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DESIGN
INVESTIGATIONS



FROM DRAINAGE TO RESERVOIR:
THE ELLEWOUTSDIJK PENINSULA AS A COLLECTIVE FRESHWATER LANDSCAPE

CAROLINA MIA GONZALES GALLEGOS

Master of Science in Human Settlements
Faculty of Engineering Science, Department of Architecture
Promoters: Dr. ir. Christian Nolf, Prof. Dr. ir. Ward Verbakel
Academic Year 2025 - 2026

DESIGN THESIS STUDIO
LANDSCAPE ADAPTATION STRATEGIES
THE INHABITED COASTS OF ZEELAND

KU LEUVEN MaHS

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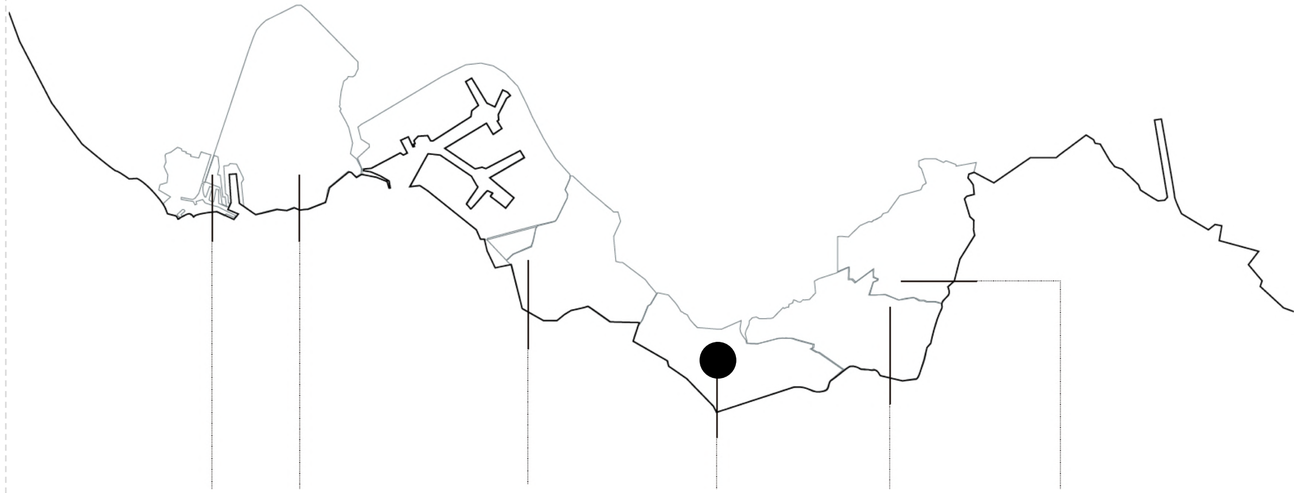
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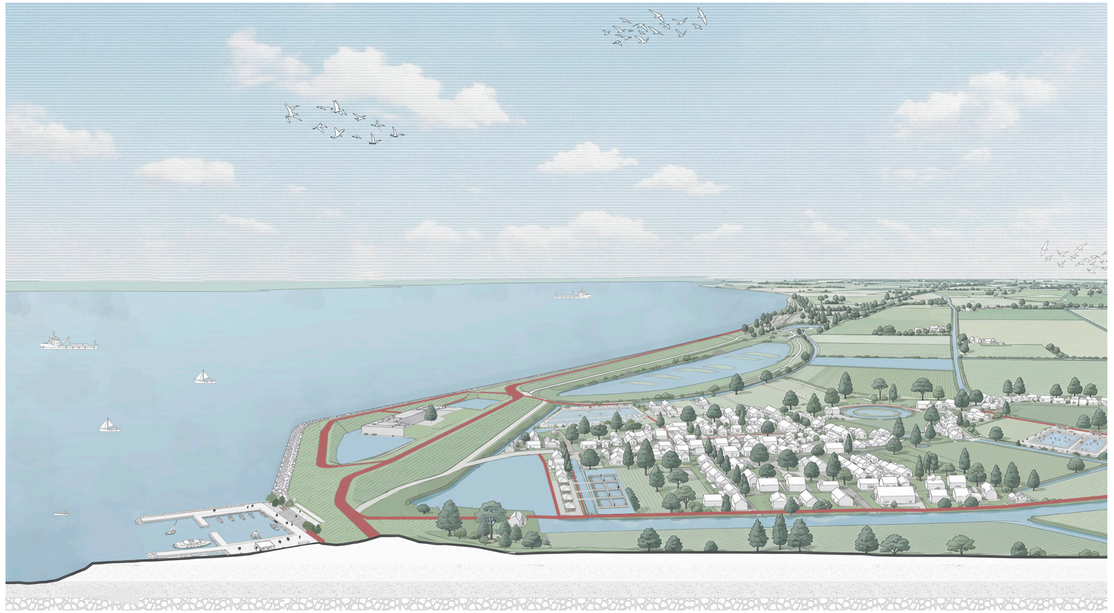
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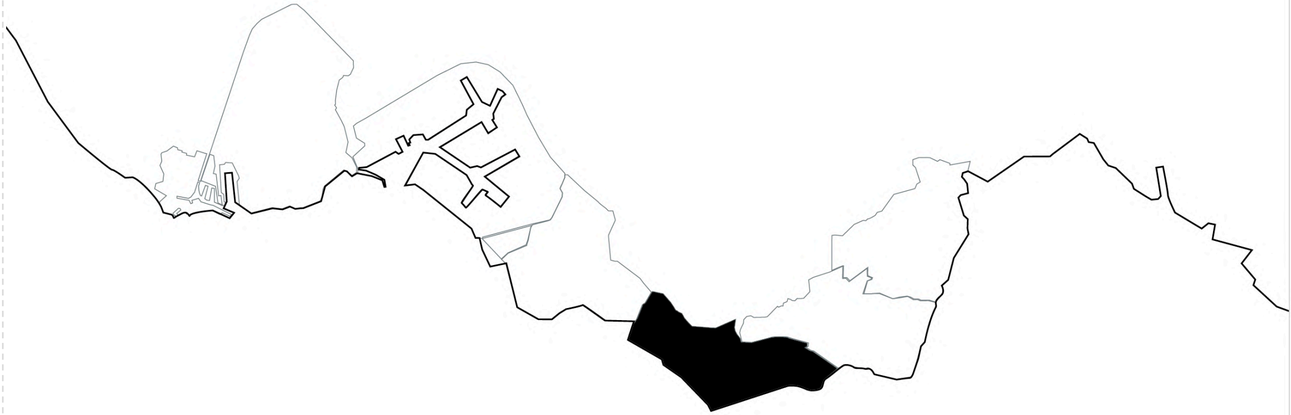
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04

