

Result of the Elective Course AR0149

Landscape Architecture On Site 2021
Ode aan de Hollandse Waterlinies

Landscape Architecture On Site

Publication date
2021



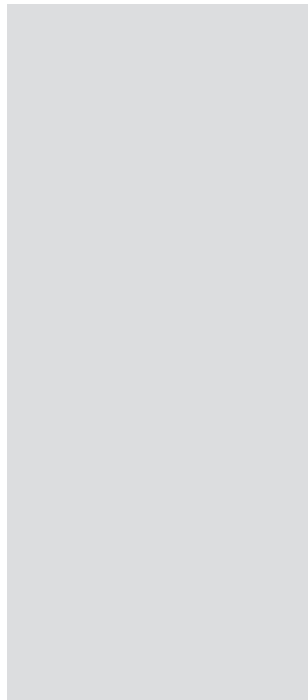
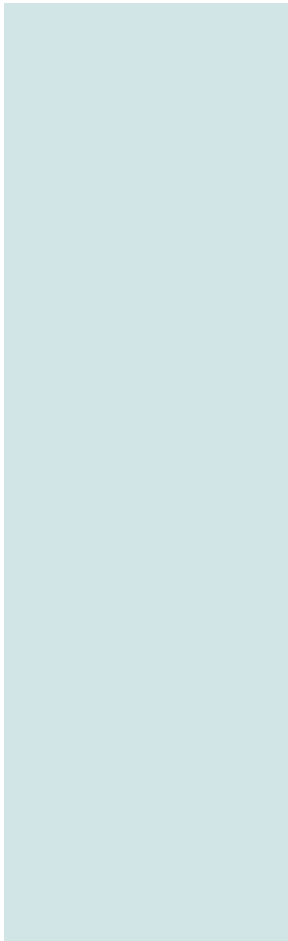
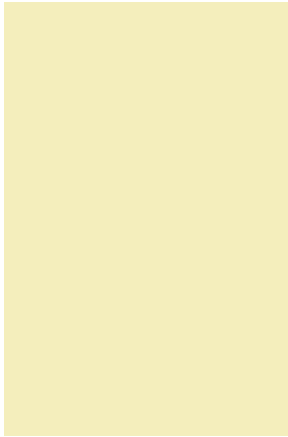
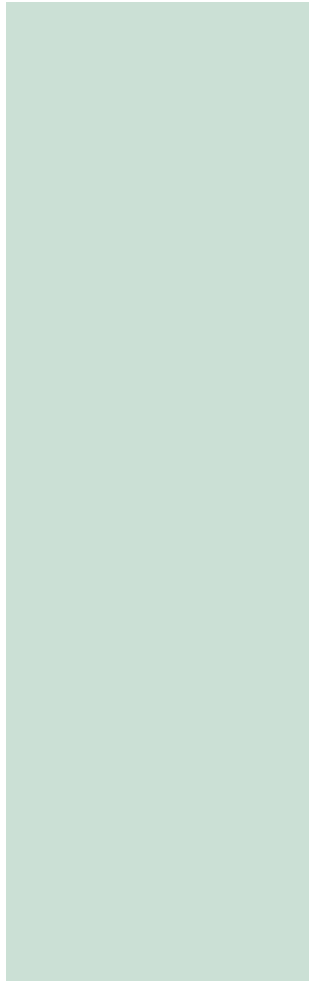
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<http://ahouseinbetween.nl>



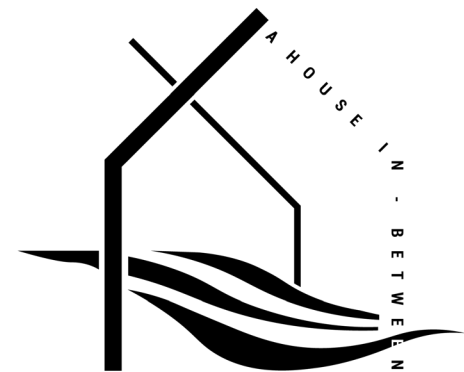
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Result of the elective course
AR0149

Landscape Architecture
On Site:
Ode aan de
Hollandse Waterlinies
MSc2/Q4

Landscape Architecture,
Faculty of Architecture,
TU Delft



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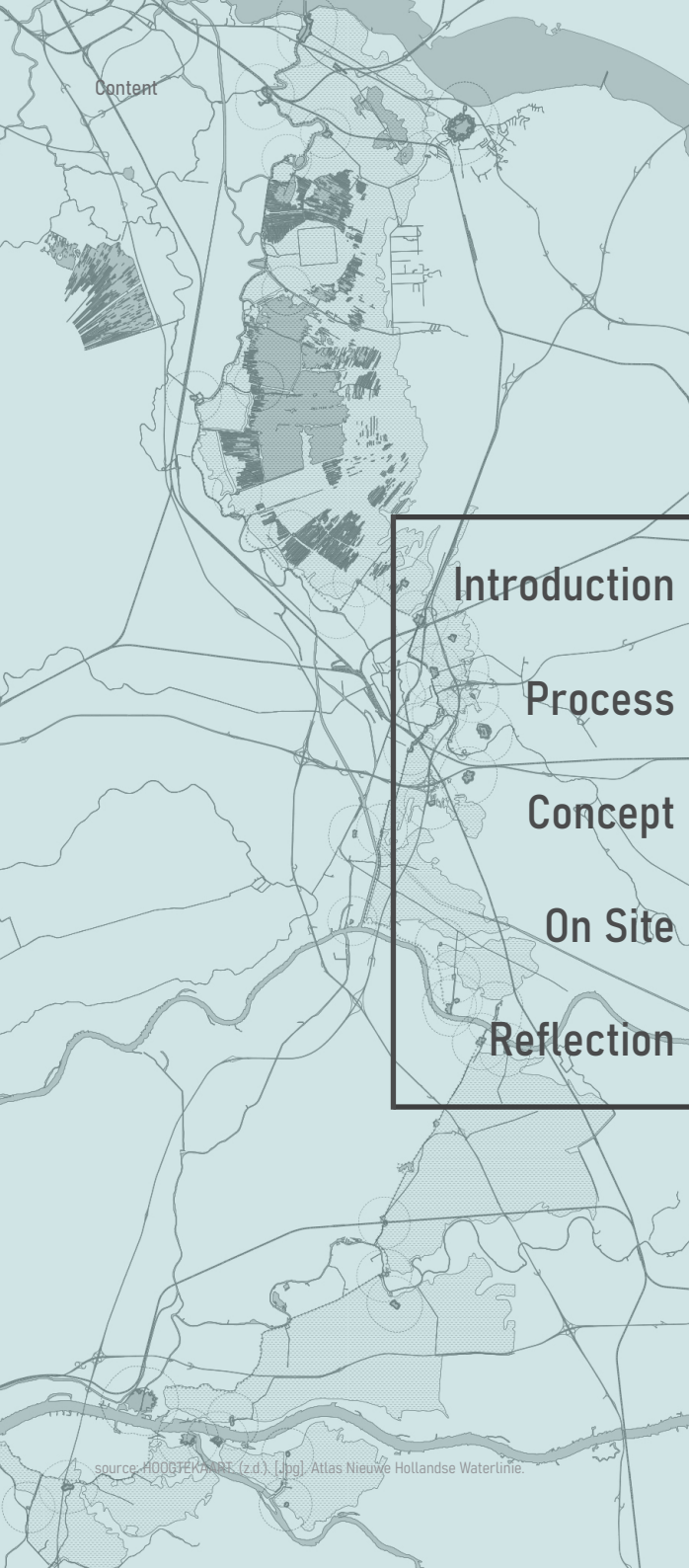
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Lotte van Oevelen
Pieter van Os
Martine Schüll
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And many thanks to supportive Ton Uijtewaal and his family.

"The landscape of the *Nieuwe Hollandse Waterlinie* is a landscape full of secrets, stories and special objects. A landscape that you only get to know when you know these stories and secrets. Today's landscape of the *Nieuwe Hollandse Waterlinie* is an open landscape on the edge of the Randstad. In this landscape, humans have made a covenant with water and nature in the past. And in the future, this landscape can offer solutions for climate issues such as drought and water storage. These stories and the possibilities in the past, now and in the future are what makes the *Nieuwe Hollandse Waterlinie* beautiful."

text source: Chair of Landscape Architecture,
Department of Urbanism, Faculty of Architecture
& the Built Environment, TU Delft. (2021, april).
Quarter Guide Q4 Elective 2020-2021 Landscape On
Site Ode aan de Hollandse Waterlinies.

source: BOUWPERIODE 1 (z.d.) 1961 Atlas Nieuwe Hollandse Waterlinie



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Introduction

PROJECT BACKGROUND

COURSE GOALS

TEAM MEMBERS

TIMELINE

PROJECT BACKGROUND

The *Nieuwe Hollandse Waterlinie* is 85 kilometers long, 3 to 5 kilometers wide and runs from the IJsselmeer to the Biesbosch. The intention behind its construction is to create an inundated area that can only be crossed with great effort. The depth of the inundation has a critical water height of 30 to 60 centimeters. This way the water is too deep for infantry to enter but shallow enough to inhibit the flotation of normal boats, especially those with heavy military equipment. To make it effective the inundation areas are several kilometers wide. Although the *NHW* has never held back the enemy as intended, it did have a psychological effect on the enemy. But in 1939 / 1940 it became apparent that the line had lost its function entirely because of the deployment of aircrafts.

Nonetheless, this immense construction consisting of the inundation areas, dikes, canals, locks and the fortresses is still intact. Most of the fortresses still exist and although some of them have fallen into disrepair, a number of them now have found other functions or have been restored.

Although the inundation areas form the core of the defense line, they are the least visible component. They seemed just for agriculture. In a country as crowded as The Netherlands, openness is vulnerable. This being the essence of the inundation fields has led to an invasion of the fields by urbanization, planting and the construction of infrastructure. The inundation fields are therefore in a far worse state than the fortresses. This specified the design assignment for this project to be the following:

*“To construct an installation that enhances the experience of
the process of inundation
and of the inundation fields
in past, present and or future.”*

COURSE GOALS

This booklet shows the process and results of *Ode aan de Hollandse Waterlinies*, a project developed in the elective course Landscape Architecture On Site. Research, analysis and Sense of Place formed the base of this project. The central aim of this course was to express the given site in a project at the interface between landscape architecture, landscape art and theatrical performance. This year the focus is on inundation and the inundation fields. As part of research for the festival "*Ode aan de Hollandse Waterlinies 2021*" our team - consisting of fifteen Master students - has realised a temporary interactive architectural installation in a privately owned meadow landscape, where cows, meadow birds and farmers live and work.

The location for the temporary installation is the Isle of *Schalkwijk* in the polder *Blokhoven*. In 2017, north-east of *Fort Honswijk*, a water retention and inundation area - which stores 23.000 m³ - was realised to prevent flooding caused by peak and/or enduring rainfall. Subsequently, a deep water pond of 1 hectare has been dug to permanently store water, as well as an area of 2,2 hectares to be used as a buffer. The latter also demonstrates the principle of inundation twice per month during the summer period, reviving the waterline for visitors to see.



TEAM MEMBER INFORMATION

On Site Team



Nicolle Cobben

Digital Team



Lotte van Oevelen



Kimberley Nguyen



Martine Schüll

Finnance Team



Sanne Maring

Construction Team



Rachel Bonnewell

Exhibition Team



Wansu Lu

Design Team



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Daria Beliavskaia



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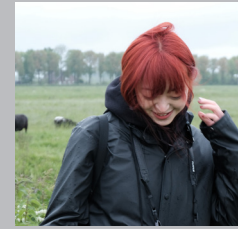


Miriam van Eck

Booklet Team



Xinyu Zhang



Fudai Yang

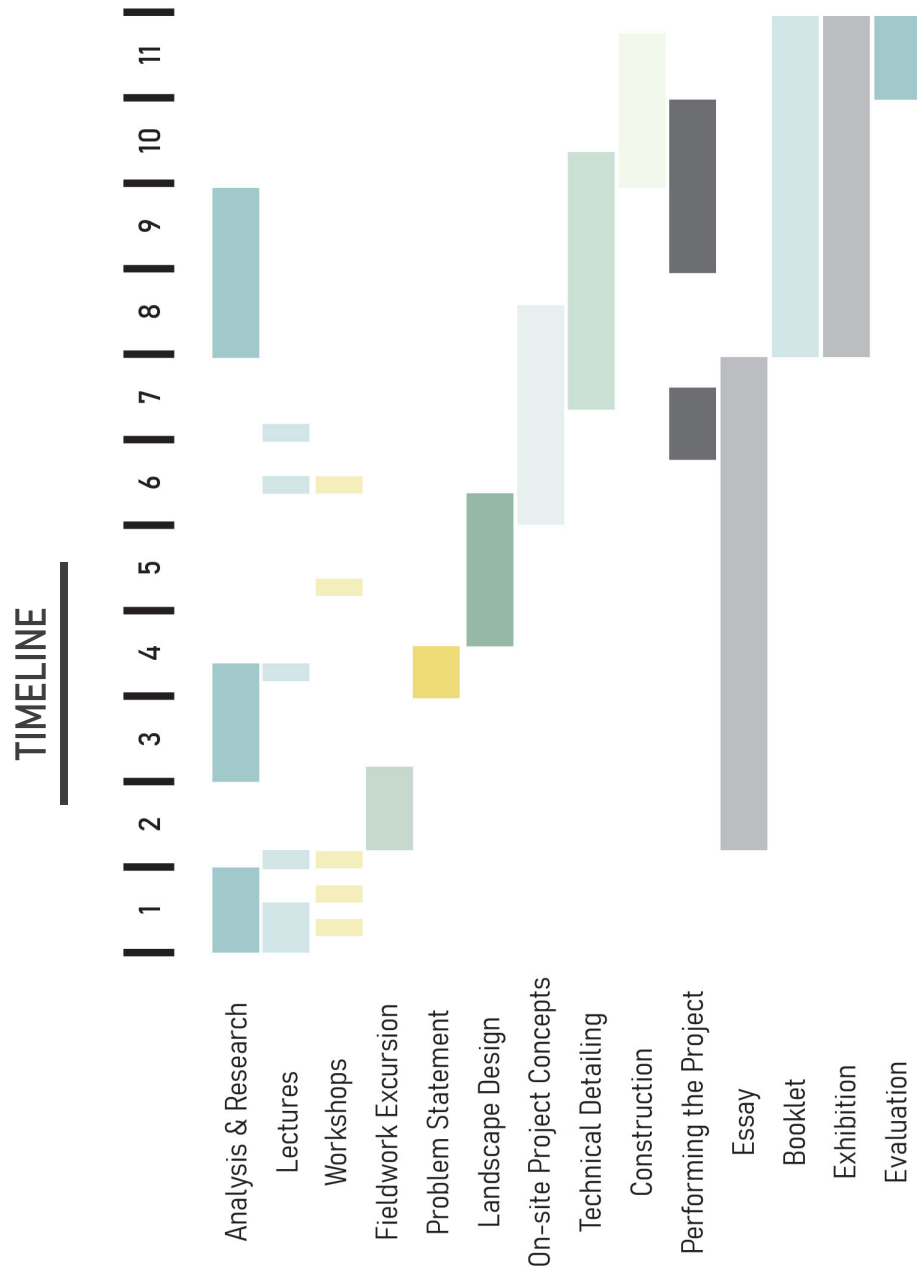


Pieter van Os



Priscilla Namwanje

The crew division only means everyone has a main responsibility and focus point, but in practice, all members did every task together.



Process

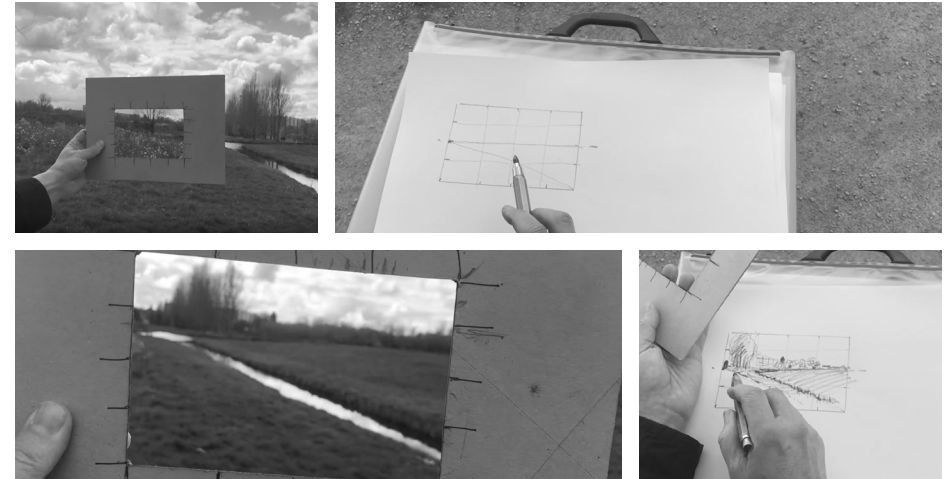
SKETCHING EXERCISE

Offender / Defender / Follow the Water / Drawing Collections

GENERAL ANALYSIS

Dutch Water Defense Lines / Development
/ Water System / Soil Survey
/ Strategic System / Military Access
/ The New Enemy

Overview of Sketching Exercise



During the first weeks of analysing we were individually given three divergent routes on the *Nieuwe Hollandse Waterlinie*, around 12 kilometers each. The objective was to walk these routes while sketching the landscape with three distinctive perceptions, respectively called Attacker, Defender and Follow the Water.

The perceptions are based on how the invading enemy, the defending ally and the neutral water would historically observe the Waterline's landscape: the focal point of a predator, the complete overview of the defender, or the poetic fraction of the idyllic water landscape.



source: Paul de Kort's Sketching Video

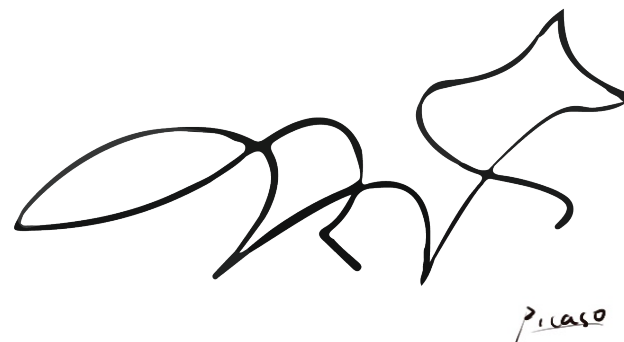
How to Draw Attacker Sketches

The first walk in the area of the waterline was oriented from 'outside to inside'. This is the 'enemy movement', the view of the attacker. The perception is similar to that of the predator in nature. Predators such as foxes, wolves, owls, but also humans, have their eyes on the front of their heads, side by side. This makes them perfectly capable of focusing, estimating distances and seeing depth.



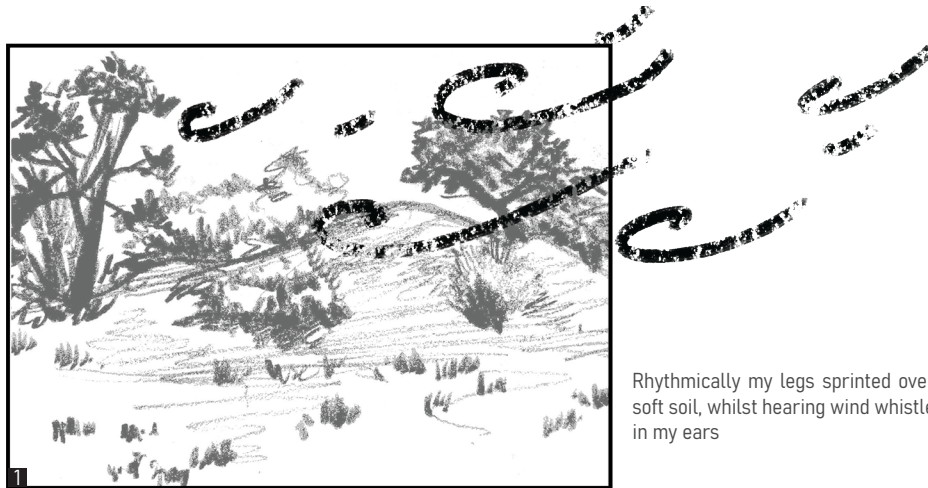
PERSPECTIVE: ATTACKER

DAY ONE



OVERALL DISTANCE: 204.71 KM

COLLECTED SCENES: 9 OUT OF 146



Rhythmically my legs sprinted over soft soil, whilst hearing wind whistle in my ears

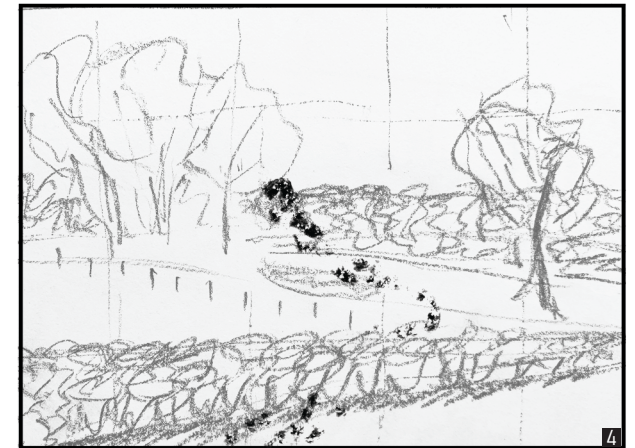


My muscles ache after having covered many miles, Yet my voraciousness impedes me from stopping

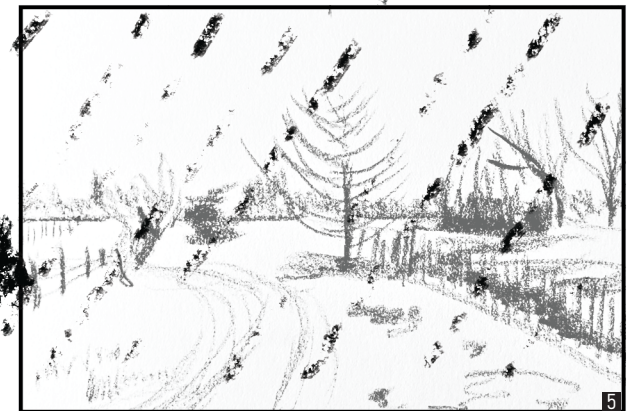


Was that a tail - flashing by that stone structure?

Emerging from the hawthorn edges, I rush over, furiously, painstakingly

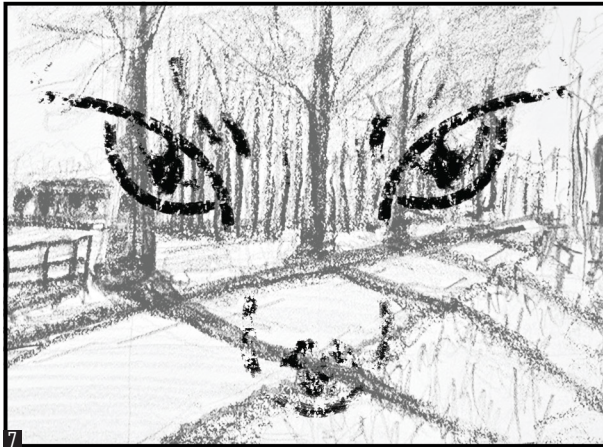


Ignoring pouring rain from above Salivating with the thought of my feast

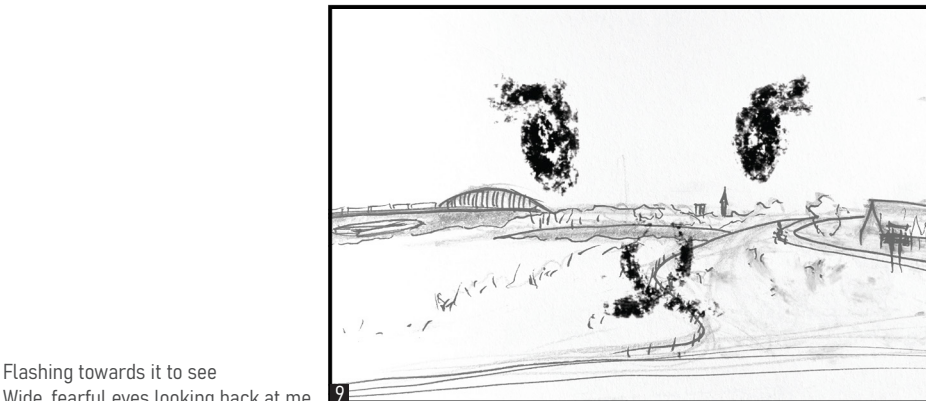
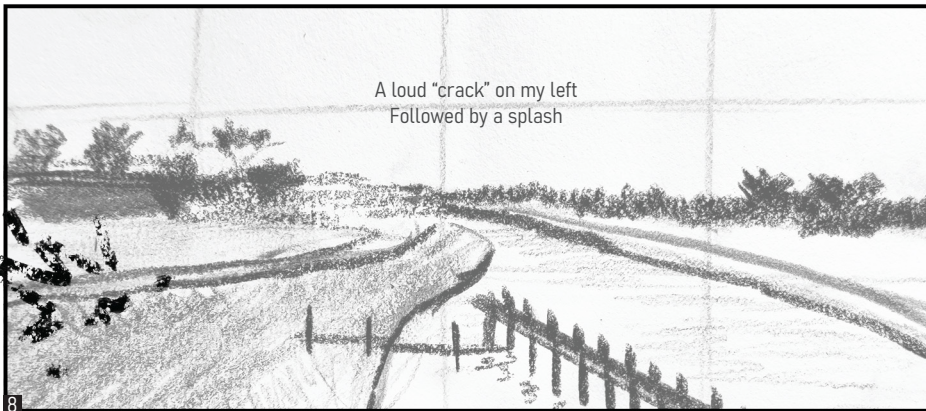


- Only to find a body of water Stretching as far as my fixated eyes could see





Was my sight deceived by shadows,
Since the sun set behind the treeline?



Flashing towards it to see
Wide, fearful eyes looking back at me

How to Draw Defender Sketches

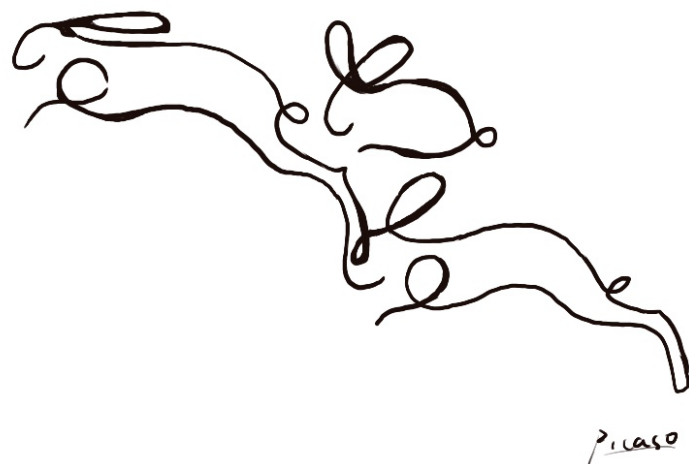
The second walk in the area was directed from 'inside to outside'. with the gaze of the defender, the prey. The perception is similar to that of the 'prey animal'. Prey animals such as deer or rabbits have their eyes on the side of their head. This enables them to have a panoramic view of their surroundings, to scan the horizon for possible danger.



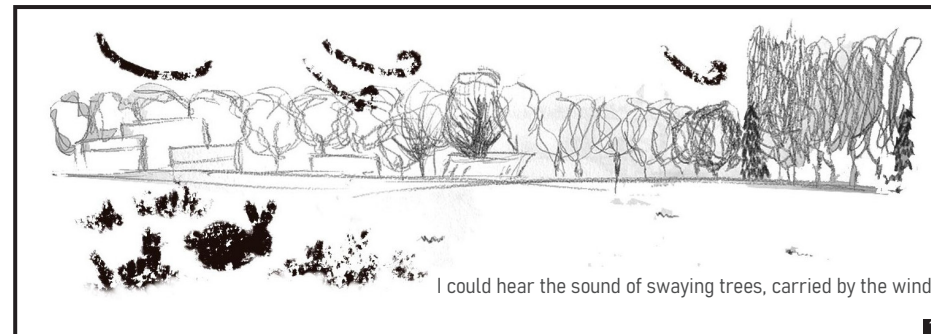
PERSPECTIVE: DEFENDER

DAY TWO

OVERALL DISTANCE: 174 KM

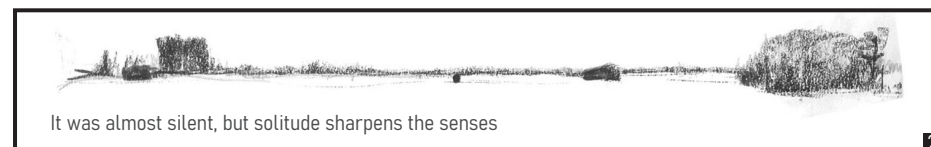


COLLECTED SCENES: 9 OUT OF 150



I could hear the sound of swaying trees, carried by the wind

1



It was almost silent, but solitude sharpens the senses

2



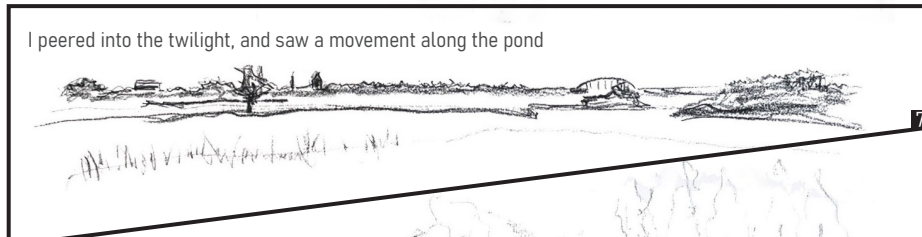
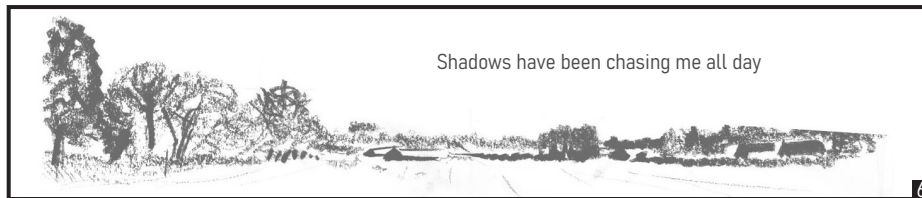
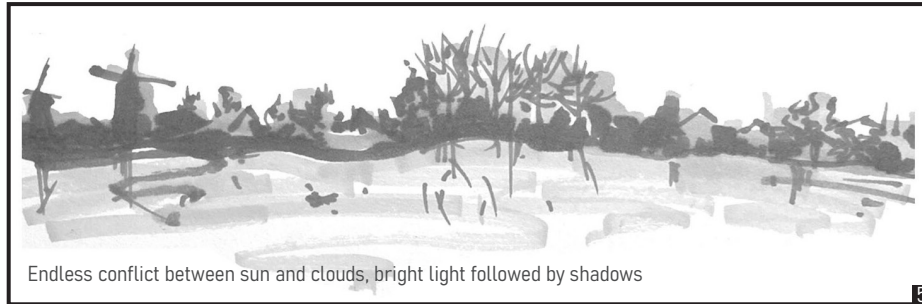
I scanned the panoramic landscape carefully, critically, deeply

3



Awaiting the inevitable encounter...

