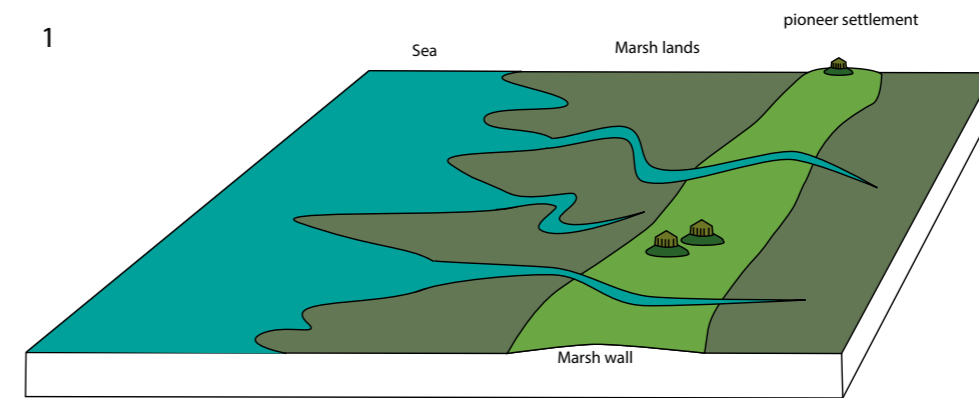
The Frisian coastal area is part of a large spatial system of the "Waddensea" and therefore does not stand on its own.

The landscape has been evolved under the constant pressure and struggle with the sea. In the illustration at the next page, the process of this landscape development is explained.

At a certain time people got more control of the unpredictable character of the sea. By building dikes and creating new land, the sea was not a real threat anymore. The further development of the land was now possible.

Some characteristics of the current landscape are:

- A wide and open meadow and dairy landscape with small villages on "terps"
- A very strict boundary (dikes) between land and Waddensea: the historic connection with the sea has been lost
- Top potato-cultivation in the northern area next to the seadike
- Leeuwarden and Dokkum are the main cities. Villages nearby function as commuter villages but other villages further from the city are facing a decline in facilities
- Farming gets more and more industrial with a decline in biodiversity as a result.



### The development of the landscape in highlights:

After the last Ice Age, the warming climate does the ice melt and the sea gets closer and closer to the current coastline. The area is always under the influence of water. Because the sea gets more calm, more deposition can take place and banks (marsh walls) are formed parallel to the coastline. These higher soils are fertile and the first pioneers settle in the area: artificial residential hills ("terps") are erected and are increasingly elevated over the centuries. Individual residential hills (terps) grow into small villages. The sea remains erratic and the clay area remains vulnerable. Dikes are now being built on a larger and more coordinated scale by monasteries. Behind these sea dikes new land is reclaimed on the sea and thus fertile "new land" is added to the village area. With the increasing certainty of dike protection, the protected function of the terps decreases. Soil from the terps turns out to be extremely fertile and many terps are partially or completely excavated. However, the function of water-courses continues to play an important role in transport until far in the 19th century. The orientation and dependence on the water remains essential for village and city. This changes with the entry of modern car transportation by roads.

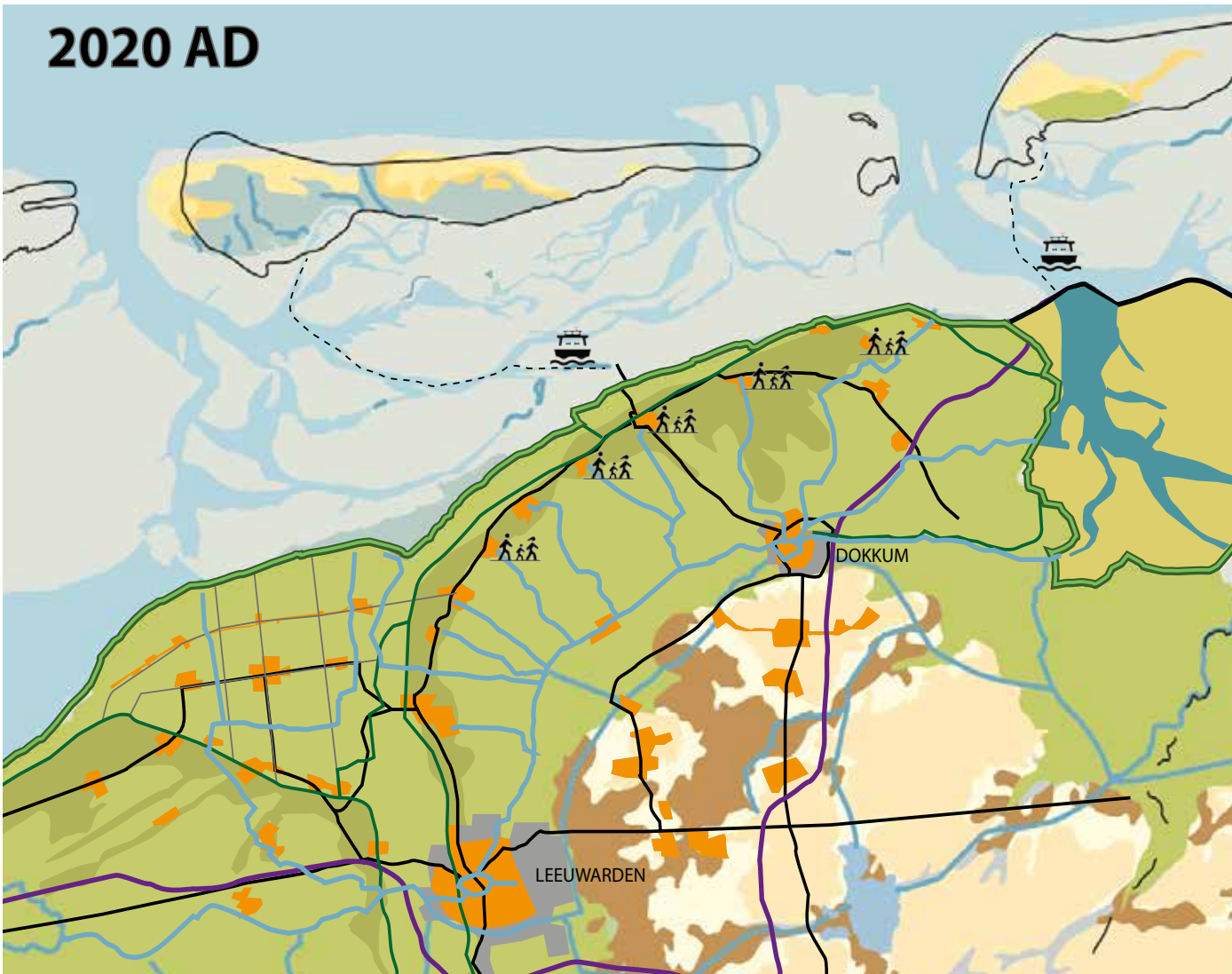


Image of the landscape and social-economic features of the coastal area

## Social and demografic development

The region of northeast Fryslân had to deal with a shrinking population and a decrease in social facilities. Due to less economic perspective, younger people has left the region. Social facilities such as primary schools are under pressure and also the amount of shops are decreasing. This again has a negative effect on the growth of population. This is not an unique

phenomonon: parts of the country that are situated in the periphery are always struggling with social-demografic challenges: how do we give a sustainable perspective for the (younger) inhabitants?

The outcome of the Frisian population prognoses for the coming decennium, has similarities with other peripheric regions:

- Hazing (less younger people)
- Double effect of aging (number of older people increases and people are getting older and older; average age increases)
- Population decline in Friesland not unique
- Suspected turnaround population decline prognosis 2020 later than prognosis 2016
- Corona effects are uncertain

In the grafic on the right side, the development of the population of Friesland till 2050 is visible.

Illustated by some numbers:

2020: 649.000 habitants  
 2040: 630.000 habitants  
 Decline -19.000 habitants

2020: 140.000 65+  
 2040: 188.000 65+  
 Growth + 48.000 / + 35%

The challenges the region stands for are:

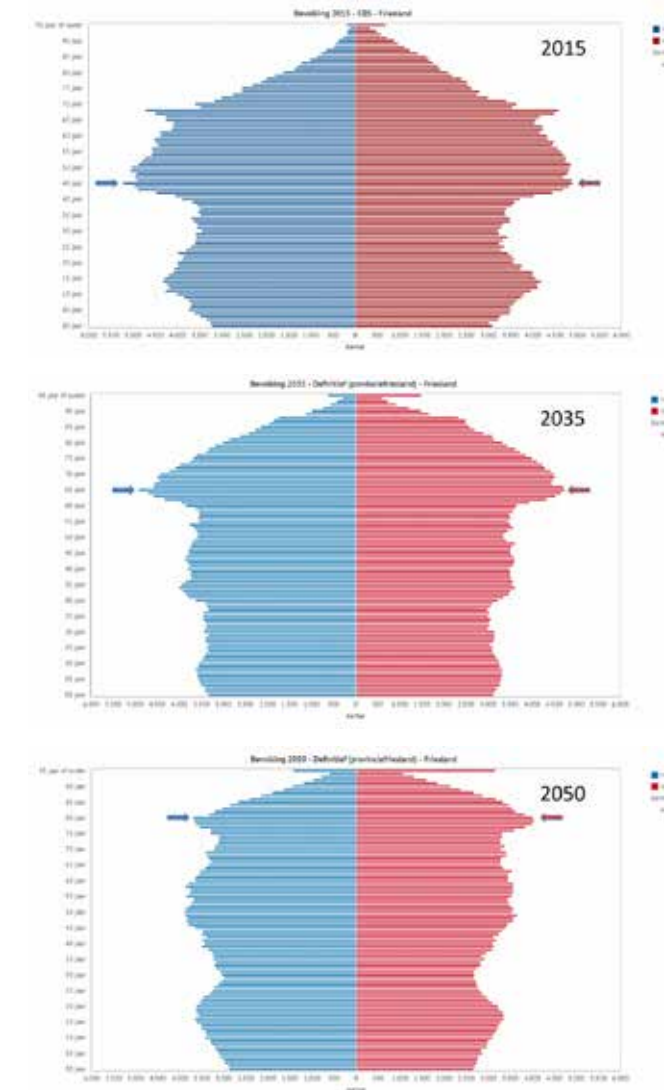
Not the quantity but the quality of housing is the issue.

Mismatch of supply and demand on the housing market; there is a lack of suitable homes for young families, older people (lifespan-proof) and single households.

Renewal of housing stock therefore is needed (re-designation of buildings, transformation, demolition).

How to ensure the quality of living, the liveability of the region, despite the demographic decline?

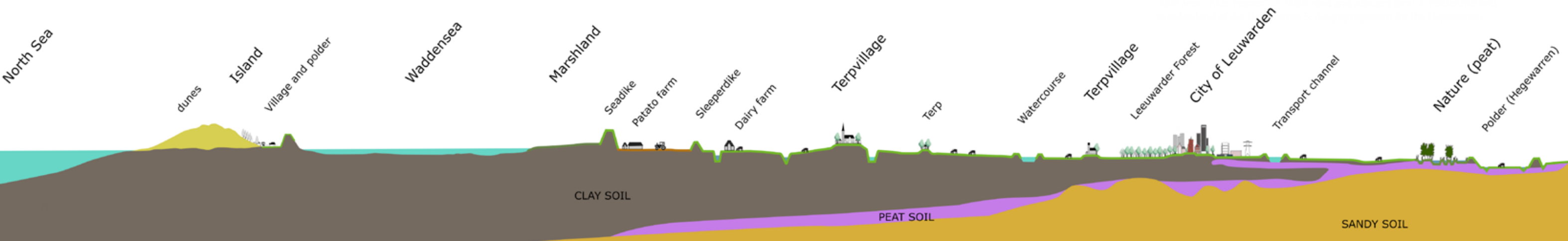
How can we meet the current demands of suitable homes on the short term without causing an



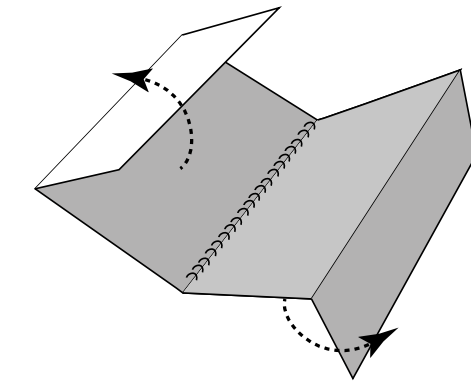
irresponsible expansion of the housing stock, leading to decay and abandonment of the existing homes in the long run? How can temporary housing be supplied?

How can we renew the housing stock and strengthen the characteristics of the villages and the landscape values of the region at the same time?

Image below: a cross section "stad-wad" from the city of Leeuwarden at the right side through the "terpenlandscape" to the seadike and Waddensea at the left side.



Folding instruction design results



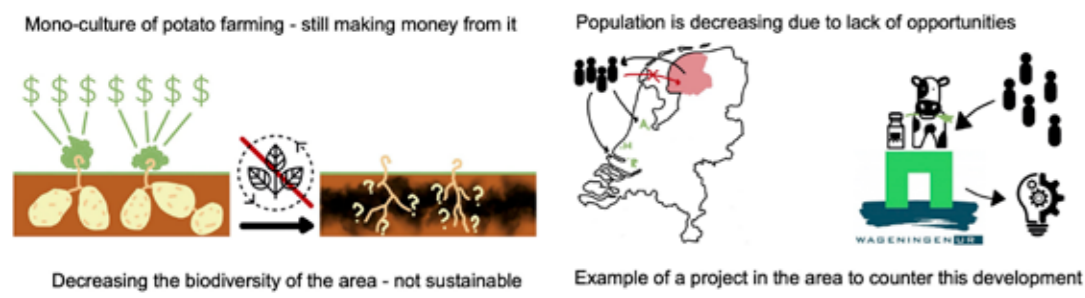
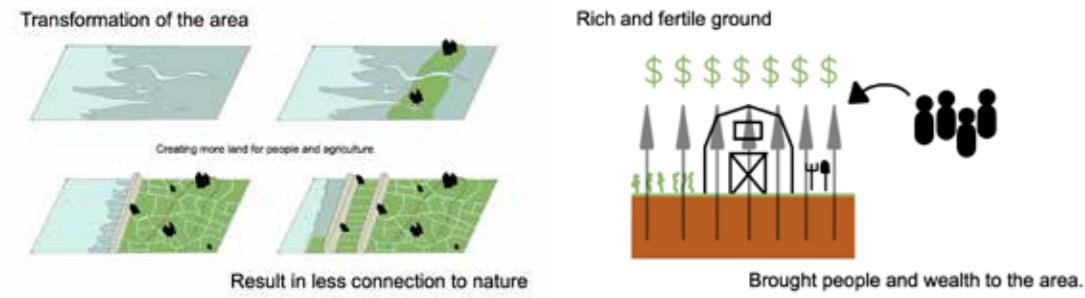
## Results from the design expedition