DESIGN STRATEGY SECTION 4

From Drainage to Reservoir:
The Ellewoutsdijk Peninsula as a Collective Freshwater Landscape

Carolina Mia Gonzales Gallegos

This thesis explores how freshwater infrastructures in the Western Scheldt polders can be reconfigured into multifunctional collective water landscapes. Focusing on Ellewoutsdijk, a polder village shaped by dikes, drainage canals, agricultural fields, the harbour, the fort and the Western Scheldt estuary, the project responds to increasing pressures from sea-level rise, salinisation, seasonal drought and changing rainfall patterns.
Rather than treating water management as a hidden technical system, the proposal transforms existing drainage lines, basins and water structures into visible landscapes of storage, filtration, redistribution and collective use. These water landscapes support productive adaptation through agriculture and aquaculture, while also creating spaces for recreation, mobility and public life.

The design strategy connects coastal mobility and freshwater storage as one integrated landscape system. An east–west public route links the former train station, village, dike, Wisselpolder, harbour, fort and Western Scheldt, while a north–south water spine reorganises drainage lines and basins across productive fields, ecological edges and collective spaces. At their intersection, water infrastructure becomes both a territorial support system and an accessible part of everyday life.
By working with the hydrological and historical structure of the peninsula, the project shifts from controlled drainage toward an adaptive and inhabited water system. In doing so, it reframes freshwater infrastructure as a spatial framework for coastal resilience, productive adaptation and collective life in Ellewoutsdijk.
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CHALLENGES