4



How to Draw Follow the Water Sketches

The third walk follows the veins in the landscape, ditches, waterways, canals, the dikes and quays, locks and other water features, focusing on the edges between water and land. During the walk 'Follow the Water' your gaze is directed downwards, to the ground, under and directly in front of your feet.

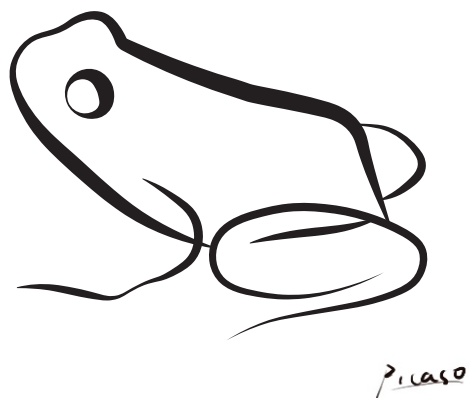
The perception is like that of an amphibian, being half in the water, half on the land, low to the ground.



PERSPECTIVE: FOLLOW THE WATER

DAY THREE

OVERALL DISTANCE: 216,35 KM

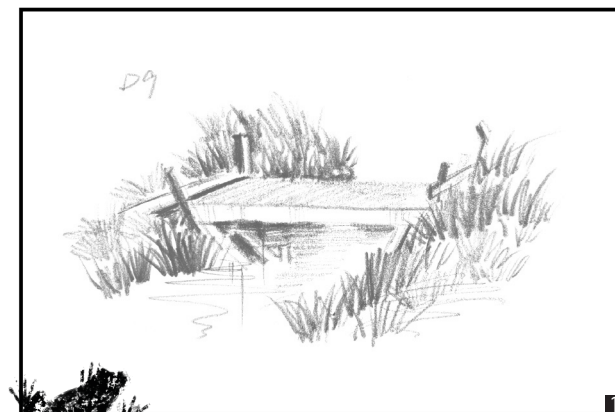


COLLECTED SCENES: 9 OUT OF 164

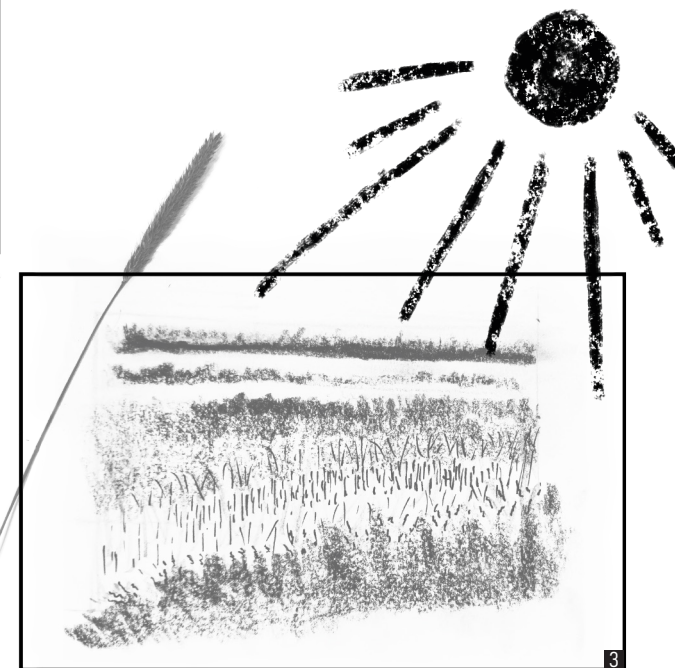
I know all ditches, dikes, quays,
Locks, canals and waterways

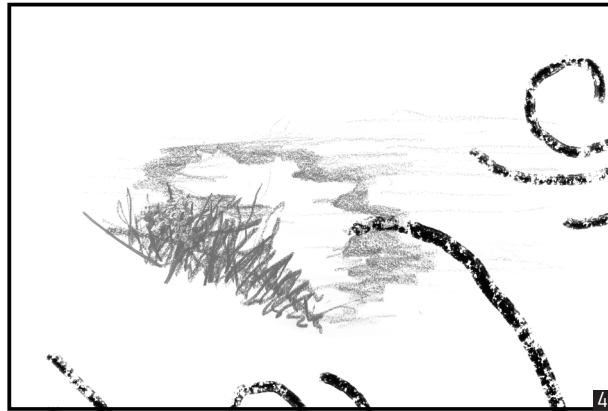


Generations before me inhabited
this terrain
Ever migrating from the scorching
sun



Clay, grass, sand, reed, mud,
Focused on the edge between water and land





Tension between drying out and
drowning
Leaping from pond to pond

4

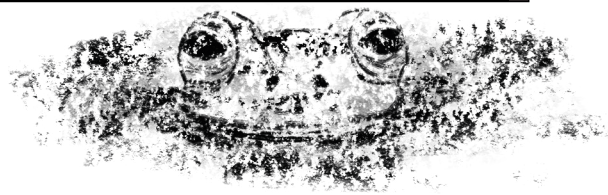
Gray brown water, they contained
It didn't swirl, it didn't flow,
it just rippled in the wind



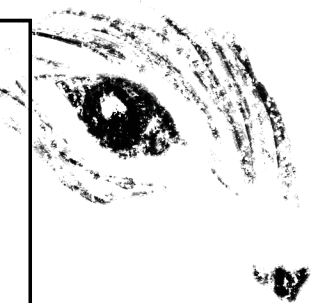
5



6



Today, an intruder arrived
Nervously hopping around

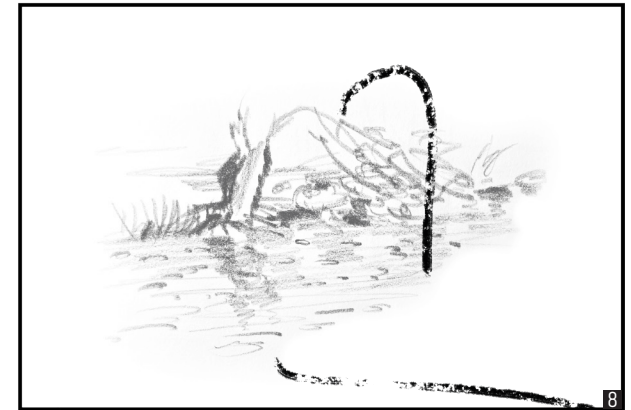


Invading my land, my pond
Wide eyes scanning my terrain

7

For he is much bigger,
I will find another sanctuary
And hope he is gone when I return

My twig breaks when I leap
Once again, following the water

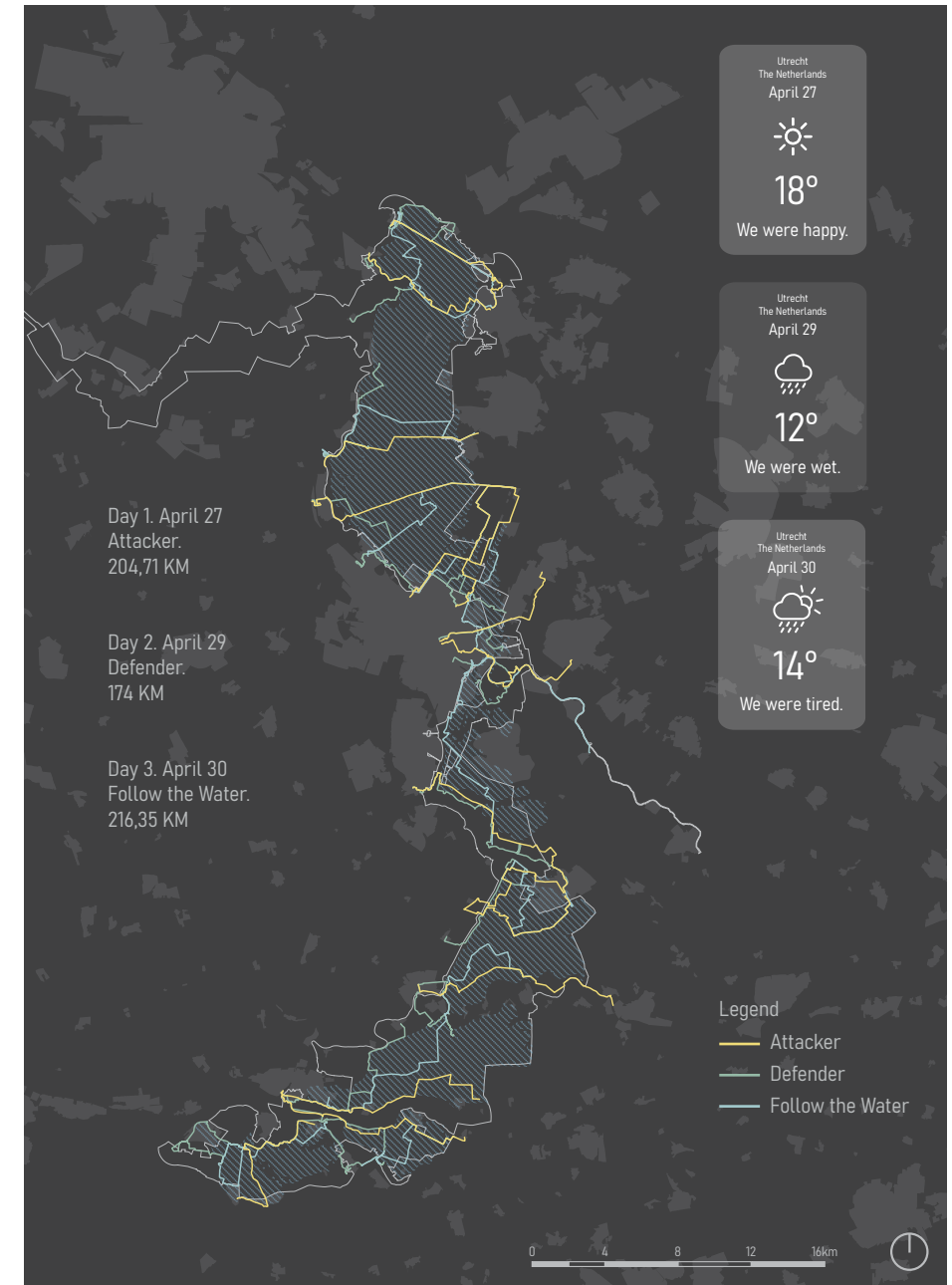


8



9

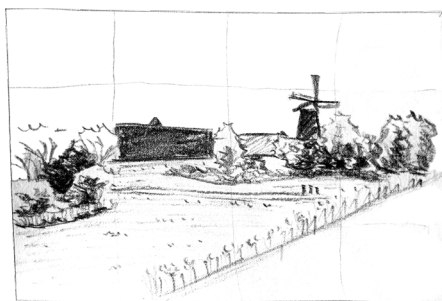
Our Routes and Moods



Drawing Collection



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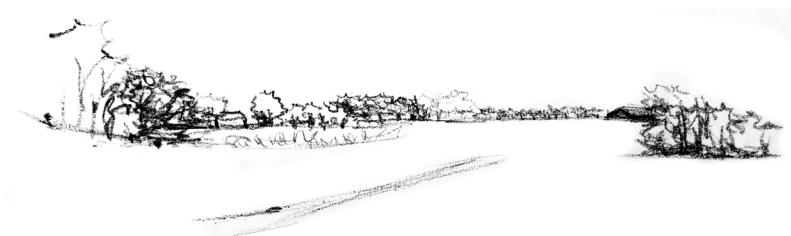
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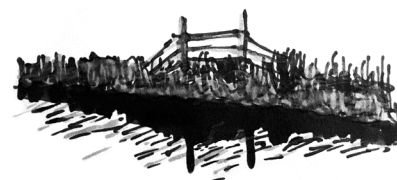
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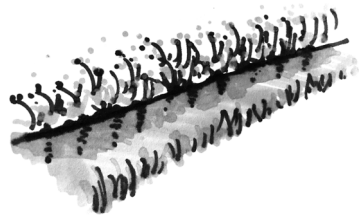


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Drawing Collection



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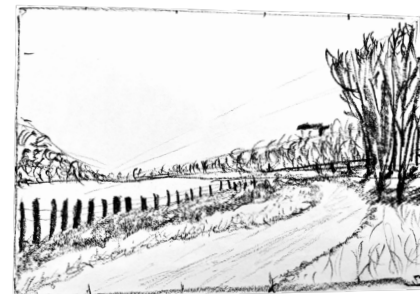
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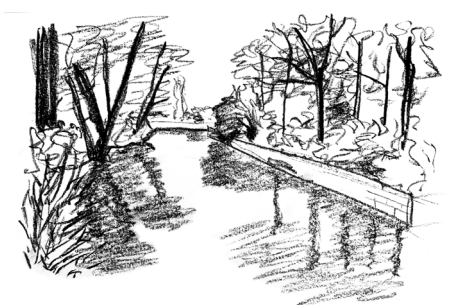
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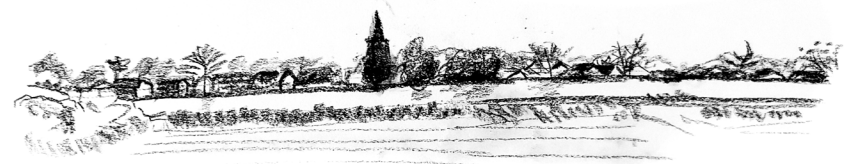
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System of the Dutch Water Defense Lines



The *Nieuwe Hollandse Waterlinie*'s precursors are the *Oude Hollandse Waterlinie* and the Stelling van Amsterdam, whose defense methods were also by inundation.

The *Nieuwe Hollandse Waterlinie* was built in the period between 1815 and 1885 and was further expanded and strengthened until spring of 1940. In contrast to the *Oude Hollandse Waterlinie*, the *Nieuwe Hollandse Waterlinie* constituted an eastward shift of the line to also protect the city of Utrecht. Not only because Utrecht was an important garrison city, but mainly to prevent the enemy from easily tapping the water obstacle through the city, by protecting the inundation locks. After the spring of 1940 and the *Nieuwe Hollandse Waterlinie* was declared obsolete, it was decided to move the main defense of the Netherlands to the Grebbelinie.

After 1945, the *Nieuwe Hollandse Waterlinie* had little to no strategic importance. However, in the time of the Cold War, a defense system was developed in the east of the Netherlands along the IJssel, also based on inundations: the IJssellinie.

source:
 Steenbergen, C. M., & van der Zwart, J. (2006). Strategisch laagland. Uitgeverij 010.
 Ministry of Education, Culture and Science, Project Office for the Defence Line of Amsterdam,
 New Dutch WaterLine programme office, Provincie Noord-Holland, Provincie Gelderland, Provincie Utrecht, & Provincie Noord-Brabant. (2019, januari). Dutch Water Defence Lines UNESCO. Ministry of Education, Culture and Science.

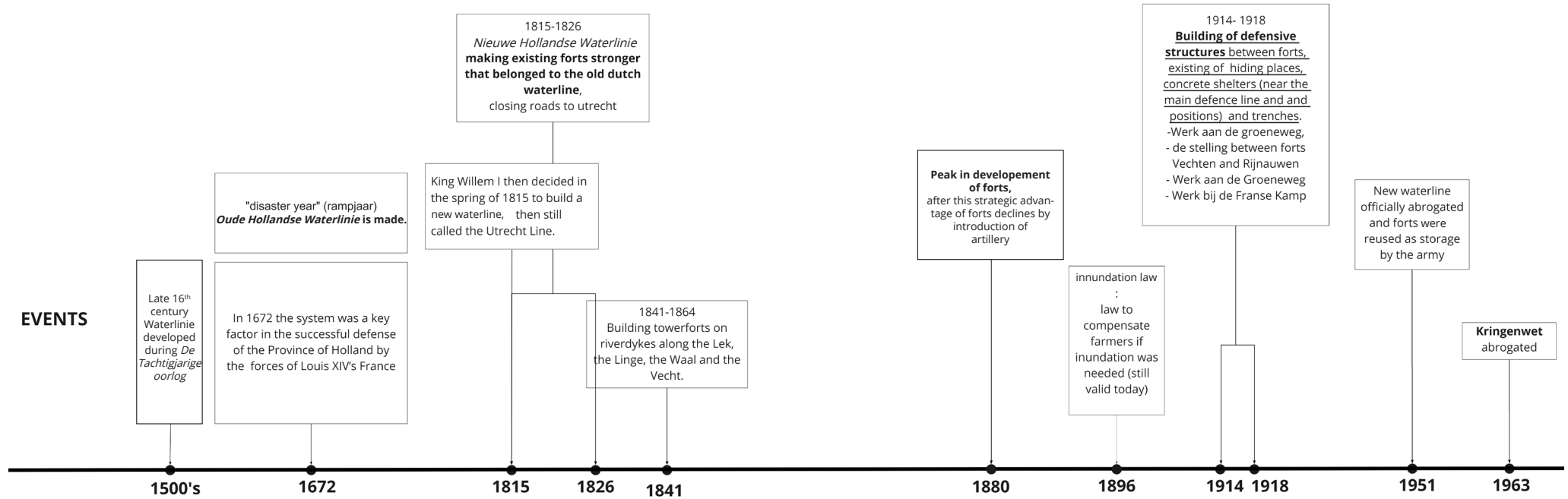
Development periods

Timeline	
<i>Oude Hollandse Waterlinie</i>	
Stelling van Amsterdam	
<i>Nieuwe Hollandse Waterlinie</i>	
Phase 0: prior to 1815	
Phase 1: 1815 to 1826	
Phase 2: 1826 to 1870	
Phase 3	
Phase 4: 1886 to 1914	
Phase 5: 1914 to 1945	
Phase 6: 1945 to now	
1815	
1826	
1870	
1880	
1886	
1920	
1914	
1945	
Overall description	<p>Old waterline mainly involved upgrading six fortified towns. Other sections were also converted and incorporated into the new waterline.</p> <p>The focus was on defending the city of Utrecht and building the inundation system.</p> <p>Defence was becoming more mobile.</p> <p>Zoning of the NWD</p> <p>The new defences joined the <i>Oude Hollandse Waterlinie</i> near Muiden.</p> <p>The focus was living armed forces.</p> <p>The <i>Nieuwe Hollandse Waterlinie</i> was brought to a state of defensive readiness and inundations were effected to Preparation Level.</p>
Water management system	<p>Construction of inundation system</p> <p>Speeding up of the inundations</p> <p>Last adaptions through new infrastructure</p>
Military fortification	<p>Fortified towns</p> <p>First ring of forts round Utrecht</p> <p>Second ring of forts round Utrecht</p> <p>Modernization and add barracks and sheds</p> <p>Construction of concrete forts in <i>Stelling van Amsterdam</i></p> <p>New (mainly military) use of forts</p>
Policy	<p><i>Kringenwet</i> 1814</p> <p><i>Kringenwet</i> 1853</p> <p>Inundation Act 1896</p> <p>Suspension of <i>Kringenwet</i></p>

40

Development of the Nieuwe Hollandse Waterlinie

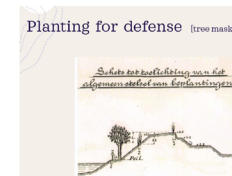
Events and Authors



AUTHOR

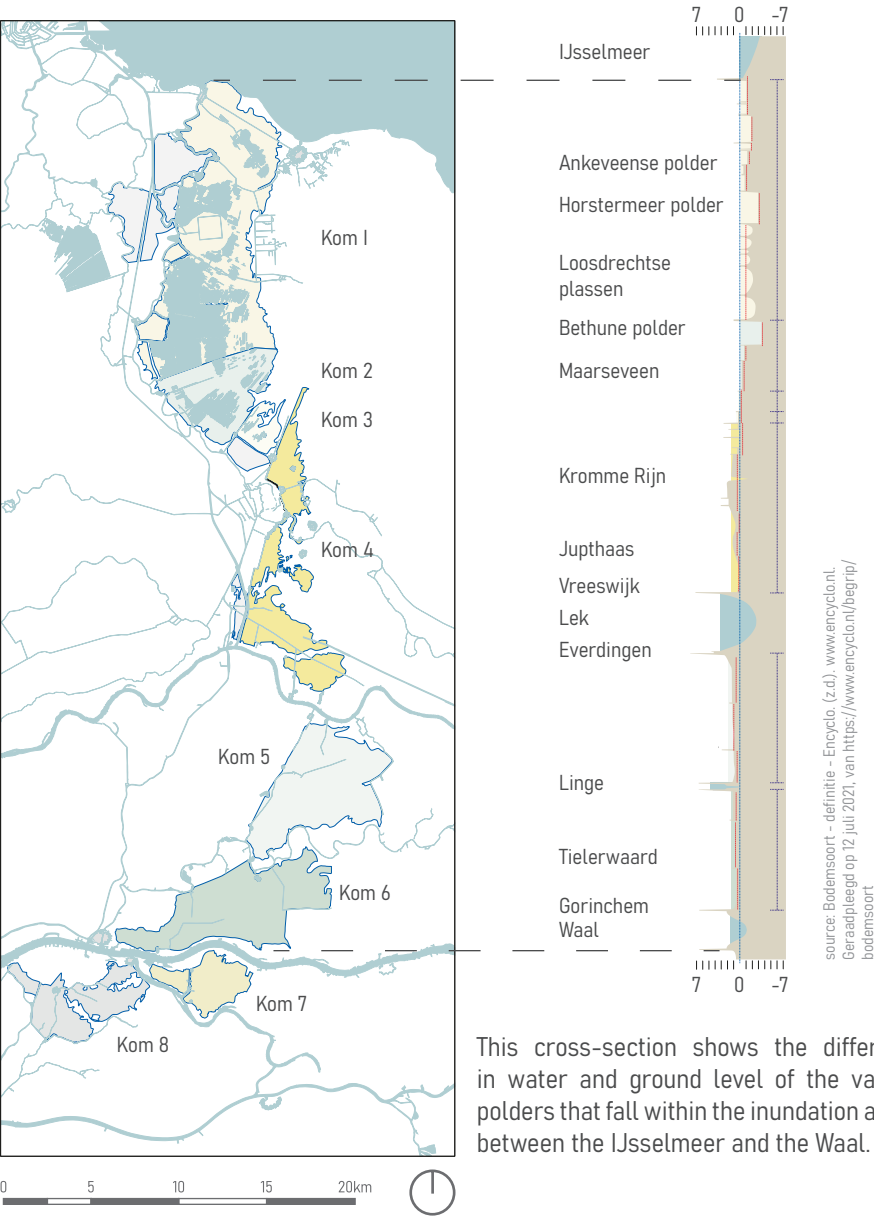


Fort Honswijk



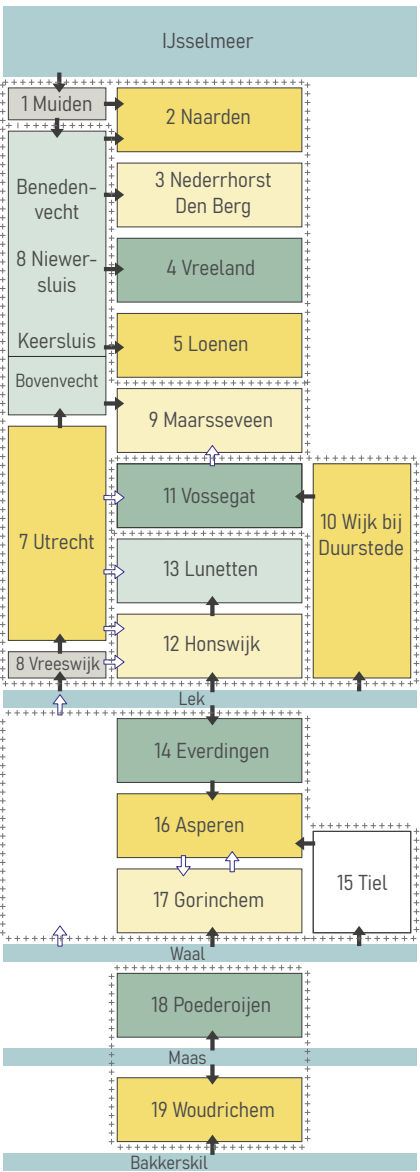
The NHW Water and Inundation System

Section Inundation Bowls

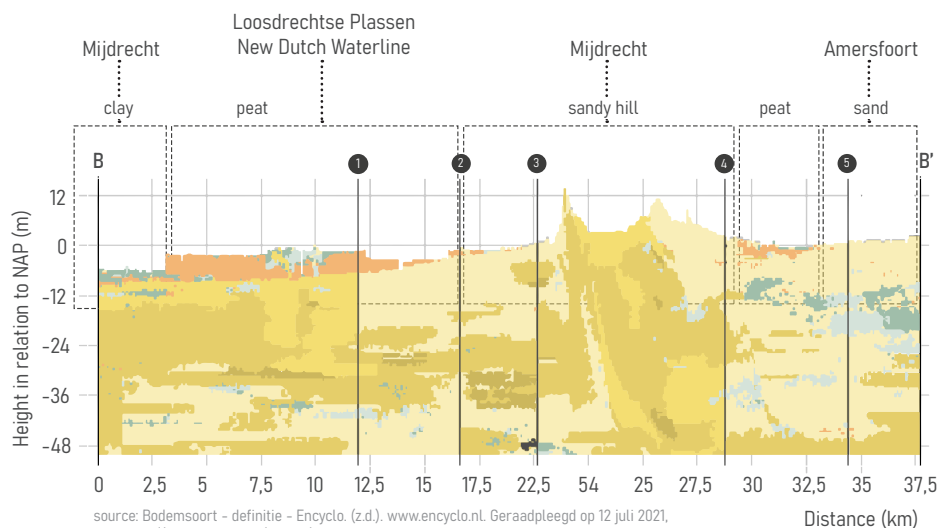
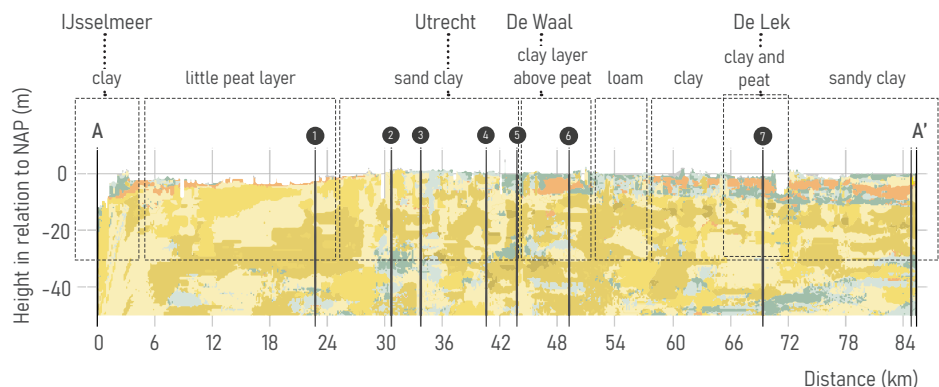


The NHW Water and Inundation System

Inundation Scheme



The NHW Soil Survey



source: Bodemsoort - definitie - Encyclo. (z.d.). www.encyclo.nl. Geraadpleegd op 12 juli 2021, van <https://www.encyclo.nl/begrip/bodemsoort>

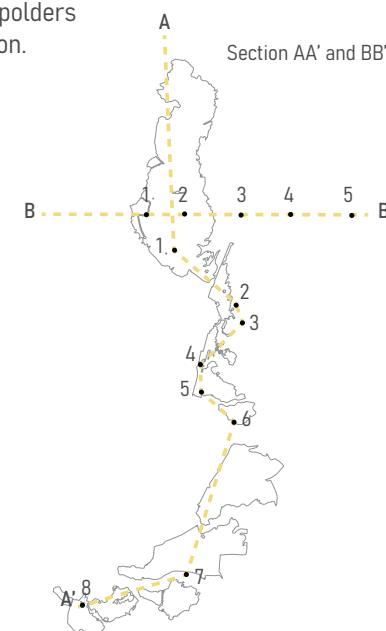
Legend

Fine sand	Peat
Middle grain sand	Clay
Coarse grain sand	Loam
Gravel	

In principle, 5 soil types can be distinguished in the Netherlands: marine clay, river clay, sand, peat and loess. With the exception of the last one (loess occurs only sporadically in South Limburg), all soil types occur in the Waterline's area. The northern inundation areas largely consist of Hollandveen, with the eastern boundary of the Gooi weir, which mainly consists of sand.

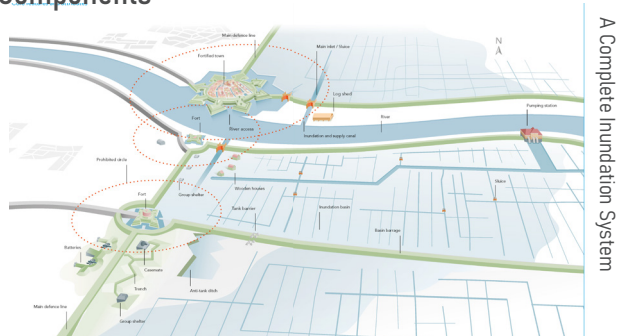
From Utrecht to the Lek, the Waterline lies on a bed consisting of river clay. This area is made up of floodplains, stream ridges and basins. The stream ridges are the higher areas in the landscape, while the basins are the lower parts, which often consist of small drained polders in which often the inundation fields are located.

From the Lek to the Land van Altena, completely in the south, the Waterline is on the dividing line between the Hollandveen and the river clay soils. This area was created by clay deposits from the major rivers. The land is relatively high, but has little relief, resulting in large river polders that are almost completely flooded during inundation.