Lunds university 2021

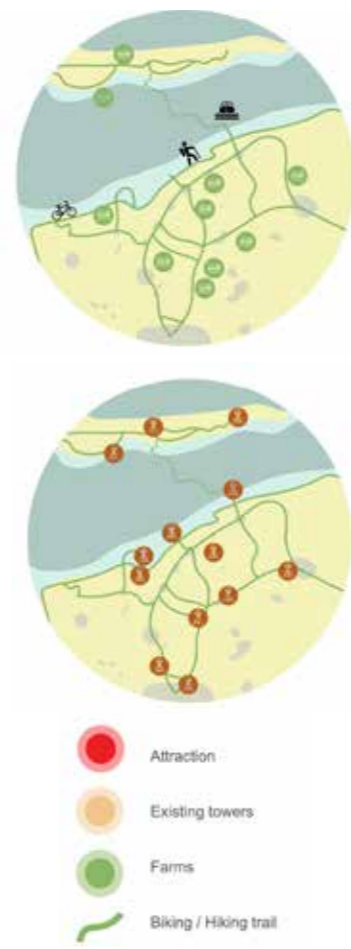
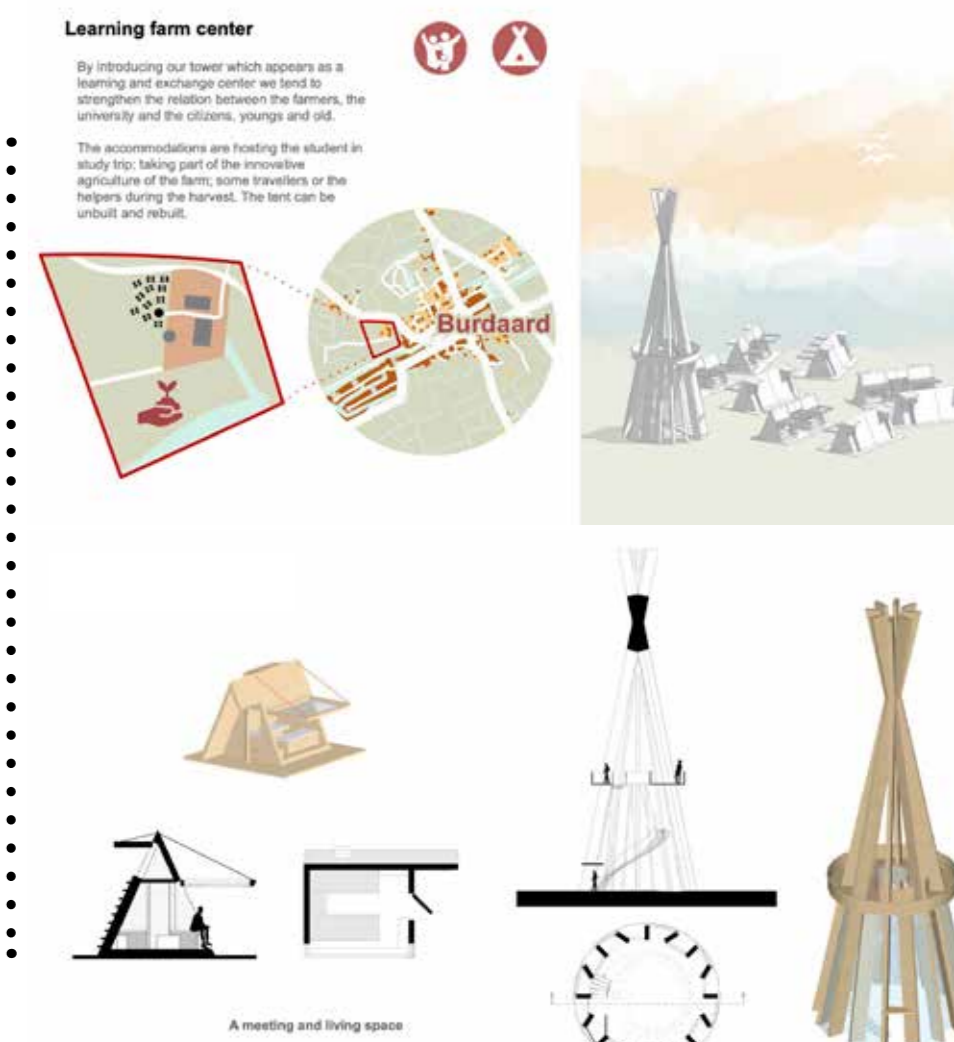
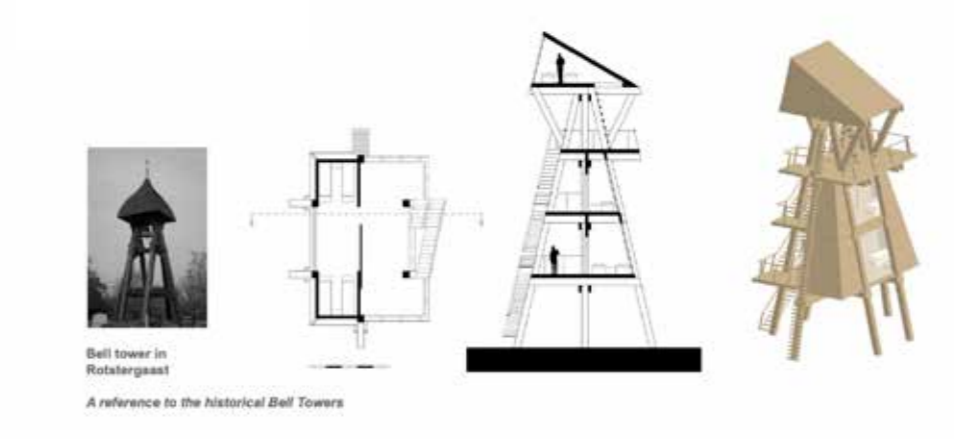
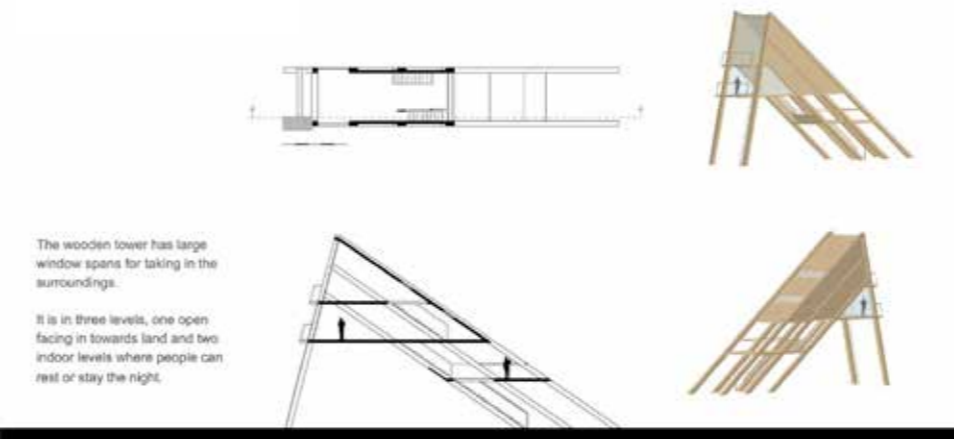
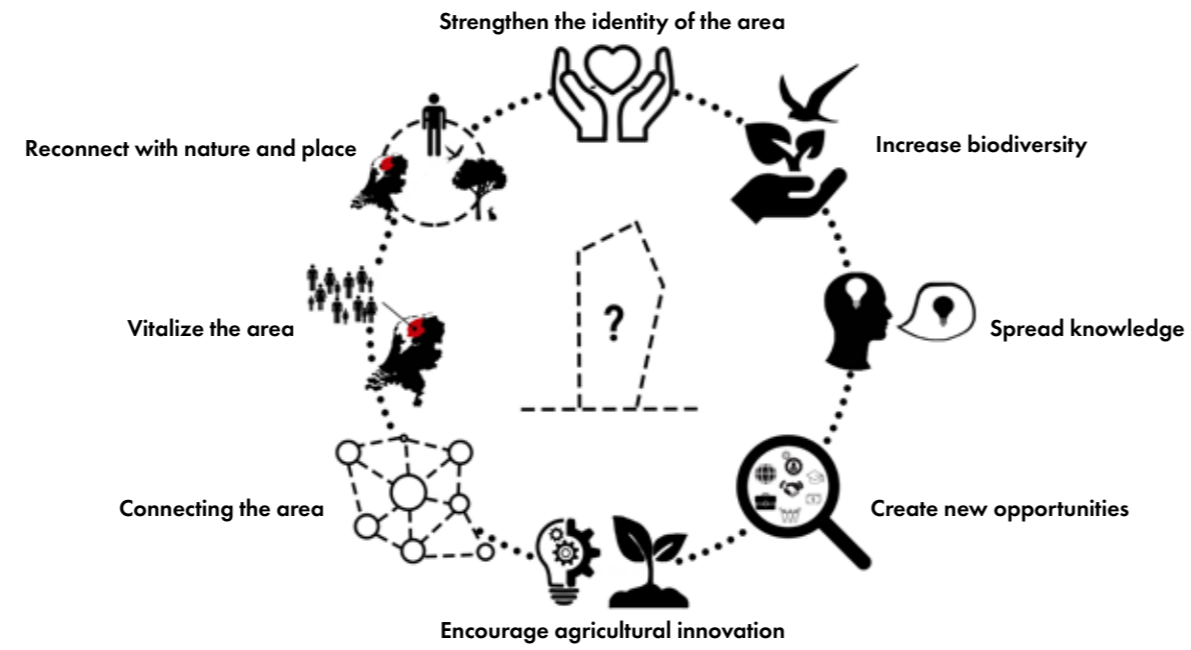
The next pages show the design results of the expedition. Each group has made a spread of 4 pages in which there results and solutions are presented.

- Group 1 *Expanding the horizon* - Unni Mattsson, Valentine Fresse and Ríkarður Már Ellertsson
- Group 2 *Pilgrimage through Friesland* – Sina Rozibay, Katharina Frank and Martin Blivik
- Group 3 *Dokkumer Ee* – Marlena Schulz, Susanne Gehlert, Carmen Povedano Olleros and Ellinore Hansson
- Group 4 *Knowledge City* - Anastasia Chatzikonstantinou, Hao Wu, Chuge Liao and David Ajigbolamu
- Group 5 *Beyond the dike* – Chloe Hébert, Ruben Epping, Sofia Eftermiddag and Leonie Blum
- Group 6 *Between Terps* – Albert Wischer, Niloufar Aghili, Defne Kucukayalar and Burak Ertuğrul Güney
- Group 7 *A path to the sea* – Josefín Antus, Anton Ljungdell and Anton Hansfeldt
- Group 8 *The Oyster Cluster* – Alina Kandyba, Chase Gause, Isak Tengzelius, Md Baiyazeed Hassan
- Group 9 *Prototyping Friesland* - Joel Bågesund, Vera Bergström and Hanna Høibø

# Expanding the horizon



Friesland, the Northern region of the Netherlands, is facing demanding challenges in regards to the environment. The water levels are threatening the area, sea dikes are raised resulting in less connection to nature. The rich and fertile ground is being exploited, used for industrial agriculture that drains the land and decreases biodiversity. Friesland is in need of Expanding the Horizon, finding new solutions for how to regain connection to nature, richness of biodiversity and land as a whole. This is already starting to happen. Close to Leeuwarden an experimental farm under Wageningen University is finding innovative solutions for the future of farming. This is something that could be expanding into the region spreading to farms across the land. In this proposal the already existing farms are integrated in a plan for future sustainable agriculture.



We propose a new trail connecting the different farms and interesting locations in Friesland to bring awareness and recognition to the area. This trail would work as a way to spread knowledge and collaboration between visitors, students, locals and farmers.

The trail starts in Leeuwarden, in Oldehove, an existing historical tower in the center. Here the visitor can see the land and get inspiration for what to explore. Afterwards the trail spreads throughout Friesland, linking the smaller villages, historical monuments, ecological farms and knowledge centers to each other. It also continues out on one of the islands to connect the land with the Wadden Sea. Along this trail the visitor is provided with information about the local culture, nature and the landscape, getting to know the possibilities and challenges that lie ahead in Friesland in regards to the environment.

This proposal is also building on the history and culture of Friesland and the Netherlands as a whole. In the past wooden bell towers were built across the country. These Bell towers were of great importance for each area, even if an area couldn't afford to build a church a bell tower would still be built. A sort of competition started to happen, who could build the higher tower? This resulted in a close-knit community. Now we are proposing to re-establish a Tower competition in hopes of bringing the communities together in Friesland. Anyone can enter the competition, presenting different kinds of towers with different functions that can enrich the trail and district. Communities would come together to build towers, creating new landmarks on initiative from the people.

## Expanding the Horizon

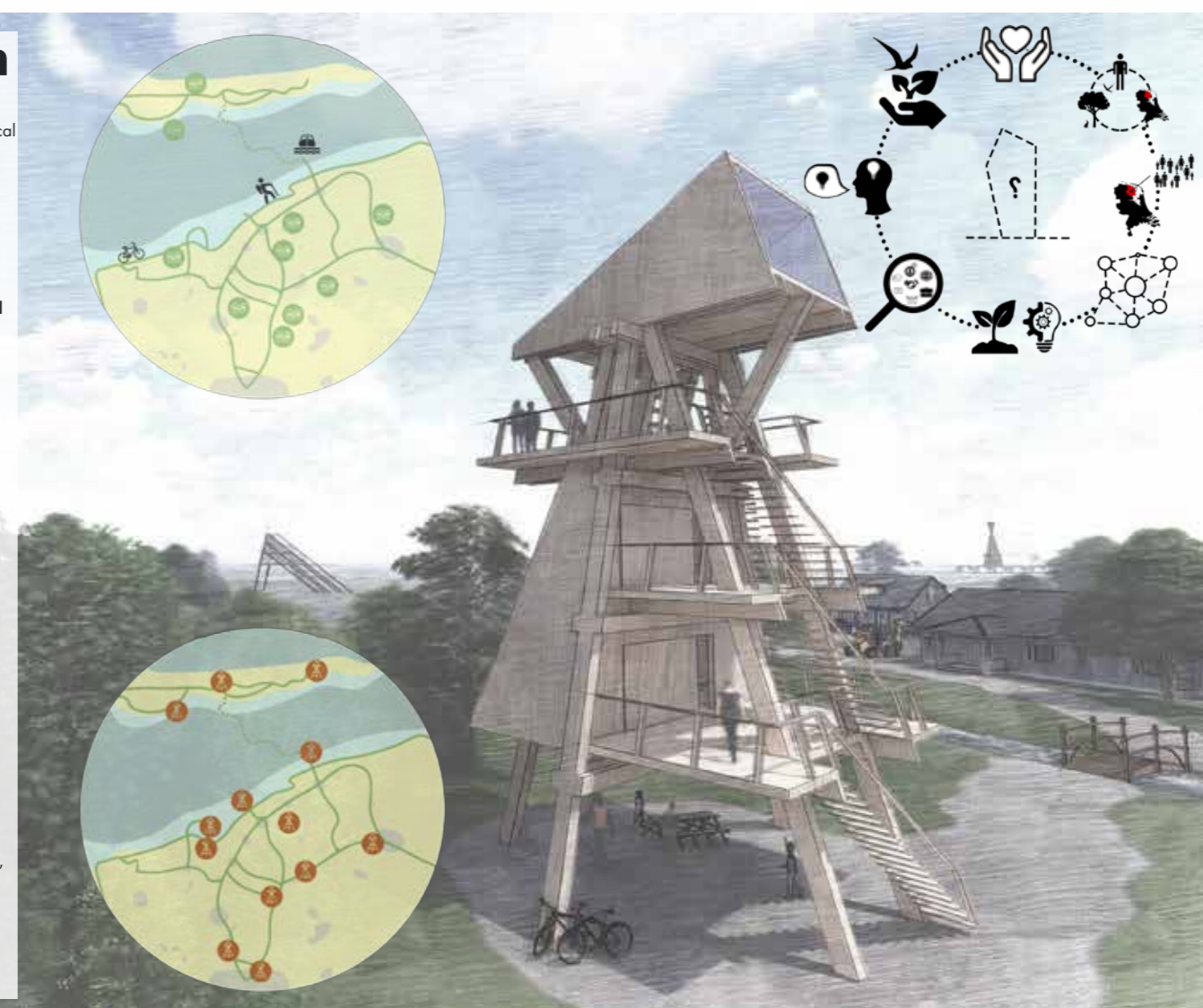
Expanding the Horizon is an open design competition organized by the local government of Friesland in collaboration with:  
**Wageningen University**  
**De Rat, IJlst sawmill**  
**Local farmers**  
**All inhabitants of Friesland**

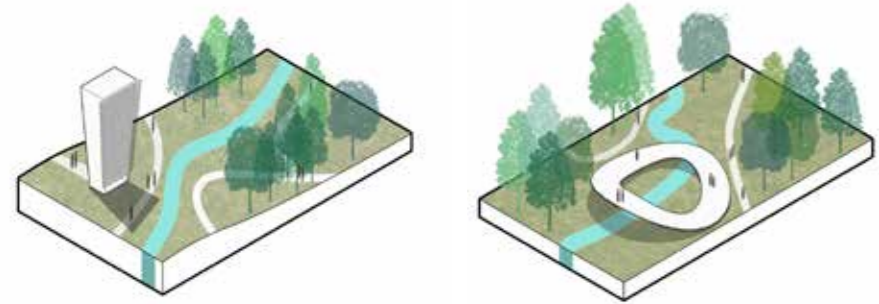
The local government of Friesland is pleased to invite architects, students, engineers, designers, and artists from around the globe to take part in the **2021 Expanding the Horizon Competition**.

The participants of this competition are to design a tower to fit into a network of towers in the region of Friesland. Each tower is meant to serve as a visual link between at least two other towers in the area. The towers are furthermore connected by walking and cycling paths as well as the current roads and dykes. The main goal of these towers and the connection between them and their surroundings is to enhance the region of Friesland in any way imaginable. This can be done in a variety of ways and the organizers of the competition have outlined certain qualities they deem desirable: improving quality of life, increasing biodiversity, spreading knowledge, creating new opportunities, encouraging agricultural innovation, connect the area, vitalize the area, reconnect with nature and place.

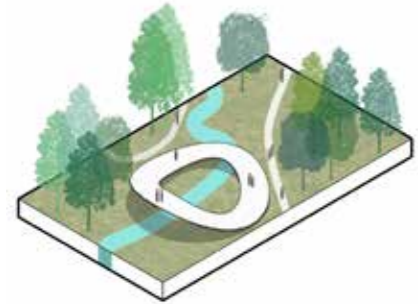
**The towers:**  
 Have no size limits other than participants deem fit.  
 Should mainly be made out of wood or other sustainable materials.  
 Should aim to enhance the area in one way or another  
 Should consider how they are constructed

The competition aims to gather a database of tower designs specified for the area. These towers will subsequently be chosen by the people of Friesland and the owners of the land they occupy. In collaboration with "De Rat, IJlst" sawmill, the chosen winners of the competition will have their towers built and added to the collection of winning towers in the area. This network of towers and paths will work together to connect the smaller towns of Friesland into a collective experience. Furthermore, these different and specialized towers will help to vitalize the area and contribute to developing it into a thriving and desired destination for people and businesses.

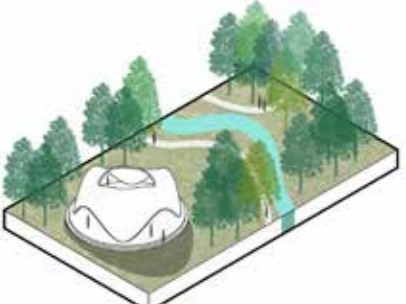




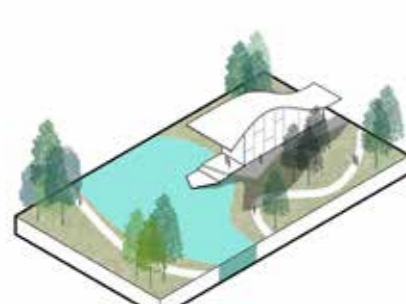
1. OBSERVATION TOWER



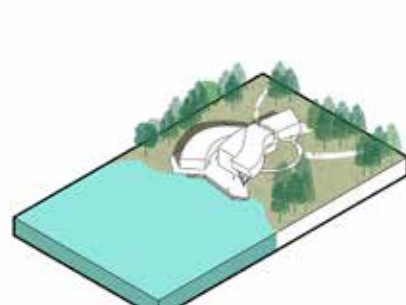
2. BRIDGE/WALKWAY



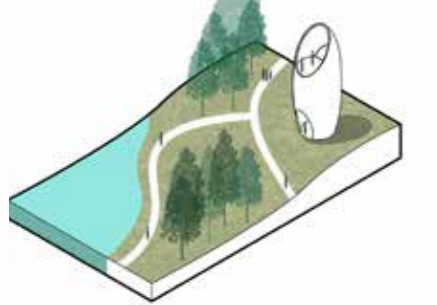
3. OUTDOOR SHELTER/PAVILION



4. WATERSTATION



5. VISITORS CENTER



6. OBSERVATION TOWER

INTERVENTIONS - STEP 3.