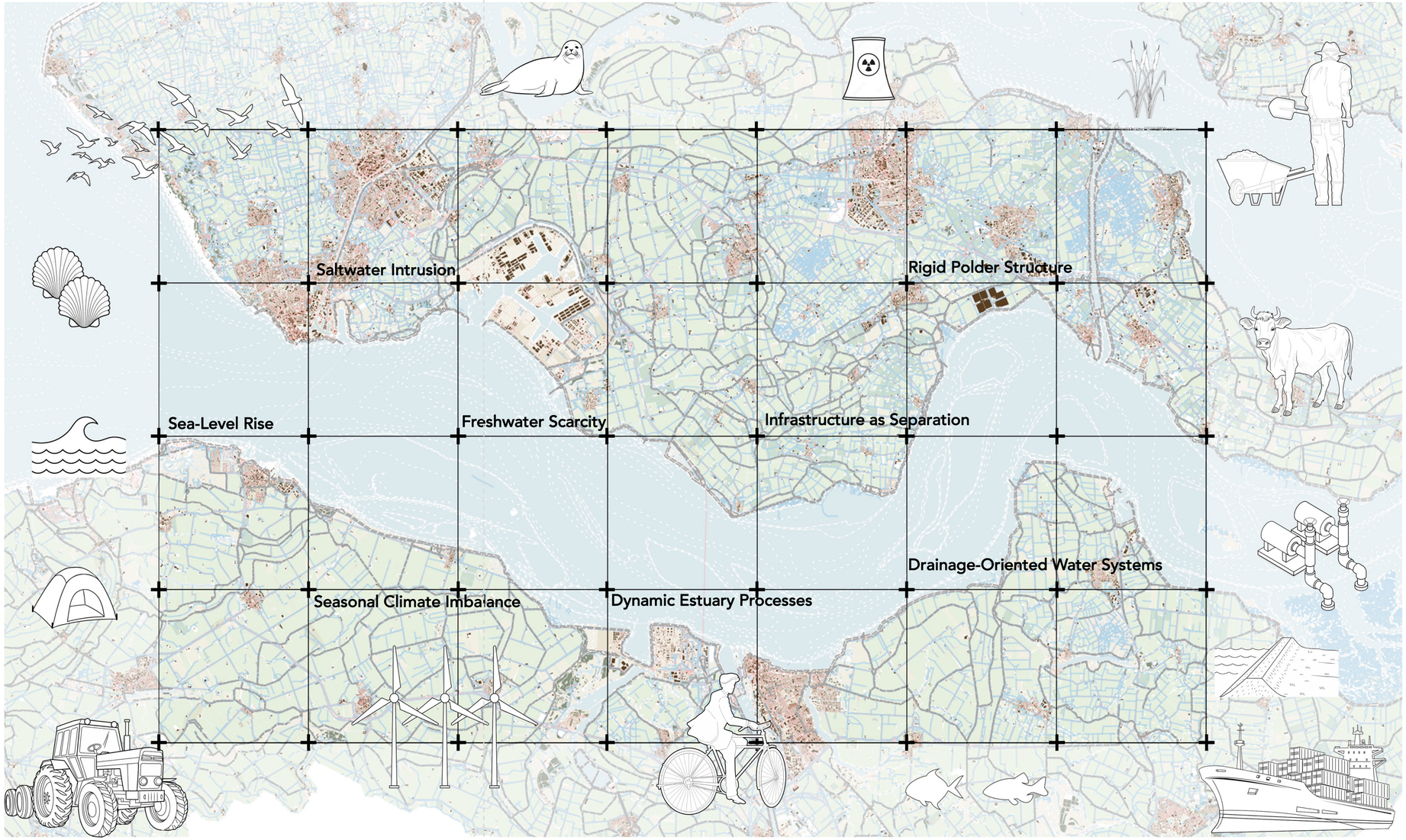
A TERRITORY UNDER COMPOUNDING PRESSURE

The Western Scheldt estuary forms one of the most dynamic landscapes in Zeeland, where water, land reclamation, agriculture and infrastructure have continuously shaped the territory. Over centuries, an extensive system of dikes, drainage networks, sluices and compartments transformed tidal landscapes into productive polders, creating a territory highly dependent on engineered water control.

Today, this system is increasingly challenged by a combination of environmental and spatial pressures. Sea-level rise, saltwater intrusion, seasonal freshwater shortages, changing precipitation patterns and ecological degradation are affecting the long-term performance of infrastructures originally designed for more stable climatic conditions. At the same time, productive landscapes remain dependent on drainage systems that prioritize evacuation over retention, while many water infrastructures continue to function as technical barriers rather than adaptive interfaces.