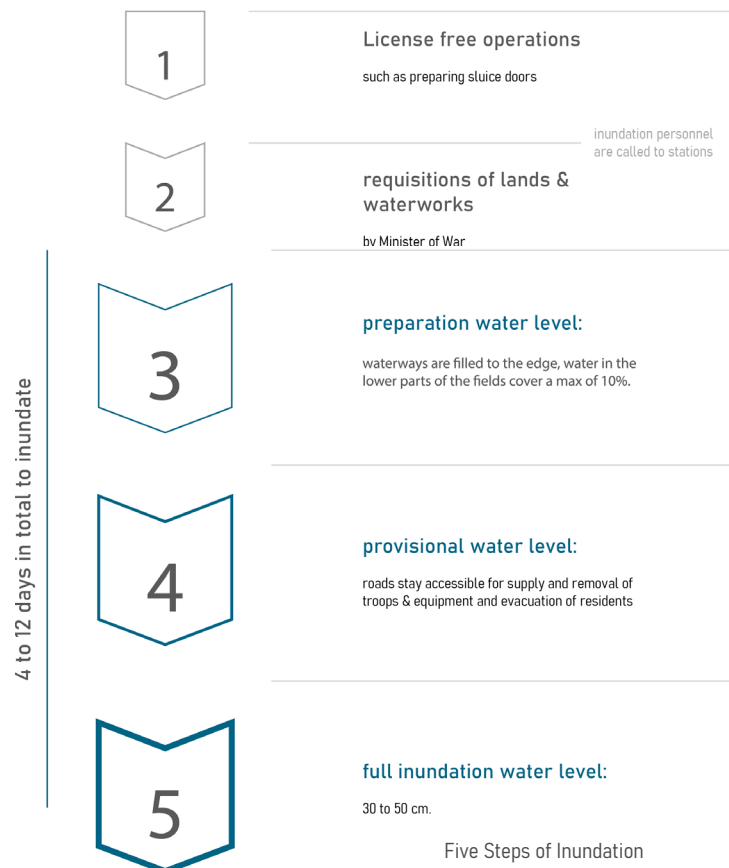


Important Elements and Components

1. The inundation fields
2. A water system with canals and locks
3. A system of dikes
4. The fortresses and other military works
5. Vegetation



source: Ministry of Education, Culture and Science, Project Office for the Defence Line of Amsterdam, New Dutch Waterline programme office, Provincie Noord-Holland, Provincie Gelderland, Provincie Utrecht, & Provincie Noord-Brabant. (2019, januari). Dutch Water Defence Lines UNESCO. Ministry of Education, Culture and Science.

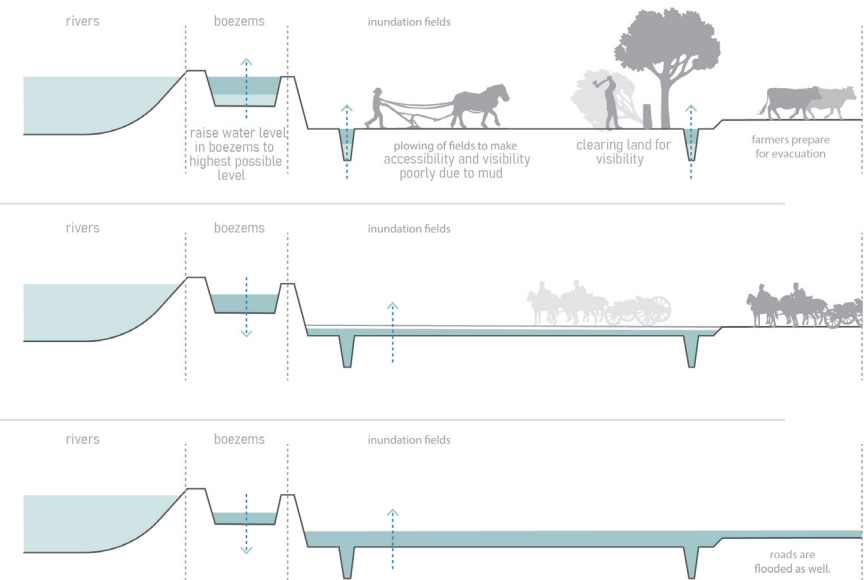


1_The Inundation Fields

2_A Water System with Canals and Locks

3_A System of Dikes

source: Steenbergen, C. M., & van der Zwart, J. (2006). Strategisch laagland. Uitgeverij 010.
van Loon, F., & Pouderoijen, M. (z.d.). Quarter Guide Q4 Elective Landscape On Site Ode aan de Hollandse Waterlinies. Brightspace-AR0149-Content.
Geraadpleegd op 13 juli 2021, van <https://brightspace.tudelft.nl/d2l/le/content/278546/viewContent/219619/View>



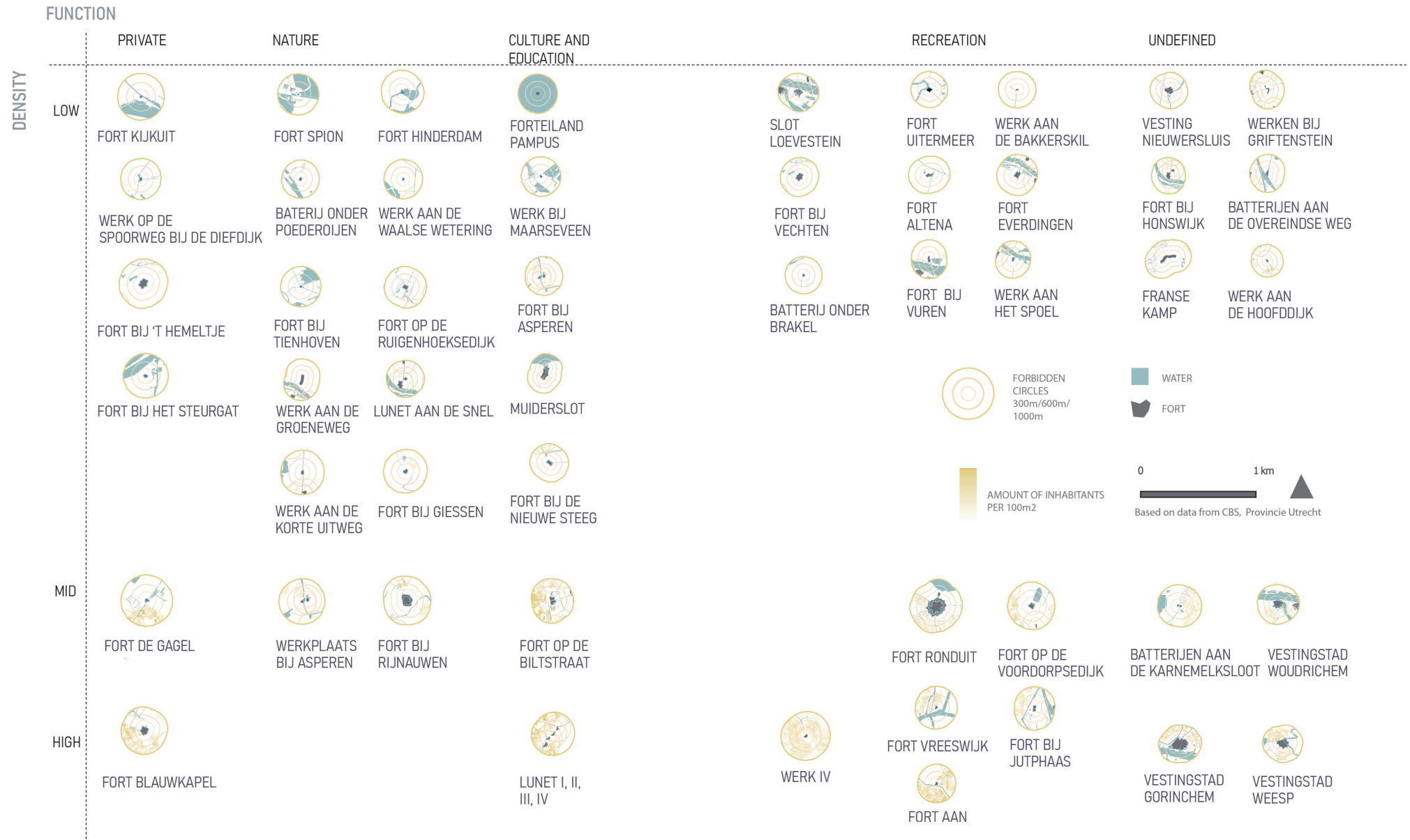
Five Steps of Inundation - Section
source: Authors (readapted from Atlas Nieuwe Hollandse Waterlinie)

The Strategic System of the NHW

Fortress Category

source:

Authors (information from CBS: <https://www.cbs.nl/nl-nl/dossier/nederland-regionaal/geografische-data/kaart-van-100-meter-bij-100-meter-met-statistieken>
 PDOK: <https://www.pdok.nl/downloads/-/article/basisregistratie-grootschalige-topografie-bgt-Provincie-Utrecht>: <https://geo-point.provincie-utrecht.nl/pages/open-data#Cultuurhistorie>)



The Strategic System of Defense Line

4_The Fortresses and other Military Works

Four out of five of these elements are landscape elements, yet the strategic system is mainly known for its forts: these are the main elements that occupy the key positions in protecting the flood defenses and inlet points and in closing off areas that cannot be flooded.

However, most military works consist of batteries and casemates, group shelters, group nests, trenches and tank ditches. All these elements together form a series of large and small architectural works, with a varying context yet mutual coherence in establishing the main defense line of the *NHW*. Their shape and size was determined by the width of the access and the location of the flooding means.

The main defence line marks the boundary between the defended area in the west and the inundatable area in the east. This was the final frontier of resistance. Quays and dikes - already existing elevations in the landscape - were used for this final line.

source:

Steenbergen, C. M., & van der Zwart, J. (2006). Strategisch laagland. Uitgeverij 010.

Ministry of Education, Culture and Science, Project Office for the Defence Line of Amsterdam, New Dutch Waterline programme office, Provincie Noord-Holland, Provincie Gelderland, Provincie Utrecht, & Provincie Noord-Brabant. (2019, januari). Dutch Water Defence Lines UNESCO. Ministry of Education, Culture and Science.

'Kringenwet'

The '*kringenwet*' (Circle Law) was established in 1853 and was legally valid up until 1963 to secure the free firing fields around the forts. Around each fort, three imaginary concentric rings were projected to restrict building and planting regulations within.

Within the first ring - at a maximum distance of three hundred meters from the fort's perimeter - constructions were only allowed to be built with wood, so that the obstacles in emergency situations could be quickly demolished or, if necessary, burned down. These so-called wooden '*kringenwetwoningen*' can still be found around the forts, bearing witness to the particular military regulations of centuries ago. In this first ring, the building plot could only be a maximum of 40 square metres. Due to this limitation in the first circle, the larger buildings are located in the middle ring and are, therefore, still easily recognizable. In this middle ring, up to six hundred meters, only certain parts (like the foundation and chimney) were allowed to be built in stone. In the outer circle, up to a thousand meters, all obstacles - buildings, trees, etcetera - could be cleared forthwith in time of war.

The military requirement for a clear line of sight or line of fire emphasises the contrast between the closed, defended side of the main defence line and the openness of the landscape on the inundatable side, including at the accesses.

As the forts of the *NHW* lost their military functions after the Second World War and were re-appropriated, the population density increased somewhat within the former "forbidden circles". However, many of these areas still appear as isolated destinations within the Dutch landscape affecting their visibility in the daily lives of those unfamiliar to the *NHW*.

source:

De Kringenwet van 1853 (ingetrokken in 1963) | Erfgoedmonitor. (z.d.). De Erfgoedmonitor. Geraadpleegd op 13 juli 2021, van <https://erfgoedmonitor.nl/de-kringenwet-van-1853-ingetrokken-1963>

Forten Info over forten, bunkers, kazematten en ander militair erfgoed in Nederland en België. (z.d.). STAATSBAD VAN HET KONINGRIJK DER NEDERLANDEN. Geraadpleegd op 13 juli 2021, van <http://www.forten.info/index.htm?http://www.forten.info/wetten/kringenwet.htm>

5_Vegetation

In the *Nieuwe Hollandse Waterlinie*, control of territory was of vital importance, making open plains with a large field of view and open firing fields a necessity. The line itself, however, needed to be camouflaged, blending in with the landscape. For this objective, plans were made around 1879 including detailed maps with vegetation on and around almost every fortress on the line. This vegetation had four distinct functions.

1. Plants with extensive root systems were planted - with the roots holding the soil steady - maintaining the earthen walls by mitigating the impact of grenade strikes.

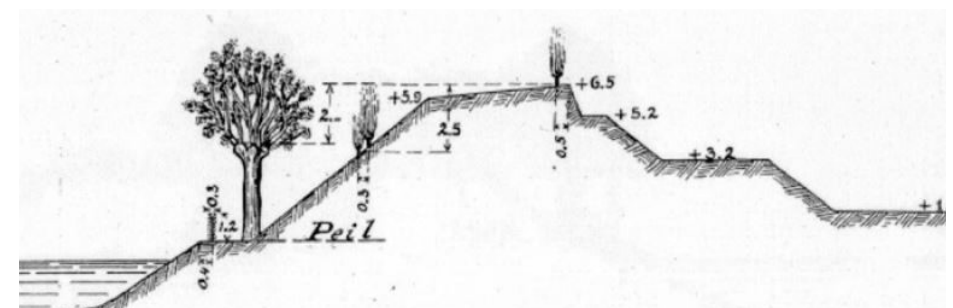
2. Alongside the fortress moat, large and sharp thorn hedges were placed which functioned as barbed wire to hinder any infantry attacks. Using live plants averted wood deterioration and decay of regular wooden fences, and were more difficult to destroy by enemy artillery fire. For this, mainly hawthorn and the pollard willow were used.

3. Trees were mainly used as camouflage to hide the fortresses - which were very visible in the flat Dutch landscape - from sight. Moreover, they gave cover to allied soldiers. Trees would be required to have dark leaves which provided a dark background for the fortresses, fading their contours and becoming less visible for the invading enemy. Mainly white willow, chestnut and poplar trees were used. The disadvantage was that these same trees hindered sight of the firing fields, making the enemy less visible. In the first world war, many trees and shrubs were abolished to improve upon this.

4. Also, trees were used as coppice for making palisades (fences of upstanding poles) and other defenses. The branches of the pollard willow were used for strengthening the parapet. Other trees located on access roads were sawn down to hinder the advancing enemy.

source: Boosten, M., Jansen, P. A. G., & Borkent, I. (2012). Beplantingen op verdedigingswerken. Uitgeverij Matrijts.

Chair of Landscape Architecture, Department of Urbanism, Faculty of Architecture & the Built Environment, TU Delft. (2021, april). Quarter Guide Q4 Elective 2020-2021 Landscape On Site Ode aan de Hollandse Waterlinies.



Vegetation Strategy Section of the *NHW*

source: Nationaal Project Nieuwe Hollandse Waterlinie. (2017). UNESCO Nominatiedossier NIEUWE HOLLANDSE WATERLINIE UITBREIDING VAN DE STELLING VAN AMSTERDAM. Nationaal Project Nieuwe Hollandse Waterlinie. <https://openarchivaris.nl/blob/6c/d1/ad368b3e9fb90f16c2415d0db4ca.pdf>

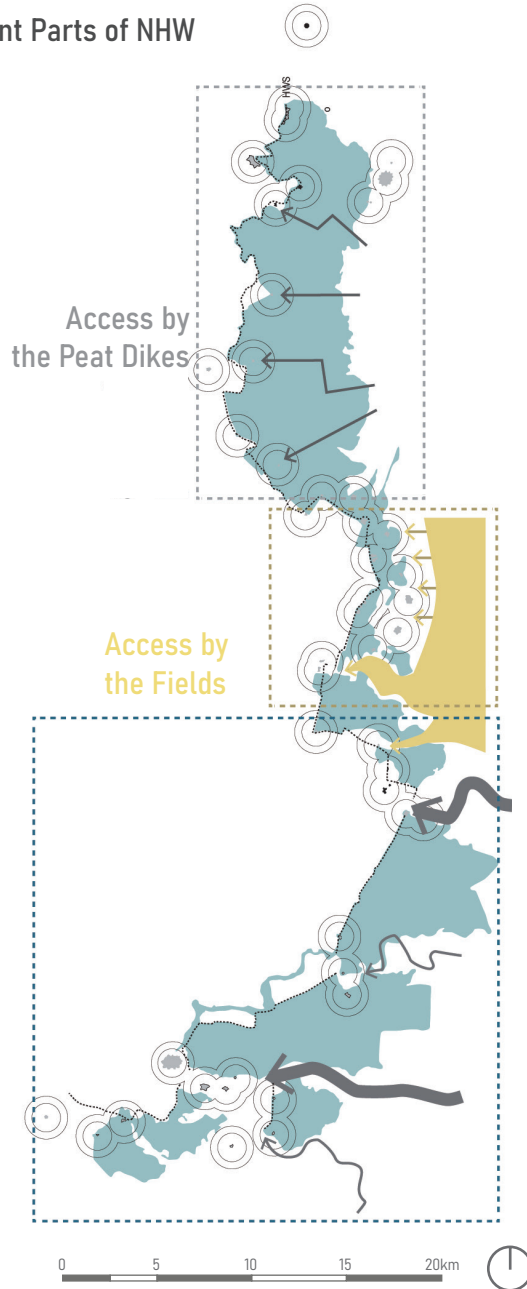
Military Access

Ways of Access in Different Parts of NHW

The *Nieuwe Hollandse Waterlinie* lies approximately on the transition between the two major water systems that have formed the Delta landscape: the sea (by erosion) and the rivers (by sedimentation). The landscape slopes down from east to west while rising from north to south and can be roughly divided into three parts: the peat and lake landscape between Vecht and Utrechtse Heuvelrug, the higher landscape east of Utrecht and the river landscape between the major rivers: the Lek, the Linge and the Waal. In effect, these also form three categories in potential access from historical offenders: access by the Peat Dikes, by the Fields and by the Rivers.

text source:
Steenbergen, C. M., & van der Zwart, J. (2006). Strategisch laagland. Uitgeverij 010.
Encyclopedie van de Nieuwe Hollandse Waterlinie. (z.d.). Encyclopedie van de Nieuwe Hollandse Waterlinie. Geraadpleegd op 13 juli 2021, van <http://encyclopedie-van-de-waterlinie.123website.nl/>

Access by
the Rivers



drawing source: made by authors readapted from Compositie & strategie ontwerpgrammatica nieuwe hollandse waterlinie - p14

Military Access

System of Attacking

① military weakness • fortress → waterway

1_Access by the Peat Dikes

In the northern part, a limited number of forts is aligned with few, narrow dike roads and a robust chain of large inundation fields. The size of these fields is relatively large because of optimal conditions of the low peat polders, and few infrastructural lines fragmenting the structure. This makes the northern part in modern days perhaps the most efficient inundation structure.

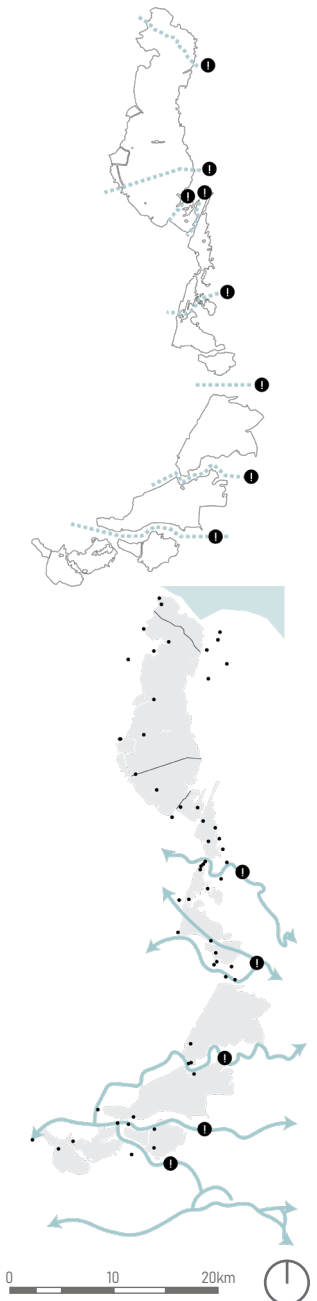
It has an open landscape due to large water bodies and agricultural fields, providing high recreational use. The long, analogous dike roads and 'lintbebouwing' characterizes the monotonous landscape.

2_Access by the Fields

The central part near Utrecht has an elevated landscape, making inundation on a large scale impossible. Since enemy infantry could more easily access these fields, it has the highest concentration and diversity of military works. Forts are within sight of each other and are thus spatially interconnected. Their design is tailor-made and adapted for a wide orientation on surrounding fields, as the enemy could approach from all sides. There is also an abundance of bunkers for defending the highly important central city of Utrecht. This provides a diverse landscape, moreover because the landscape is partly overtaken by residency and fragmented by large infrastructural roads.

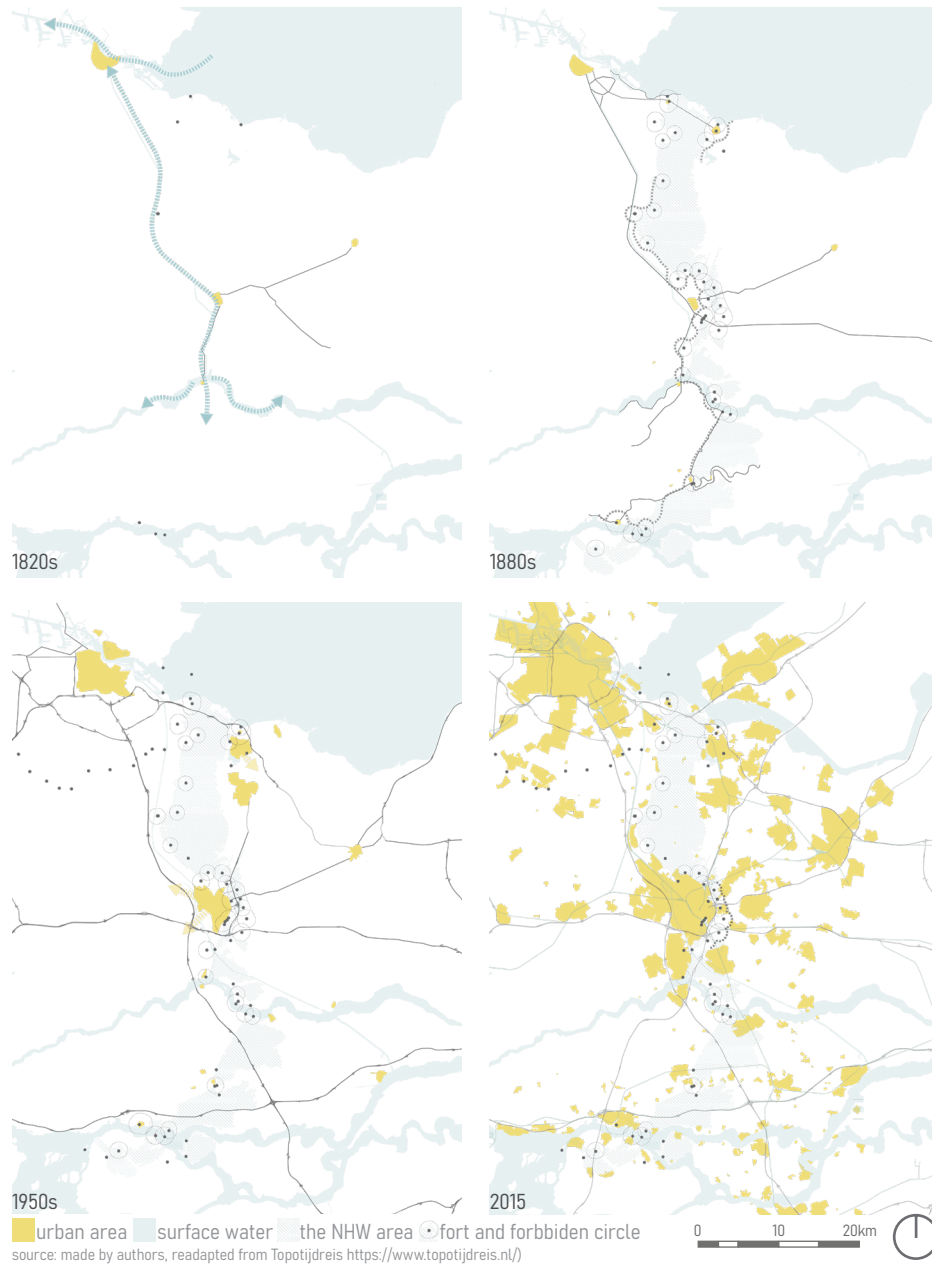
3_Access by the Rivers

The southern part is focused on protecting against river access from both sides. Similar to the northern part it has large inundation fields. At the Lek, forts are multi-oriented on rivers, 'uiterwaarden' and elevated land behind the dikes respectively. At the Linge, only two forts are sufficient to protect the river. Finally, various military works are scattered along the Waal, including castles and fortified cities. Again similar to the north, the landscape has an open character, dominated by agriculture and minimal buildings. This enhances the visibility of the military elements.



The New Enemy: Urbanization

Development in Urbanization



The New Enemy: Urbanization

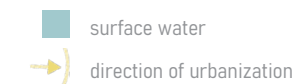
Direction of Urbanization in the Surrounding Areas

The presence of the *Nieuwe Hollandse Waterlinie* has had a compelling influence on the urbanization of the surrounding municipalities for more than 100 years. In spite of this, the original building cores of the (fortified) towns present at the beginning of constructing the *NHW* have grown into larger metropolitan areas.

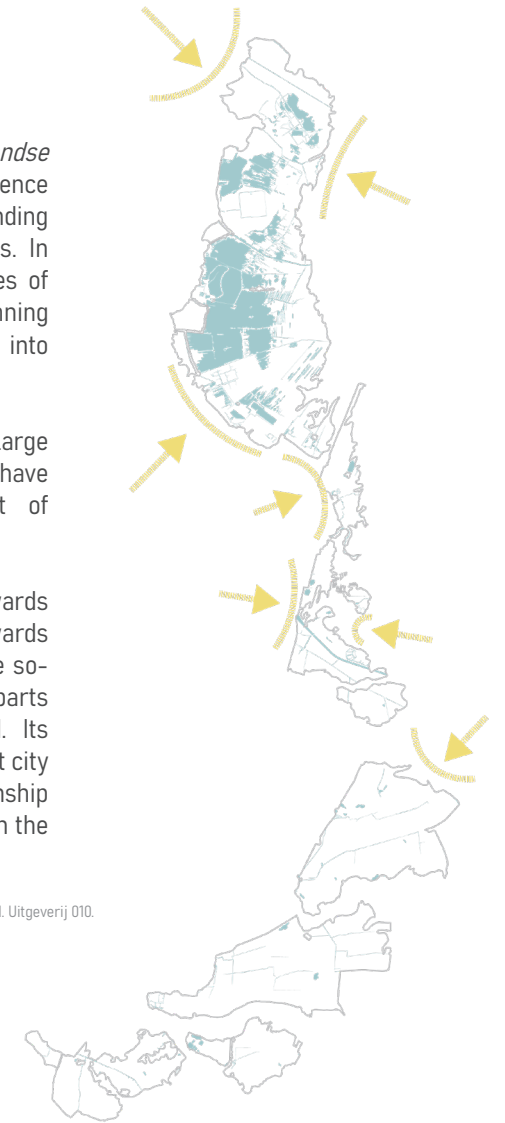
Particularly around the city of Utrecht, large parts of the original inundation areas have disappeared under the development of residential areas and industrial estates.

From Utrecht, the buildings expand towards the north along the Vecht and south towards the Lek. Towards the east, however, the so-called '*kringenwet*' declared large parts of the area to be undeveloped land. Its consequences can be read in the Utrecht city map, and to this day the stubborn relationship between city and the *NHW* can be felt in the landscape around the city.

source:
Steenbergen, C. M., & van der Zwart, J. (2006). *Strategisch laagland*. Uitgeverij 010.

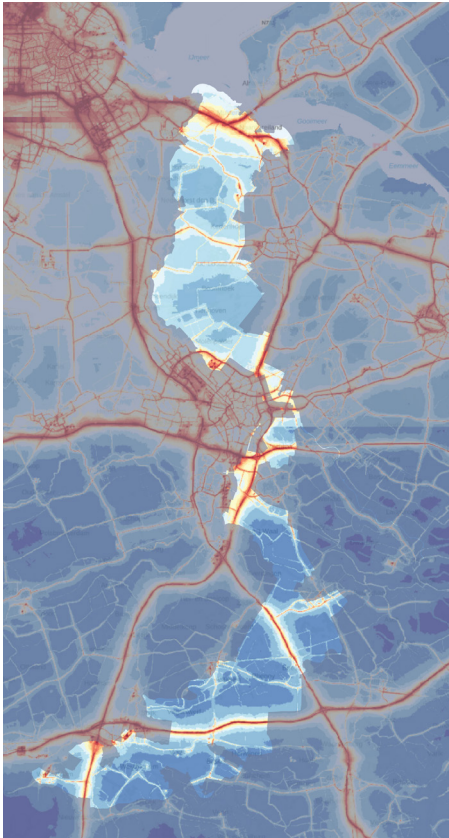


source:
made by authors, readapted from <https://geo-point.provincie-utrecht.nl/pages/open-data#Cultuurhistorie>
<https://www.pdok.nl/introductie/-/article/statistics-netherlands-land-use-2015>



The New Enemy: Urbanization

The Influence of Infrastructure



Estimated Influence of Noise and Air Pollution

source: made by authors, based on information from
AtlasvoordeLeefomgeving, Provincie Utrecht



New Infrastructure Disrupting the *NHW*



Highways, railways and power lines with national significance cut through the landscape. Already before 1940, the construction of the first highways started: the A2 and A12. Decades later, the A1, A15, A27 and A28 have been realised to connect major urban areas in the Netherlands by car. Various east-west connections – especially the elevated highways and entire junctions – are cutting through the inundation fields, fragmenting the waterline. Even a military work – *Fort aan de Uppelsedijk* – is intersected by a highway, the A27.

The infrastructure is also responsible for the identified “danger zones” from MGR: this deals with the estimated influence of noise and air pollution on our health.

source: Steenbergen, C. M., & van der Zwart, J. (2006). Strategisch laagland. Uitgeverij 010.

Concept

SITE SPECIFIC INFORMATION

PERSPECTIVES

Agriculture / Nature / Water

INSTALLATION CONCEPT WORKSHOP

THE FINAL CONCEPT

Site Specific Analysis: Schalkwijk

De Stelling van Honswijk

De Stelling van Honswijk consists of the following elements:

- | | | |
|---------------------|-------------------------------|--------------------------|
| ① Fort Honswijk | ④ Gedekte Gemeenschapsweg | ⑦ Werk aan de Groene Weg |
| ② Lunet aan de Snel | ⑤ Werk aan de Korte Uitweg | |
| ③ Inundatiekanaal | ⑥ Werk aan de Waalse Wetering | |



Plan of *De Stelling van Honswijk*

0 2 4 6 8km



During the second construction period of *the Nieuwe Hollandse Waterlinie* (1841-1864), the first element of *De Stelling van Honswijk*, *Fort Honswijk* (1842), was built. The reason for the construction was the at that time undefended northern bank of the Lek. The fort owes its name to the nearby historic town of Honswijk.

Honswijk's function was both to hinder a hostile advance from the Noorder Lekdijk and higher areas, as well as to seal the Lek together with *Fort Everdingen*. In addition, it protected the new inundation sluice, which was constructed at the same time as the fort and accelerated inundation of the area between Vreeswijk and Schalkwijk.