# PILGRIMAGE THROUGH FRIESLAND

WORKSHOP - LINES TO THE LANDSCAPE

Sina Rozibay, Martin Blivik, Katharina Frank

Our idea is to connect and to expand two different ongoing projects: The Leeuwarden forest to the south and The Holwerd aan zee to the north. This will be done through a series of interventions or steps. We started by looking at the topography of the land. This gave us the location for the continuation of the flooding of the Holwerd aan zee project and a general direction of our project.

There is still space for traditional agriculture but it will have to co-exist with other means, such as forestry, aquaculture which could be fish farming, seaweed farming or energy harvesting

Going from a pure agricultural landscape to a more diverse one is beneficial both from an ecological perspective, leading to more biodiversity and also from an economical perspective, spreading the risk over several industries instead of only one.

It also gives the new surfaces we introduce a double use. The spectacle and the production.

This is a map of what it could look like in the future. A new path connecting Leeuwarden with Holwerd and the Wadden Sea, making it possible to access the sea from both Leeuwarden and Dokkum by boat.

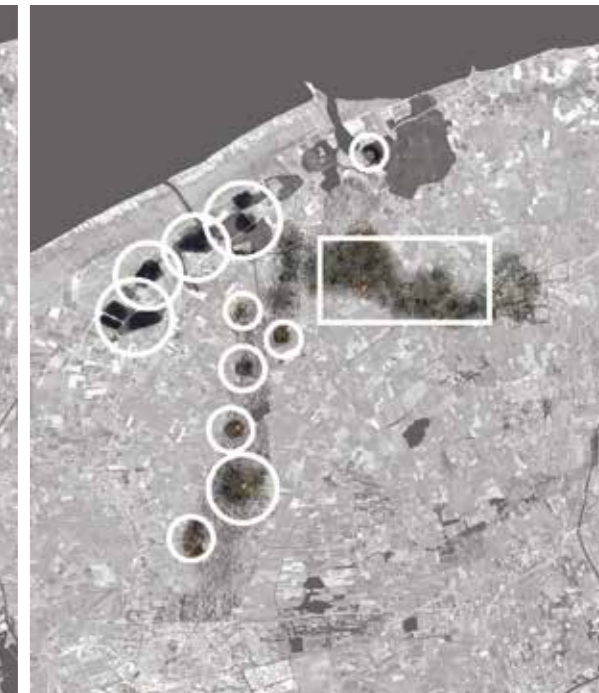
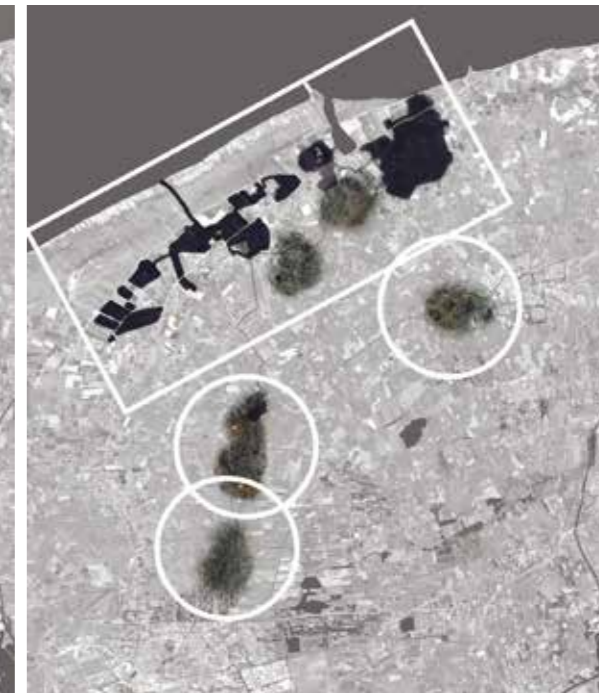
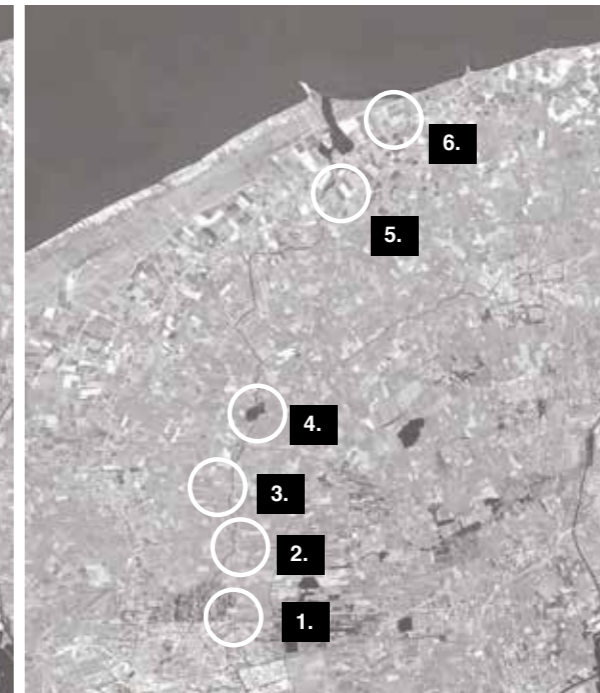
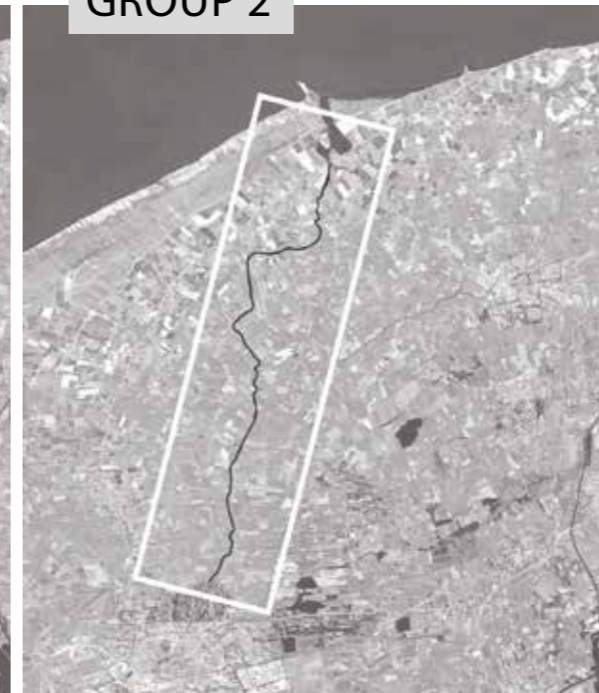
The next panel is a zoom-in on a location next to Holwerd where we will place a Visitor center. A location also growing in steps Step 1 and 2 are smaller in scale - a path, a connecting river a birdwatching station Whereas step 3 and 4 is a bit larger, the trees are becoming a forest and the bird watching stations is a fully equipped visitors center. One of several destinations linking Leeuwarden, Holwerd and the Sea.

We also continue growing the Leeuwarden forest, favoring a diverse forest with trees of different species.

Step 5 is changing the production of the landscape.



GROUP 2



STEP 1.

The project begins with two already started projects. The Leeuwarden forest to the south and Holwerd Aan Zee to the north. The aim is to connect these two projects through a forest, a river and different scale interventions. This connection will in turn breath som new life in to the landscape and re-establish the connection with the sea.

**ZOOM-IN**  
The area is filled with agricultural fields. Small canals separate them and bigger creeks are pulling through the landscape. People are not able to visit this area yet.

STEP 2.

Step 2 is the drawing of the line - part river, part path - that will inform the rest of the project. We start with following the Dokkumer Ee, a large canal between Leeuwarden and Dokkum. Traditionally an important shipping route but now mostly serves leisure boats.

By the village of Tergreft we part from the Dokkumer Ee and follow a smaller river leading us up to the old term Hegebeintum and later Oosterbeintum. From here we propose a new water connection with the planned Holwerd aan Zee.

**ZOOM-IN**  
The path and the river is added as well as the bird watching station which is directed to the dike and the sea. First area of natural forest is planted and starts to grow on the other side of the river. Both sides are connected with a bridge. There is an opening water landscape which gives space for a break for water sports.

STEP 3.

Along the newly drawn line we start to add interventions. The path transform from being a device of transportation to part destination, using old terps, such as Hegebeintum, as a starting point.

**ZOOM-IN**  
The trees have grown to a small forest. Providing room for plants, birds and other animals. There is a trail going through the forest. Its starting point is the newly build Naturum. The Naturum has a small museum about the Frisland landscape. It has become a destination for more people, coming by bike, canoe or hike. The second area of trees are planted.

STEP 4.

Step 4 is to start to transform the landscape. Today Friesland is 80% agricultural landscape, an industry that struggles with sustainability, soil degradation, methane production, monotonous landscapes and what is probably the most dire in Friesland - rising sea levels.

Working with the existing topography we create lakes and forest for added bio-diversity. The already initiated Leeuwarden forest continues to grow north, with more spots added on the new path. Dokkum is also included, setting up for a future connection with Holwerd.

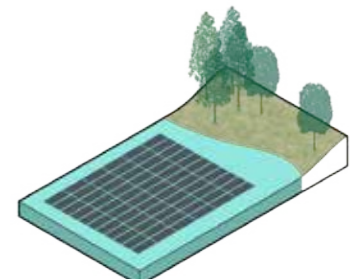
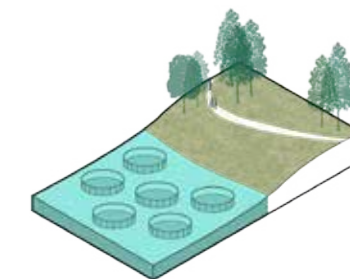
Holwerd Aan Zee is expanded along the coast. To the north-east, where the land is lower, a larger lake for leisure is added.

**ZOOM-IN**  
The Naturum now has a small coffee shop within. The trees now have grown to a big forest. The bird watching station is more used because of its closeness to the new lake, that provides a place to be for more birds. The forest trail is turned into a barefoot trail for the opportunity to experience the forest even closer.

STEP 5.

Step 5 is changing the production. The landscape can still stay productive, but the products will be different such as energy harvesting, aquaculture and a forest production

Transforming the landscape from a purely agricultural to a more diverse one gives synergistic effects between the industries, and creating a more sustainable economical landscape, spreading the risk over several industries instead of only one.



# DOKKUMER EE

LINES TO THE LANDSCAPE – FRIESLAND WORKSHOP

CARMEN POVEDANO | MARLENA SCHULZ | SABIANE GEHLERT | ELLINORE HANSSON

Friesland is the largest province in the Netherlands, provided you include areas of water. The original waterways within the landscape date back hundreds of years and used to connect the Terge along the northern shore facing the Wadden Sea, before roads and highways replaced them as the main means of transportation in the area. Along these roads and on former loop silos, small settlements and communities developed, whose main source of income remains agriculture and tourism to this day. Over the years Friesland, like many other rural provinces, has experienced a decrease of population. People either move to larger local cities, or even away from the region altogether. One consequence of this is rising housing prices in cities like Leeuwarden and thus a decrease of affordable living space. In order to propose a solution to this housing shortage and reconnect the cities in Friesland with the countryside, it seemed natural to use the advantages of the already existing water network not only as an asset in this project, but to make it one of the central elements of the concept.

This waterway, particularly the river between Leeuwarden and Dokkum, would be reactivated by forming so called 'dorpsgemeenschappen' alongside the riverbanks which propose a sort of satellite housing village within a twenty minute boat-commute to the city. These village communities would therefore be directly inserted into the surrounding landscapes and recreational areas of Friesland and offer a close-to-nature alternative living.



TIMELINE: 1500 - 2075

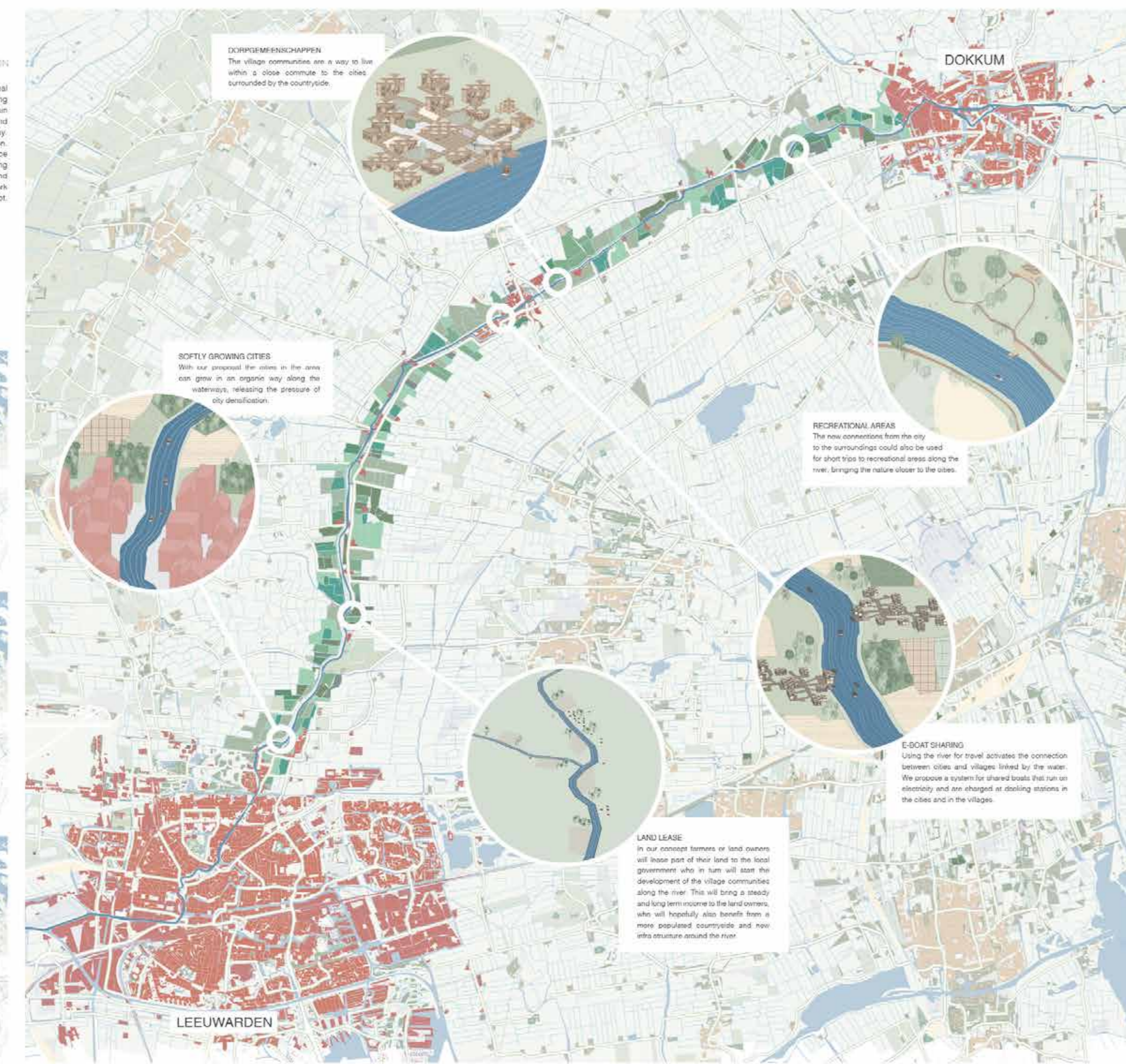
1500: TERTIARY DEVELOPMENT AND ORIGINAL WATERWAYS



1950: INDUSTRIALIZED AGRICULTURE



2021: RURAL DEPOPULATION



**DORPSGEMEENSCHAPPEN**  
The village communities are a way to live within a close commute to the cities surrounded by the countryside.

**SOFTLY GROWING CITIES**  
With our proposal the cities in the area can grow in an organic way along the waterways, releasing the pressure of city densification.

**RECREATIONAL AREAS**  
The new connections from the city to the surroundings could also be used for short trips to recreational areas along the river, bringing the nature closer to the cities.

**E-BOAT SHARING**  
Using the river for travel activates the connection between cities and villages linked by the water. We propose a system for shared boats that run on electricity and are charged at docking stations in the cities and in the villages.

**LAND LEASE**  
In our concept farmers or land owners will lease part of their land to the local government who in turn will start the development of the village communities along the river. This will bring a steady and long term income to the land owners, who will hopefully also benefit from a more populated countryside and new infra structure around the river.