These pressures do not occur independently. Flood risk, salinization, freshwater availability, agricultural productivity and public accessibility are deeply interconnected processes operating across multiple scales of the estuary. Together they reveal the growing tension between a dynamic water system and a territorial structure largely organized around stability, separation and control.

Ellewoutsdijk exemplifies these broader conditions. Located at the interface between the Western Scheldt and the reclaimed polder landscape, the peninsula concentrates many of the challenges currently affecting Zeeland. It therefore provides a relevant local lens through which larger territorial transformations can be understood and explored.



Conceptual synthesis of compound water challenges across the Western Scheldt estuary.
Source: Author's own elaboration based on PDOK cartography.

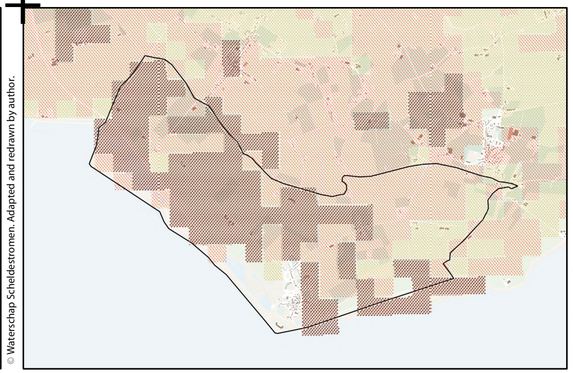


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Water network hierarchy

Primary water lines Secondary water lines Tertiary water lines

Pumping stations Sluices



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Annual Grass Yield Loss due to Drought Stress, 2050 High Scenario

Low <10% Moderate 10–20% High 20%

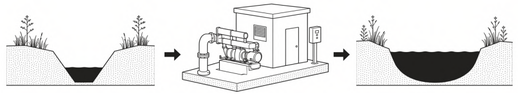
1 DRAINAGE LOGIC VS. FRESHWATER SCARCITY

The Ellewoutsdijk peninsula is increasingly exposed to drought stress, despite being situated within a water-rich delta landscape. Its agricultural productivity depends on the continuous availability of freshwater within the soil, yet the existing polder system remains primarily organized around drainage and discharge. The hierarchy of ditches, canals, pumping stations and sluices efficiently removes water from the land, but provides limited capacity for retaining freshwater during dry periods.

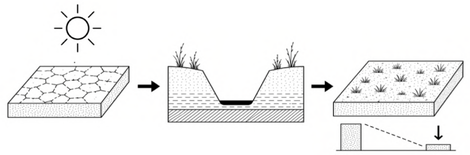
This condition becomes particularly relevant for grassland productivity. The projected annual grass yield loss under the 2050 high scenario indicates that several areas of the peninsula may experience moderate to high productivity decline as drought stress intensifies. This suggests that the problem is not only a quantitative lack of water, but also the spatial and infrastructural inability to keep freshwater available within the productive landscape.

Drought stress therefore reveals a territorial vulnerability. Fields that are mainly connected through drainage infrastructure become dependent on direct rainfall and less resilient to prolonged dry conditions. As soil moisture decreases, the existing water network no longer operates as a supportive structure for agricultural continuity, but as a system that accelerates the loss of a scarce resource.

The challenge is to reinterpret the drainage hierarchy as a potential framework for freshwater retention and redistribution. Rather than allowing water to leave the polder too rapidly, the landscape requires collective storage areas and adaptive water connections.