Like *Fort Honswijk*, *Lunet aan de Snel* (1845) was built in the second construction period of *the Nieuwe Hollandse Waterlinie*. It was then an earthen defensive work that protected Fort Honswijk, the inundation canal and the land north of the Lekdijk. During the fourth construction period of *the Nieuwe Hollandse Waterlinie* (1871-1886) the Stelling was

improved and expanded. *Fort Honswijk* and *Lunet aan de Snel* were modernized and two new defenses were added: *Werk aan de Korte Uitweg* (1871-1877) and *Werk aan de Waalse Wetering* (1875-1878).

During the mobilization of the First World War, *Werk aan de Groeneweg* (1914-1918) was the last to be added. The defense from the forts was no longer sufficient. The work became part of the military defense of the area north of the Lek which was difficult to inundate (Dutch Water Defence Lines & Ministry of Education, Culture and Science, 2018).

source: Dutch Water Defence Lines & Ministry of Education, Culture and Science. (2018, December). Significant Boundary Modification of the Defence Line of Amsterdam WHS (No. 759). The program office of the New Dutch Waterline and the program office of the Defence Line of Amsterdam. https://www.programmanieuwehollandsewaterlinie.nl/wp-content/uploads/2019/02/PS_NweHollWaterlinie_Management-plan_web_LR.pdf

Inundation system

From *Fort Honswijk*, the water from the Lek flows through locks to the inundation canal and the Wetering, from which the inundation fields fill. The inundation canal works in the opposite direction as with the drainage. The lock at the canal prevents the emptying of the inundation fields. The Plofsluis north to the *Eiland van Schalkwijk* prevents the water from flowing out the inundation fields into the lower-lying Amsterdam-Rijnkanaal (Steenbergen, 2004)

The inundation canal of Honswijk-Schalkwijkse Wetering was built in two phases:

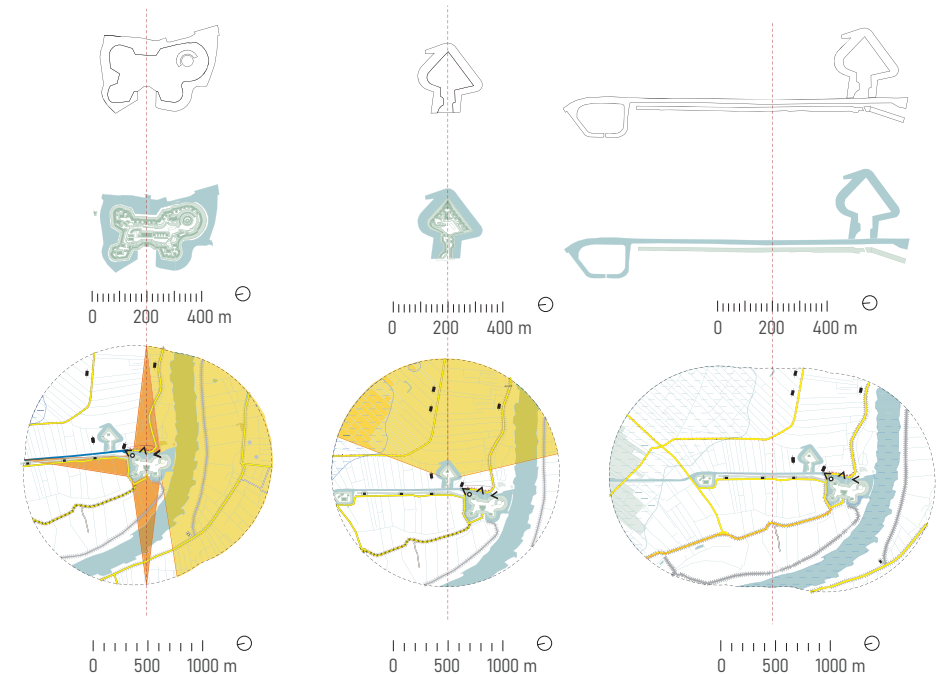
Phase 1 (1845-1846): a 700 m long canal was dug from Fort Honswijk via the moat from Lunet aan de Snel to the Waalse Wetering. The canal replaced the natural watercourse De Snel.

Phase 2 (1871-1874): the canal was extensively improved to 3,000 meters long and 15 meters wide for the water supply of the Schalkwijkse Wetering. An extra obstacle was formed for the enemy, since this area could not be inundated. At the same time, the Gedekte Gemeenschapsweg, a long embankment of 1,035 meters with a gravel road, rampart and parapet behind it, was constructed. This allowed troops and equipment to be transported safely (Dutch Water Defence Lines & Ministry of Education, Culture and Science, 2018).

Source: Steenbergen, C. M. & Atelier Rijksbouwmeester. (2004). Compositie & Strategie. Atelier Rijksbouwmeester.

Site Specific Analysis: Schalkwijk

Site Related Fortresses



Plan and Defense Direction of Nearby Fortresses

Fort Honswijk

Construction year: 1841-1848, 1879-1888, abolition in 1953
Construction period NHW: 2 and 4
Type: big fortress (13,5 ha)

Military function: defend the Lek and its river forelands, the inundation canal with sluices and the non-inundatable dry strip east of the fortress
Garrison: 350 troops
Current function: none

Lunet aan de Snel

Construction year: 1845, 1871-1879, abolition in 1953
Construction period NHW: 2
Type: small fortress (2,25 ha)

Military function: defense inundation canal with sluice, back road and embankment Lek dike
Garrison: 90 troops
Current function: nature

Gedekte gemeenschapsweg

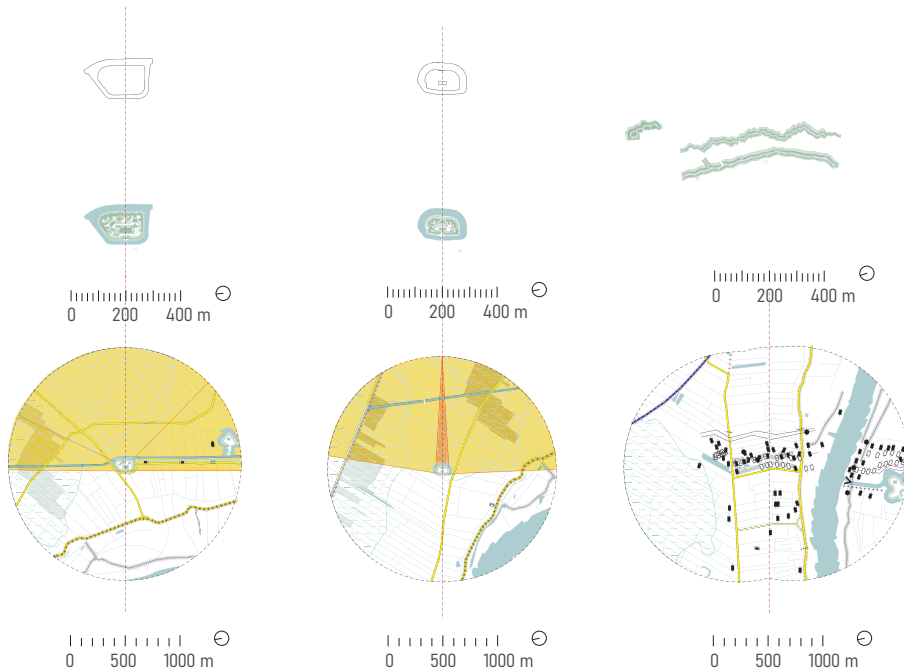
Construction year: 1871
Construction period NHW: 4
Type: trench (1.035 m)

Military function: defense inner bank of the northern Lekdijk, de Lange Uitweg and cover Werk aan de Waalse Wetering.
Current function: none

source: Steenbergen, C. M., & van der Zwart, J. (2006). Strategisch laagland. Uitgeverij 010.

Site Specific Analysis: Schalkwijk

Site Related Fortresses



Plan and Defense Direction of Nearby Fortresses

Werk aan de Korte Uitweg

Construction year: 1871-1877, 1882

Construction period NHW: 4

Type: small fortress (2 ha)

Military function: defense inundation canal and the gedekte gemeenschapsweg.

Garrison: 160 troops

Current function: nature camping, tea house, conference location, exposition, nature, zorgfort

Reynaerde

source: Steenbergen, C. M., & van der Zwart, J. (2006). Strategisch laagland. Uitgeverij 010.

Werk aan de Waalse Wetering

Construction year: 1875-1878

Construction period NHW: 4

Type: small fortress (3 ha)

Military function: defense non-inundatable strip, cover werk aan de Korte Uitweg and attack the enemy coming from Houten

Garrison: 108 troops

Current function: nature

Werk aan de Groeneweg

Construction year: 1914-1918, 1936-1938, 1939-1940

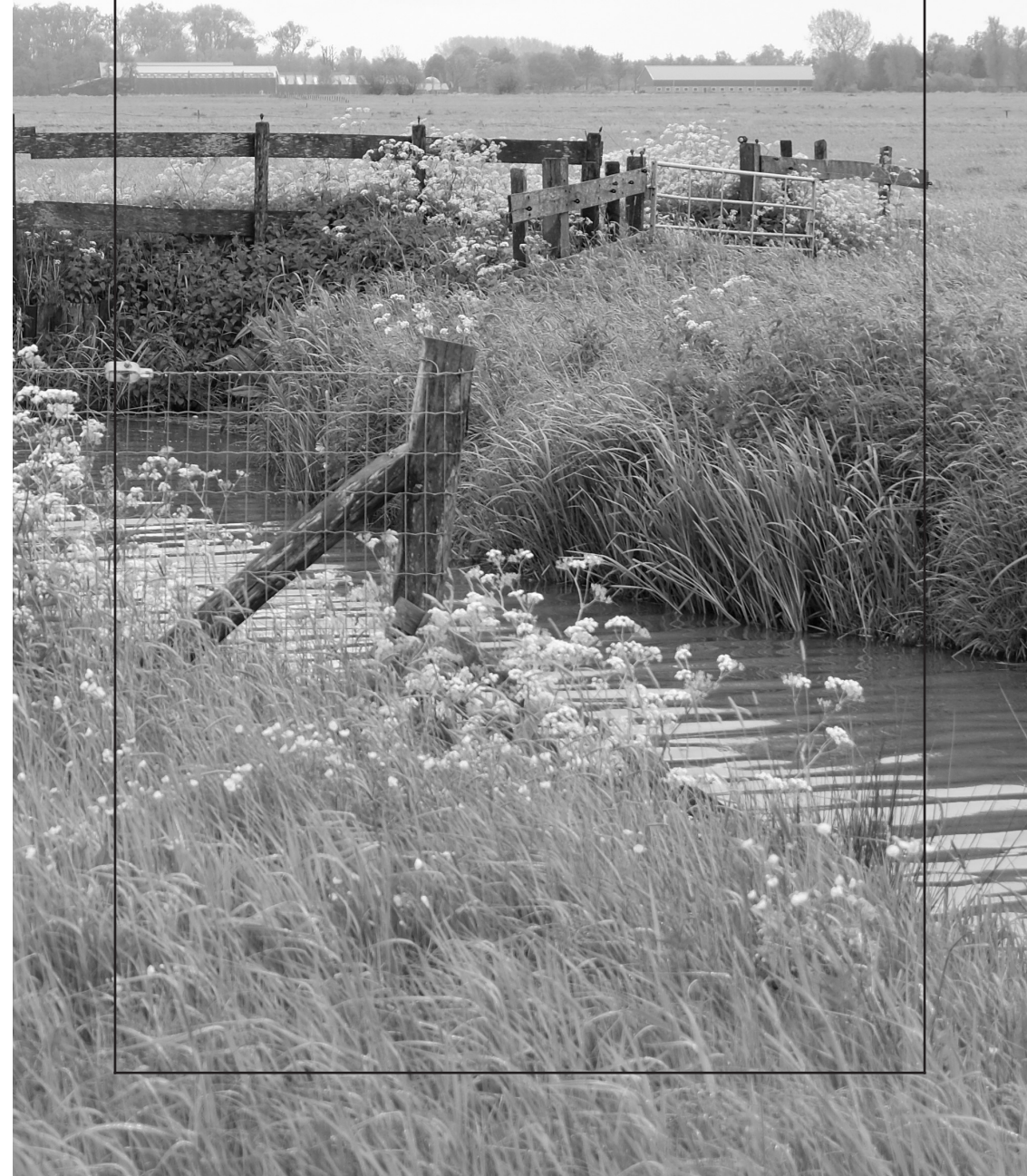
Construction period NHW: 6

Type: double trench (10 ha)

Military function: defense non-inundatable dry strip riverbanks Lek and protect the railway near Culemborg and the recessed, older military elements.

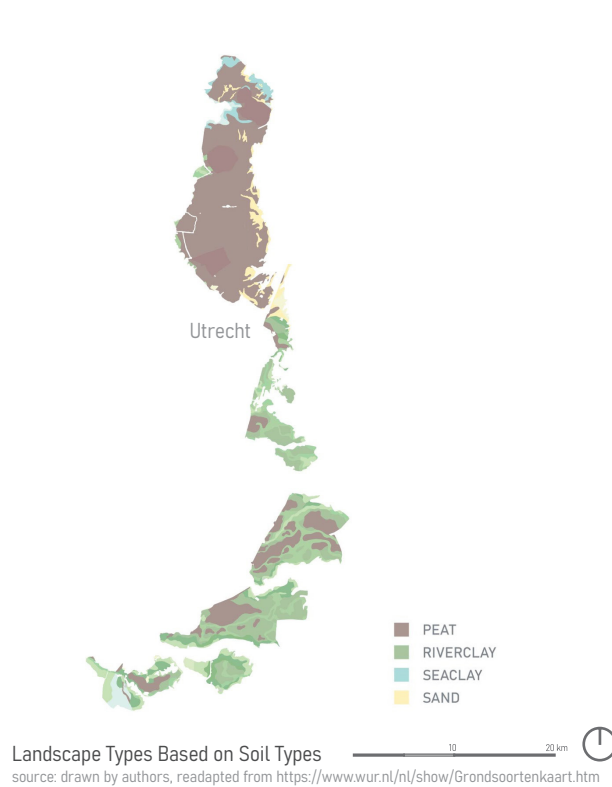
Current function: nature, recreation

DESIGN CONCEPT FROM NATURE PERSPECTIVE



The Natural Landscape

Landscape Types



Sea clay
source: <https://images.app.goo.gl/wpomN1kb-CVfQe3ncA>



Peat
source: <https://images.app.goo.gl/uxA61tvY3x-Tdergx7>



Sand
source: <https://images.app.goo.gl/dEPiYDMstS-gyrJep7>

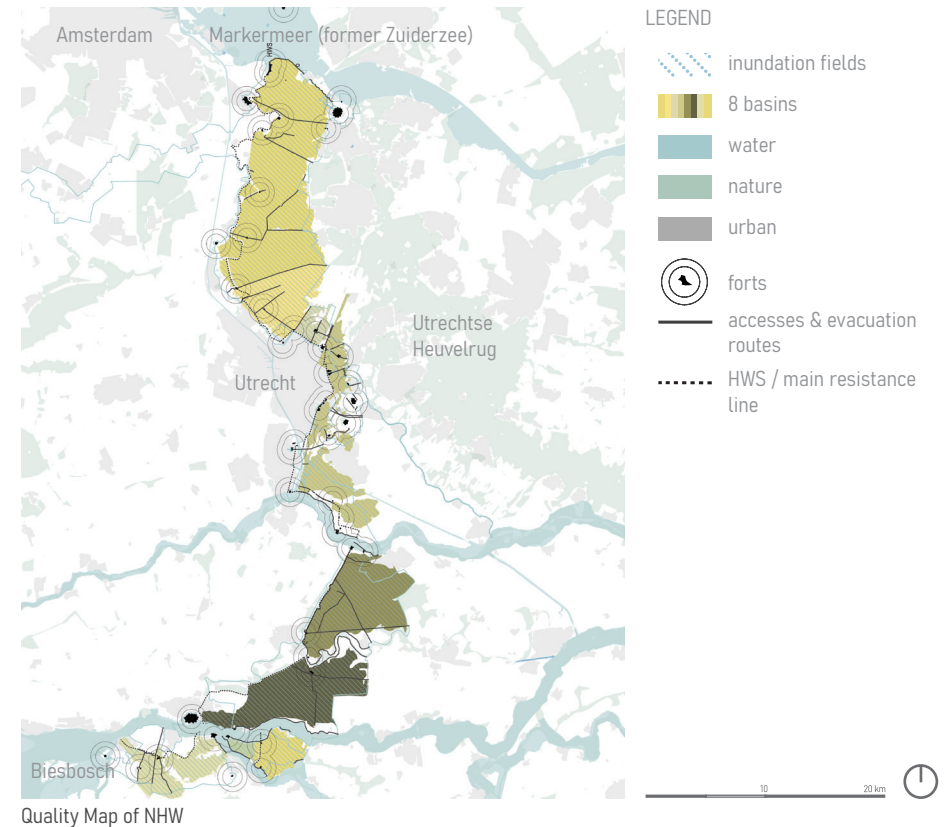


River clay
source: <https://images.app.goo.gl/dKA3F-MT35QASInPKA>

Landscape diversity

The *Nieuw Hollandse Waterlinie (NHW)* consists of a variety of landscape qualities based on the soil types and their formation. The northern part of *NHW* is a sea clay landscape due to its closeness to the former Zuiderzee. Between the sea clay area and the city of Utrecht is a large area of peat landscape, with in the center an unique peat lake. Patches of sandy landscape are found scattered at the east side of this peat area. To the south of Utrecht, the river clay landscape dominates. Over time, deposits were made, forming a vast meandering river landscape. Variety across the *NHW* creates great potential for its development as a large-scale, prosperous, rich ecology zone.

Quality Statement of the NHW



Strengths & Weaknesses of NHW

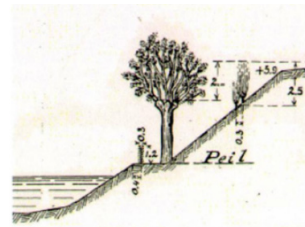
Although the largest land-based defense mechanism the Netherlands has ever conceived lost its function decades ago, the principles and qualities of the *NHW* that fascinated the authors most are:

- Humankind's dominance and control over the landscape and water systems.
- The site-specific implementation of defense works, perfectly adapted to the underlying natural and cultural landscape.
- The strategy to work together with nature, by choosing water & vegetation as allies.
- The different water basins show us how segregated areas can work together as a system towards a singular goal.

Quality Statement of the NHW

Current strengths of the *NHW* we identified and strive to enhance with the concept include:

- It's direct relationship with the Randstad and therefore its proximity to and accessibility from these urban areas. Simultaneously, its location in between nature areas of the Utrechtse Heuvelrug, the Biesbosch, and the Markermeer.
- The existing *NHW* evacuation routes/accesses that are part of the system, which are a link from west to east, i.e. urban areas to nature.
- The forts operate as nodes of activity where humans and nature come together today. Some forts already provide habitats for different species, such as bats, bees, aquatic animals, and unique vegetation, while simultaneously providing recreational, living, and working environments through recent transitions.



Vegetation at forts

source: Nationaal Project Nieuwe Hollandse Waterlinie. (2017). UNESCO Nominatiedossier NIEUWE HOLLANDSE WATERLINIE UITBREIDING VAN DE STELLING VAN AMSTERDAM. Nationaal Project Nieuwe Hollandse Waterlinie. <https://openarchivaris.nl/blob/6c/d1/ad368b3e9fb90f-16c2415d0db4ca.pdf>

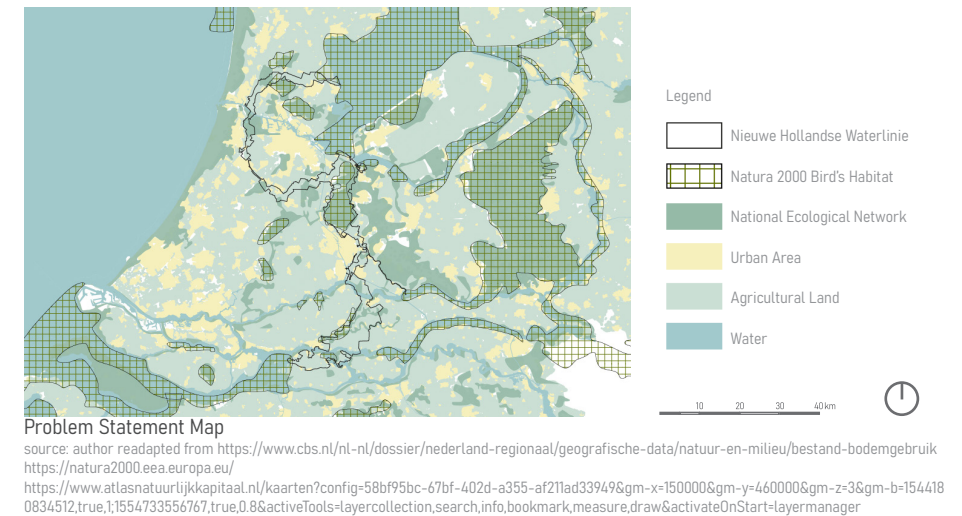
Planting was used as an ally for camouflage of the defense works, as barrier and for wood supply. Even outside of the forts, contiguous rows of trees provided camouflage, making the exact location of the fort unrecognisable and offering sheltered relocation for personnel and equipment.

Current weaknesses we strive to address with the concept include:

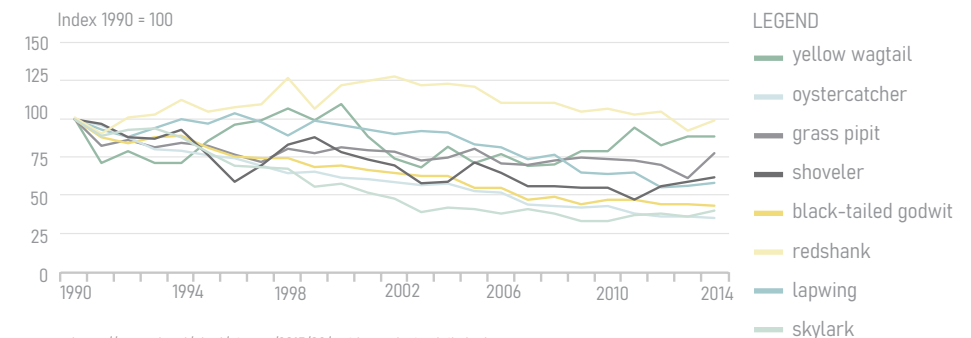
- The landscape as a military system is, due to its size, complexity, and large scale, hard to fully grasp and understand for visitors. Elements are rather linked to a traditional polder landscape and therefore the system does not receive full appreciation. In addition, the two interesting perspectives on the *NHW* landscape, that of the defender and attacker, are not obvious to the untrained eye.
- The invisibility of the main resistance line of the system, it's backbone, to the untrained eye. This was intended by design, but it makes the system of the *NHW* less readable for today's visitors.
- The urban development is disturbing the coherence of the *NHW* system, which makes its operation as one system harder to grasp.

Problem Statement

Large-Scale Fragmentation & Tension



Green space in the form of nature-based areas in the Randstad are limited and lack connection. The area is dominated by urbanization and agriculture. Whereas agricultural land used to be nature inclusive, this is seldom the case with today's intensive farming activities. This change is noticeable for the entire ecosystem, of which the decline in meadow birds is just one example. Furthermore, urban development increases pressure on remaining green areas, in the form of agriculture and nature areas, resulting in more post stamp nature landscape. This mixture of urban, agricultural and nature areas causes tension; CO₂ emissions by human activities and methane emissions from farmland causes deprivation of nature areas nearby. In addition, high tensions between farming activities and (top) predators and large grazers exist.



source: <https://www.cbs.nl/nl-nl/nieuws/2015/32/weidevogels-in-duikvlucht>

Chosen Strategy

Problem statement

Nature is under attack by human activities: high levels of Nitrogen and CO₂ are disturbing nature. Urban areas and infrastructure are expanding, intensified agriculture activities leaves little space for nature, and recreational outdoor activities are often consumerism driven for which the natural and cultural landscape only acts as a décor.

Goal

The goal of the concept is to create a more balanced eco-system with flourishing biodiversity. The *NHW* could be an example for how to live with nature. An area that stimulates people to understand their place in nature; an awareness that can even benefit nature beyond its borders.

Strategy

Repurpose the *NHW* as a defense mechanism against the human attack on nature by making 8 nature-inclusive basins. This is done by:

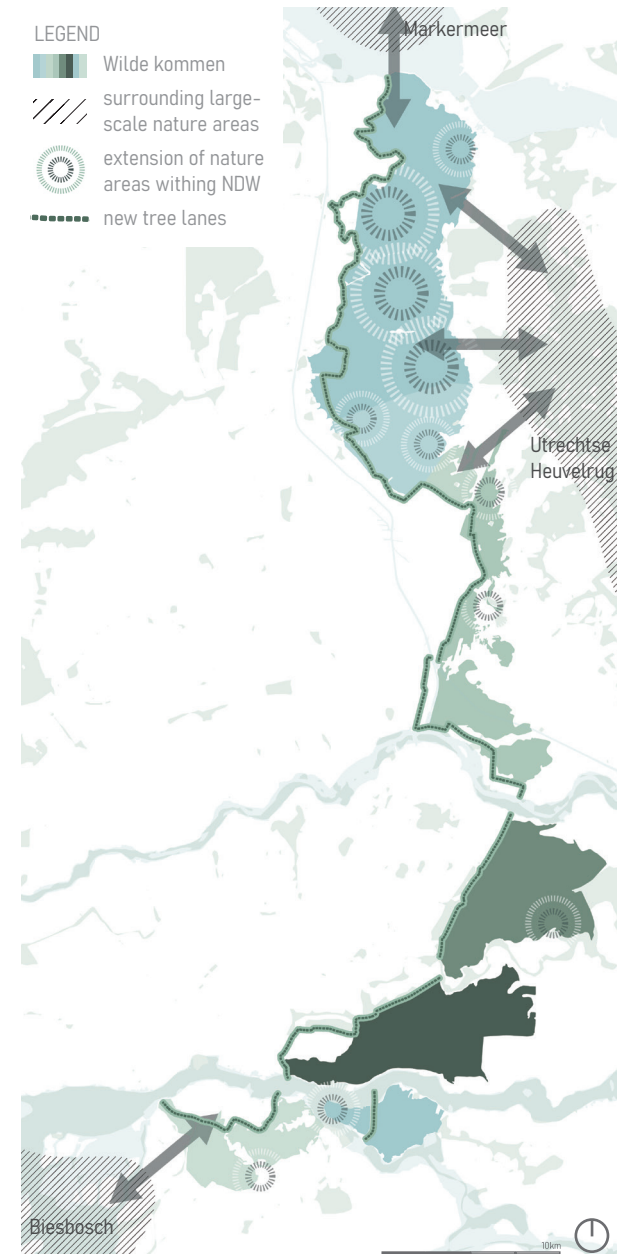
1. Reviving the rich ecosystem in the inundation basins by transforming agricultural landscape into nature dominated areas according to their landscape qualities.
2. Connecting these 'wild' basins to the surrounding nature reserves for flora and fauna by a linear habitat network, integrating the whole *NHW* as one rich ecosystem.
3. Inviting people to engage and appreciate nature by offering naturally and culturally oriented experiences in the *NHW*. An experiential route that involves cultural heritage promotes the shared identity of this landscape. By stimulating participation at greater frequency, the conservation plan for such an extensive area becomes more sustainable.



Problem Statement Visualization

Concept: De Wilde Kommen

Concept Map De Wilde Kommen



Nature gradient; examples of site specific nature potential



Concept: De Wilde Kommen

Connecting and Ccreating Nature (Inclusive) Areas

Firstly, biota will profit from connections with large-scale existing nature areas outside of the *NHW* such as the Markermeer, Utrechtse Heuvelrug, and the Biesbosch. Eco corridors and stepping stones will make habitats throughout more robust.

Secondly, the fragmented nature areas within the *NHW* can be optimized by small scale extensions. The openness and wetness of the *NHW* landscape offers suitable conditions for insects, birds, small mammals, amphibians, reptiles, and fish paradises. The basins can together offer a gradient of different landscape types, based on the underlying natural landscape and soil. By using the water system of the *NHW*, different water levels of the polders can steer nature in the desired direction. To illustrate, a swampy reed area can be created by raising water levels. After several years, succession can be reversed by lowering water levels again. By doing so, we can preserve the open character of certain areas.

In addition, we propose to focus on creating well-functioning connections between nature areas within the *NHW* to make the current nature as robust and flexible as possible.

The typical landscape elements of the Dutch cultivated land, being pollard willows, coppice, wooded banks, tree singles, bushes, and hedges, can be restored for this purpose. Biologist Victor Westhoff has shown with his life work that these small-scale elements are of excellent value to nature. Besides, by accentuating the cultural landscape and its characteristics, the foundation of the large-scale defense mechanism of the *NHW* becomes more obvious. A special tree lane will be introduced, running North-South, to emphasize the main resistance line. In addition, several West-East tree lanes will connect the urban landscape with the natural landscape. Both will be explained later in more detail.

Concept: De Wilde Kommen

Re-Wilding Reflection

The ultimate vision would have been to give room for self-maintaining, naturally functioning eco systems as the most extreme defense strategy: rewilding of the *NHW*. However, as nature reserve *Oostvaardersplassen* taught us, closed off nature without top predators will result in unhealthy conditions for flora and fauna due to unlimited growth of grazers, which Posthumus (2018) describes in 'Heibel in de polder'. A healthy functioning nature area requires the presence of all layers of the food chain.