## GROUP 3

2030 FUTURE SCENARIO



2051 FUTURE SCENARIO



2075 FUTURE SCENARIO

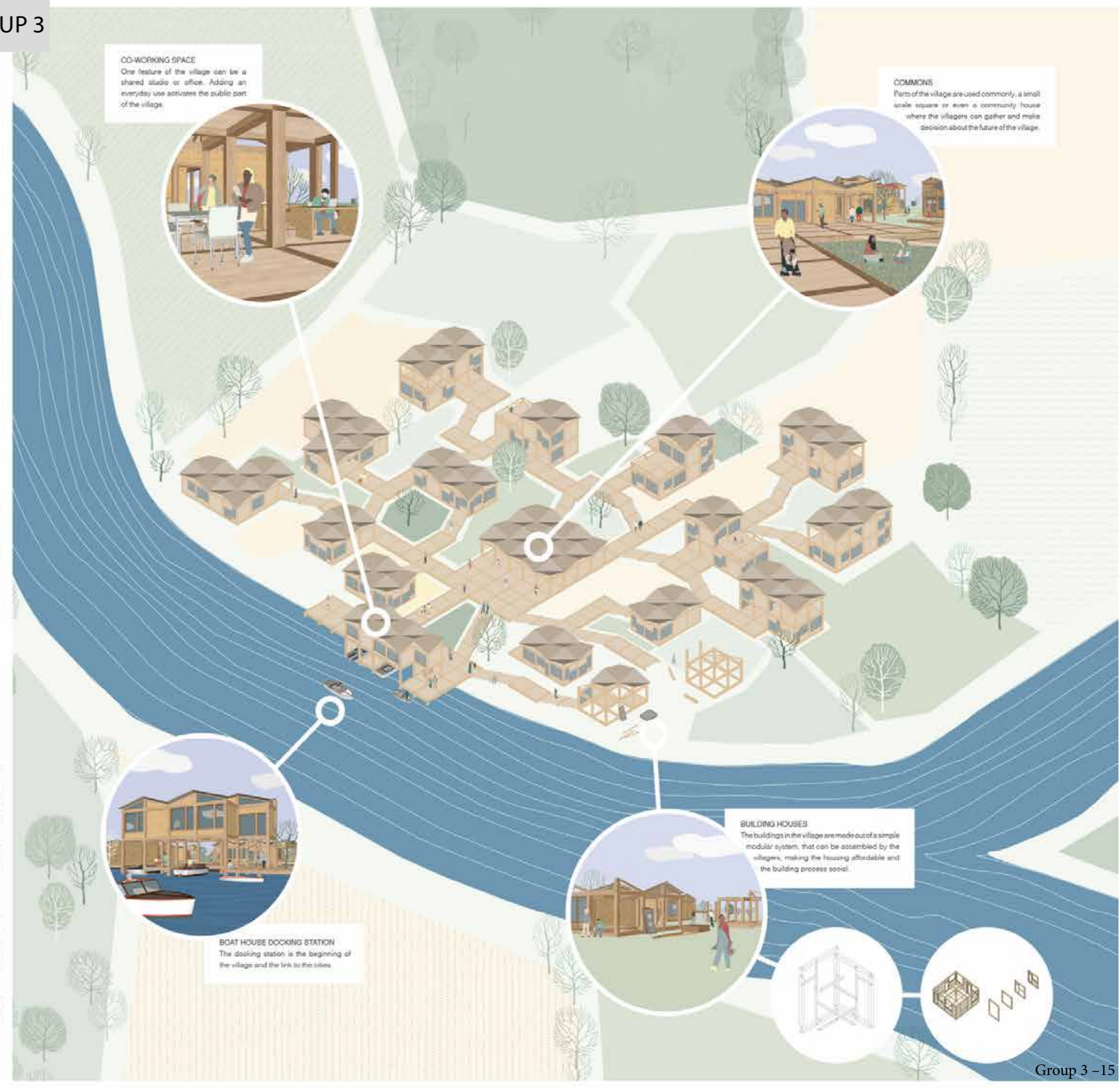


The land used for the communities is primarily owned by farmers. The concept is based on an initiative started by the local government to provide incentives for Friesian and also Dutch citizens in general to establish village communities or to relocate to such communities. The idea is for the government to lease said land from the farmers, possibly for a period of 50 years, and then rent it out to the village communities. This system would operate independently from the conventional housing market and would therefore not be regulated by its prices. For the farmers, this could create an alternative income to farming, without the labour of cultivating the land. In turn, the potential residents of the communities are given the option of a more affordable housing alternative to the traditional house purchase, but still live in their own house. Part of the governmental initiative is the provision of basic infrastructure for the areas, including electricity and internet. To the benefit of the rural population, the entire region will be socially revitalized, thus increasing tourism in the area.

In these village communities people of different age and backgrounds can live together close to nature and with commonly shared facilities, which could be a co-working space above the shared boating house or a common room in the middle of the village. The village itself is being built in a group effort. Village residents helping other village residents build their homes not only strengthens the community, it also keeps down labour costs. This is possible thanks to an easy-assembly system of modular housing units. The light-weight modules are made out of wood and can easily be customized and adjusted to the individual needs of the residents. The overall structure is designed to last and be durable, but should also be easily dismantled and moved if necessary.

The concept aims to strengthen and reactivate the link between Friesland's rural life and its towns and villages. Affordable housing surrounded by nature just a stone's throw from the city will take pressure off the urban housing market, reactivate the river and water network as main means of transportation for daily commuters and provide a sustainable and attractive alternative to conventional housing in Friesland.

CARMEN POVEDANO | MARLENA SCHULZ | SABIANE GEHLERT | ELLINORE HANSSON



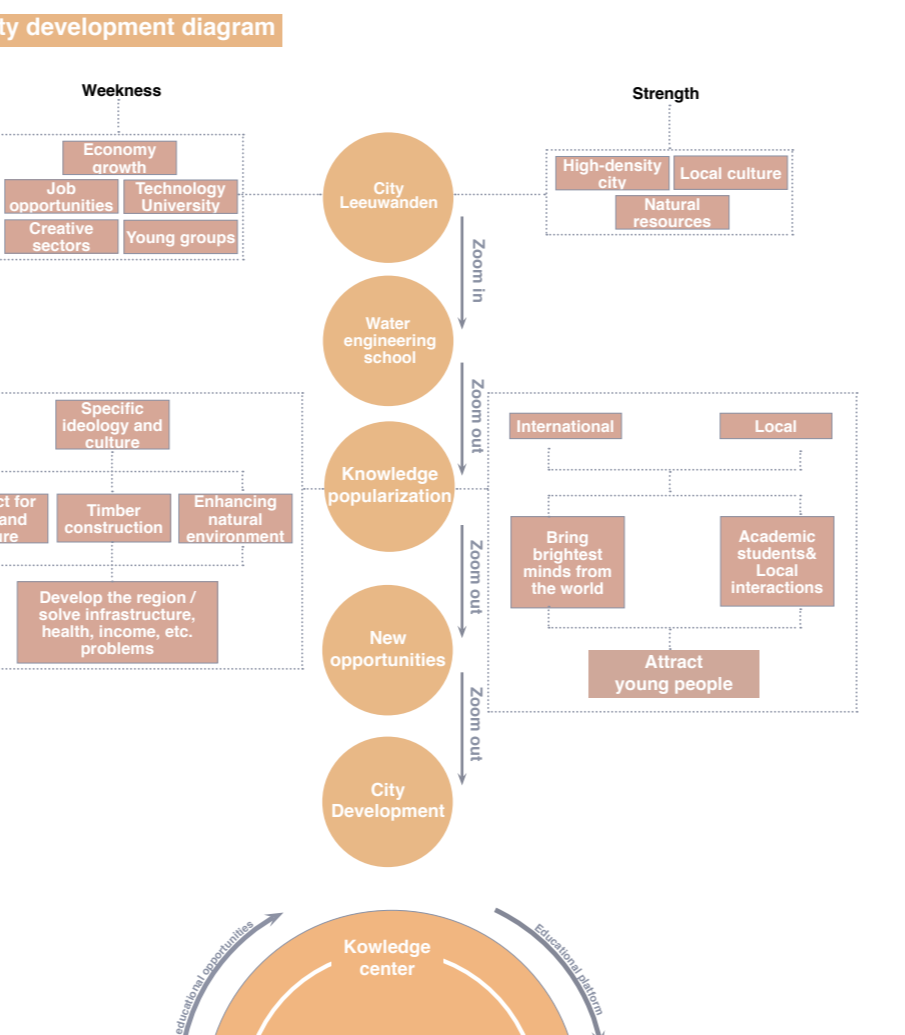
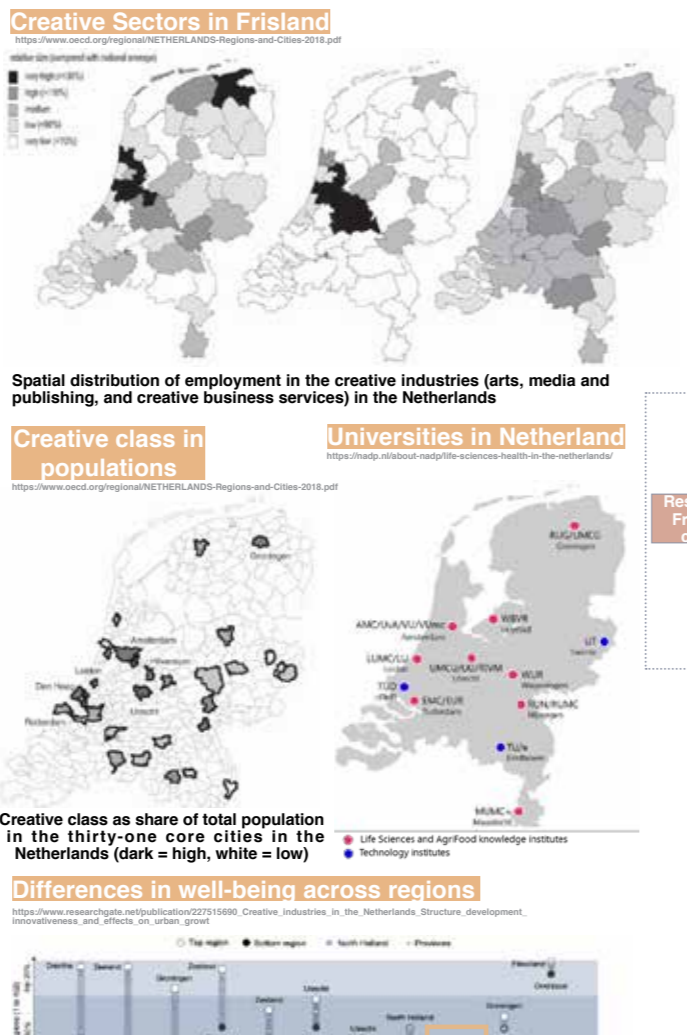
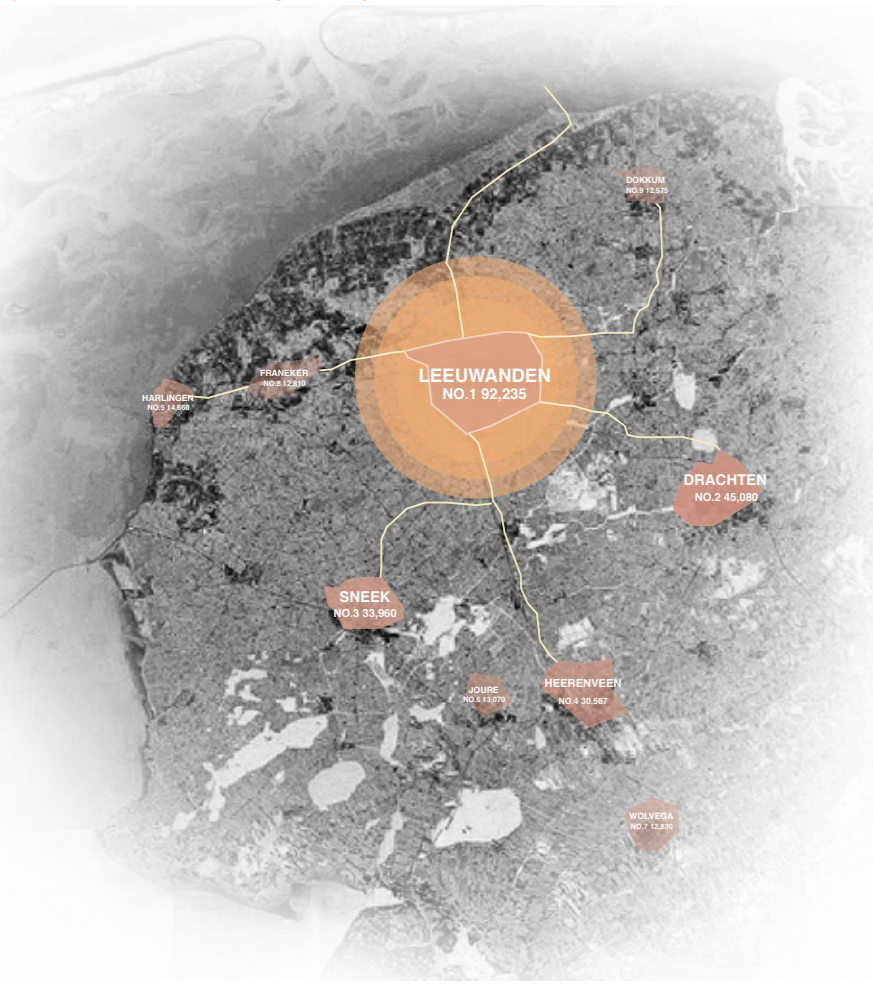
**CO-WORKING SPACE**  
One feature of the village can be a shared studio or office. Adding an everyday use activates the public part of the village.

**COMMONS**  
Parts of the village are used commonly, a small scale square or even a community 'house' where the villagers can gather and make decisions about the future of the village.

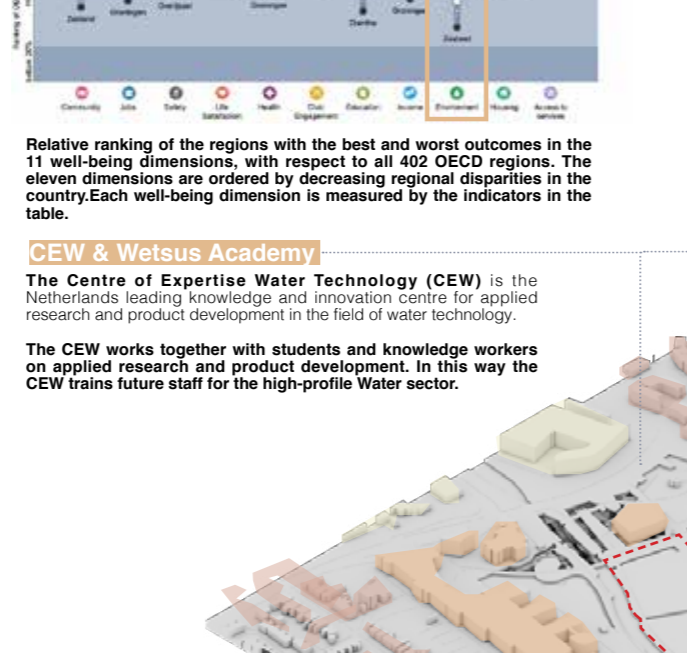
**BUILDING HOUSES**  
The buildings in the village are made out of a simple modular system, that can be assembled by the villagers, making the housing affordable and the building process social.

**BOAT HOUSE DOCKING STATION**  
The docking station is the beginning of the village and the link to the cities.





- ### Universities & Colleges in Leeuwarden
- To provide qualifications, Friesland has a wide range of educational establishments, such as the higher vocational college
- Stenden South Africa B.V.
  - NHL Stenden Hogeschool
  - Salario- en Personeels- Administratie Studievereniging Ingenio
  - Open Universiteit stenden Leeuwarden
  - Rijksuniversiteit Groningen/Campus Fryslân Centre for Internationalisation of Education
  - NHL Stenden Social Work en Pedagogiek
  - Watercampus Leeuwarden
  - Centre of Expertise Water Technology
  - Van Hall Larenstein
- Benefits of the campus area
- Close to the train station
  - Close to the city center
  - The expansion of the Watercampus Leeuwarden
  - Link to the water canal De Polmarge
  - Close to the Rijksuniversiteit Groningen/Campus Fryslân



### CEW & Wetsus Academy

The Centre of Expertise Water Technology (CEW) is the Netherlands leading knowledge and innovation centre for applied research and product development in the field of water technology.

The CEW works together with students and knowledge workers on applied research and product development. In this way the CEW trains future staff for the high-profile Water sector.

**Cooperating institutes:** Wageningen University, University of Twente and University of Groningen.

**Programme orientation and type:** Academic Master Field(s) of study: Natural and physical sciences, water engineering and technology.