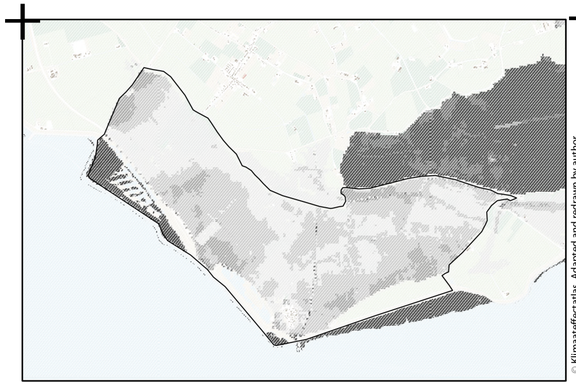


CURRENT DRAINAGE CYCLE



DROUGHT STRESS

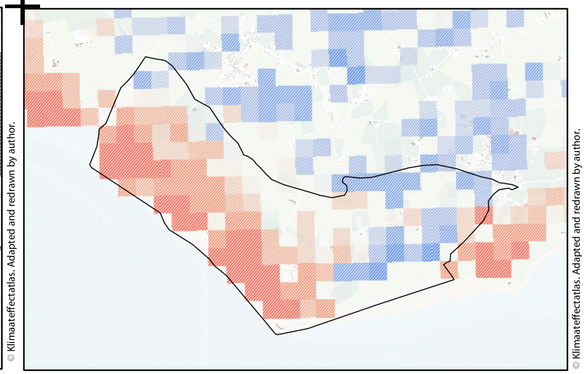
The challenge is not only freshwater scarcity, but the persistence of a drainage system that removes water before it can support the productive landscape.



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Maximum Flood Depth – Low Probability Scenario, 1/1000 Years (meters)

More than 5 m. 2–5 m. 1.5–2 m. 1–1.5 m. 0.5–1 m. Less than 0.5 m.



© Klimaateffectatlas. Adapted and redrawn by author.

Salt Load Change Factors under 1 m Sea-Level Rise with soil subsidence and autonomous processes

<-10,000 -5,000 -2,500 -1,000 -500 500 1,000 2,500 5,000 10,000>

Strong freshening No change expected Strong salinization

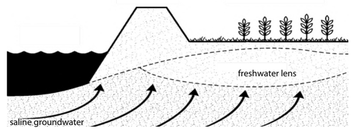
2 SALINIZATION AND PRODUCTIVE LAND VULNERABILITY

The Ellewoutsdijk peninsula is increasingly exposed to overlapping water pressures from the Western Scheldt, including flood risk, sea-level rise, saline seepage and changing groundwater conditions. Although the dike system protects the polder from direct tidal flooding, the maximum flood depth scenario shows that low-lying productive areas behind the dike remain vulnerable under extreme water conditions.

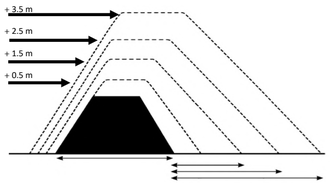
This exposure places growing pressure on the defensive infrastructure. A conventional response would be to raise and reinforce the dike, but this strategy has significant spatial consequences. Each additional meter of dike height requires a much wider base and slope, demanding several meters of horizontal expansion and making continuous enlargement increasingly difficult to sustain.

The effect is not only technical, but territorial. Expanding the dike consumes productive land, reinforces the separation between village, polder and estuary, and reduces the possibility of developing gradual adaptive edges. Flood protection therefore cannot be understood only as a line of defense, but as a spatial system with long-term landscape implications.

At the same time, salinization gradually transforms the soil and water conditions that sustain agriculture. Areas close to the dike become increasingly affected by saline pressure, while conventional freshwater-dependent production remains spatially fixed. This condition requires the productive landscape to be rethought as a gradient between flood protection, salinity pressure and agricultural adaptation, rather than relying on dike heightening as the only future response for the peninsula over time.

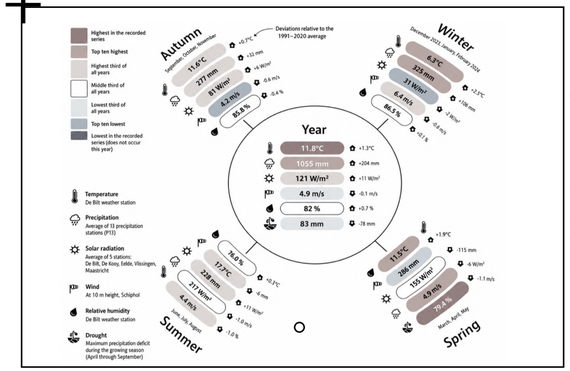


SALINITY / GROUNDWATER SEEPAGE

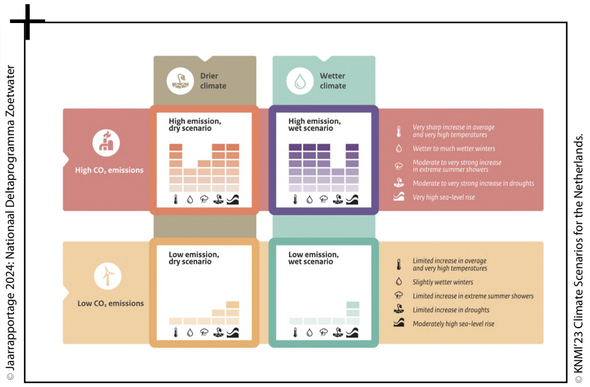


DIKE ENLARGEMENT

The challenge is not only to hold water back, but to create a productive transition between flood protection, salinity pressure and agricultural adaptation.