However, the close proximity of the *NHW* to urban and agricultural land, does not provide suitable conditions for top predators. As the return of the wolf showed us, we are not yet (and maybe never) ready to live along the spectrum-wide nature. So to say, we believe ultimate rewilding is not the optimal solution for the *NHW* considering today's mindset and the densely populated conditions of the Netherlands. We therefore propose a less drastic but still impactful strategy.

source: Posthumus, R. (2018). Heibel in de polder. Atlas Contact. Amsterdam

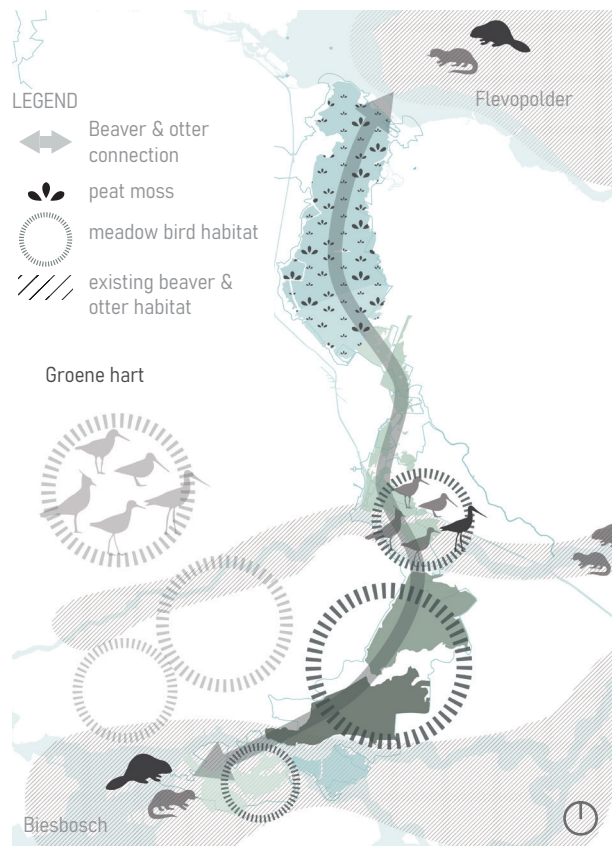


Initial inspiration image by Jeroen Helmer

source: Welkom terug, wild dier: na de wolf kunnen er nog veel meer terugkeren in Nederland, dromen sommigen. (z.d.). de Volkskrant. Geraadpleegd op 13 juli 2021, van <https://www.volkskrant.nl/wetenschap/welkom-terug-wild-dier-na-de-wolf-kunnen-er-nog-veel-meer-terugkeren-in-nederland-dromen-sommigen-b0e2e51d/>

Concept: De Wilde Kommen

Large-Scale Connections & Stepping Stones for Keystone Species



Concept Map for Ecology Connections

Interventions to Create A Meadow Birds Habitat

if possible, removal of phosphorus rich top clay layer, which can be used for trenches elsewhere.

replacement of rye-grass by more open hurbaceous grassland for chicks to hide and find nutrients.

choose a bird controlled mowing date and leave 50 m² grass surrounding nests.

raise water level to minimum 20 - 40 cm below surface. More ideal is 0 - 20 cm.

use a natural lower area or create a lower part for inundation of 0-20 cm, or choose revival of wet drainage strokes.

flattening of ditch slopes to prevent drowning of chicks.

Beavers

Beavers and otters are already established in the Biesbosch, the river floodplains and the Flevopolder. The wet character of the *NHW* can be seen as a suitable location for a North-South connection. Beavers, as ecosystem engineers, are beneficial for water quality and can create wetland habitats for fish, reptiles, and other aquatic animals.

Peat moss

Peat moss has a positive effect on hydrology by working as a sponge and will lead to soil acidification, making it suitable for bogs. Furthermore, it is an effective means to fixate CO₂ and is beneficial for water quality. The existing

peat soil in the northern *NHW* makes this a suitable location for peat restoration.

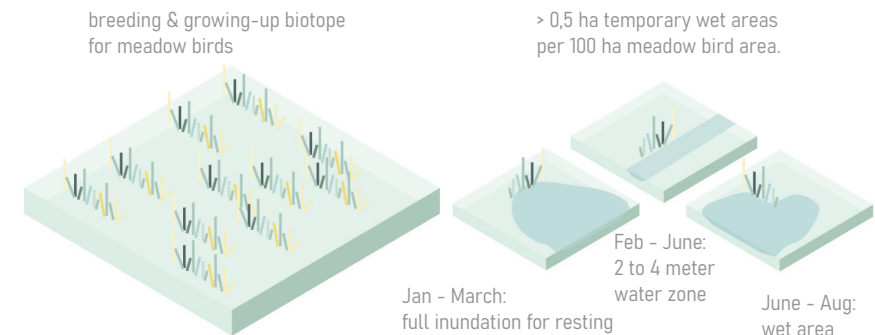
Black-tailed godwit

Meadow birds are selected as priority, and the black-tailed godwit specifically, because more than half of the world wide population broods in The Netherlands.

The less urbanised, more calm areas with clay soil in the south part of the NDW could provide a suitable basis for meadow birds by transforming current meadows to moist, hurbaceous grasslands. Several interventions, as listed above, together create suitable habitats for meadow birds and the black-tailed godwit specifically.

By designing in the *NHW* for keystone species, a large impact on the ecosystem can be achieved. These species help to support and maintain the area they live in as well as having a positive effect on many other organisms in the community.

Development of nature, even more small-scale interventions, raises the question of financial feasibility. However, several existing businesses show that the needed transformation can create revenue. In Germany, farmers have been experimenting for some time with peat moss as a crop. This can serve as a raw material for the potting soil industry. An example of meadow bird inclusive farming is a 'meadow bird farm', where the secondary activity of milk production lowers the costs of meadow bird management. In addition, recreational activities such as bird-watching, excursions, quaking peat hiking, etc. can contribute to the revenues needed. Furthermore, we believe that collaboration and sharing knowledge between farmers is key. For instance, the interventions needed for meadow birds are only effective if all are executed, which is demanding for a single farmer. By rotating wet areas, multiple farmers together can provide all required elements, alternating with more productive land, resulting in a mosaic of landscapes and greater biodiversity.

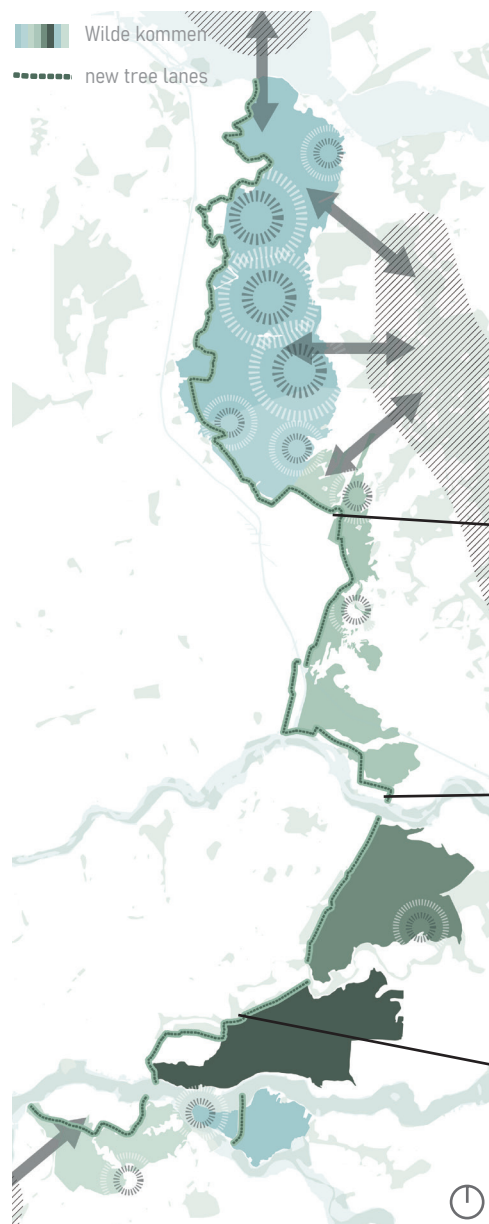


Concept strategy for nature landscape; elements to rotate.

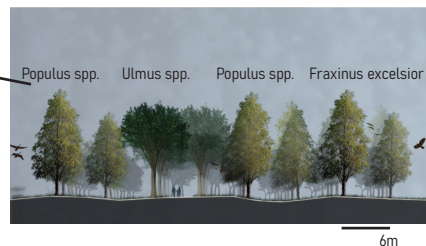
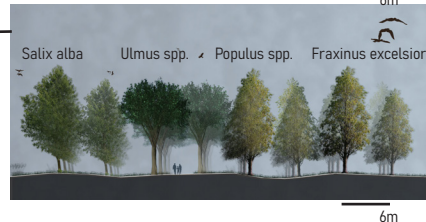
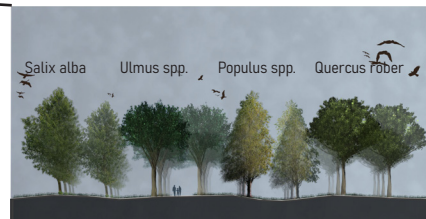
source: made by authors, readapted from Vogelbescherming. (z.d.). Factsheets boerenlandvogels. Vogelbescherming Nederland. Geraadpleegd op 1 juni 2021, van <https://www.vogelbescherming.nl/bescherming/wat-wij-doen/onze-boerenlandvogels/factsheets1>

Concept: De Wilde Kommen

Connecting North & South

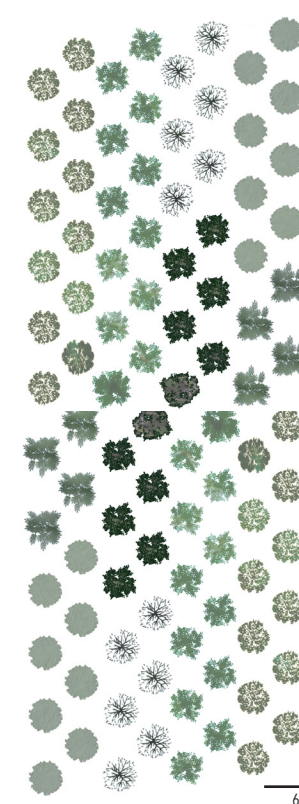


For the special tree lane running north to south, we propose a tree lane of 8 trees as an expression of the invisible backbone of the Waterlinie. This historical landscape was, in design, invisible or hidden from the enemy at eye-level. The tree line makes the 'the line' visible yet blends it into the natural and cultural landscape. The tree types in these lanes are not fixed but change as the landscape and soil type changes. They are in essence a reflection of the locale, yet one species of tree is present throughout. The *Ulmus* tree is present through the line as representation of this defense system.



Tree lane sections

Concept North - South Natural Connection



Concept Scheme Tree Lanes in Plan

Tree lanes have always been used in the polder landscape to make space and create connections. These lanes defined 'rooms' in another wise flat undefined sea of space and were also used to create projected squares within a large polder. This polder system is at the very base of the inundation fields. (Reh, Steenbergen & Aten. 2005)



Ideal Planting Image of the Beester(polder)
According to the Planting
Right of 1616

source: Zee van Land p.127 (Reh,
Steenbergen & Aten. 2005)

The eight tree lane composition, that follows the main defense line, will eventually encounter the strategically placed forts. The entire structure forms a green 'necklace', with the forts as hidden gems. Since the forts are often hidden behind existing greenery, there is a disruption and integration of new and old. The formal aspect of the tree lanes express humankind's continued dominance and control over the landscape while connecting to the existing nature reserves and area with one another.

The choice of the tree species for the composition is related to the soil type in the different parts of the *NHW* landscape, as well as, the tree species that were originally used for planting schemes in the defense system. The *Ulmus*, *Quercus robur*, and *Salix alba* were all used for lane arrangements in addition to being useful for firewood and the camouflaging of the forts. The *Populus*, *Alnus*, *Acer pseudoplatanus*, *Aesculus hippocastanum*, and *Fraxinus excelsior* could also all be found in the *NHW* providing different services within the system.

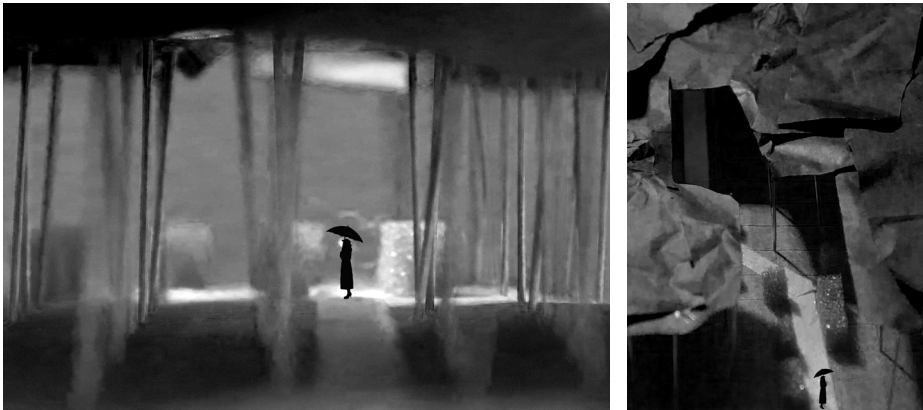
source: Reh, W., Steenbergen, C., & Aten, D. (2005). Zee van Land. Stichting Uitgeverij Noord-Holland

Concept: De Wilde Kommen

Connecting North & South: When Meeting Existing Cultural Elements

The tree lanes create not only an ecological corridor from the Markermeer in the North to the Biesbosch in the south, but also create a spatial experience for those living around and visiting this connecting element through the landscape.

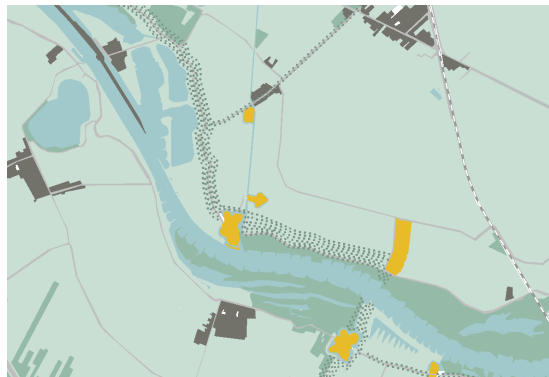
Openings and breaks in the canopy happen when the tree lanes encounter existing elements in the landscape, such as dikes, fortresses, roads, canals and other elements of the Defense Line. Here places within the rhythm of the lines are created and significance to the elements is highlighted. Opening in the tree lanes also provide opportunities for a diverse plant and animal life among and around the trees, especially in openings in the middle of the lanes where there is a buffer from industrial human activity.



Tree lane model 1:500 - spatial qualities and arrangements

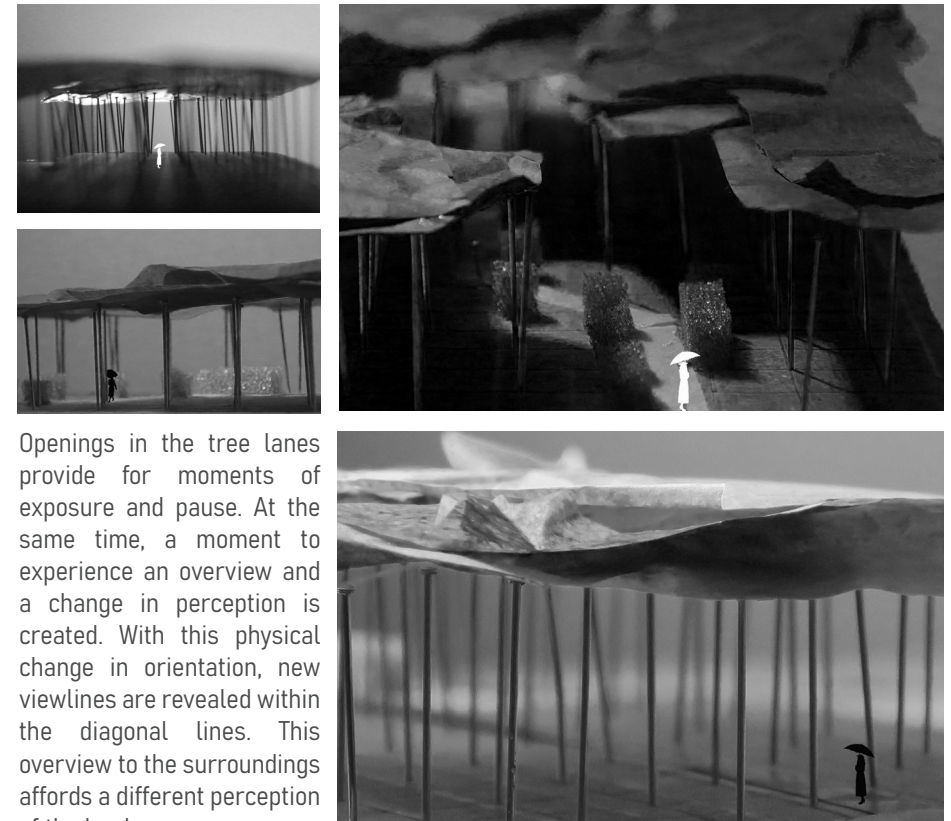
LEGEND

- tree lanes
- forts
- water
- farm fields
- urban
- greenery
- roads
- railway



Tree lanes on the island of Schalkwijk

Tree lane model 1:500 - spatial qualities and arrangements

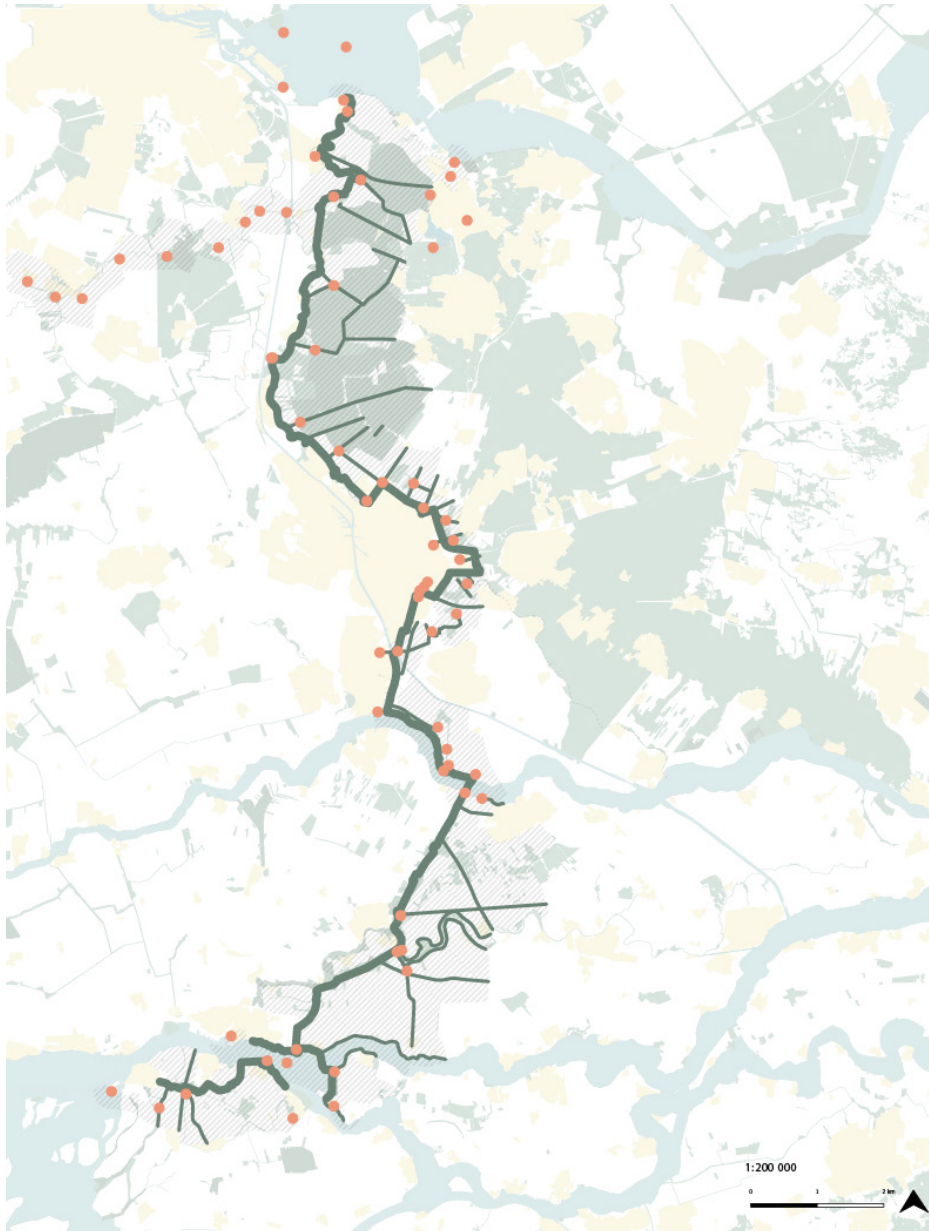


Openings in the tree lanes provide for moments of exposure and pause. At the same time, a moment to experience an overview and a change in perception is created. With this physical change in orientation, new viewlines are revealed within the diagonal lines. This overview to the surroundings affords a different perception of the landscape.



Concept: De Wilde Kommen

Connecting West & East



Network of Tree Lanes Connecting Urban and Natural Landscape

Urban Landscape Randstad



Utrecht Central Station

source: <https://www.volkskrant.nl/economie/mist-utrecht-cs-het-wow-effect-bc3f4306/>

Natural Connection Formal Tree Lanes



Eiken Laan (Oak tree lane)

source: <https://natuurfotosdrenthe.wordpress.com/2017/05/08/landgoed-huize-alme-lo-en-omstreken/eiken-laan-2/>

Natural Landscape Utrechtse Heuvelrug



Utrechtse Heuvelrug

source: <https://www.heuvelrugertgoedpas.nl/>

Formal singular tree lanes, perpendicular to the main defense line and 8-tree lane, will connect the urban landscape to the natural one. These formal tree lanes will emerge along the roads that were previously used as evacuation routes during the active days of the *Nieuwe Hollandse Waterlinie*. Their new function will be focused on connecting people living in the urban areas to the natural area of the Utrechtse Heuvelrug

Concept: De Wilde Kommen

Experiencing the Landscape



Network of Experiential Route Along the NHW

Extent of Disturbance

Connecting people with nature

Hiking



Cycling



source: <https://images.app.goo.gl/XP17YRKL6ib8Z5x7>

Driving by



source: <https://images.app.goo.gl/5Jav13/2d7Ym1p6-6>

Picnicking Terrace / Cafe



source: <https://images.app.goo.gl/GYHdEBtz1f6/7N7A>

Camping Canoeing Thinning productive forest



source: <https://images.app.goo.gl/FN1QYpdgPLU3Z3LH6>

Fruit picking Fishing Hunting



source: <https://images.app.goo.gl/KRr7YMsT6JrRd2e8>

In order to raise awareness that humans are part of nature, and not apart from it, more engaged outdoor activities are needed.

We propose a variety of activities in the NHW. The forts play an important role as gathering spots where people are invited to engage in activities as fishing, fruit picking, monitoring water quality, thinning of productive forests, removing invasive plants, all in a culturally rich landscape.

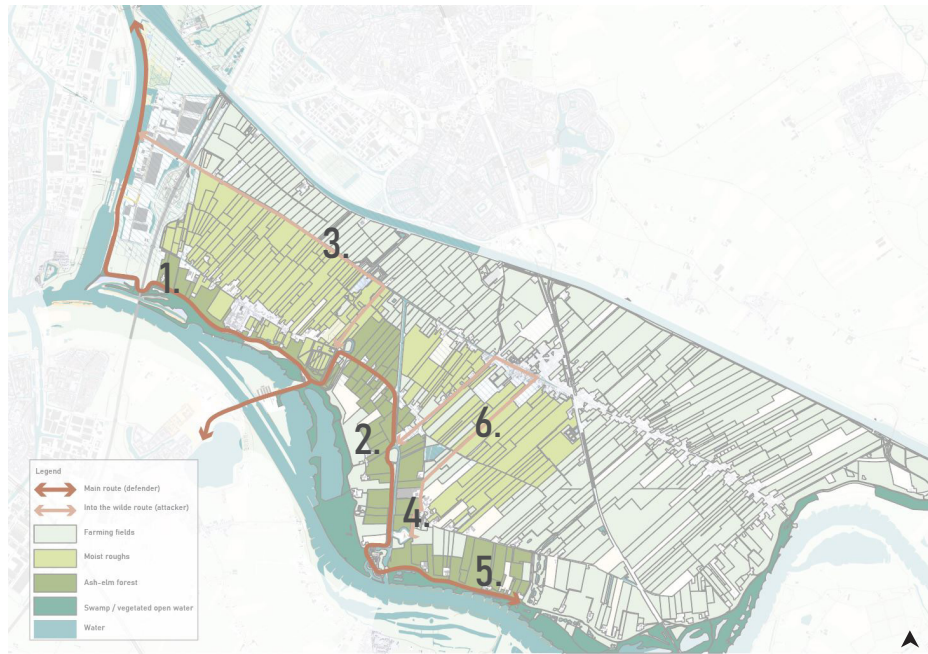
By getting people involved in activities that relate to the resources they use, such as food and timber, it will tighten the connection between visitors and nature. In line with this, wildlife meat consumption can be part of the grazers management of larger nature areas. This does not exclude more touristic activities such as walking or canoeing.

The activities are linked by a visitors' route which is designed to give the experience of the defender and attacker. The defender route is on the dikes. Visitors are invited to feel like a part of a connected network. The perspective over the landscape on the dikes give a sense of security. The attacker route is in the fields, which makes visitors feel viewed and exposed. The broad fields can also make visitors disoriented. The feelings of vulnerability gives way to the desire to be sheltered.

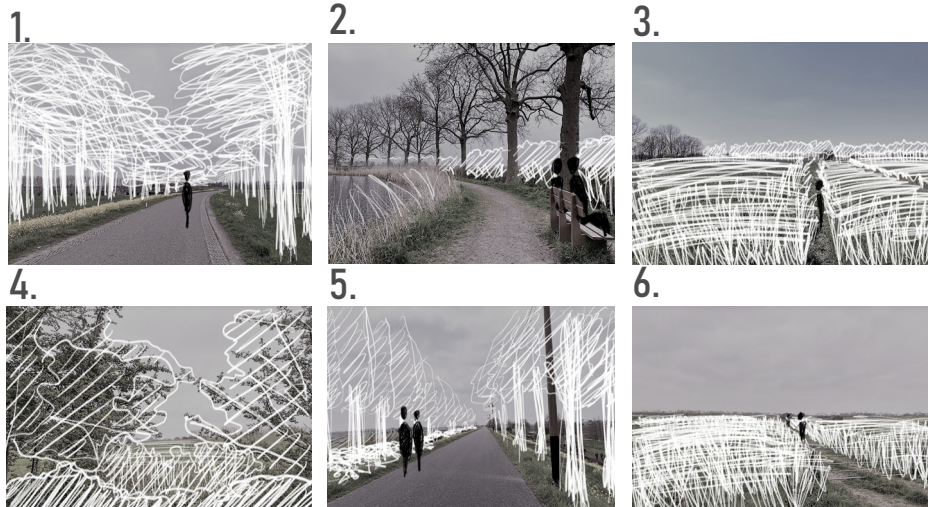
A deep experience can be stimulated by letting people going on and off the route in designated areas while also strolling through nature rich areas.

Implementation

ON SITE: Schalkwijk



Nature Concept on the island of Schalkwijk



Visitor's experience at Schalkwijk



Seeing through the 8-trees lane, a wild river landscape is revived at Schalkwijk.

The agricultural field is turned into a meadow bird's paradise owing to the diverse tree and vegetation types.

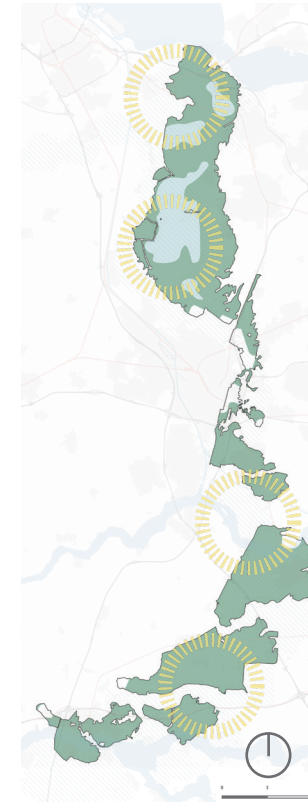
More animals are attracted to this area, followed by nature lovers.

Vision Schalkwijk

DESIGN CONCEPT FROM AGRICULTURE PERSPECTIVE



Nature Inclusive Agriculture



Map of the NDW inundation basins

Problem Statement

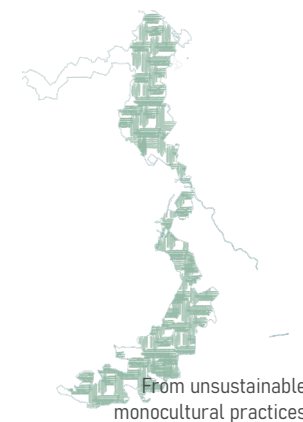
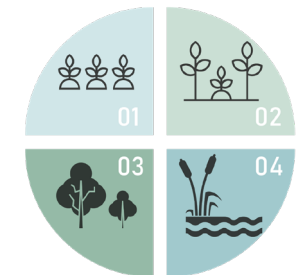
Unsustainable agricultural practices, such as intensified monoculture have led to poor soil quality and loss of biodiversity amongst others. This effect is exemplified especially in the large agricultural landscapes such as the former inundation fields of the *Nieuwe Hollandse Waterlinie*.

The design question we asked was: can *the NHW* landscape acquire a new identity as an experimental field for nature inclusive agricultural practices?

Proposed strategy

The proposed strategy is to employ the use of nature inclusive agriculture through four main practices which would be applied across *he NHW* landscape.

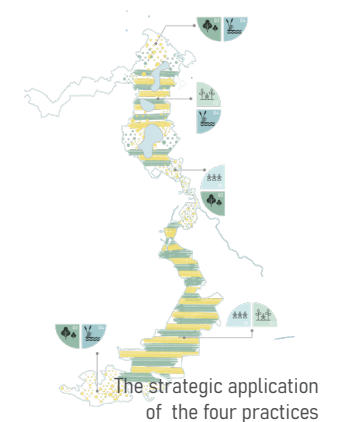
These practices are;
 01. Strip agriculture
 02. Mixed agriculture
 03. Agroforestry
 04. Wet agriculture



From unsustainable monocultural practices



To nature inclusive agricultural practices

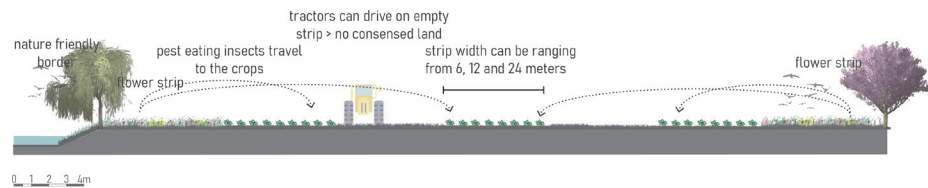


The strategic application of the four practices

The Nature Inclusive Practices

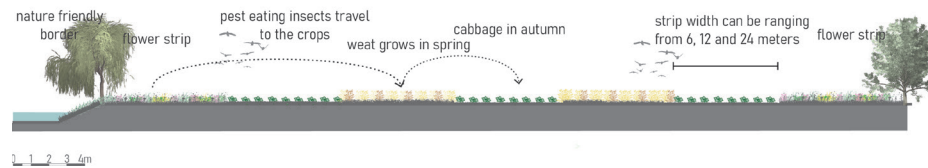
Strip Agriculture

Strip agriculture involves the growing of smaller strips of crops creating a robust, plant-based food production system.