**Duration:** 24 months (120 ECTS)

**Programme Variant:** full-time

**CROHO code:** 65005

**Language of instruction:** English

**Teaching methods:** Lectures, Tutorials, Practical training, Groupwork, Excursions, Individual Paper and Independent Study

**Start:** September

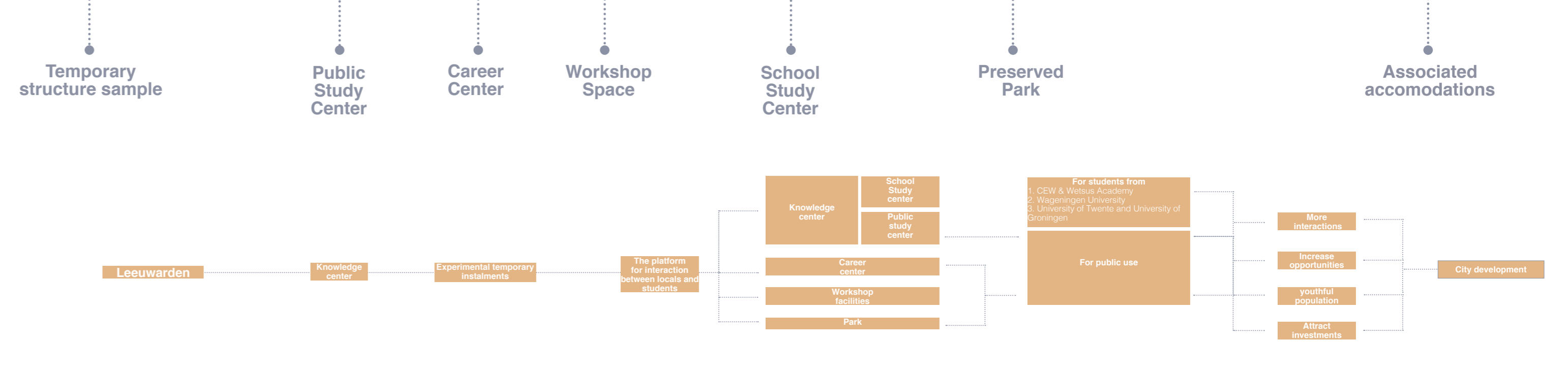
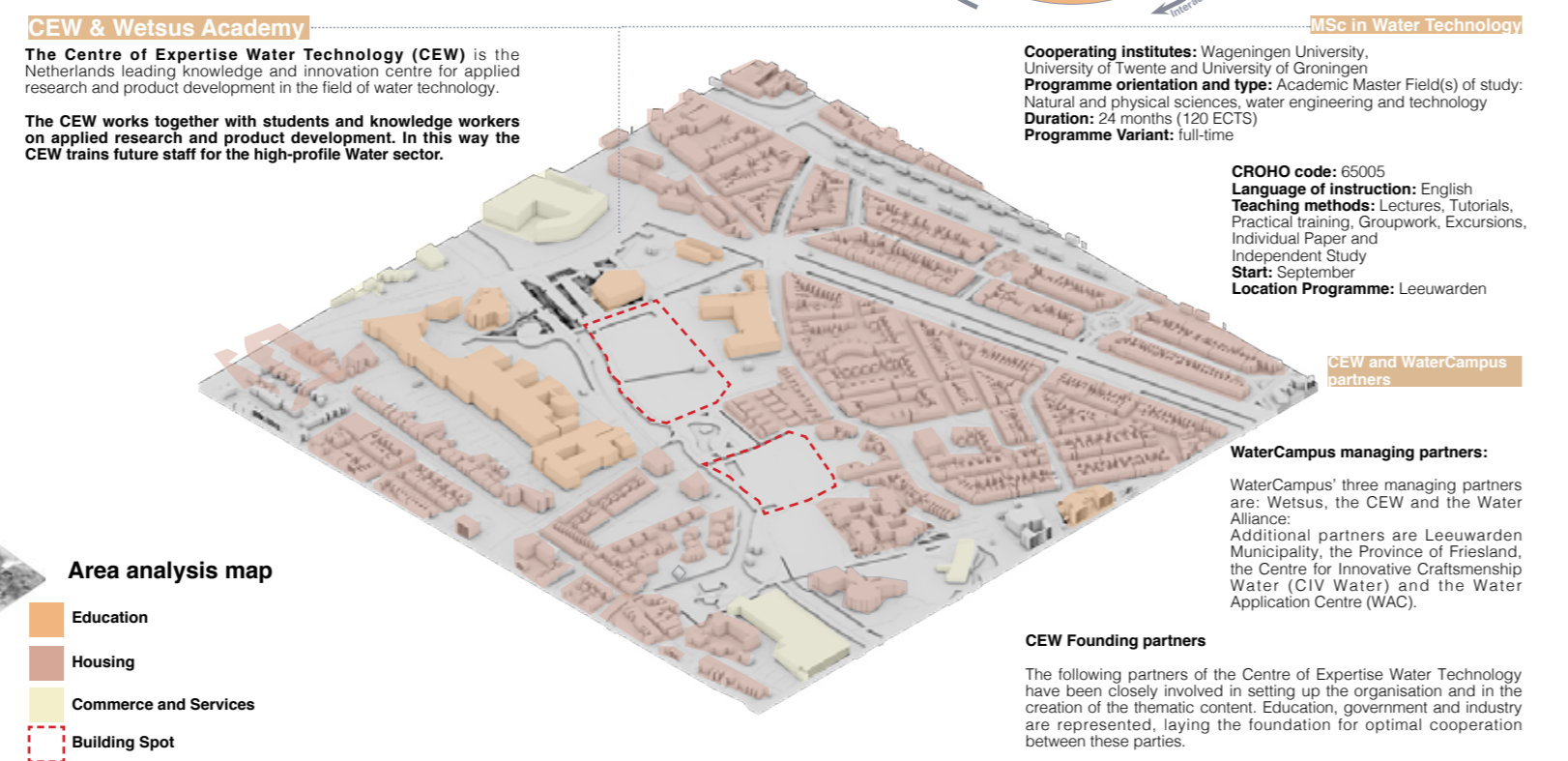
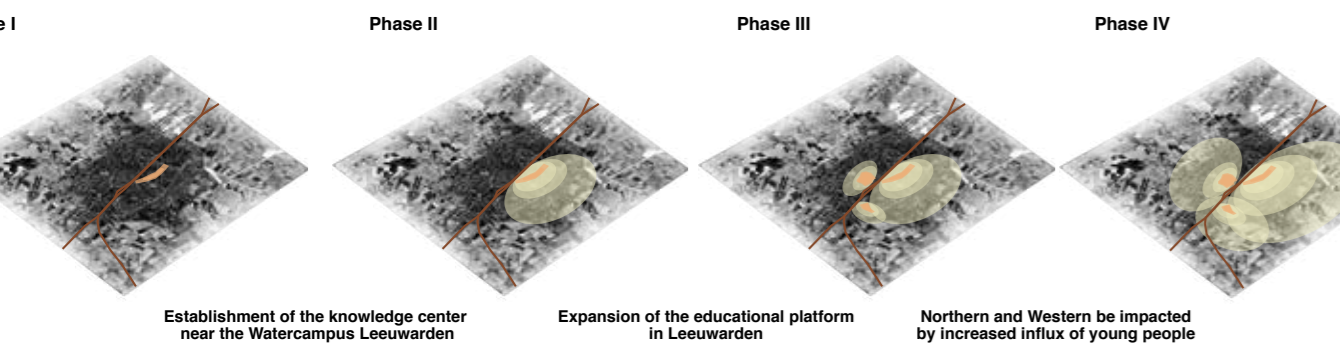
**Location Programme:** Leeuwarden

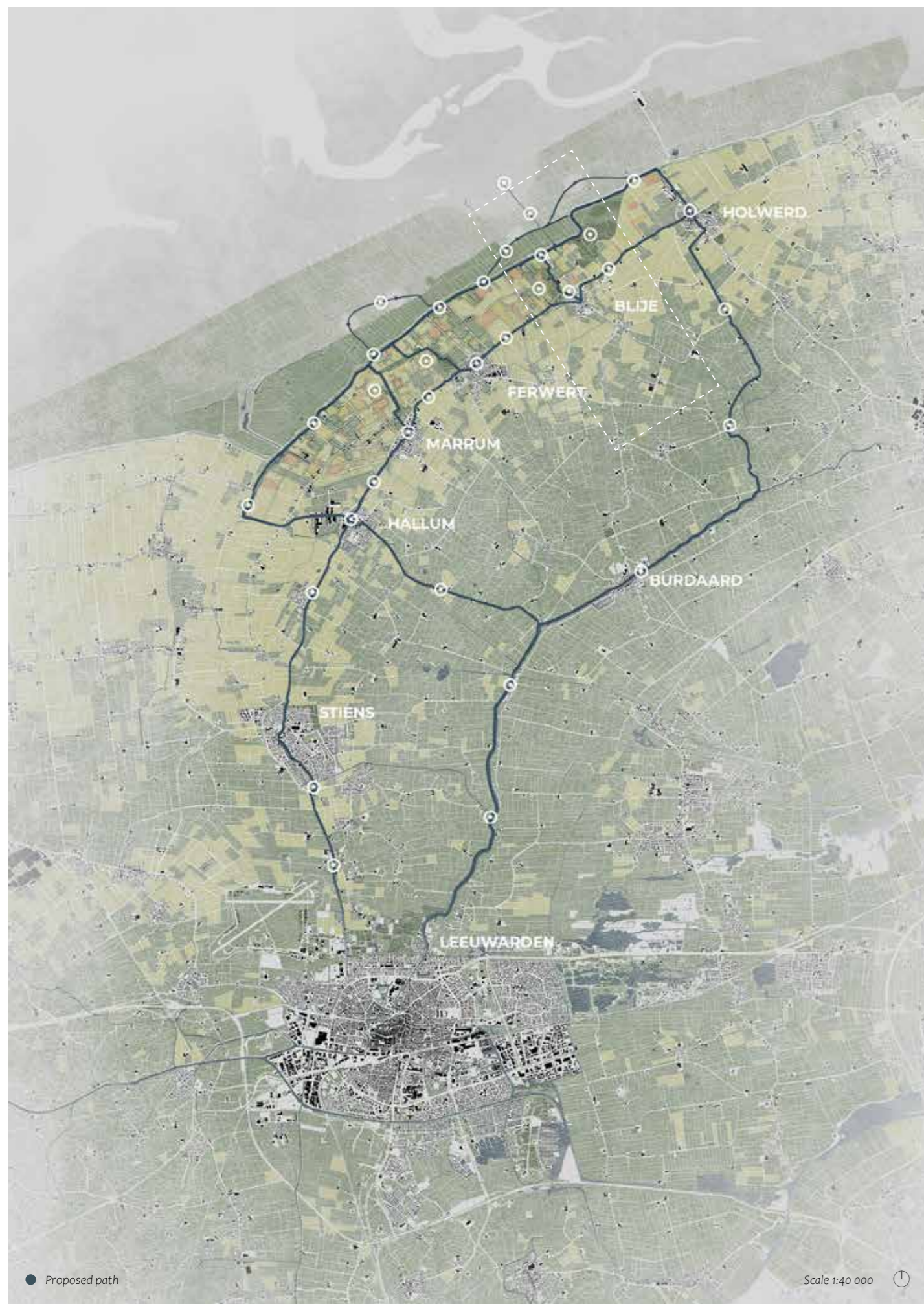
**CEW and WaterCampus partners**

**WaterCampus managing partners:** WaterCampus' three managing partners are: Wetsus, the CEW and the Water Alliance. Additional partners are Leeuwarden Municipality, the Province of Friesland, the Centre for Innovative Craftsmanship Water (CIV Water) and the Water Application Centre (WAC).

**CEW Founding partners**

The following partners of the Centre of Expertise Water Technology have been closely involved in setting up the organisation and in the creation of the thematic content. Education, government and industry are represented, laying the foundation for optimal cooperation between these parties.



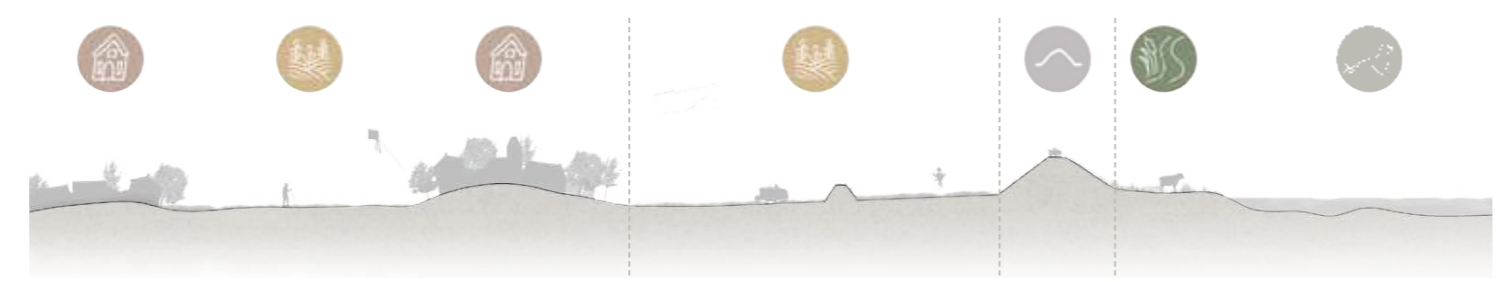


## BEYOND THE DIKE

The coastal area of Friesland is dominated by vast areas of farmland which create a barrier between the historical terp villages and the wadden sea as the main natural element. The lack of variety in landscape and attractions, together with the agriculture as main driver of local economy, results in a fairly unattractive living environment for people not intending to work in this industry. A variety in resources for contemporary and future oriented living and working standards is not provided.

To reconnect the villages to the sea and overcome the vast distances through the farmland, a chain of interventions is proposed that reduces distances between attractions and is located along a network of biking tracks as main traffic routes.

### Intervention Zones



Leeuwarden is the capital city of Friesland. Although the city is close to the Waddensea, there is a disconnect between the inhabitants and the landscape beyond. By **improving accessibility** the barrier between the zones of this landscape will be overcome.




Agriculture is an economic pillar in Friesland. With interventions that address the need for **polycultures, improved biodiversity,** and accommodate recreation in **new forested areas,** this land can offer more to the natural environment and to people alike.





The dike is an overlooked feature that unfortunately functions as a barrier between people and the environment. With interventions that bring new purpose to this land and encourage people to **occupy and cross the dike,** it will be activated as a **connecting element.**



The Friesian portion of the Waddensea is largely inaccessible. **Access to the water** will be improved via a path network that brings people through the landscape. Furthermore, interventions that offer **educational opportunities** will increase awareness.

- 

**Connectivity**  
A bike route with rest stops will bridge the boundaries between the Frisian landscape as a method of reconnecting people to culture, the natural environment, and the Waddensea.
- 

**Monoculture to Polyculture**  
A transition from monocultures to polycultures. This change in plant diversity will allow farmers to continue working while simultaneously contributing in the effort to foster balance within the ecosystem.
- 

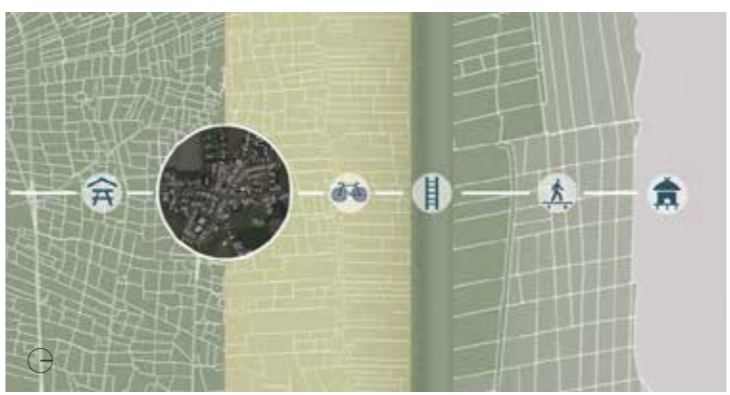
**Enhanced Biodiversity**  
Increase biodiversity in the region by providing species with more natural environments. This process involves disrupting the current grid of the farmland through the introduction of forested areas and ecological corridors.

- 

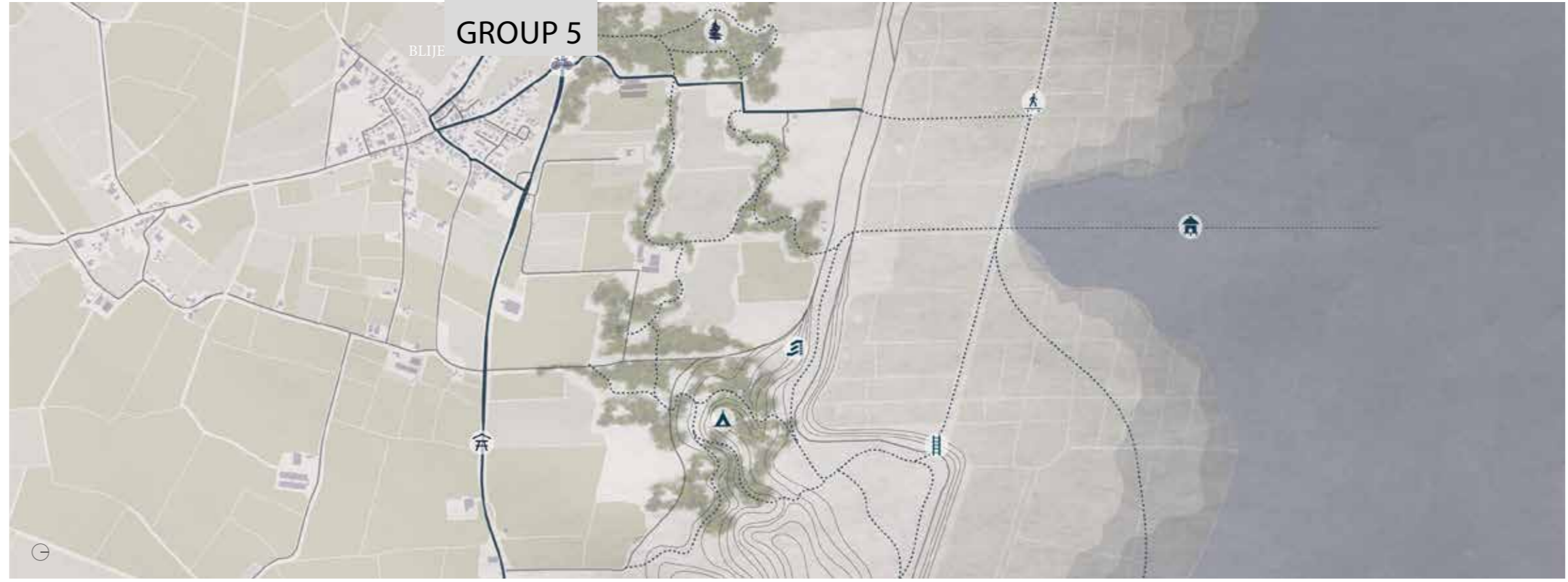
**A New Lifestyle**  
By increasing accessibility to the natural environment in both forested areas and by the Waddensea, new opportunities will arise to interact with and observe nature.
- 

**Demographic Diversification**  
With new attractions in the Frisian region, interventions that offer a different lifestyle, and more varied employment opportunities, the demography of Friesland is subject to evolve.
- 

**Job Opportunities and Economic Growth**  
New interventions in this landscape will promote tourism, attract new residents to the region, and make way for more diverse employment opportunities. The outcome of these changes will bring economic growth to the region.