2024 Weather Patterns: Warmer Conditions and Seasonal Water Surplus



© Jaarrapportage 2024: Nationaal Deltaprogramma Zoetwater

© KNMI'23 Climate Scenarios for the Netherlands.

Climate extremes and seasonal water mismatch — KNMI'23 scenarios

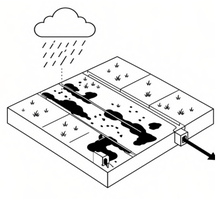
3 SEASONAL CLIMATE IMBALANCE

Seasonal climate imbalance is increasingly disrupting the relation between rainfall, soil moisture and agricultural demand in the polder landscape. Water availability is becoming unevenly distributed across the year: wetter winters concentrate precipitation, while warmer spring and summer periods increase evaporation, drought pressure and dependence on stored freshwater.

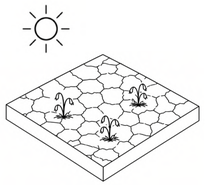
This temporal mismatch exposes a weakness in the existing water system. Infrastructure designed to drain excess rainfall continues to treat winter water as surplus to be removed, even though this same resource becomes necessary during the growing season. The problem is not only climatic variation, but the absence of continuity between wet and dry periods.

For agriculture, this imbalance produces growing uncertainty. Grasslands and productive fields become more vulnerable when soil moisture declines, especially during prolonged dry periods. Private water storage basins have already appeared across the area as local adaptation measures, yet they remain fragmented and individual, with limited capacity to respond to increasing seasonal demand at the scale of the peninsula as a whole.

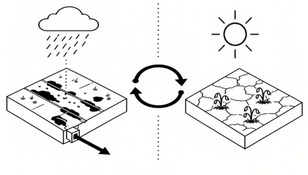
KNMI'23 scenarios project a warmer Dutch climate, with wetter winters, hotter and more drought-prone summers, rising sea levels and more intense summer showers. This means water may arrive in short, extreme events, but not necessarily when or how the productive landscape can store and use it. The resulting vulnerability is therefore linked as much to timing and distribution as to the total amount of rainfall over time.



winter surplus



summer deficit



Seasonal mismatch

The challenge is the growing mismatch between seasonal water surplus and summer agricultural demand, a condition that climate change is expected to intensify.



© Adapted from Bosch Slabbers, Groenstructuurplan Borsele 2018–2038.

Landscape and Management Zones

Nature and Landscape Zone | Residential / Work Zone | Village Centre Zone



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Green Structure Classification

Secondary structure | Main structure:municipal property | Main structure:private property

4 LIMITED COLLECTIVE LIFE AROUND WATER INFRASTRUCTURE

Around Ellewoutsdijk, water infrastructure plays a decisive role in organising the landscape. Ditches, basins, sluices, pumping stations and retention areas structure the functioning of the polder, yet they are mainly perceived as technical devices rather than accessible spaces for daily life or shared stewardship.

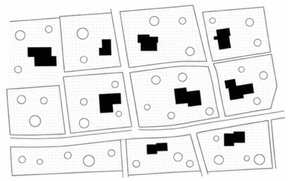
This condition is reinforced by the scarcity of public space within the historic village core. The *Groenstructuurplan Borsele 2018–2038: Uitwerking Ellewoutsdijk* recognises that the village's green quality is strongly shaped by the Scheldedijk, private estates, the cemetery, walking routes and sightlines toward the surrounding landscape. However, much of this green structure is either privately owned, infrastructural or primarily scenic, rather than actively programmed as collective public space.

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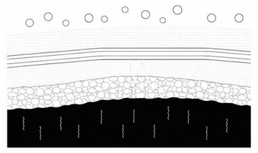
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As a result, water-related spaces remain disconnected from everyday social use. Canal edges, drainage corridors and water-management structures are often residual, inaccessible or weakly linked to pedestrian routes and gathering places. Although water is visible throughout the landscape, it rarely becomes a setting for meeting, observing seasonal change, learning about water management or participating in the care of local resources.