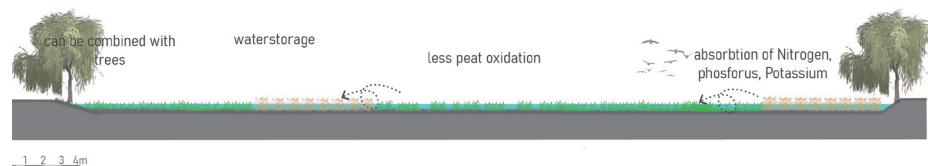
Strip Agriculture + Mixed Agriculture

This is essentially the same as strip agriculture but also involves the simultaneous production of several crops on one plot.



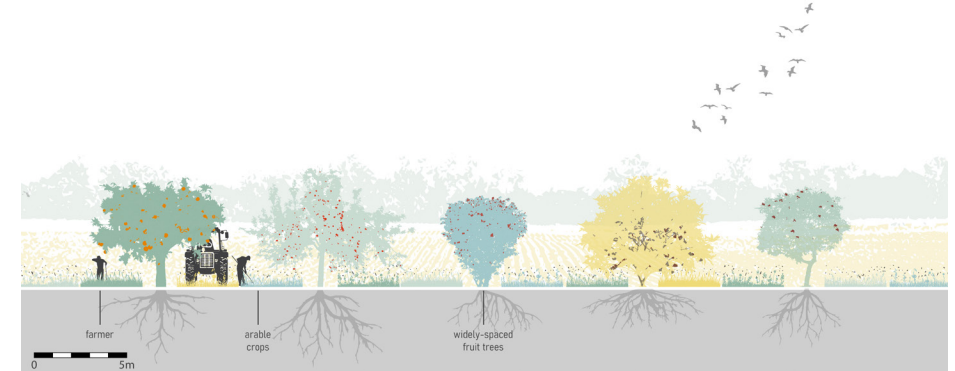
Wet Agriculture

Also known as paludiculture, the focus is on agricultural production on very wet soils and the cultivation is adapted to the naturally moist conditions of the soil. (Bestman et al, 2019)



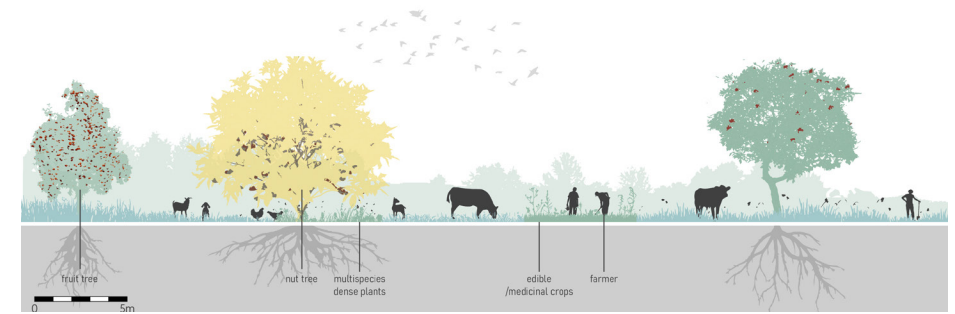
Silvoarable Agroforestry

This is comprised of widely-spaced trees and/or shrubs associated with arable crops



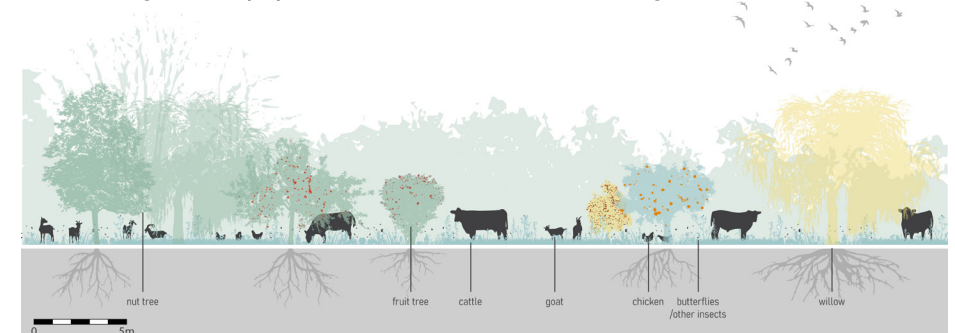
Silvopastoral Agroforestry

This is a combination of trees, forage (pasture) and livestock production



Food Forests

These are agroforestry systems with trees, shrubs, herbs, vegetables and animals

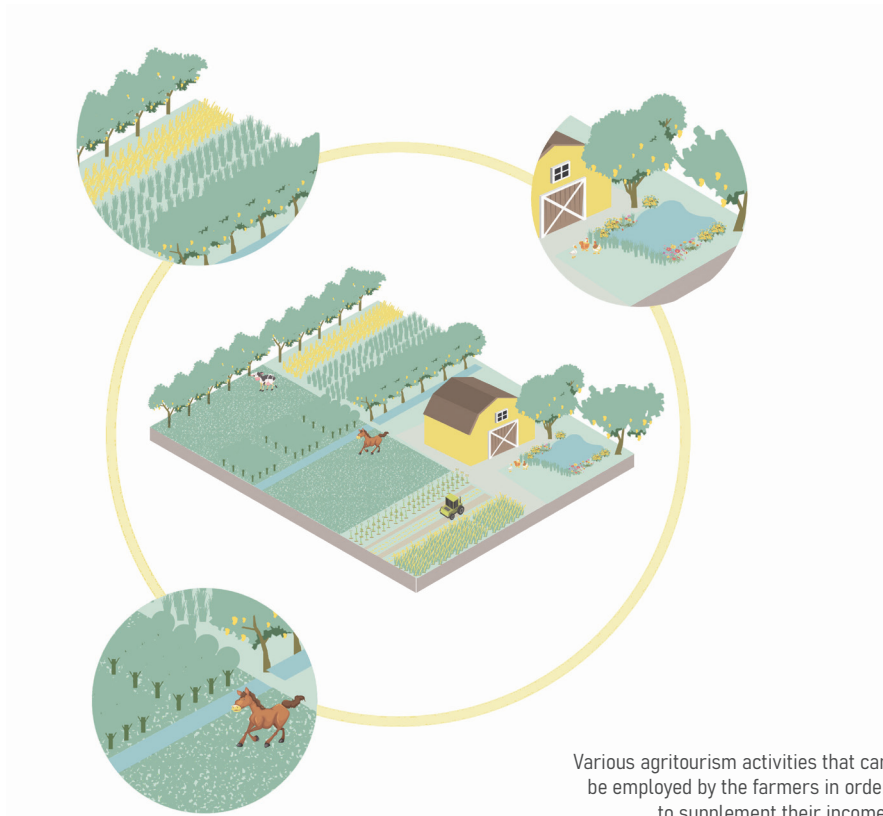


Other Interventions

Agritourism

Agritourism allows for other recreational activities to happen alongside agriculture. These activities could include; lodging, camping and picnics, agricultural fairs and festivals, hayrides, petting zoo, horseback riding, birdwatching, guided crop tours, farmers market and others.

Such activities could help to increase biodiversity and also help farmers diversify their sources of income.



Various agritourism activities that can be employed by the farmers in order to supplement their income.

Toolkit to diversify the agricultural landscape

Listed are small interventions in the agro-ecological building blocks presented that farmers could implement in their own company (WUR, 2019). Most of these blocks are relatively easily implemented. (Dawson & Norén, 2021). We propose a system where besides the main types of nature inclusive agriculture the farmer also needs to implement a big amount of these blocks in order to create a substantial change for biodiversity. If the farmer meets these conditions, he or she can get a financial subsidy, or can get other benefits.



Design Proposal

Considering the soil properties, the different, nature-inclusive, agricultural types are distributed over the area of *the NHW*. The borders of the old defense line are lined with hawthorn bushes, subtly referencing the previous impenetrability of the area. A range of strip and mixed agriculture are spread throughout *the NHW*, adapting to the most suitable crops per area.

Wet agriculture finds it's way along the banks and the low lying peaty areas and finally the agroforestry is centered around the Utrecht region and the south of *the NHW*.

BORDER

STRIP AGRICULTURE

BANKCULTIVATION

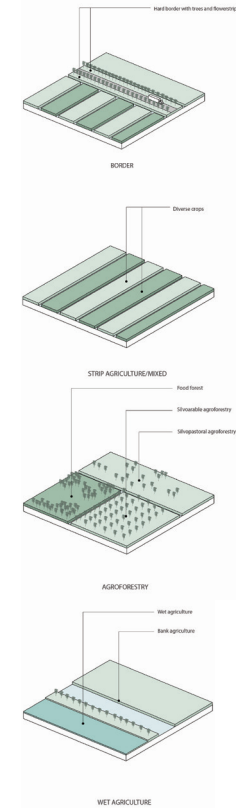
PALUDICULTURE

AGROFORRESTRY



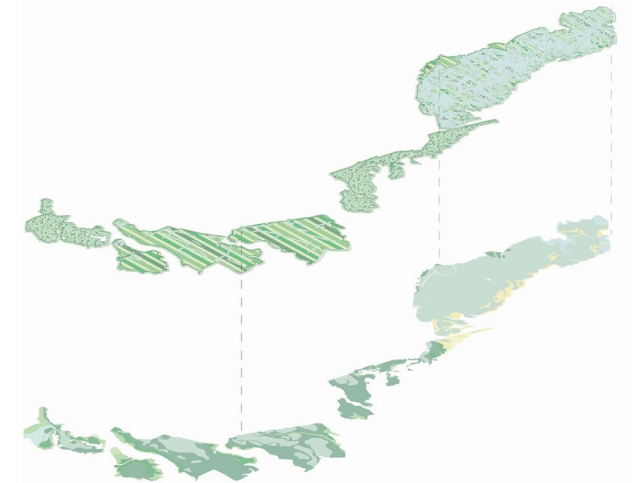
Inspired by:
Dutch Water Defence Lines & Ministry of Education, Culture and Science. (2018, December). Significant Boundary Modification of the Defence Line of Amsterdam WHS (No. 759). The program office of the New Dutch Waterline and the program office of the Defence Line of Amsterdam. https://www.programmanieuwehollandsewaterlinie.nl/wp-content/uploads/2019/02/PS_NweHolWaterlinie_Managementplan_web_LR.pdf

By allowing the agriculture to remain instated but changing the omgevingswet and introducing stimuli to support these more nature-inclusive agricultural practices the *Nieuwe Hollandse Waterlinie* transforms into a sustainable example for the entire country, defending us once more by transitioning away from ecologically harmful practices.

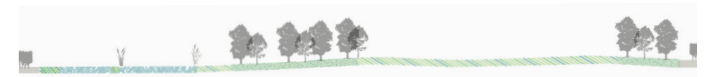


Axonometric diagrams showing the proposed nature inclusive agricultural practices

Inspired by:
Steenbergen, C. M. & Atelier Rijksbouwmeester. (2004). Compositie & Strategie. Atelier Rijksbouwmeester.
Steenbergen, C. M., & van der Zwart, J. (2006). Strategisch laagland. Uitgeverij 010.
Last Coming from UNESCO nominatie dossier web. Dutch Water Defence Lines Appendices Part I.



Map of *the NHW* inundation basins showing how the soil layer beneath informs the agricultural activities practiced in the different areas



Section across *the NHW* showing the varying types of agricultural activities that can be implemented.

Case study

Schalkwijk



In our case study of Schalkwijk, located just south of Utrecht, there are a lot of agricultural plots lined along a polder structure. As this low lying, wet clay and peaty soil allow for low growing paludi culture to cover the patches of this former inundation site whilst intermittently surrounded with strip- agriculture and agroforestry. The north of the Amsterdam Rijn kanaal is slightly higher and dryer and so the agricultural landscape changes along with it, gradually allowing for more strip agriculture and agroforestry. The polder landscape is covered in small ditches and canals these water banks are lined with reapeable grasses. Big swaths of land along the lek present a semi organic shaped landscape to introduce the wet agriculture to the area.

The Impressions

Before and After Interventions

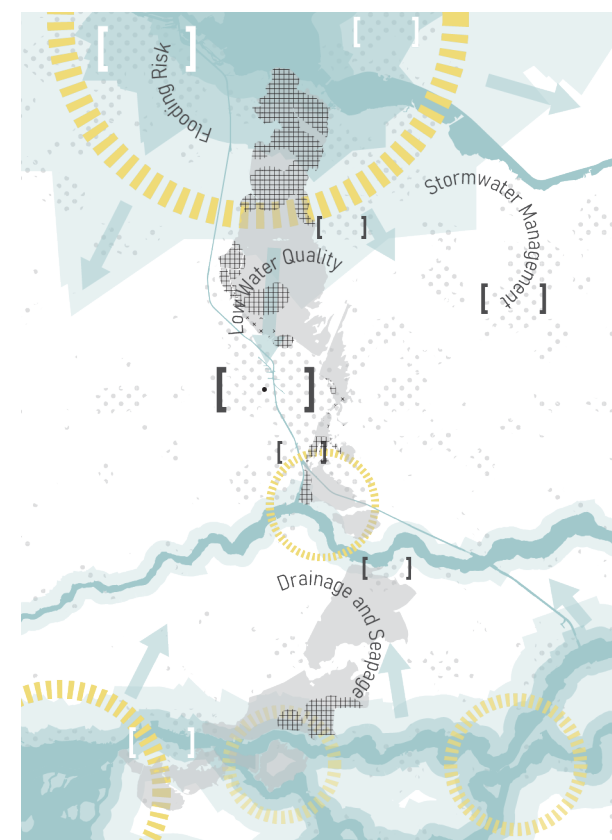


DESIGN CONCEPT FROM WATER PERSPECTIVE



Problem Statement

Wordwide Challenges Happening on Regional Scale



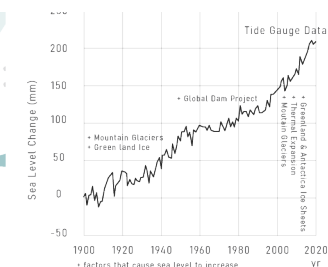
Water Related Problems Overview Within the NHW Area



Water Qualities in Agriculture, Recreation, Nature & History

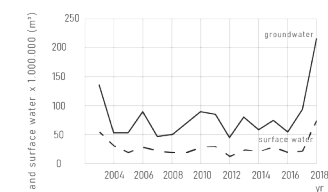
source: Made by author (Yang,F,2021) based on historical Nieuwe Hollandse Waterlinie photos.

As sea levels rising has become a worldwide threat, the *Nieuwe Hollandse Waterlinie* has a potential to gain a new significant role using the existing water infrastructure. Nationally speaking, water management is one of the most significant focus points for big cities. However, the unique possibilities of working with water within the *Nieuwe Hollandse Waterlinie* are hidden for most people.



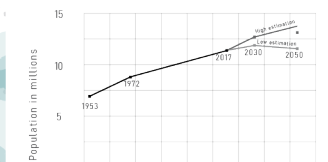
GLOBAL MEAN SEA LEVEL CHANGE

Source: NASA's Goddard Space Flight Center/JPL DAAC



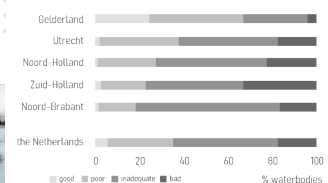
WITHDRAWAL GROUND AND SURFACE WATER AGRICULTURE

Source: CBS, Wier



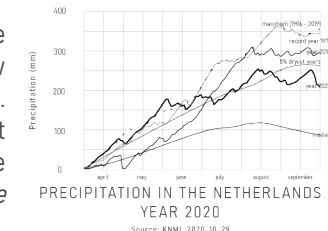
POPULATION LIVING IN FLOOD-PRONE AREAS IN THE NETHERLANDS

Source: PBL/NL



REGIONAL WATER BIOLOGICAL QUALITY

Source: IHW (Waterschappen, RWS), edited by PBL

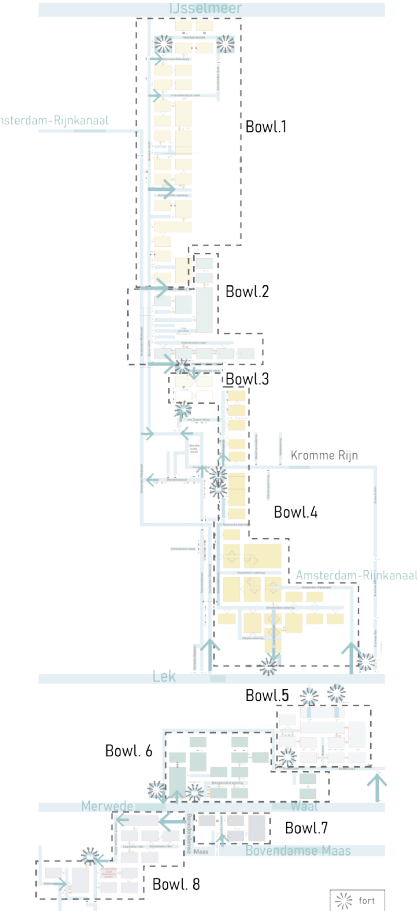


PRECIPITATION IN THE NETHERLANDS YEAR 2020

Source: KNMI, 2020-10-29

Quality Statement

Inundation Scheme



source: INUNDATIEKOMMEN. (z.d.). [Jpg]. Atlas Nieuwe Hollandse Waterlinie.

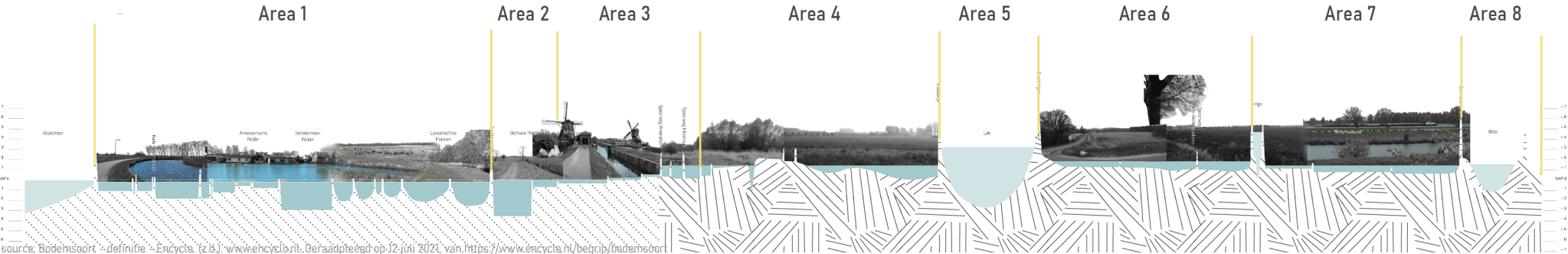
The inundation fields are divided into 8 so-called “bowls”, depending on the ground level of each area.

The graph on the left is illustrating how the water would flow into the polders from the connecting large water bodies.

In the past, the bowls would work as one defense system, being flooded simultaneously. Currently, multiple waterboards are managing the different areas and therefore have alternative focus and priorities in future developments.

As the *Nieuwe Hollandse Waterlinie* stretches from the North to the South of the Netherlands, different qualities of the landscape are more dominant.

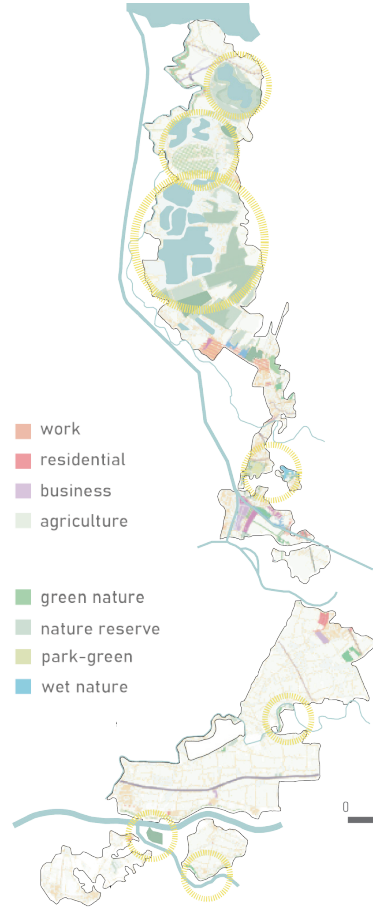
The section below illustrates the various spatial qualities and soil types that can be observed throughout the line: fom large open water bodies close to IJsselmeer, to more built up areas close to Utrecht, and open green fields around the river Lek.



source: Bodemsoort - definitie - Encyclo. (z.d.). www.encyclo.nl. Geraadpleegd op 12 juli 2021, van https://www.encyclo.nl/begrip/bodemsoort

Quality Statement

Water Potentials within the NHW area



The entire water system is no longer working as a whole, since the inundation function has become obsolete as defense system after World War II.

A large part of the line is now used for its historic function of agriculture. It has fragmented ownership and has no longer an overlapping goal. However, knowing the potential of this underlaying water system, the different areas can be given new functions according to land use.

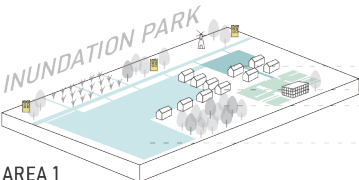
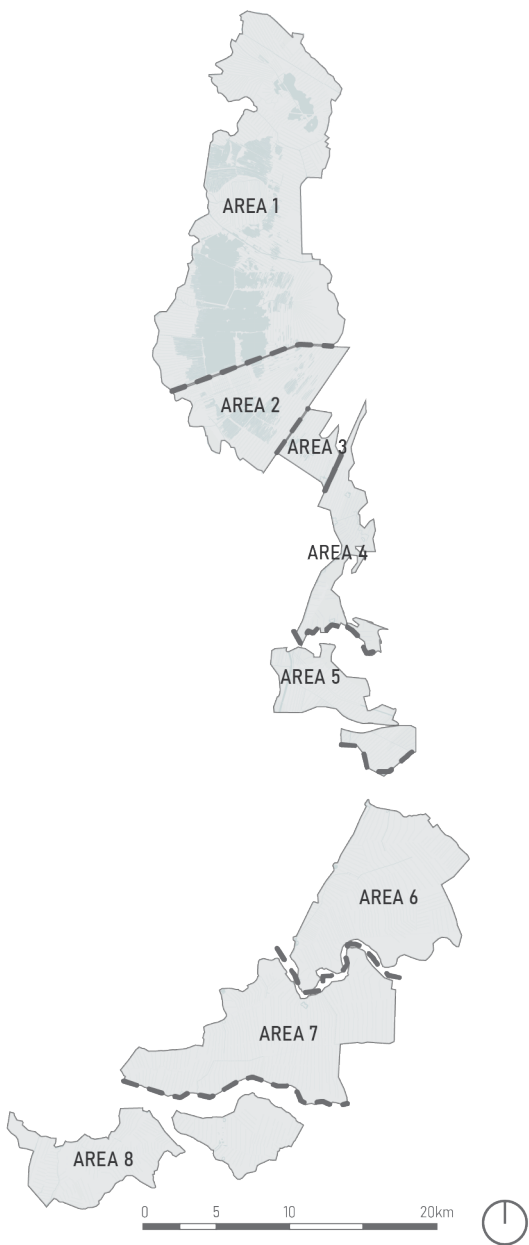
Illustrated on the left, it includes flood systems that retain water to deal with flooding problems, water retention in nature reserves that focus on ecological benefits, and drainage system based on agricultural land. Additionally, archaeological water systems and recreation functions, as well as water purification system for clean drinking water in densely populated areas, can be added to maximise the use of this unique water structure.

Partition Strategies

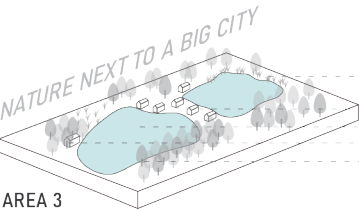
From Threat to Opportunity

Strategies in 5 Categories

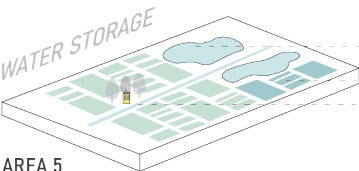
From Recreation to Nature Oriented



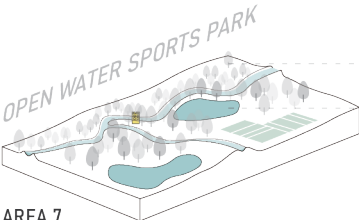
AREA 1
an open door between city and nature



AREA 3
a nature getaway from busy urban life



AREA 5
the island of Schalkwijk is the only part of the line where the original ensemble is still visible



AREA 7
various water sports activities

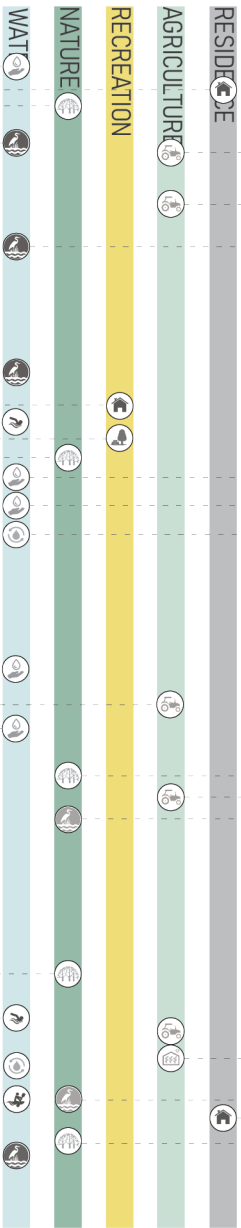
WATERFRONT RESIDENCE

INUNDATION PARK

WATERFRONT HOTEL

WATER STORAGE INUNDATION FIELDS

WATER STORAGE INUNDATION CANAL



PALUDICULTURE

WET AGRICULTURE

WATER STORAGE SWALE

WATER STORAGE PONDS

WATER RECYCLE

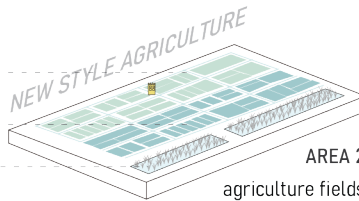
BIODIVERSITY AGRICULTURE

MEADOW FOR BIRDS

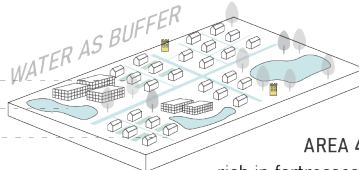
HORICULTURE

WASTE WATER TREATMENT

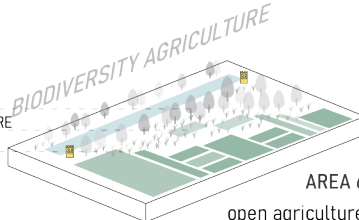
FISH FLOOD PLAIN



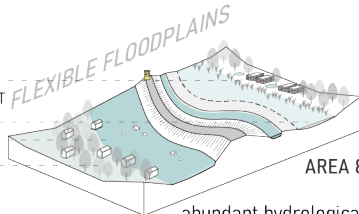
AREA 2
agriculture fields as a new green corridor



AREA 4
rich in fortresses and water heritage elements



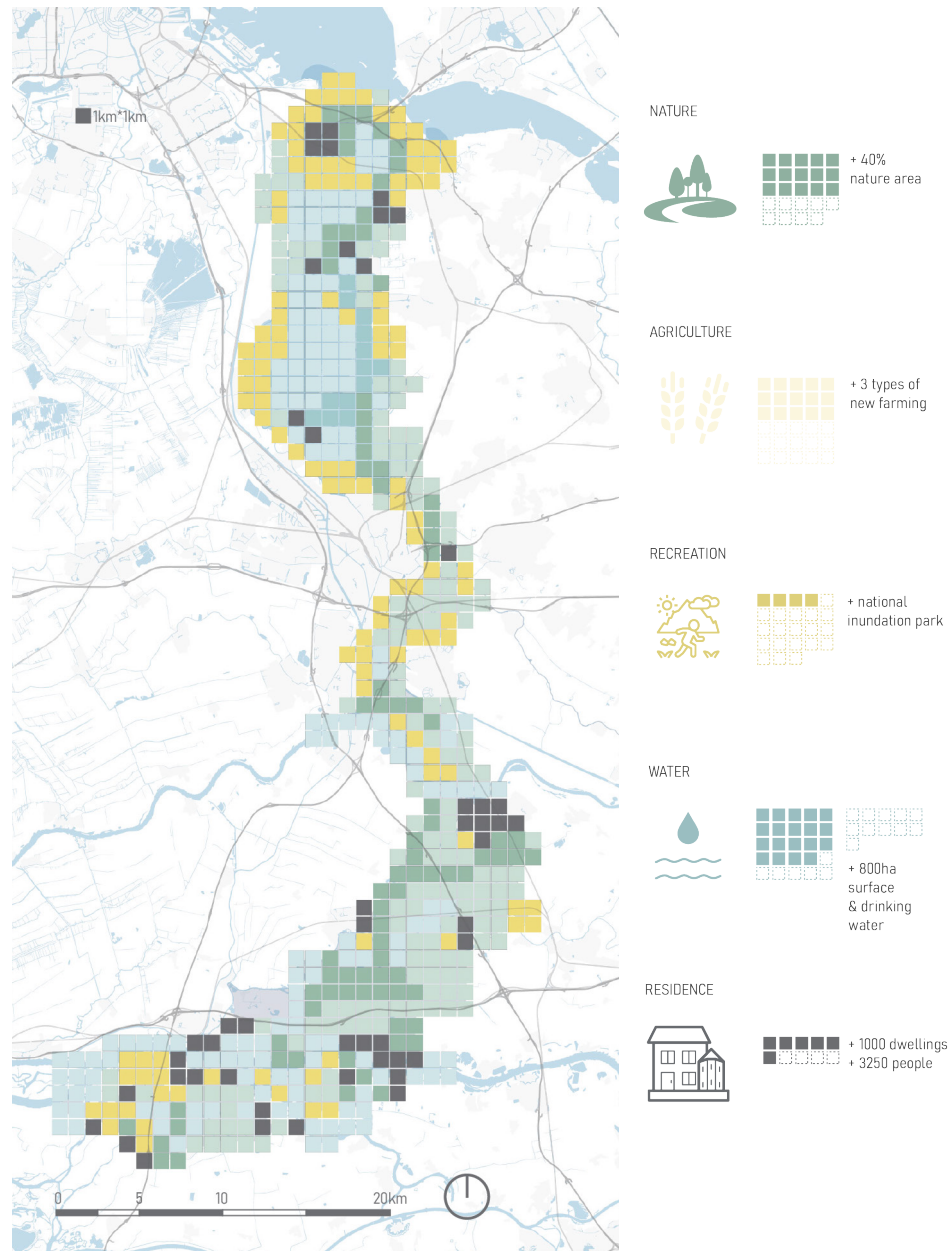
AREA 6
open agriculture landscape with visible polder system



AREA 8
abundant hydrological and natural resources

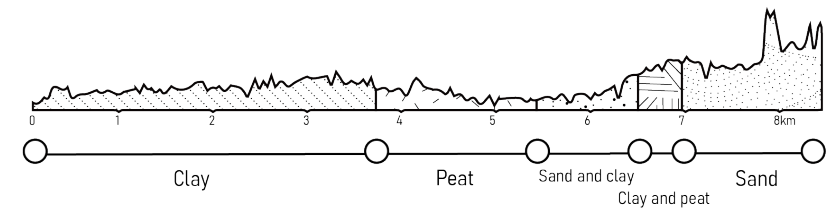
Concept Planning

Pixel Mapping the Future of Water and How to Achieve It



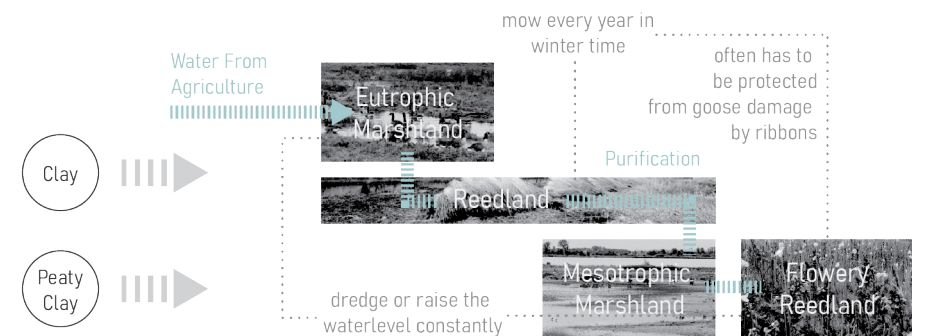
Water Potentials on Site

Location, Qualities & Strategy



source: Bodemsoort - definitie - Encyclo. (z.d.). [www.encyclo.nl](https://www.encyclo.nl/begrip/bodemsoort). Geraadpleegd op 12 juli 2021, van <https://www.encyclo.nl/begrip/bodemsoort>

The site is located south of Utrecht, along the river Lek, with the current primary function of agriculture. The most dominant soil type in the area is clay, with some peat in the farm fields, and sand towards the river shore.