Shortening distances by adding a chain of interventions.



**The Bike Path**  
Meandering through the typical Friesian field scenery, the path goes all the way from Leeuwarden to the dike. Wooden pavilions along the way offer information and local products, reconnecting the visitors with the region.



**The New Forest**  
The planted forest provides a living habitat for many different species. It invites visitors to set up their camps and enjoy a unique mix of woodland and ocean breeze, whilst learning about its inhabitants.



**The Dike**  
The dike is crossed at several locations to connect the sea side with the inner land. These crossings offer room for observation platforms, information or benches for lunch breaks.



**The Boardwalk**  
A network of boardwalks serves to extend the paths from the nearby villages and provides new access to the Waddensea. This low-impact infrastructure enables people to experience the marshlands up-close by foot and by bike.




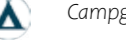


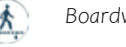



**The Nature Center**  
To create awareness for the unique biological conditions at the Waddensea a new nature center is located out in the sea. The educational area can be expanded with a research facility connected to the university in the future.



Lines to the landscape / BEYOND THE DIKE / Chloe Hebert, Leonie Blum, Ruben Christopher Epping, Sofia Ellidin Mårtensson



-  Bicycle / walking trail
-  Rest-stop
-  Forest
-  Campground
-  Point of access
-  Boardwalk
-  Naturum
-  Playground

### Future development

By re-attracting people to Friesland the project creates new job opportunities in tourism and research, which then enhances the economy as well as the educational level of the area. This newly won economical power and strengthened demographic structure will lead to an overall growth, which will then attract even more people to move back or settle down, counteracting the hazing trend and demographic change the region is facing at the moment.

Not only will the existing villages be strengthened but the project will also generate the demand for new future settlements, making the area more diverse and vibrant. The projects will set a starting point, which can be adapted and expanded in the future, leading to a self-enhancing cycle. By creating accessibility and overcoming the borders landscaped by the dike and the strict zoning of the surrounding landscape, the Friesian mainland will be transformed from a point of transfer to a tourist destination, allowing visitors to discover what the region has to offer.



# BETWEEN TERPS

The disconnection between the urban and rural areas in Friesland is one of the critical issues this workshop has to take into consideration. Blurring the transition between the rural and urban has already been done on the site, but in a smaller scale. On the site today there is a young artificial forest on the edge of the northern part of the city and the rural areas above. In this project, we considered this idea as a starting point towards more connected urban and rural areas.

What we are primarily aiming for in this project is to use the landscape as a tool for integrating the city with the countryside. To do so, we propose a network of farmlands, forests, lakes, and the so-called terps as elements of a new landscape lying from the northern forest of Leeuwarden towards the Waddenzee. This is also a tool to improve the long declining biodiversity of the Netherlands and create new habitats for endangered and rare species. The new landscape's elements consist of:

## 1. Farmlands and Meadows

Farmlands in this network are going to be preserved as much as possible. The only crucial change to them is the forests surrounding them. This also helps to establish a more wind-protected area within the farms. This creates new environments for insects and smaller animals that needs more protected habitats to thrive. Smaller areas will keep as wild meadows creating better conditions for insects and wild flowers.

## 2. Lakes

The idea of creating the lakes comes from the strategy of connecting the existing canals more together and to the suggested network. This idea not only produces a recreational area for the residents but also helps to preserve and increase the biodiversity in the region. These lakes will create new habitats for the endangered otter, beavers, amphibians and fish.

## 3. Forests

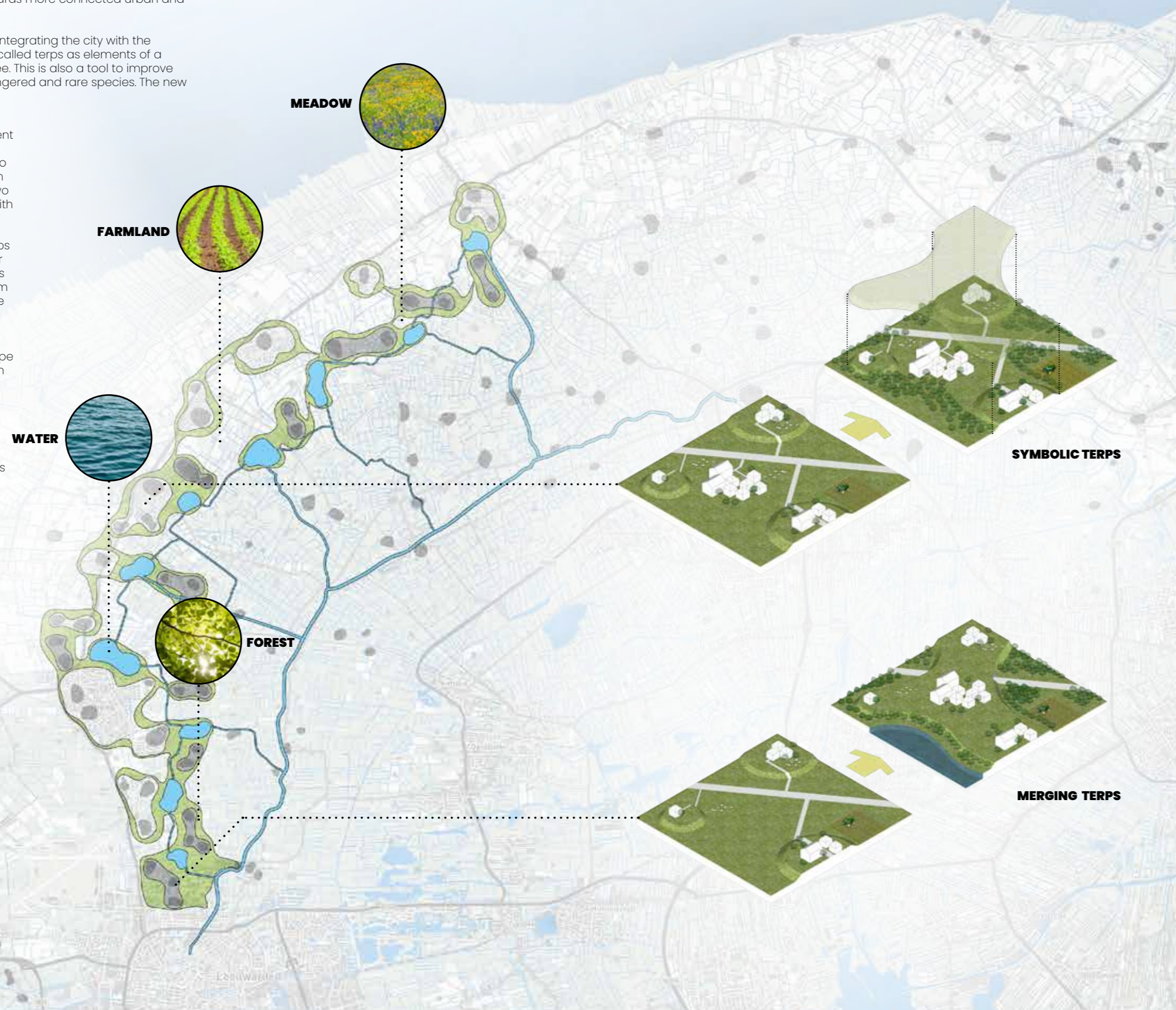
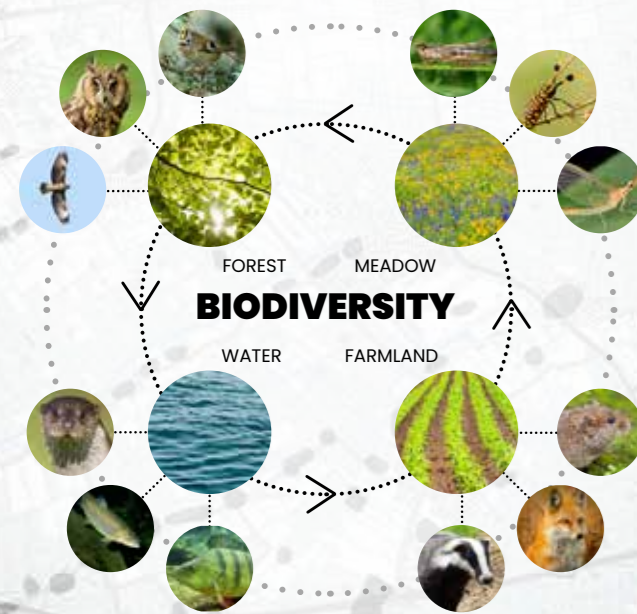
Leakage of forests through the terps, farmlands, and lakes are considered as a tool for generating an integrated network connecting the city to the countryside. This also helps improve the biodiversity in the region creating new habitats for birds, mammals and insects.

## 4. Terps

In this research, we perceived the current terps as isolated disconnected nodes in the existing landscape of Friesland. To activate those terps and connect them to the network, this project proposes two new types of terps considered in line with the historical process of merging terps.

**Merged Terps:** The first new type of terps is the ones that today contains none or just a few buildings. What we propose is to merge those terps, using the soil from the production of the artificial lakes. The new temporary housing will be placed on these merged terps.

**Symbolic Terps:** The other proposed type of terps consists of a new interpretation for them which are called symbolic terps. This kind of new terps emerging where there is a village or more built environments around the terps. In this case, what we do is to enclose these areas with forest, creating a stronger connection between these urban areas and clarifying the its border.



**GROUP 6**  
ALBERT WISCHER  
BURAK ERTUGRUL GÜNEY  
DEFNE KÜÇÜKKAYALAR  
NILOUFAR AGHILI

# BETWEEN TERPS

GROUP 6

GROUP 6: ALBERT WISCHER, BURAK ERTUGRUL GÜNEY, DEFNE KÜÇÜKKAYALAR, NILOUFAR AGHILI



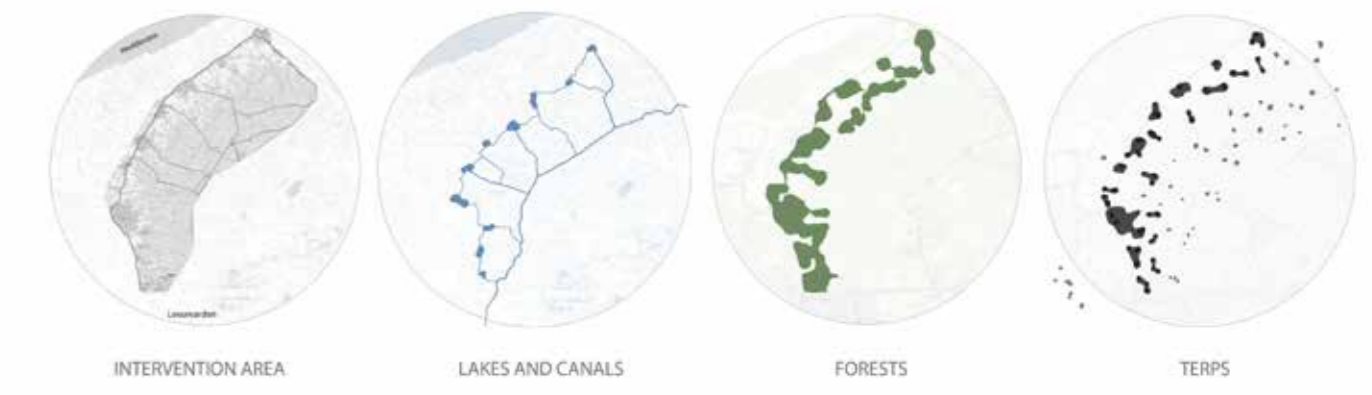
**DETAILED PLAN**  
ZOOM IN OF INTERVENTION AREA CLOSEST TO LEEUWARDEN



**CONCEPTUAL SECTION**



**VISUALIZATION**  
TEMPORARY HOUSING NEAR AN ARTIFICIAL LAKE



**ELEMENTS**



**PHASE ONE**  
SYMBOLIC AND MERGED TERPS



**PHASE TWO**  
ARTIFICIAL LAKES AND WATERWAYS



**PHASE THREE**  
FOREST AND PROTECTED FARMLANDS

# A Path to the Sea

Strengthening the connection between coast and inland

Josefin Antus, Anton Ljungdell, Anton Hanstfeldt  
Lund University - School of Architecture

The project focuses on the relationship between the Wadden Sea coast and the immediate inland villages of northern Friesland. A relationship that is seen as disconnected with both physical and mental barriers. The aim is to, through the examination of an imaginary line between village and marshland, suggest a series of potential interventions and areas of possible development. The village Ferwert is here used as an example, but the proposal should be seen as an attempt at activating and strengthening the connection of inland and coast for all villages in this area.

During analysis of the area key aspects emerged as being of generative value that could be utilised and enhanced in order to strengthen this lost connection. The unique landscape, the natural darkness and the sense of community existing today.



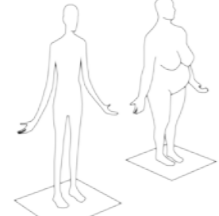
Wadden Sea

The Wadden Sea is the largest unbroken system of intertidal sand and mud flats in the world, with natural processes undisturbed throughout most of the area. The World Heritage property encompasses a multitude of transitional zones between land, the sea and freshwater environment, and is rich in species specially adapted to the demanding environmental conditions. The Friesland area is a unique part of the Wadden sea which is in more or less completely artificially altered by humankind.



Darkness

Increasing loss of natural darkness has a negative impact on ecosystems and biodiversity. NightLight is a EU project where regional authorities around Europe join forces to improve their regional policies for the prevention of light pollution, preservation of dark skies and the sustainable exploitation of dark sky places. In Friesland NightLight identifies the 'darkness' of this rural province as one of its 'core spatial values'.

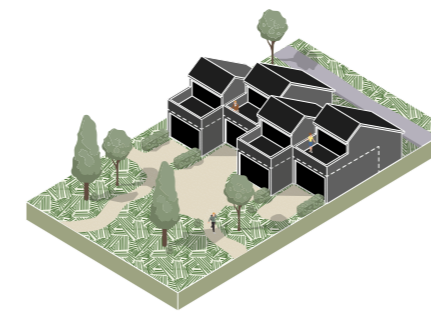


Community

Sense of Place is a local organisation that aims to raise awareness among the Dutch public of the rich nature, landscape and cultural history of the Wadden Area by staging cultural landscape projects. Through the projects they want to boost the local economy and strengthen the local social fabric.

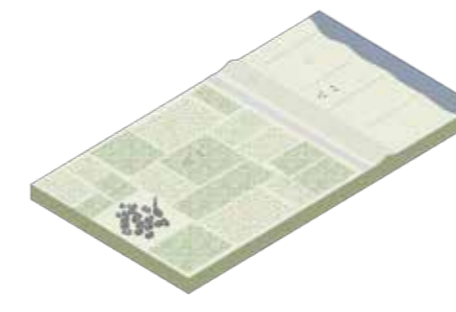
## Village & countryside

## GROUP 7



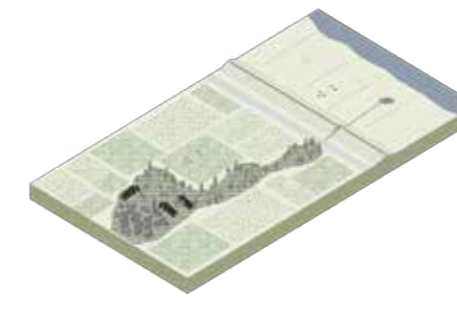
### Temporary housing

There is today a discrepancy in supply and demand of the housing market in the northern Frisian villages along the sea dike. The existing monoculture in housing typologies means that there is a lack of suitable housing for young families, elderly and single household, in other words there is a need for smaller types of housing. One potential way to tackle this issue is the implementation of temporary housing catering to this need. By combining smaller apartments with more flexible programmatic elements a more sustainable way of living might be achieved. With the potential to further develop the area regarding slow-tourism and research related to the unique nature, landscape and cultural heritage, the flexible parts could be used as a way to accommodate visitors for example. The apartments should be configured in such a way that parts could be separated for different uses and or expanded if need be, a young family might need to expand their living space as they grow.



### Current situation

Despite the vast open Frisian landscape, it is one with several barriers, both physical and mental. The northern villages close to the sea dike perceives a loss of connection to the sea. Today the agricultural fields between the villages and the marshland, as well as the dike itself constitutes a barrier with land not easily accessible. This means there is a lack of suitable recreational areas in the near vicinity of the villages.



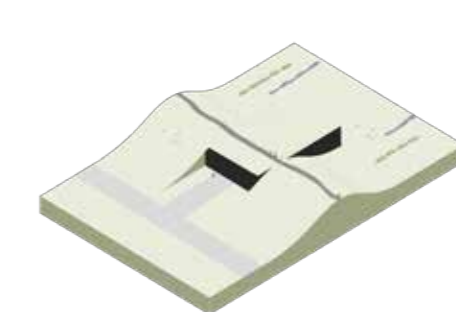
### Recreational area

These new areas of housing would be situated in direct connection to the existing villages facing the sea. Within and around this new residential area recreational forestry and vegetation would be planted, acting as a soft buffer towards the dike and marshland, a way to reduce the impact of light and sound pollution on the vulnerable natural landscape beyond. A new way of living in the otherwise flat and open landscape is suggested. If the declining demographic trend continues and there is no longer a need for temporary housing the green area can be kept as a park/recreational area connected to the villages. By extending this green zone to the dike a connection to the sea could be reestablished for villagers and visitors alike.