The municipal plan proposes to strengthen green structure, biodiversity, walking routes and climate adaptation. These ambitions are relevant, but they remain largely framed through public green quality rather than through the social and spatial role of water infrastructure. The broader challenge is therefore the limited integration between water systems, public space and collective life: water remains central to the village's identity and functioning, but fragmented from shared public experience.



Private Green, Limited Public Space



Water Edge Without Public Interface

The challenge is the disconnection between water infrastructure, public space and everyday collective life.

CHALLENGES AS A COMPOUND CONDITION

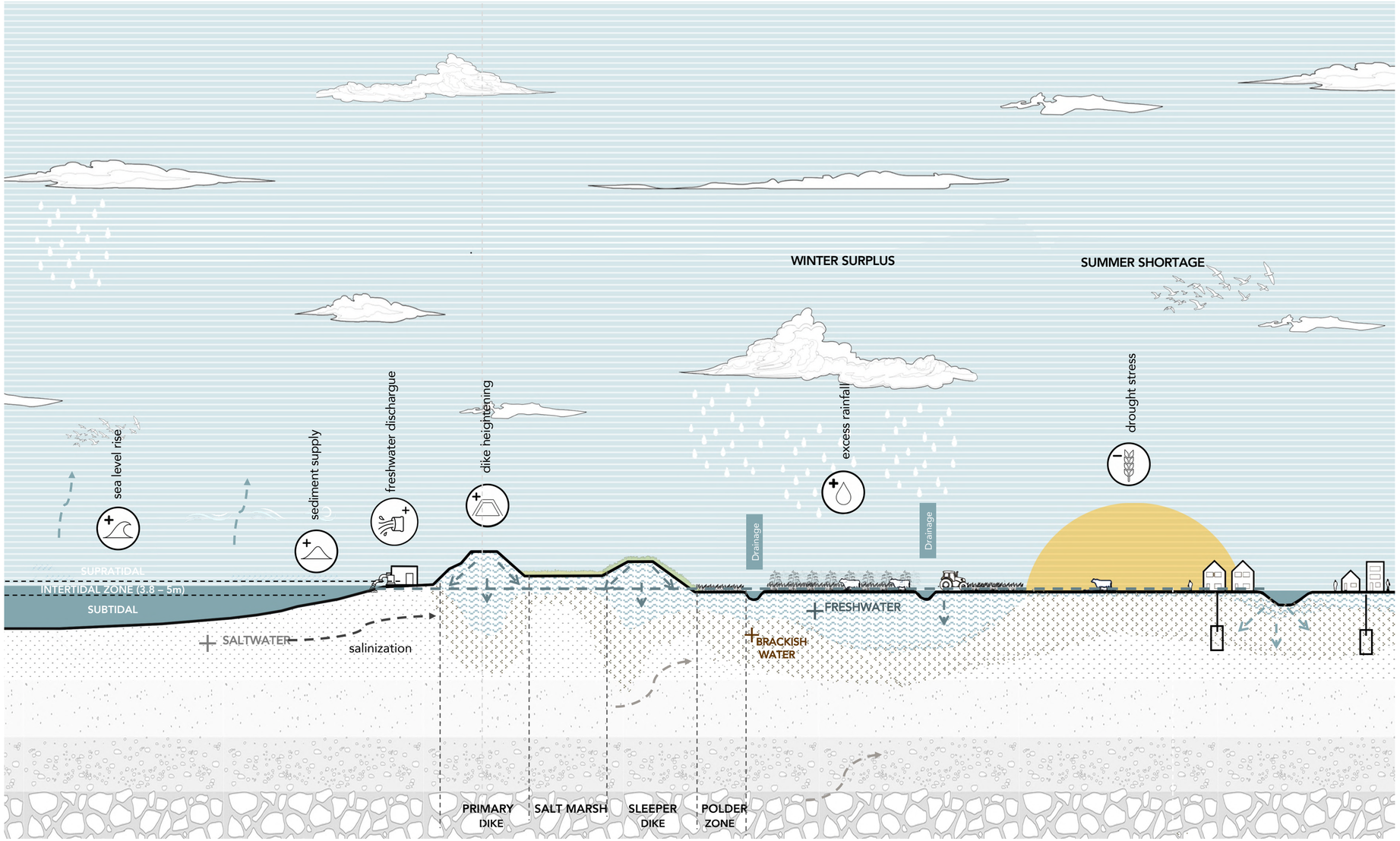
Drainage, salinization and seasonal imbalance across the coastal-polder landscape

The challenges affecting Ellewoutsdijk do not operate as isolated pressures. They form a compound water condition in which coastal dynamics, polder drainage, salinization, seasonal rainfall and agricultural vulnerability reinforce one another. Rising sea levels and higher water pressures increase the risk of saltwater intrusion, while the existing drainage system continues to remove excess rainfall from the polder toward the Scheldt.