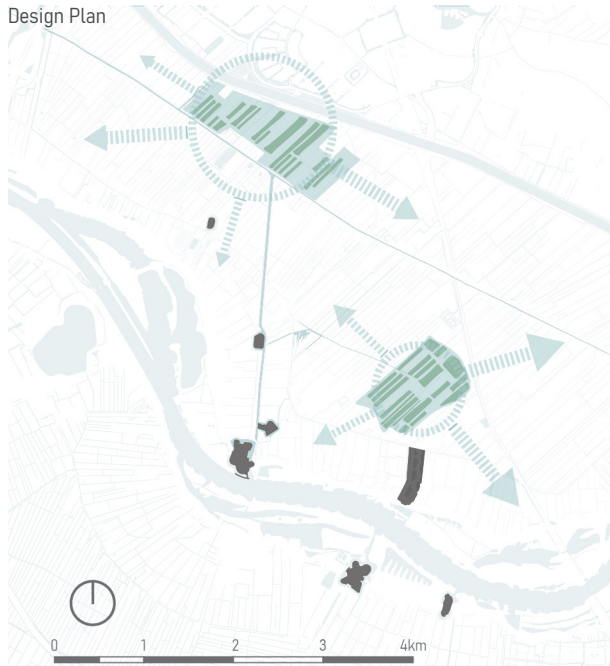
Formation of Landscape

source: Sijf Janssen. (2020). Landscape Type Transformation [Powerpoint-slides]. Landscape

Site Design from Perspective of Water

Plan & Phasing

Design Plan



The island of Schalkwijk has the ambition to create a sustainable and climate proof water system, the main task for the future is to hold more fresh water. In times of water shortage, they have to let water in from the Amsterdam Rijnkanaal or the Lek. This is however detrimental, because water from these sources is of lower quality.

The goal of the concept is to store more water in the area and renew the old inundation system's purpose. To realise this, two areas within the inundation field will be transformed into wetlands based on the underlying peat soil. The wetlands not only help to balance the water system, but also create a valuable impact for the biodiversity and water quality in the area too. Furthermore they provide an attractive recreational space, which is both positive for tourists and locals (Groenblauwe netwerken, n.d.).



5 Years Later

The lowest fields are reinundated. The prototype of water system appears.



10 Years Later

The peat situation is stable and suitable for the water system elaborated.



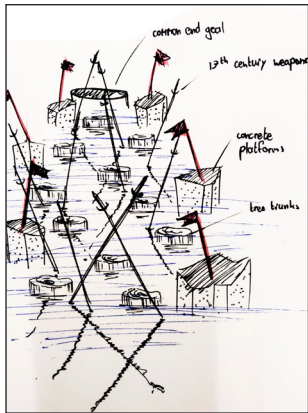
15 Years Later

A water system completed including marshland and reedland, which has recreational, ecological, water retention, water purification benefits.



Installation Concept Workshop

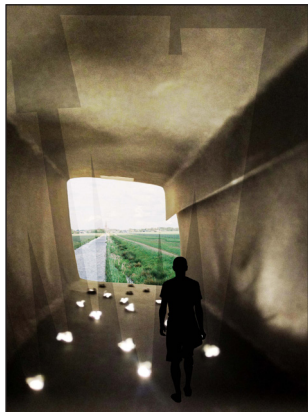
Round One



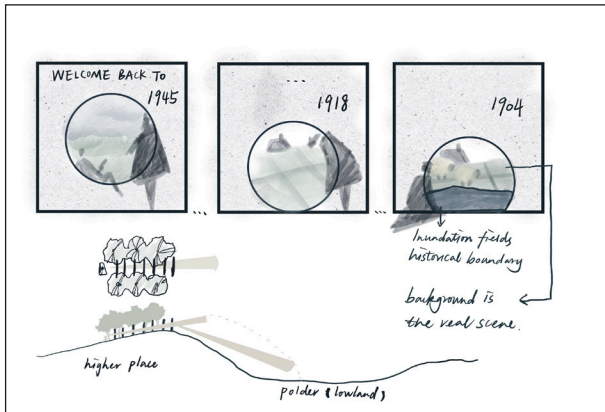
Idea By Pieter
 #dancer #water #wood #concrete
 A route where the visitor has to maneuver around various obstacles, which represent elements of the NHW.



Idea By Rachel
 #rabbit #steel #shadows
 In this route, varying heights, angles and distances of and between poles evoke different feelings for visitors.



Idea By Priscilla
 #student #fabric #light
 The visitor experiences the landscape from within a bunker, playing with light and shadow for a dynamic environment.



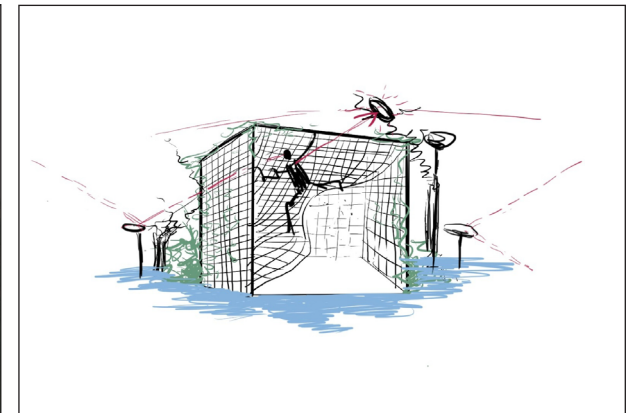
Idea By Fudai
 #teenage girl #water #concrete
 Creating historical lenses with concrete, indicating where the inundation lines are still visibly positioned in the landscape.

Installation Concept Workshop

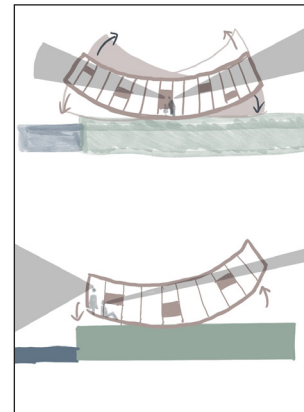
Round Two



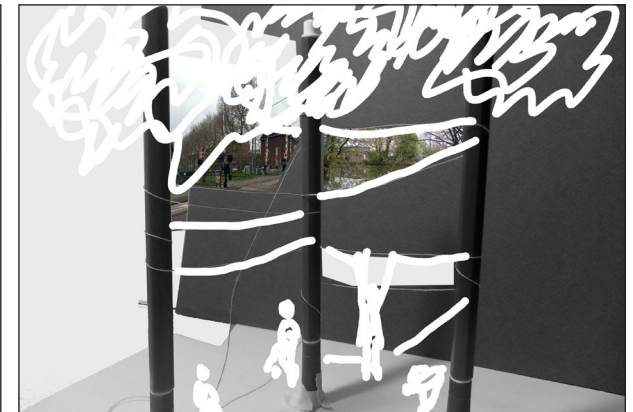
Idea By Daria
 #defender #mirror
 The orthogonal mirror in the field creates a 'hidden cave' in the field, visitors will see themselves suddenly when passing by.



Idea By Wansu
 #defender #dancer #resilient rope #steel #mirror
 The visitor climbs in different positions to see the various landscape elements through mirrors with different heights and angles, creating a 'hide and seek' playground.



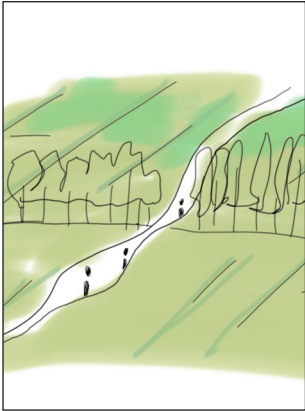
Idea By Fudai
 #dancer #wood #light
 Visitors stand within an arc on the ground with windows in all directions, where the scenery changes with their movement, creating a feeling of uncertainty.



Idea By Priscilla
 #kid #tree #rope
 Trees are used to hang ropes at different heights to create different perspective frames, where the visitor can view elements of the landscape.

Installation Concept Workshop

Round Three



Idea By Sophie

#student #wind #soil #water

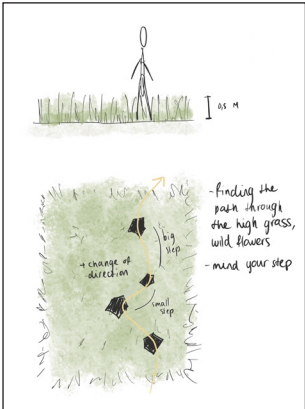
Creating a ditch altering in height and width, where visitors can experience the landscape at inundation level.



Idea By Kimberley

#attacker #fabric #wind

The visitor gets guided by the wind between 50cm tall fabric walls, which symbolizes water flowing through the inundation fields.



Idea By Nicolle

#student #fabric #light

The visitor walks through tall grass and wildflowers, minding their step as tiles are spread out to create a route.



Idea By Fudai

#defender #wind #grass

Bunker-like structures with soft and transparent materials invoke the feeling of shelter and home during wartime, embracing the inundation fields.

THE FINAL CONCEPT



The Final Concept: A House In-Between

Design Concept

Living in the inundated landscape raises the question; who should you fear more? A foreign enemy, or the domestic army?

Here, you are housed but not sheltered, a living obstacle between water and fire. For living within the firing range of a fortress meant a constant threat of having to leave your hearth and home.

Also experience how the feeling of safety eludes you step by step. Expose yourself to the open inundation fields and discover the hidden stories of people trapped in a war landscape, not just here, but worldwide. Because what used to be a reality for the residents of this place, is still reality today.



Concept Sketch

Storytelling

The Three Men - International Scale

Story telling is an important part of the installation. We tell the story of 3 different men with the same experience found in the Netherlands, Vietnam and Latvia.



Local Farm Family
WW2 - The Netherlands



Dit is de geboortegrond van een familie wier stamboom teruggaat tot de 15e eeuw, vernoemd naar het gehucht, het fenomeen van een dijkdoorbraak, 't Waal. Vechtend tegen en werkend met het ongedurige landschap is de familie onlosmakelijk verbonden met de plek.

Hun familiewoning - in het schootsveld van het fort Lunet aan de Snel - is gemaakt van hout, zodat die te slopen is als de vijand komt. Dit is nooit gebeurd, wel is polder Blokhoven tweemaal geïnundeerd, door zowel vriend als vijand.

Van woest moeraslandschap tot frontlinie en altijd open weide, immer wordt het land bewerkt en beheerd door de agrariërs van Polder Blokhoven. Voor de toekomst zien zij perspectief in het cultureel ontwikkelen van de waterlinie, waarbij een andere manier van boeren met nat grasland het belang van de weidevogels dient.

On this ground one family's history is rooted far back into the 15th century, named after the village, the phenomenon of a dike failure, 't Waal. Fighting against and working with the restless landscape this family is intertwined with the place.

Their family home - In the line of fire from the Lunet aan de Snel - is built out of wood, allowing for a quick demolition when the enemy comes. It never came to that, though the polder Blokhoven was inundated twice, by both friend and foe.

From wild swamp landscape to frontline and open fields, this ground has always been worked by the farmers of Polder Blokhoven. Looking to the future, they envision a cultural development of the waterline, in which a new type of farming of the wet grassland befits the meadowbirds.

Storytelling

The Three Men - International Scale



Minh Quang Nguyen
Vietnam war - Vietnam



"In de Vietnamoorlog, die duurde van 1957 tot 1975, woonde Minh-Quang Nguyen in een vissersdorp in Vietnam. Doordat het dorp midden in het land ligt, werd er vanuit Noord-Vietnam gespeculeerd dat de dorpsbewoners zouden samenspannen met het zuiden, terwijl in Zuid-Vietnam werd gedacht dat het dorp zou samenwerken met het noorden. Door deze ongelukkige positie, werden de bewoners aangevallen door beide kampen.

Mannen uit het dorp werden gedwongen om te vechten, waarbij de kans dat ze levend zouden terugkomen minimaal was. Veel bewoners zijn derhalve op de vlucht geslagen, de zee op, waar zij de geschiedenis in zijn gegaan als de eerste stroom bootvluchtelingen.

Vluchten uit wanhoop, met gevaar voor eigen leven, niet omdat zij op zoek waren naar een betere toekomst, maar omdat ze anders zouden sterven.

Bootvluchtelingen hebben geen drang om geluk te zoeken, zij hebben slechts de menselijke drang om te overleven. Zo verlieten zij hun veilige haven, hun huis en haard, om een onzekere toekomst tegemoet te gaan."

"During the Vietnamwar, between 1957 and 1975, Minh-Quang Nguyen lived in a fishing village in the middle of Vietnam. Due to the location of the village, North-Vietnam speculated that the villagers would conspire with the South, whilst South-Vietnam suspected they would collaborate with the north. Due to their unlucky position, the residents were attacked by both sides.

The men of the village were coerced to fight, in which the chance of survival would be minimal. Many fled over the sea, going down in history as the very first boat refugees.

Fleeing out of desperation, in fear for their life, not because they were looking for a better future, but because they were looking for a future.

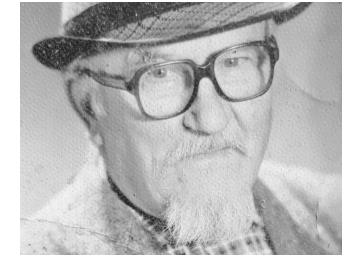
Boat refugees have no space to yearn for happiness, only the fundamental human urge to survive. Thus they left their safe-haven, their home and hearth, to venture into an uncertain future."

Storytelling

The Three Men - International Scale



Augusts Dābols
WW2 - Latvia



"Aan de andere kant van Europa had mijn overgrootvader in Letland een vergelijkbaar verhaal. Hij bevond zichzelf midden in een strijd van twee kanten.

In de tweede wereld oorlog op, 16 juni 1940, stelde de Sovjet Unie de Letse regering een ultimatum en eiste dat zij ontslag zou nemen en een onbeperkt aantal Sovjettroepen in Letland zou toelaten. Zo werd Letland door de Sovjet Unie binnengevallen uit het oosten. Terwijl de bedoelingen van de Sovjet Unie best goed waren, het gevecht aangaan tegen Hitler, stond Letland gewoonweg, 'in de weg'.

Een jaar later, in de zomer van 1941, viel Duitsland Letland binnen uit het westen omdat Duitsland Letland niet als een vrije en onafhankelijke staat beschouwde, maar als een bezet gebied van de Sovjet-Unie.

Mijn overgrootvader moest toekijken hoe zijn land van twee kanten werd binnengevallen, en werd gedwongen in beide richtingen te schieten om zijn huis te beschermen. Later is hij voor zijn verzet naar een strafkamp in de zogenaamde Oelagarchipel gestuurd. Gelukkig overleefde hij dit kamp en kon hij naar huis terugkeren om daar zijn bestaan op te bouwen en een gezin te stichten."

"On the other side of Europe my great grandfather in Latvia had a comparable story. He too found himself in the middle of a battle between two fronts.

During the Second World War, on the 16th of June 1940, the Soviet Union placed an ultimatum on Latvia and demanded that they would concede and allow an unspecified amount of Soviet troops to enter the country. And so Latvia was invaded by the Soviet Union from the East. Though the intentions of the Soviets in fighting Hitler were amenable, Latvia simply stood "in the way" for that.

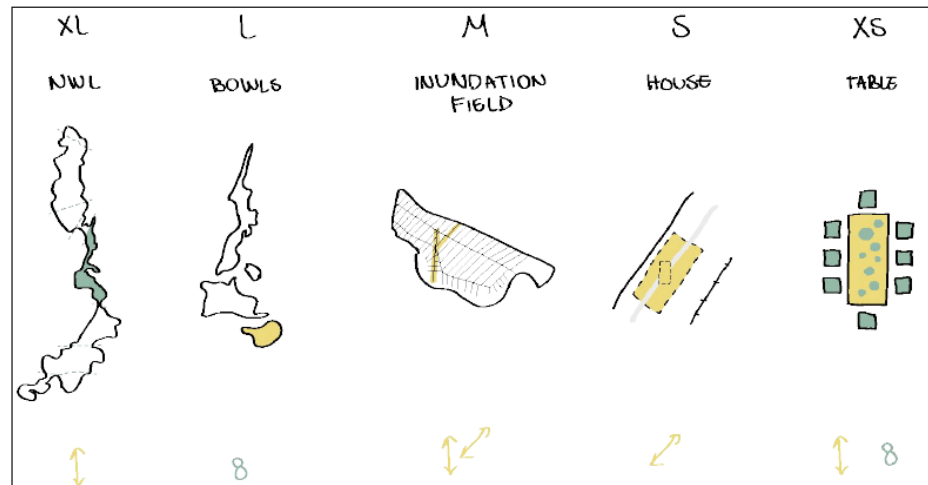
A year later, in the summer of 1941, Germany invaded Latvia from the west as Germany now did not consider Latvia an independent country but an occupied territory of the Soviet Union.

My great grandfather had to see how his country was invaded from two sides and was forced to shoot in both directions to protect his house. For his resistance he was later placed in a punishment camp, the so-called Gulag Archipelago. Luckily he survived this and was able to return home to build his life back up and raise a family."

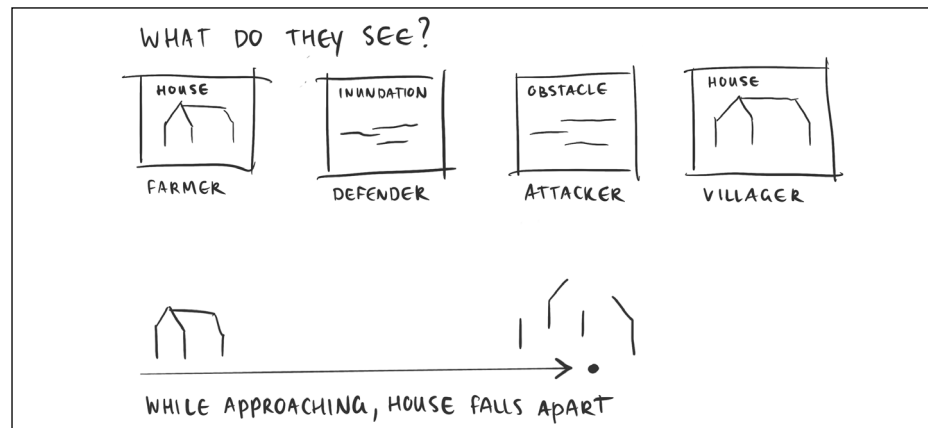
Meaning Behind the Elements

Formation of Concept: Design and Elements

The installation that we built consists of an optic illusion of a house. From far away it looks like a house but when the visitor is approaching it, the house falls apart as illustrated in the image below.



Design Concept Through Scales



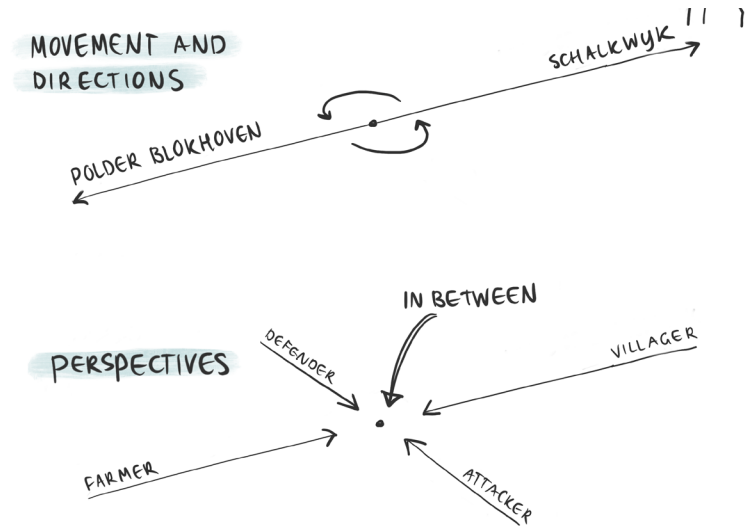
House Concept

Meanings of Elements in the Installation

- House: feeling at home, sense of a place.
- Table: memory of a home there once was, a place to come together and share stories.
- Bowls: representation of 'the NHW' and a (farm) family.

Meaning Behind the Elements

Formation of Concept: Design and Elements



Direction of Important Elements

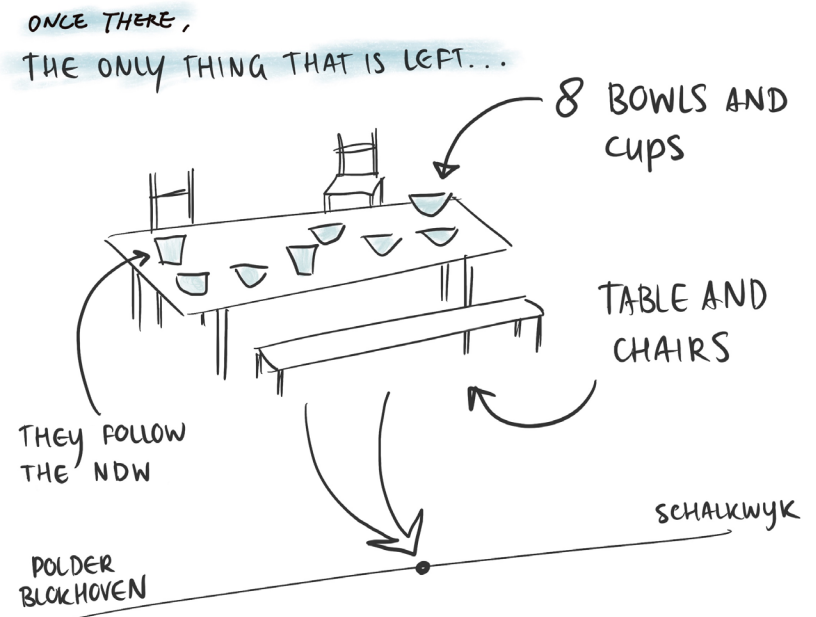


Table Set Elements

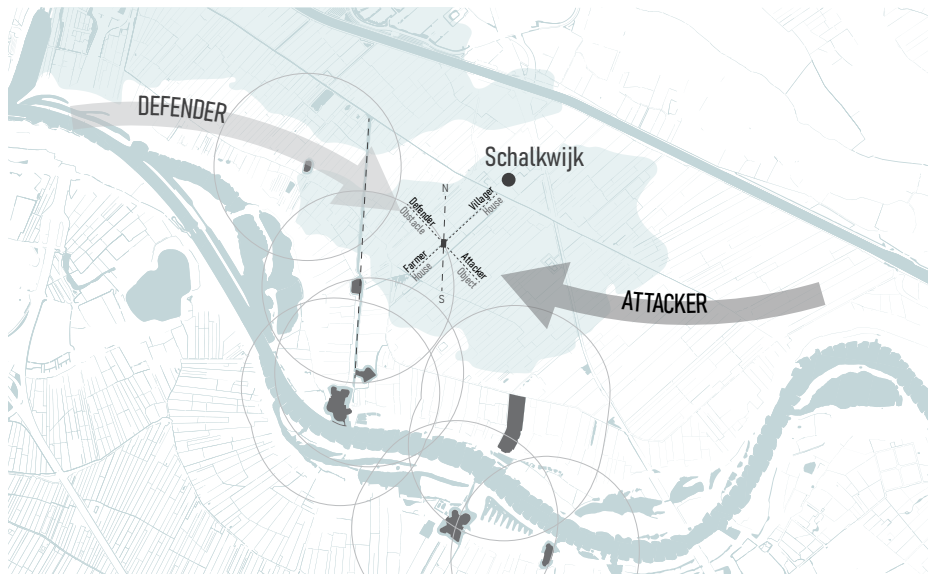
Position

The Essence of Design and Relations with Site

This concept stemmed from the story of a local farm family living in the inundation fields and within firing range of the fort. Their stories are not singular. Many farming families have known the hardships and heartache of war, and some have lost everything by physically having been caught in-between. This installation is about the farmers and their families that have been trapped in between the attack and defense line. Home is what people should be able to associate with a safe haven, but it turns out to be just an illusion.



Site Photo



Site Location



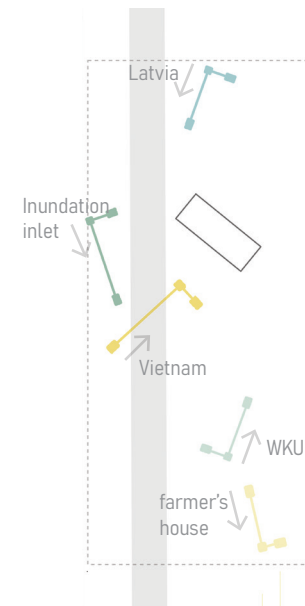
Composition

Directions and Spacing

The installation is a carefully chosen ensemble of five elements. From far away, the five elements merge together into a well defined silhouette of a house typically built in the inundation fields (see reference picture). However, as you approach their spacing results in a house falling apart into loose elements. When arriving at the installation, the visitor is confronted with a family's kitchen table and their story.

The first three elements respond to the story of three men. The long stretch of these three elements direct towards the origin of their stories, their house in-between (Vietnam, Latvia & a farmhouse nearby). A fourth element highlights the importance of the location within fire range of Fort Werk aan de Korte Uitweg. The fifth element guides the eye of the visitor towards the inundation inlet of river Lek.

The table is positioned in a North - South direction, aligned with the *Nieuwe Hollandse Waterlinie* map on top.



Direction in Plan



Farmer's House

source: Aanwijzingsprogramma houten huizen - Rijksdienst voor het Cultureel Erfgoed

Table Concept

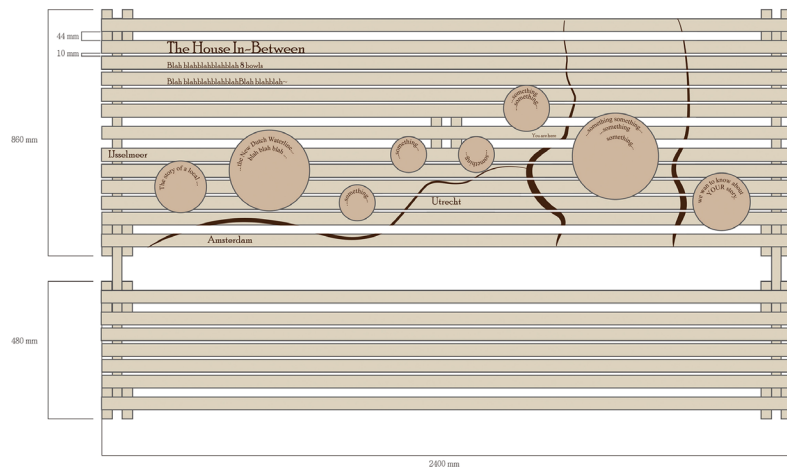
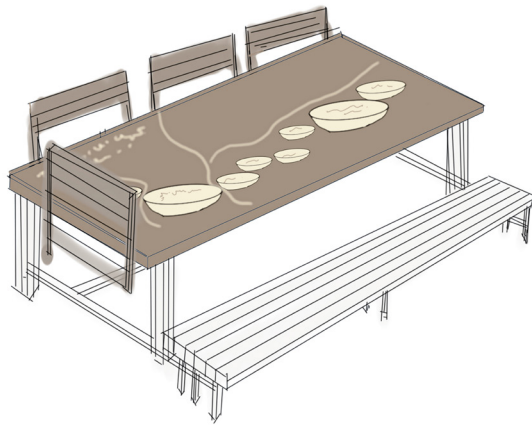


Table Impression and Plan

The table is part of the illusion effect of the installation. Though more subtly, it too falls apart as it's approached. A carved out map on the table top shows the entire defense line, making people aware of their current position within the large-scale inundation system.

The bowls pop-out by their distinctive color, attracting visitors to emerge themselves in the story of the local farm family that is written inside the bowls and subsequently invite visitors to share their own story on the corresponding website.

Table Concept

Story bowls

Nederlands

Kom 1: "Bij de inval van de Duitsers werd het gebied geïnnundeerd..."

Kom 2: en werden mijn opa en oma, en hun 3 zoons geëvacueerd richting Voorburg. Echter, na de snelle capitulatie konden zij weer na een paar dagen huiswaarts. Het gebied bleek voor het grootste gedeelte blank te staan...

Kom 3: ...en het vooraf losgelaten vee scharrelde gelukkig nog rond de boerderij.

Kom 4: De melkkoeien stonden te loeien vanwege hun volle uiers,

Kom 5: en de biggetjes speelden in de modder en zwommen in het water.

Kom 6: Gelukkig hadden de soldaten de koeien nog een beetje gemolken.

Kom 7: De tweede inundatie werd door de Duitsers uitgevoerd omdat de geallieerden in aantocht waren. Zo kan je eigen, weliswaar verouderde verdedigingswerk, ook nog tegen je gebruikt worden. Daarnaast dreigden de Duitsers de forten...

Kom 8: ...met munitie en al te laten exploderen. Dat leverde nog wel wat spanning op, omdat onze familie op nog geen 300 meter van het fort woonde."

source: Ton Uijttewaai

English

Bowl 1: "During the invasion of the Germans the area was inundated..."