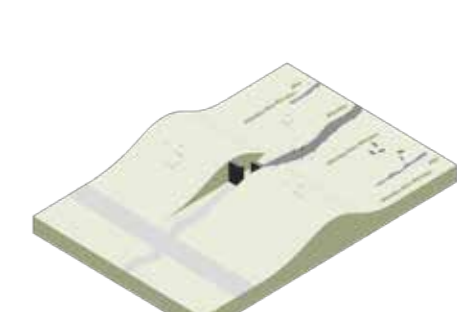
### Cycling and hiking

The Dutch and Frisian landscape lends itself well to activities such as biking and hiking and there are several trails and routes throughout the area. Part of the ERFD-funded project Wadden 2.0 project includes the further development of cycling routes in the area of Friesland and Germany. As it stands today the top of the dike is not used for paths but rather paths go along the foot of the dike. A road where cyclists and hikers have to contend with cars. By establishing bike and hiking paths partly on top of and along the sea dike a new way of moving through and exploring the landscape is created. A path elevated from the surrounding flat landscape would give a grand view of the agricultural countryside on one side and the marshland reaching out towards the sea on the other. In a zoomed-out perspective one could imagine a continuous route all along the Wadden Sea coast, from Denmark, through Germany and ending in Friesland.



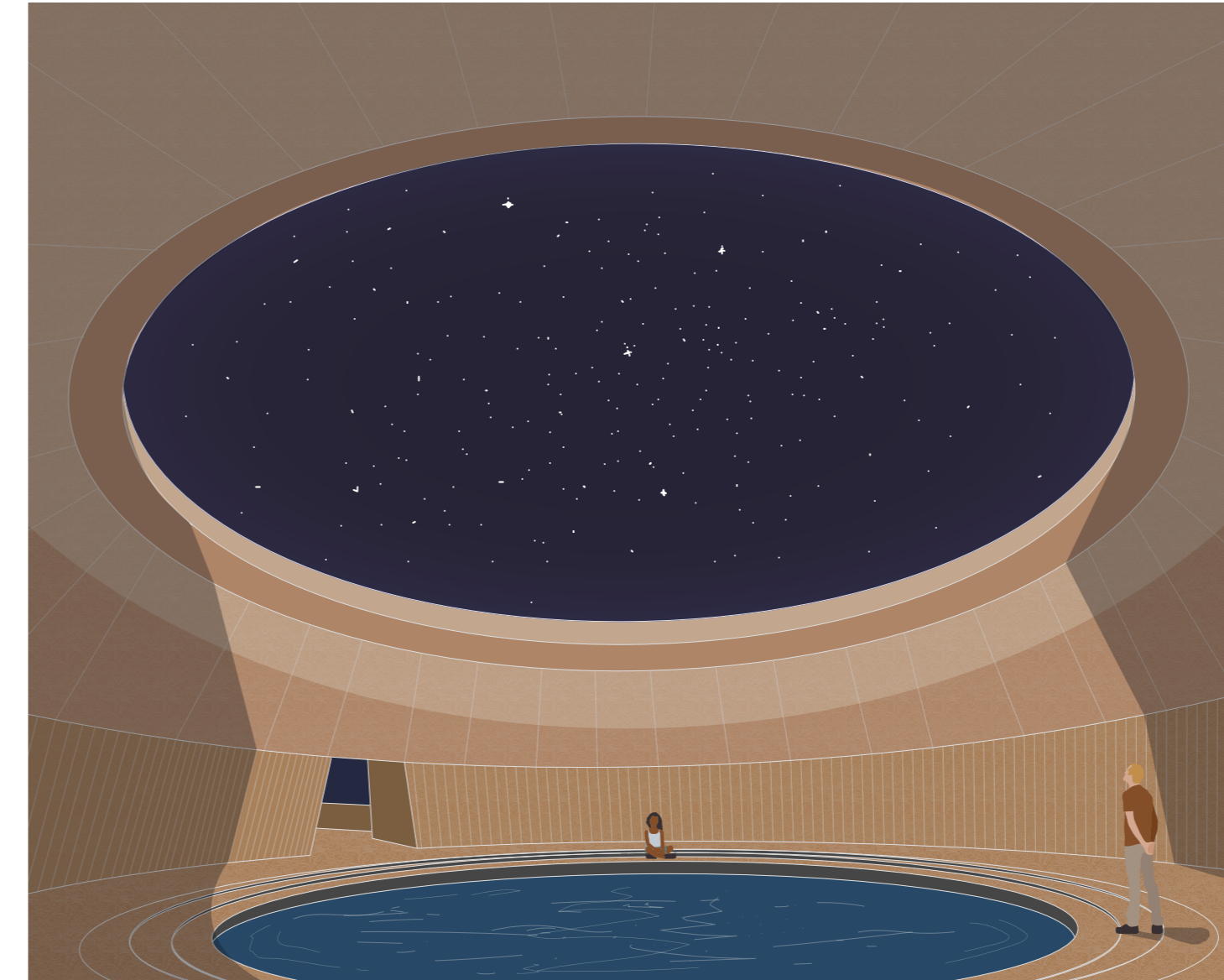
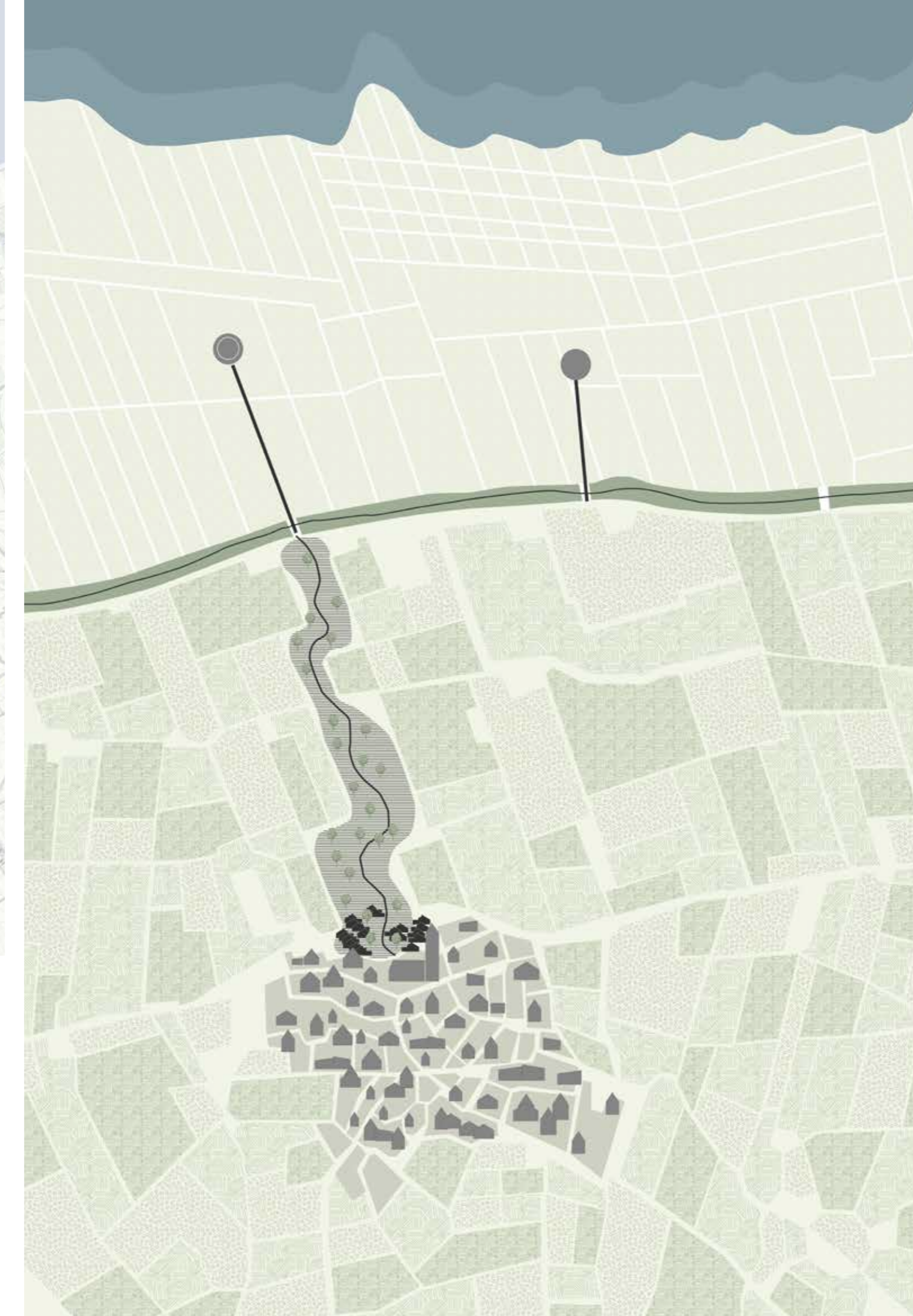
### Nature Center

The proposed nature center is a place to learn about the Wadden Sea, how it has evolved over time and the flora and fauna of the area. The focus will be on the human impact on nature, how it affects ecosystems and biodiversity, historically, in the present and in future developments. This area of the Wadden sea is a completely artificial landscape, inhabited by a multitude of species. The unique meeting between man-made and natural offers the users of this center a unique opportunity to study wildlife in an altered wetland. The center itself sits within the border between these two landscapes, accentuating the act of softening the barrier the dike constitutes.

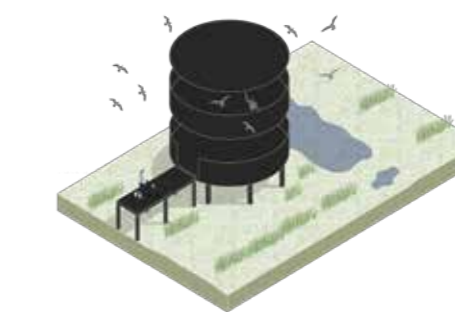


### Passage and view

To overcome the dike's ocular obstruction and let users see beyond the elevated ground a number of incisions can be constructed in the landscape. This would let people experience the ocean from the other side of the barrier and thus spark an interest for further discovering. This would also be an illuminating approach to uncover the dike in its environment. Moving through the wall could offer a new view of the scale and proportions of the massive project that is the seediik. Altering the terrain is a necessity deeply rooted in the Frisian culture. To enable the experiencing of this could therefore be a way to strengthen the identity of the municipality and a tool for the site to exhibit itself.

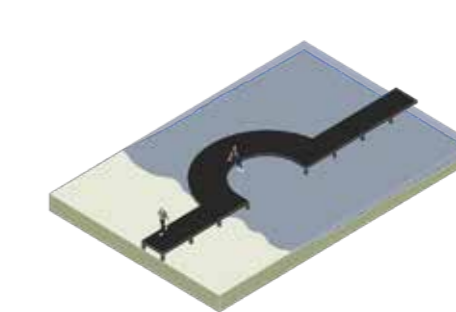


## Marshland



### Bird Watching

The Wadden Sea and the salt marshes on the other side of the dike hosts an impressive array of both breeding and migrating birds due to availability of food and a relatively low level of disturbance. For migratory birds the area provides a staging, moulting and wintering area and is an essential stopover enabling the East Atlantic and African-Eurasian migratory flyways. Several of the birds present are also listed as endangered. Bird watching towers in the salt marshes can provide the opportunity for both tourism as well as research whilst keeping the disturbance to a minimum when set up in the right place.



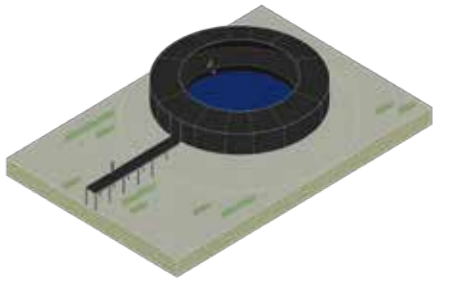
### Maritime Life

The landscape of the intertidal zone is constantly changing from being wadable mudflats to covered with water. Under these specific conditions, about 2,700 species have their habitat. On the mudflats worms, shrimps and crabs can be found, and in the wadden sea, more than hundred different species of fish have been recorded. The paths above the mudflats provide an opportunity to observe both the animals and the changes of the tide.



### Elevated Path

Marshlands and mudflats are difficult landscapes for people with reduced mobility to move around in. With elevated walking paths the nature behind the dyke becomes more accessible for people with moving disabilities and the growing group of elderly in the nearby villages whilst simultaneously keeping disturbance of wildlife at a minimum.



### Stargaze

The natural darkness offers a perfect opportunity for the people and visitors of Friesland to experience the unique qualities of the area. The inhabitant species thrives on darkness and users can interact with the landscape under a starlit sky. With this in mind, a future development dedicated to star gazing could further strengthen the identity of the space. This could act as an island of awe where users move through the vibrant night ecosystem in darkness towards a structure with its eye towards the sky.

The architecture of the observatory would be rooted in the culture, history and context of the marshes. The materials would blend in and speak with the surroundings. This could be natural, earthy and tactile choices like grass, wood and clay. During the night a grand window towards the sky would offer the users a unique outward experience. During daytime the observatory would work as a shelter from the elements and a tool for exploring the wildlife. It would generate encounters and stimulate attraction.

# THE OYSTER CLUSTER

The province of Friesland is missing one of the most essential elements of a waterborne territory - the coast. The Friesian coastline can be considered an exclusion zone, due to dramatic tides, low altitude and the soil type of the land. Specifically the coast of Wadden Sea can be characterized as undefined, fickle and unoccupied. Lacking infrastructure for locals, entrepreneurs and tourists.

However, the mentioned coastal areas are promising. The waters of the Wadden sea are suitable for oyster and mussel cultivation. Similarities in coasts can be found in the South of Netherlands and Denmark. The Wadden sea shore is in the golden mean between the cities of Leeuwarden, Dokkum and the friesian islands, which is a popular destination for summer vacation.