Bowl 2: and my grandfather, grandmother and their three sons were evacuated to Voorburg. However, after the quick capitulation they were able to return home after a couple days. The area appeared largely empty...

Bowl 3 ... and the previously released cattle was luckily still walking around the farm.

Bowl 4: The milk cows were bellowing due to their full udders.

Bowl 5: and the pigs were playing in the mud and swimming in the water.

Bowl 6: Fortunately the soldiers had milked the cows a bit.

Bowl 7: The second inundation was executed by the Germans as the Allied troops were approaching. In this way your own, however outdated, defence structure can also be used against you. Besides that the Germans threatened to...

Bowl 8: ... blow up the forts, munition and all. That increased the tension somewhat, as the family lived no more than 300 meters from the fort".

Ecology

Species Selection



Phacelia Blooming

source: <https://www.cotswoldseeds.com>

Aside from its blue color, that perfectly mimics a flooded field, the ecological benefits of this plant are also remarkable. The *Phacelia tanacetifolia* is used as a soil improving green fertilizer. Phacelia is effective at preventing nitrogen leaching and suppressing weeds, due to its fast establishment. Although not known as a deep rooted species, its dense zone of shallow roots is very good at conditioning the top 3-4cm of soil. In addition, the annual flower attracts bees (Cotswold, n.d.).

Structure

Structural Connections

To represent the materiality and temporality of the houses in the forbidden circle the structural design is based on lightweight wood. freestanding pavilions. The resulting structure consists of fairly thin pinewood beams of 44 mm. A construction that is stable due to the interlocking connections. The combination of 4 to 6 wooden beams to create columns gives the installation a mass appearance from a distance, without losing its lightweight, more fragile look from nearby.



Wooden Joint

source: <https://design-milk.com/a-relaxing-spatial-installation-named-gecit/>



Structure Reference

source: <https://www.archdaily.com/941062/ginga-pavilion-giovanna-taques-plus-guitheme-schmitt>

Rendering

Impressions



Structure and Vegetation



Table and Bowl



Scenery

On Site

MATERIALIZATION

CONSTRUCTION

Day One - Day Five, the Field, the Workshop & the Campsite
/ Planting Scheme

REALIZATION

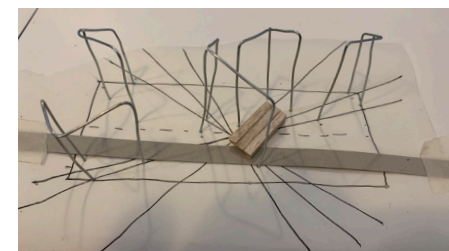
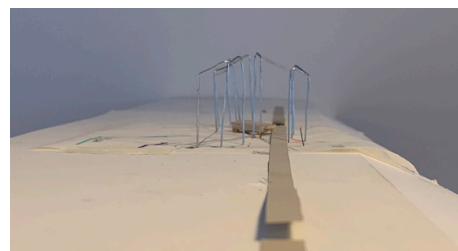
Materialization : House

On site



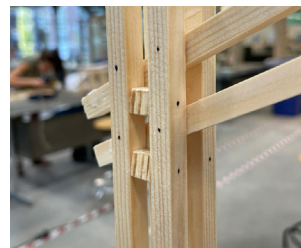
By positioning elements on site we tested how an object is seen from different distances and angles. This informed our decision to widen the roof elements to at least 35cm.

Composition



We worked with a couple of physical scale models to test the distribution and perspective whilst evaluating the overall composition. This process determined the directions and positioning

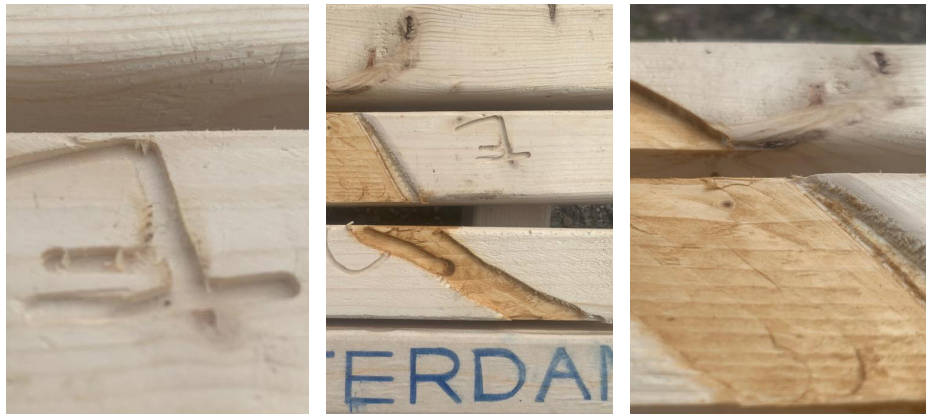
Wood connections



To test the connections and materiality we built a 1:50 scale model. This helped with the decision to alternate the 2x2 and 3x2 columns.

Materialization: Signage and Table

Table



To test the milling of the waterline different bits and depths were tested including whether or not the inside should be colored. we decided to go with a smooth curved edge and neutral coloring as to not distract from the bowls.

Signage



To make the text legible and depth tests and coatings were tested to match the rest of the installation.

Materialization: Bowls

Bowls

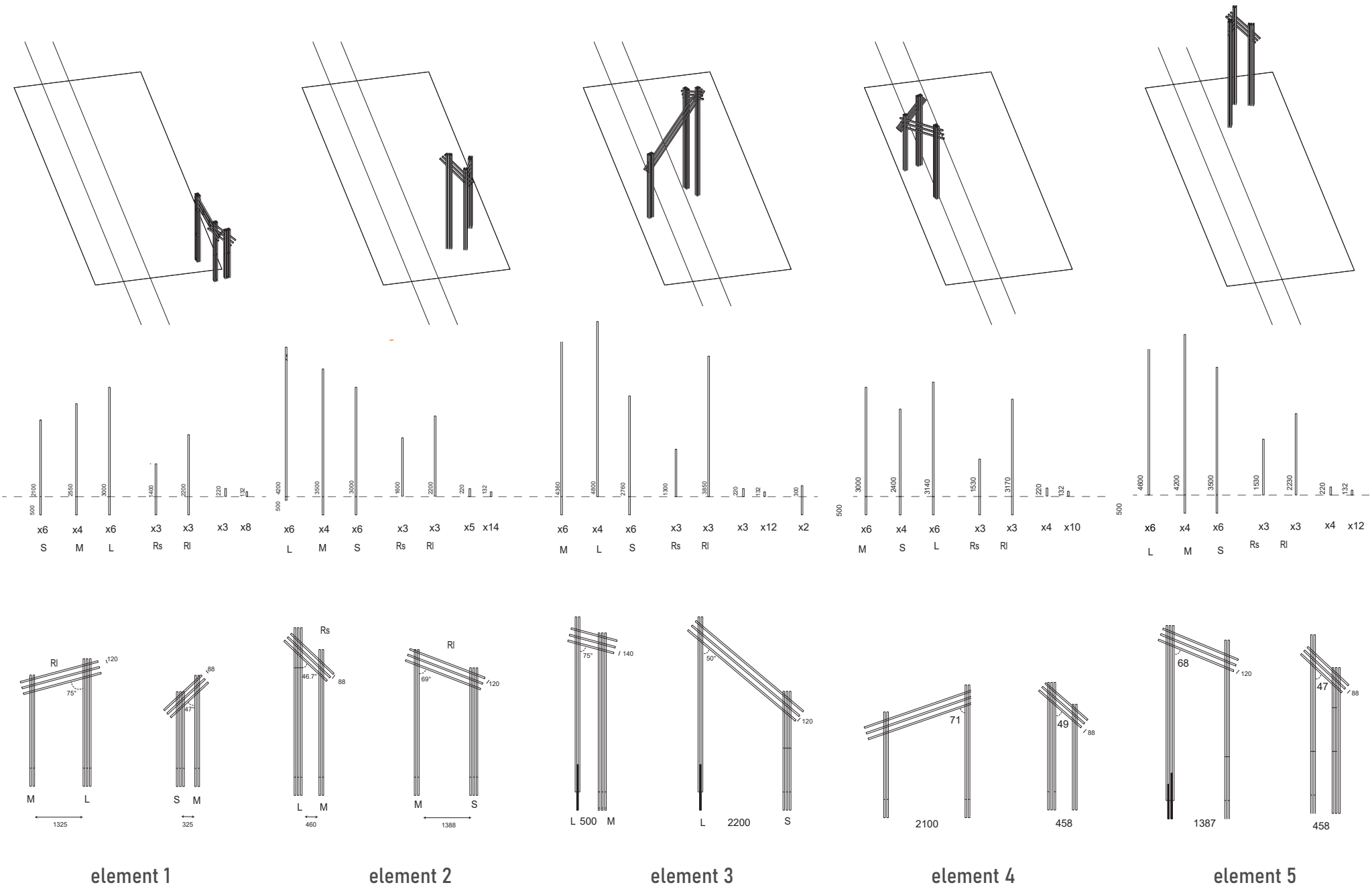


The shape, size and material of the bowls were experimented with to best represent the different inundation bowls. The positioning of the text was best placed on the edge of the bowl.



Due to the curvature laser engraving was not an option. Instead of burning the text into it, the letters were laser cut and glued on for better results.

Construction Drawings



Construction Day One: the Field Orientation



Returning to the site for the actual build required some reorientation. We gathered with the entire group, scoping out the state of the field and establishing our footing. It gave us the opportunity to check if our assumptions behind the computer matched the site. After running through the planning for the day we divided the roles and teams



and contacted one of the managers of *Lunet aan de snel* and local farmers to start mowing the grass of the area we demarcated. As the mowing machine broke down he returned with a scythe to finish the last pieces.



Construction Day One: the Workshop Orientation



To our extremely pleasant surprise we were offered a shed workspace on a local farm. This space became our base for the coming weeks. Jasmijn and Susie organized the workline designating measuring, sawing, drilling and assembly stations.



As the tents were being set up on the campsite the wood arrived and the real work was ready to start.



Construction Day One: the Field Preparation



As the neighbor finished of mowing the last of the high grass, it needed to be raked and removed. Due to a lack of proper tools this was done by hand, collecting all the grass onto a haystack that served as a very comfortable resting spots in the following days.



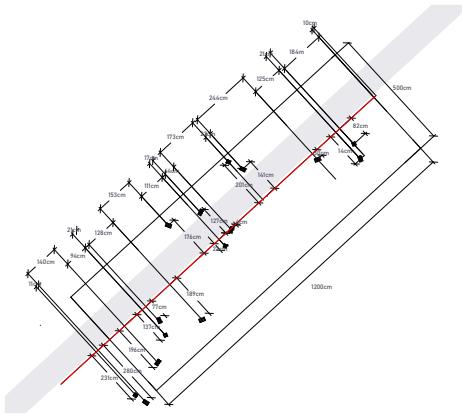
Construction Day One: the Workshop Preparation



The shop was set up and we were ready to begin preparing the beams. The pieces that were to go into the ground were coated with a varnish and the measuring team started noting the lengths that required sawing.



Construction Day One: the Field (Re)measuring



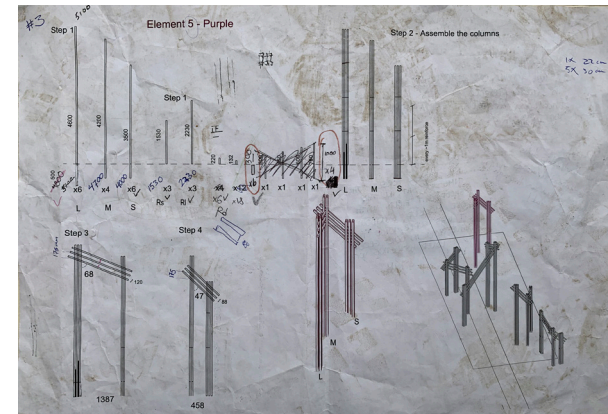
A team trained to perform the site measuring and got to work with the site drawing. This turned out more complicated than expected. being the first time this was done on site caused some uncertainties but also found some discrepancies with the site-drawing, of which the largest issue was the actual width of the impenetrable path.



After most of the site was marked, test holes were dug using a spade. The thick pack of grassroots and clay resulted in an extremely tough dig.



Construction Day One: the Workshop (Re)measuring



We had both laminated and non laminated construction drawings printed out on A3. These were crucial to the build, but we found the more often used non-laminated ones, making quick edits when discovering indiscrepancies. In the workshop the organization was not yet completely flowing.



However as the day progressed we realized a major overhaul needed to be done in response to the repositioning of some of the holes on site. A small team huddled together in the evening to work towards a solution.



Construction Day Two: the Field

Sizing up



The following day the site-team returned to finalize the placement of the holes with the new drawings, after remeasuring and beginning to dig it became increasingly clear that getting through the dense root layer and to dig down to at least 50cm would become very labor intensive.



Backup was needed and the local farmer was contacted.



Construction Day Two: the Workshop

Streamlining



As many of the lengths were measured and marked the sawing commenced. Allowing for the flow of the workshop to become more efficient. The first columns were beginning to take shape. The sawing however created a lot of dust, not only creating a mess but also triggering hay-fever.



Luckily, Sjoerd came to the rescue bringing a vacuum to connect to the saw. Now the sawing of all the pieces and building of the table could get started!



Construction Day Two: the Field

The dugout



After the farmer came to dig out the holes with a machine the site was left with large (slightly unrefined) holes and lots of clay that needed to be cleaned up.

We were expecting to come and till the top soil, in preparation for the Phacelia planting the next morning, and the heaps of clay needed to be moved out of the way.



Time was running out as it was also getting dark.

Reinforcements from the workshop crew were summoned and in a fight against the clock the soil was moved out of the way as the sun went down.



Construction Day Two: the Workshop

first parts



After a brief review, the construction of both the frame and the table were underway and the first results could be seen in the workshop.



Construction Day Three: the Field leveling



Early in the morning, the call is made to delay the tilling of the site until after the on site installation was completed. We don't want to lose the locations of our land survey posts and, the edges of the holes and the compact earth surrounding them. This hard, stable surface will be crucial for the scaffolding and the installation of the (house) elements later.



The newly dug holes required some reshaping and leveling. This was accomplished by reintroducing clay onto the sides and creating a square panel in the size of the tiles later added to stabilize the beams.



Construction Day Three: the Workshop teamwork



As the parts became larger and more complex we learned to communicate better and find collaborative solutions.



Construction Day Three: the Campsite



Besides the work, the week was filled with food, camping and walks to recharge our batteries and strengthen our sense of teamwork. This went well with fresh strawberries, the great weather and toasted smores by the campsite.



Construction Day Four: the Field Placing



We were finally able to place the first element on site. With only a couple of people the structure was standing! It did however reveal a few new difficulties with positioning and fitting the beams through the prefabricated columns. These required significant force to be locked in place.



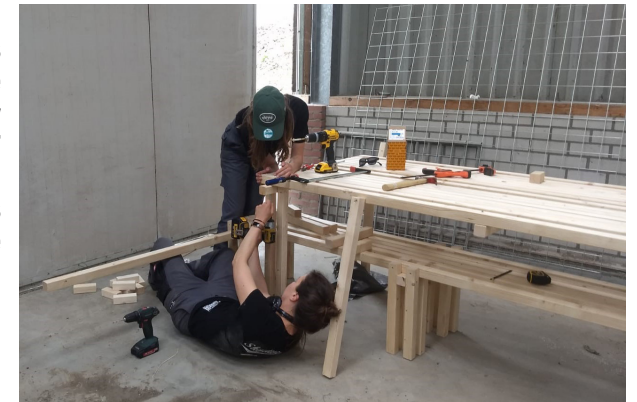
Construction Day Four: the Workshop Construction



The table was nearing it's final stages: a few split wood beams need replacement, some edits where made to the construction and it was ready for another coat of varnish.



Meanwhile more column and beam pieces of the elements where moving from the construction to the assembly area. Here the 'kim-blocks' were screwed into position and predrilling in the columns before sending it out for the installation on site.



Construction Day Five & Six: the Field

Placing



As the final elements were constructed and moved to site, we were able to start positioning them into the holes, screw them together and fill the holes with sand. To stabilize them further, we increased the density of the sand by adding water and stomping on it afterwards.



The largest elements, reaching nearly 5 meters height, required scaffolding.



Construction Day Five & Six : the Workshop

The Scrum board



Looking ahead to the opening, we realized there was a lot of work still to do and a small team came back to the workshop on Sunday to push forward on the construction and assembly of the elements and sign posts.

Martine suggested a Scrum board could facilitate better communication between the teams and help with the



overview. The 'table, bowl and sign' team filled out cards straight away from high to low priority (red/orange/yellow). The 'house' team added their cards and we had a great overview in the workshop of what to do, what was been done and who was doing it.



Construction Day Five & Six: the Field

Balancing act



With a larger team together again on Monday we were able to place the final elements. This required balancing as the parts were being screwed together, the beams were leveled and the sand thrown into the holes.



Throughout the process and all the adaptations we found a few of the well measured holes were off of the new positioning, but nonetheless, we made it fit.



Construction Day Five & Six : the Workshop

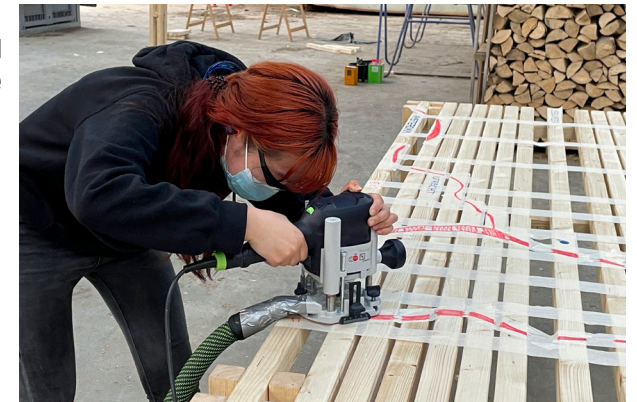
Finalizing



The final modifications were made to the elements, making sure the bottom was level and the parts were connected at the correct angle.



Meanwhile, Fudai redrew and mapped out the design to be milled out of the table.



Planting On Site

Creating Inundation

Not only did we want to create the imagery of a house in this inundation field but also a visual representation of the inundation itself. The goal was to visualize the depth and process of inundation for the visitors of this site. For an earlier concept Dr.Ir. Nico Tillie had recommended the flowering species Phacelia due to its height and colour for this possible representation. Testing this on-site was not possible within the time frame but literature research and consultation with the seed company provided enough conclusive information to move forward with the concept.

Firstly, the Phacelia will bloom until mid-September and can be planted until August. It takes 2 weeks to germinate in the ground, in correct conditions, and will flower in 6-8 weeks depending on the temperatures. This was considered ideal for the project as the sowing would take place at the beginning of July and the installation would remain at this site until the 10th of September. Inundation itself is a slow process and it would take up to 14 days for the water to reach the ideal depth of 50-70cm. In a poetic conclusion: the flowers would be in full bloom when the House In-Between would need to be dismantled thus the only thing to remain would be the 'inundation' of the fields.

As the site was covered in tall grass before construction started, it was necessary to first mow and remove the grass to prepare the site. The decision was then made to wait with the tilling of the ground for the seeds until after the build was completed. The tilling was necessary to open up the top soil for the seeds and disrupt the grass roots as they would be competition for the Phacelia.

The site for the 'inundation field' around the house was ca. 1000m². The tilling of the soil was done with the help of a local farmer. The conditions for tilling this heavy clay soil turned out to be optimal after the construction as there had been a few days of rain and the soil was moist.



Tilling of the ground for the 'inundation field'

After the tilling, 1000 grams of the Phacelia seeds needed to be spread over the site. First the technique of mixing the seeds with some soil from the site was applied to spread the seeds. This proved not to be ideal as the clay soil was quite heavy and chunky. Control over the amount and spread of the seeds was better without the addition of the soil. The prevailing wind that afternoon was coming from the south-west and walking the rows with the wind in our backs proved to enable the even distribution of the seeds.

Planting On Site

Creating Inundation

After sowing the 1000m² site it was necessary to manually rake over the soil. This is done to facilitate the germination of the seeds. Turning the soil puts the seeds under a layer of soil which is necessary to keep the seeds from drying out and the Phacelia needs to germinate in darkness, sounded by soil.



Ground after the raking

The whole process took half a day on the 7th of July. There was one additional step that could have been applied but was not. Watering the site after sowing can be done to ensure the ground and seeds have a good amount of moisture. This step was skipped as we missed the necessary tools for it, but the earth was quite moist to start with and rain was predicted for the next day and quite often for the coming week, so we believed additional manual watering was not necessary.

Planting On Site

Future with Phacelia

As this is to be a temporary land art project we needed to be able to deconstruct the elements and return the site to how we found it. But what if we could do better? What if we could leave the 'site' in better condition than we found it? The site is currently surrounded by thick grass with very little other flowers. The roots of this fast growing plant will condition the top 3-4cm of the soil and is known as a 'green manure' for the soil. The Phacelia is an annual plant but may survive the winter if the frost is not severe. It may not be a nitrogen-fixer but is a nitrogen holder which is very beneficial in an area of intense agricultural usage. The flowers of the Phacelia are also particularly attractive to bees, wasps, and hoverflies (Green Manure, n.d.).



Future perspective Phacelia field

Due to the green fertilizer properties of this plant, the soil surrounding the construction will be improved and will encourage more diverse plants and flowers in the coming year.

Realization: Scenery



Realization: Scenery



Realization: Table, Bowl and Signage



Realization: Structure Detail



Realization: Interactions



Realization: Surroundings





Reflection

TUTORS' REFLECTION

TEAM'S REFLECTION

Tutors' Reflection



About The Course

The set-up of the course is an action-packed program, in which students are informed content wise on the topic and are directed to go from individual students to being member of the team. In non-corona times this process is hands on guided by the mentors.

The process from individual participant to team player is done with all kinds of activities. Activities ranging from specific group exercises like 'counting to 20', brainstorm sessions for developing an abundance of ideas to creative activities like drawing and filmmaking which also develop new ways of looking and creating a design.

The action-packed aspect of the course is introduced to create a flow in the work and make the students aware that it is not enough to have one good idea, but that to really investigate the essence of a place, it is necessary to have a lot of ideas.

The final product shows that it worked, there is a lot of depth to the project and there are a lot of stories to be told with the project, while it clearly has a core, a goal and project identity.

On the other hand, it did leave the students with a feeling of unfinished business and a lack of time. Here extra communication is necessary.

About The Process

In these corona times the process of becoming one group, is difficult. Meeting in person only once a week is not enough to create a 'home base'. A 'home base', a place where you go to and be sure to find others, a place to bring and gather your ideas and know that people will use them to inform their own ideas. A place where you can see what others are working on and you can contribute too.

A place like that is essential to shake off the feeling of solitude, of private ownership of plans and ideas.

Home base, where you can also observe your teammates and discover their qualities and strengths within this team, while you discover your own. To give everybody a position in the team where they perform at their best.

I am proud of this team because despite these difficulties in a few weeks the attitude went from leaning back and waiting for instructions to self-organisation and proactivity. Of course, this process was not the same for everybody and did not happen at the same moment for each team member.

This year, due to a very different way of contact than usual, we the teachers, found it difficult to have a good insight on the process and development of everybody. We can imagine that some of you have felt lonely and/or left out at some point and we are sorry for that. We do hope that everyone can look back on this project with a great feeling of ownership. Because we believe that all the input of each and every one of you has been very valuable.

About The Team

What a wonderful group of people. We have seen true leadership in different stages of the process, connected to different people. This makes it true leadership, because that is about knowing when you have the most experience or the best qualities to deal with certain problems and challenges and when you see somebody else who is better equipped for the job at that moment.

We have seen great design qualities, eye for details and esthetics but also craftsmanship, building intelligence, determination, stepping out of comfort zones and so much more heroic actions.

For us it is always difficult to find the balance between being in control and letting go, letting you make your own mistakes. This year it was often very hard to keep up with you guys and so the letting go was not always a choice. But throughout the whole process we had more than enough confidence in the team, not to use the emergency break.

'Mistakes' are always made. There is often time pressure, lack of all the specific knowledge etc. So, it is not interesting to linger on 'mistakes' it is how you deal with them. In this case we witnessed great openness in addressing and discussing the risen problems. It is in most cases resolved by team support, team thinking and the overall flexibility to deal with unpleasant surprises. Linger on those moments!!! They are so important to remember.

About The Project

In one word: brilliant!

A complex wooden construction built in the middle of meadows, by people who are not experienced in building at all. A construction that expresses the desired expression and intention very well. Enriched with a beautiful booklet and a clear and attractive website.

Very well done!!

It was a real pleasure working with you all.

Kind regards,
Michiel and Frits



Michiel



Frits

First impressions & expectations

Week 4: What are your thoughts about the project so far?

Daria



I am really happy with doing things I usually don't. The team is great, and I can't wait to start making our ideas a reality.

Rachel



Really loving the energy in the group. Creating something together is really an energizing process, even if it's mostly online, as there are some many ideas and perspectives shared freely.

Nicolle



I am very excited of what we have learned until now and I am really looking forward to design and build our installation with the group.

Miriam



Interested, excited, and confused.

Jasmijn



I think it is a nice project for the end of the year, but I am still waiting for the nice weather.

Retrospect

Final Week: What are your thoughts about the finished project?

I am most happy that the final installation is not just about our knowledge and expertise, but also about emotional connection we gained to the New Dutch Water Line, its inhabitants, and each other.

What an incredible pressure cooker this project has been! That has also what has made it an enjoyable and intellectually stimulating project. The opportunity doesn't happen often to switch between individual concepts and working in different groups so frequently. Working quick and focused on your own and others ideas has been an incredibly valuable experience. The power of the group really flourished and it's wonderful to see so many ideas and concepts that we have along the way in this land art installation. I'm proud of what we achieved (and built!) in such a short period of time.

First of all, I am impressed how we succeed in combining two of our last concepts, the house and the bowls, into one. Standing on the path, looking in the direction of the church gives me jitters! I can only say that I am very proud of the end result and what we have achieved. The final installation is made up of different scales and tells a story which is not only informative but also emotional and cross the borders of the NHW.

The project taught me a lot about the importance of transferability and the complexities of developing an idea in a diverse group of people (within an extremely limited timespan). The final result and the team completely outdid my expectations and the whole semester was a lovely exercise in trusting the process.

It was a super fun project to learn that the design project goes through the entire construction project. We have worked as a team, and I am proud of what we have achieved.

First impressions & expectations

Week 4: What are your thoughts about the project so far?

Sui-Hui



The quarter is really different from anything I have experienced/ trained. Aside from the content, the approach of working is totally new for me as well. Therefore, I am very excited about learning new things but feeling challenged at the same time.

Wansu



It's so fresh and interesting for me to work with many 'departments'. I'm really looking forward to the final product of the group work!

Sanne



I think this project is a nice one, as it's a real life project. We don't get to do this as much during our studies, so to actually deliver something that is touchable is very exciting.

Priscilla



I'm really enjoying the project, i like the brainstorms, the exhibitions in studio, the discussions and the field trips. I feel as though im rediscovering my love of design :). Also, everyone is so enthusiastic and motivated, so im always inspired by all our ideas. I'm looking forward to the product, and enjoying the process :)

Kimberley



I really enjoy the fieldtrips and the close collaboration and support within our team.

Retrospect

Final Week: What are your thoughts about the finished project?

The quarter had been so unreal! I am glad that with applied all our knowledge we learned during the process to the final installation, including researching, hiking, sketching, film making. Moreover, I enjoy the moments we share to figure out the installation design and the construction technique. Thank you all for a memorable quarter!

As I thought before, it is not easy to organize a large team to do a project with so much detailed work, but finally we did it! I think I have learned a lot from teamwork from task assignment to time management. I also gained new experience in construction and camping, which is a very valuable experience for me.

This quarter has acted as a comfort for me. I have fallen in love with the Dutch landscape and have never felt as connected to it as I do now. Working with a group that, to me, also felt like the people in it had a good grip on life made me feel structured and steady as well. During the project I had been working on structuring my life, and this sometimes made me miss meetings, etc. because I needed some me-time or had other obligations. This made me feel out of the loop and superfluous, and resulted in my being very protective over my personal role in the project. In the end I do feel like I added something valuable and am very proud of what we achieved with the group. It was a lot of fun!

This has been as much fun as it was challenging. Not once did I imagine we would still be working on it in week 12, but here we are! That just goes to show how much the project consumed us and how we've had to pull through as a team to get it completed. It is so satisfying! Ive also never worked with as many women on a project before, and that for me has been the most amazing part of this experience :)

I still can't believe that we did this. We all got to learn so many different skills during this process that I didn't expect. I feel honored that I got to share my dad's process in the story, which helped to inspire others to share their stories as well. When I'm standing on the path, looking at our installation, it still feels surreal, kind of like a dream. Seeing your design come to live is one of the most rewarding aspects of being a designer.

First impressions & expectations

Week 4: What are your thoughts about the project so far?

Lotte



I love the project so far! I like the creativity and the people. Also, being in the field and experiencing the course is really inspiring.

Pieter



I enjoy the idea of becoming a genuine design team, having true responsibility for the first time in my (our) study career at BK.

Martine



Very inspirational. I enjoyed the field trips and gained new perspectives. The guidance from Paul de Korte was amazing, looking forward to his next workshop.

Fudai



I really like this quarter! Workshops and teams are well-organized, and classmates' ideas are inspiring. (It's delightful to talk with you guys!) Can't wait to see the final products.

Xinyu



It feels like a real project and is mostly organized by ourselves! Much excited and also a little nervous.

Retrospect

Final Week: What are your thoughts about the finished project?

I am proud of it! Not only because we have achieved a beautiful big structure. But also because we have achieved something as a group. I have found amazing people and I hope to keep in touch. I also have found a new confidence in myself that i can just think about something and that I am able to build it.

Of all projects done at Bouwkunde, TU Delft, this one was by far the most frighteningly enjoyable. Encountering many problems during design and construction - and then managing to solve them - is the most educational and thrilling experience a student can have. I am most proud of our resourceful group, and I am grateful to everyone involved.

Being in the construction process was intense, bonding for us as a team, hilarious or frustrating at times, and in the end more than satisfying and unforgettable. I'm grateful to the teachers and supporting parties. It's truly amazing to see a design on paper become reality. I'm looking forward to visit the installation this summer and organize a big breakdown event in September.

From brainstorming, combining different concepts, selecting materials, to finally building it by hand, the whole process is all of us work together to gradually turn a thought into reality. There's nothing happier than seeing the installation stand in the field and explain itself independently without us!! I'll remember this summer forever!

IT IS a real project! We designed and built this all by ourselves, and I enjoyed working with different perspectives through the whole project. The thing I like about teamwork is that we never run out of ideas, which brings many inspirations during each part of the process. I gained quite a lot of new skills especially in the construction week, it is always thrilling to open up new doors, and I'm lucky to do it with a wonderful team.



Landscape Architecture,
Faculty of Architecture,
TU Delft