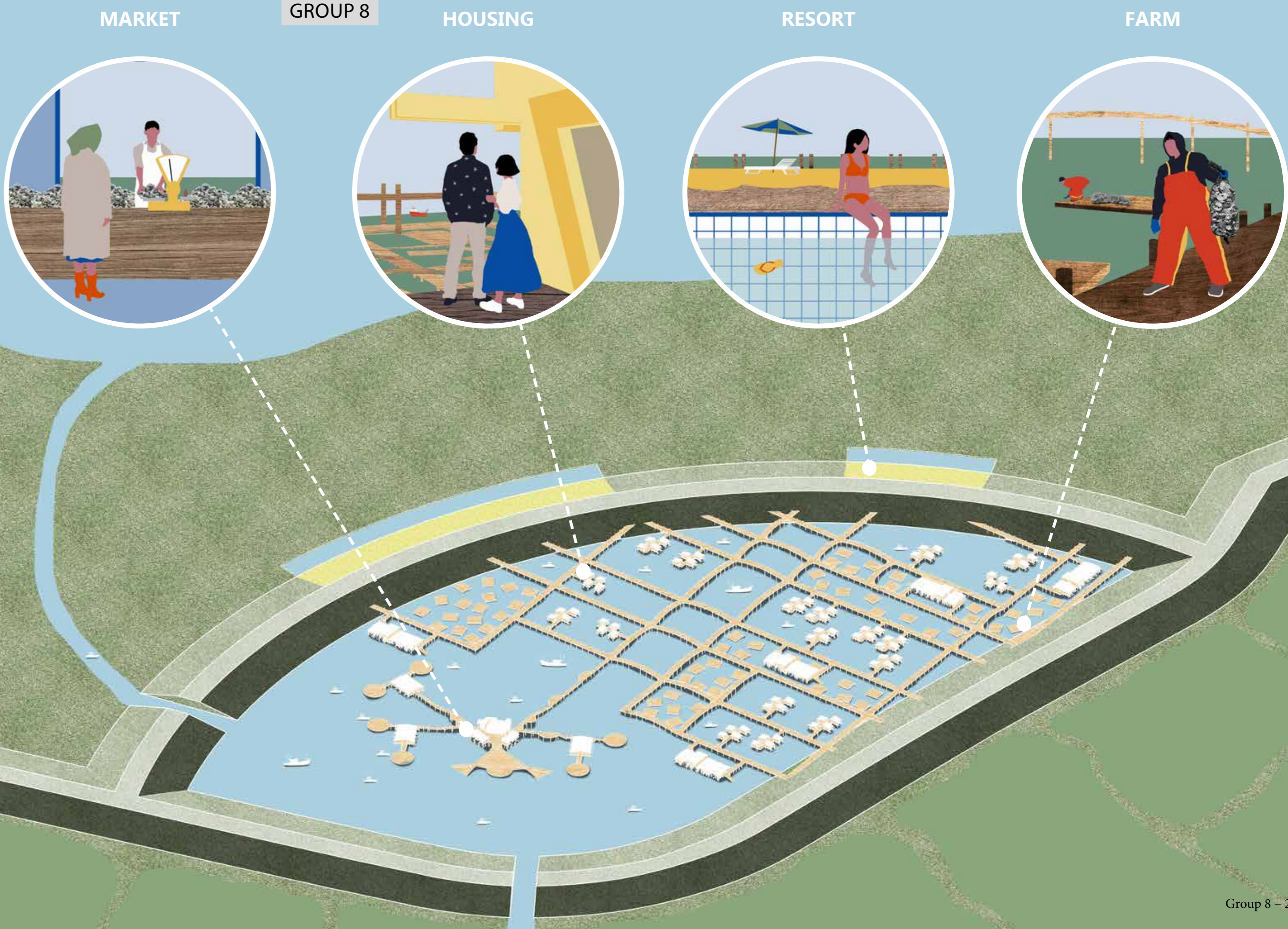
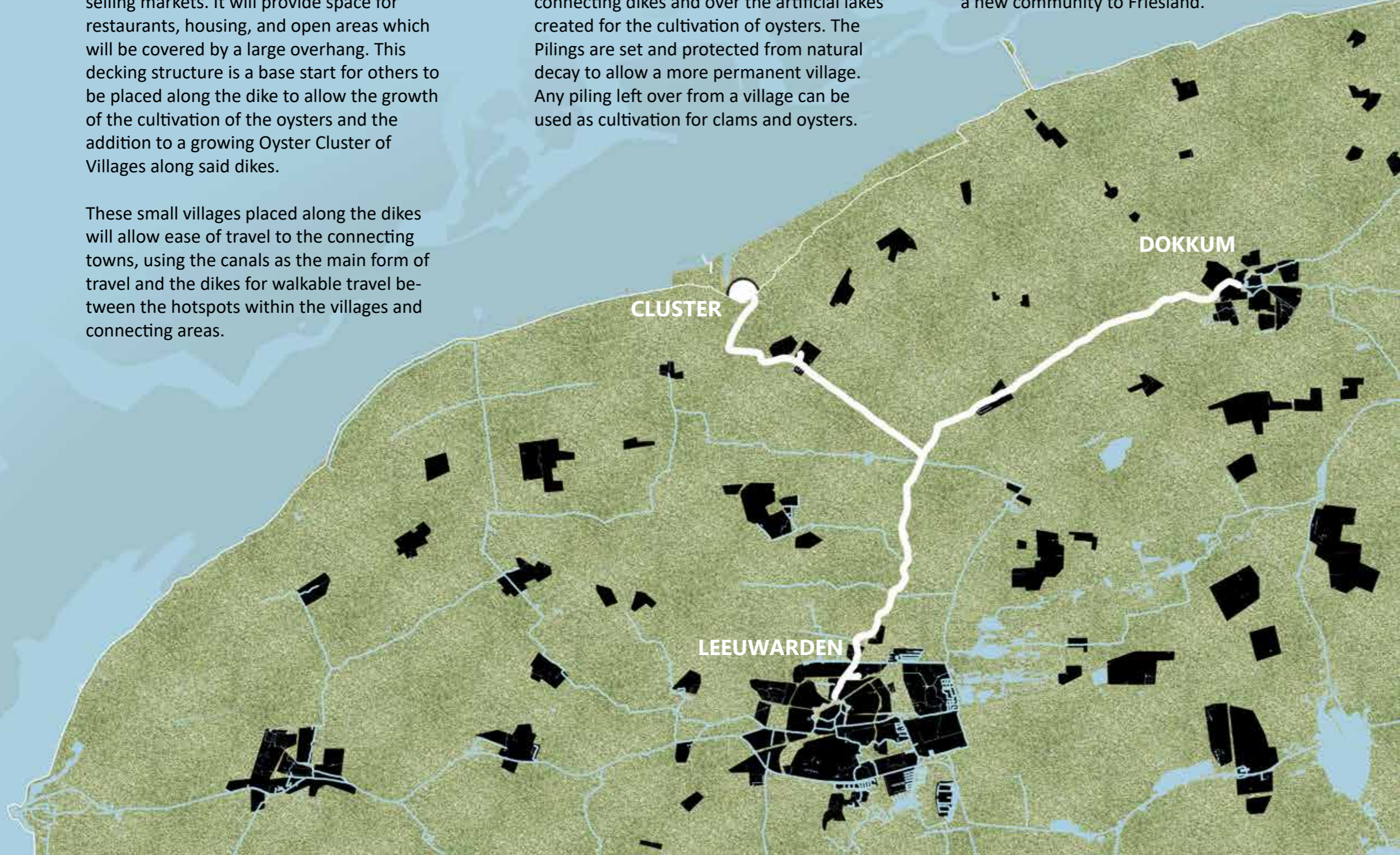
The Oyster Cluster is a new type of a village, situated along the frisian dike and the coast. It will offer jobs, housing and a community for the locals as well as provide accommodation for tourists during the summer. The Oyster Cluster is placed along the dike, with an artificial lake for controlled clam farming, a deck for personal and corporate boats and is connected by canals to the cities.

This deck has fingerling docks attached to allow the docking of tourist and local harvesters. This platform will be a start of a local and communal hotspot for larger selling markets. It will provide space for restaurants, housing, and open areas which will be covered by a large overhang. This decking structure is a base start for others to be placed along the dike to allow the growth of the cultivation of the oysters and the addition to a growing Oyster Cluster of Villages along said dikes.

These small villages placed along the dikes will allow ease of travel to the connecting towns, using the canals as the main form of travel and the dikes for walkable travel between the hotspots within the villages and connecting areas.

Using Piling structures to allow the growth of a vertical and horizontal village without transforming the surrounding landscape below. The villages can be placed along the connecting dikes and over the artificial lakes created for the cultivation of oysters. The Pilings are set and protected from natural decay to allow a more permanent village. Any piling left over from a village can be used as cultivation for clams and oysters.

Creating this Oyster Cluster village brings together the surrounding towns whilst forming and creating markets, careers, connectivity, auditoriums, coastal sites, and a new community to Friesland.



# Prototyping Friesland

An investigation of future developments in Friesland

Vera Bergström / Joel Bågesund / Hanna Høibo / Fabian Koppers

*"God created the world,  
but the Dutch made  
the Netherlands"*

- Dutch Proverb



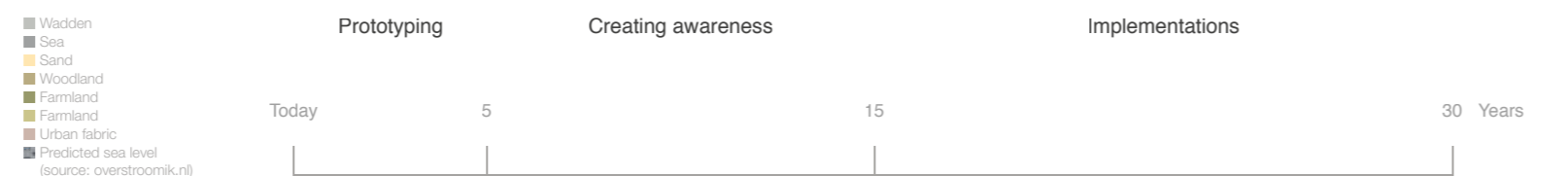
**Windmills**  
Function:  
Pump out the water to  
reclaim land.



**Dikes**  
Function:  
Protect the land from  
the sea.



**Deltawerken**  
Function:  
After the big flooding in  
1953 the Deltawerken  
were initiated to better  
protect the country.



Ever since the earliest days of settlement in what is today the Netherlands, life has been a constant struggle to overcome the troubles of settling lands that lie below the sea level. This is no exception in Friesland, and from the first terps to today's sophisticated pumping systems, these lands have been conquered bit by bit, each generation adding knowledge and commitment to the task of keeping the threat from the ocean at bay. Inside the dike, society has thrived mainly thanks to the agriculture industry, which stands for the larger part of Friesland's economy.

The people of Friesland view themselves as generally happier than the rest of the population. Their homelands are not as crowded as the other provinces, and nature is close with the Wadden Sea and its islands to the north, while the fascinating terp villages dot the landscape with its historic buildings.

However, with new times ahead, there are also new challenges. The province of Friesland is facing a demographic shift, with young people moving out from the small countryside villages to neighbouring cities like Leeuwarden, or even to elsewhere in the Netherlands. This creates a situation where the population consists increasingly of older people, which might eventually lead to a decline. The villages need revitalizing, and new ways to earn a living.

Also, the farming landscapes of Friesland are suffering from increasing soil salinity from sea water infiltration, and poor biodiversity as a result of the use of monocultures and hard ecological barriers like the dikes. These issues will impact the economy in the long run, as the soil increasingly degrades.

Despite this, the greatest challenge is maybe still the sea, as climate change causes more aggressive floods and rising sea levels. New times and changing tides call for new solutions, working in with nature instead of against it. To do this, new knowledge must be acquired.

Main concepts that informed the project:

**Soft defence:**

- Flood protections that work with nature rather than against it.
- A layered defence against the ocean.

**Biodiversity:**

- Improved habitat for birds and animals.
- Building for animals as well as for people.

**New ways of living:**

- Agriculture in salty environments.
- Adaptation to rising sea levels.

**Education:**

- Building and spreading knowledge about qualities and challenges in the area through research and education programmes.

**Community:**

- Using the existing communities as a resource, creating value for them with the interventions.

**Attraction / Accessibility:**

- An attractive and accessible coast line, preserving the wonderful "emptiness" of the Frisian coast.

Above:  
Sandbags along flooded area in Noord Brabant (Source: Het Geheugen).

Above right:  
Plan showing the west part of Friesland, with areas that are at risk of submersion below the future ocean surface level. With the sea level rising, and people moving out from the villages, it is clear that something must be done. To know how to proceed from here, a testbed is needed where prototype solutions can be developed and tried, both for the closest and the furthest future.

Below right:  
Plan drawing showing a coastline floodscape, with a prototype building that connects the existing village to the Wadden Sea.



## GROUP 9



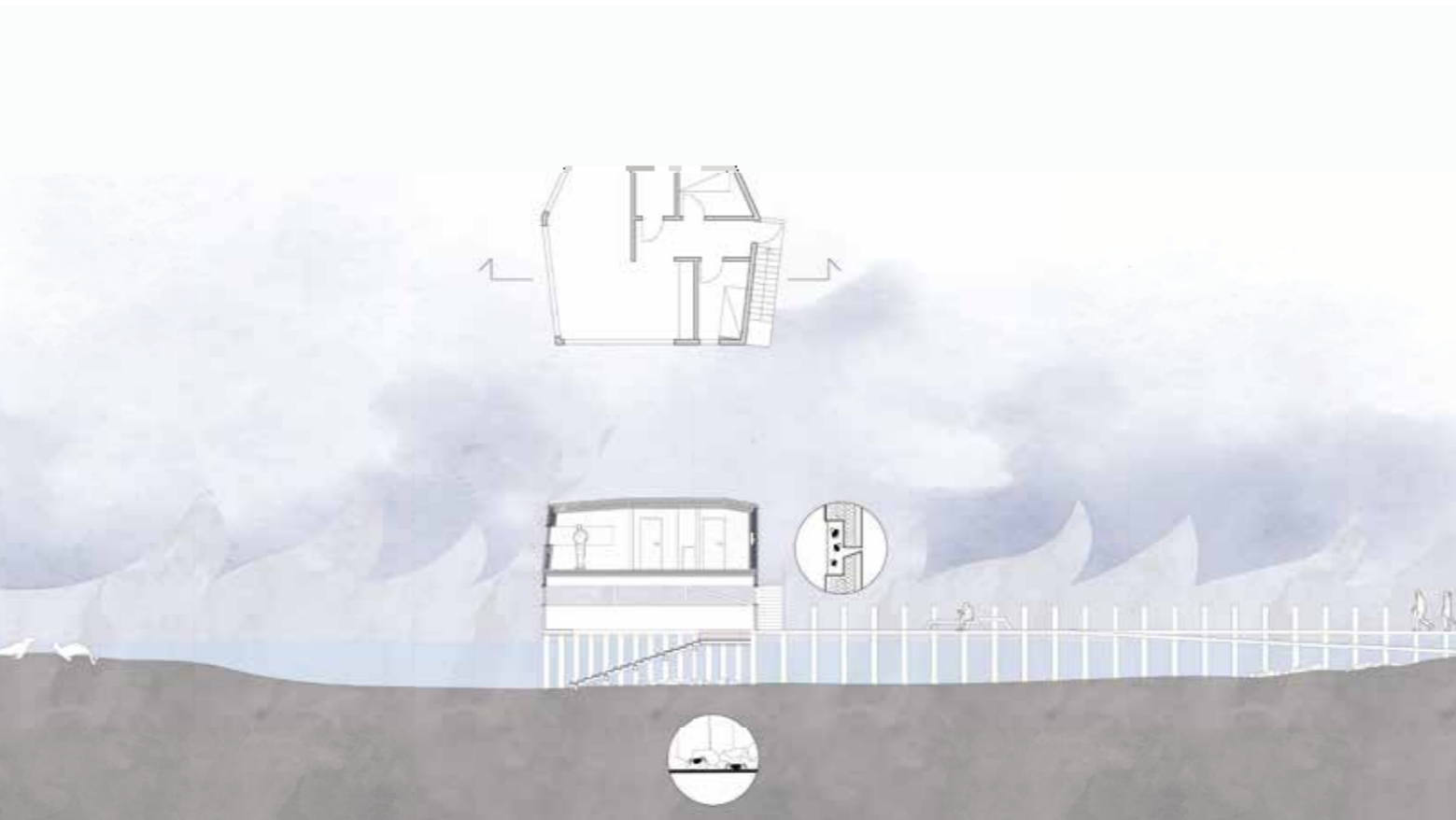
**1. Soft defences:**  
A second outer line of dunes and permeated "soft dikes" in the water breaks the waves and retrieves sediment brought in with the tide, transforming the mudflats into natural salt marshes that are flooded but also drained by the daily fluctuations of the water level. This creates a buffer zone to prevent the saltwater from reaching the farms inside the dike, and turns the hard coastline of the dike into a soft zone of floodscapes - keeping the sea in check without battling it.

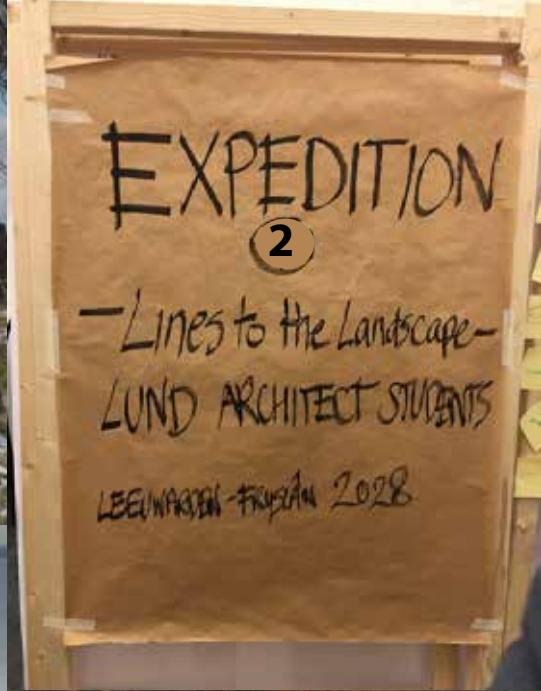
**2. Biodiversity:**  
In this new environment, an increasing amount and variety of birds and animals may occupy the floodscape. Additions using shapes and textures to imitate the natural habitat of different species may be introduced to speed up the recovery of biodiversity, and works with simple and less expensive measures that can be created quickly.

**3. Nature tourism and recreation:**  
The mudflats have long been a part of the Frisian culture and heritage, being used for "mud hiking" ("wadlopen") and birdwatching among other things. The augmented floodscapes may, if made accessible through light infrastructure, become attractive areas of nature tourism and recreation that makes the coastline into a destination in its own right.

**4. Community:**  
The area closest to the existing dike could be used for experimentation with new types of saltwater agriculture, with oyster farming or cultivation of salt resistant plants. This may act as a force to make people come together, and create knowledge and value for the farmers within the dike.

**Below:**  
The mudflats and the tidal zone is made accessible with buildings on piles, where visitors can interact with the floodscape both during ebb and flood. The building is reversible as the piles can be left up or dismantling, contributing to the ecosystem as they gradually rot.





Imagining Stad-Wad is part of an ongoing "expedition" which is exploring the theme "lines to the landscape" by design studies. Stad-Wad is the second one in collaboration between the province of Fryslân, the city of Leeuwarden and Lund LTH University - Sweden.



## Findings and conclusions

The 9 design proposals show a great variety of ideas and imagining the theme Stad-Wad. Although they are diverse and rich, three themes as we see them are included in most groups.

### **Strengthening the connection between both sides of the seadike** - A path to the sea, the Oyster cluster

The proposals work with activating the landscape around the seadike through implementing new programmes like agricultural use but also celebrating the unique experience of the tidal landscape. Existing villages get a new connective address at the seadike which is no longer a barrier but a line in the landscape as a living sculpture.

### **Creating a new landscape in the zone between city of Leeuwarden and Dokkum and Waddensea** - Between Terps, Dokkumer Ee, Pilgrimage through Friesland

New living landscapes are imagined, built on both existing regional qualities but also historically grown identities. The works show interesting strengths for the future of the landscape creating new terps for working and living together with an enlarged natural value like forest zones creating a more intimate landscape in contrast with the open agricultural fields.

### **Adding new iconic elements in a spatial network** - Expanding the horizon, Prototyping Friesland, Beyond the Dike

These plans create a layered network of cultural points in the landscape and by doing so expand the horizon. The landscape in north of Friesland becomes a part of the city of Leeuwarden, without losing its openness. By intensifying the possibilities for experiencing the landscape it gains interest and accessibility.

Alex van de Beld  
Stephan Smeijers



“Lines to the landscape” is part of a design collaboration between Lund University, the city of Leeuwarden and the province of Fryslân.

**Contributors:**

Noon	Idea and concept Lines to the landscape
Lund university	Alex van de Beld, program maker and teacher Prof. Christer Malmström teacher Andreea Marcelu , on-line organization
Provence of Fryslân	Stephan Smeijers, program maker and co-teacher Wybren Jorritsma, content facilitator Tsjerk Bottema, social economic assignment
LAOS landschapsarchitectuur	Mathijs Dijkstra, introduction climate landscapes
2-inch productions	Film Lines to the Landscape