This produces a territorial paradox: water becomes excessive during wet periods, yet increasingly scarce during dry periods. Winter rainfall is rapidly discharged before it can support the productive landscape, while summer drought increases the demand for freshwater in soils and agricultural fields. As salinization progresses, the availability of freshwater becomes more fragile and unevenly distributed.

Ellewoutsdijk is therefore shaped by a condition of simultaneous excess and scarcity. Flood protection, drainage, soil salinity and agricultural productivity are not separate problems, but interdependent processes that intensify the vulnerability of the peninsula over time.

The challenge is a landscape where water is drained in moments of surplus, but scarce in moments of demand.



Synthetic section of the compound water challenges across the coastal edge, polder system and productive village landscape. Source: Author's own elaboration.

SECTION 04
Ellewoutsdijk Peninsula
Carolina Mía Gonzales Gallegos

RESEARCH QUESTION

FROM CONTROL TO INTEGRATION

The Western Scheldt polder landscape has long managed water through precision, separation and control. Dikes protect reclaimed land, drainage systems evacuate excess water, and compartments organize agricultural production. However, under changing climatic conditions, this logic is becoming increasingly limited. Freshwater is drained before it can be stored, basins remain fragmented or private, and saltwater pressure advances inland without a spatial gradient capable of mediating this transition.

These conditions are not only technical challenges, but spatial and conceptual ones. Infrastructure conceived mainly as defense or evacuation is now confronted with a territory that increasingly requires retention, redistribution and adaptation.

The Ellewoutsdijk peninsula concentrates these pressures within a legible local condition: exposed to the Western Scheldt, shaped by drainage and dikes, dependent on agriculture, and limited in its collective relationship with water.

This creates the need to rethink freshwater infrastructure beyond its conventional role as a system of control. Rather than treating water as a problem to be removed, contained or kept at a distance, the research explores how it can become a structuring resource for new relations between settlement, agriculture, ecology and public life. From this condition, the central research question and subquestions emerge:

How can freshwater infrastructure in the Western Scheldt polders be reconfigured into collective water landscapes that retain, store and redistribute freshwater, while supporting public life, productive adaptation and ecological resilience?

SQ1 — Freshwater retention and redistribution
How can the existing drainage logic of the Ellewoutsdijk peninsula be reconfigured to retain, store and redistribut freshwater across seasonal conditions?

SQ2 — Multifunctional basin landscapes
How can decentralized basin infrastructures organize ecological habitats, productive land and collective spaces as an integrated landscape system around the village?

SQ3 — Temporal adaptation
How can this inhabited water landscape evolve across seasonal, medium-term and long-term timeframes in response to drought, salinization, sedimentation and sea-level rise?



Facing the Estuary: Interpretative collage. of the coastal edge as a space where human settlement approaches the sea, while still depending on protection, distance and control.
Source: Author's own elaboration

SECTION 04
Ellewoutsdijk Peninsula
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CONCEPTS

THE THEORETICAL FRAMEWORK

A project that rethinks freshwater storage in Ellewoutsdijk cannot be framed only as a technical response to drought or salinisation. It requires a conceptual framework capable of reading water infrastructure as spatial, ecological, political and temporal.

The three concepts presented here provide that framework. Pierre Bélanger's Landscape as Infrastructure allows existing hydraulic elements to be understood as landscape systems rather than isolated technical devices. Erik Swyngedouw's Urbanization of Water reveals how water infrastructures are shaped by power, ownership and access. James Corner's Landscape as Process frames landscape as an evolving field of relations rather than a fixed composition.

Together, these concepts position the project as a shift from monofunctional water-control infrastructure toward a collective freshwater landscape, where storage, ecology, production and public experience can be understood as interdependent systems.

1

LANDSCAPE AS INFRASTRUCTURE

Key reference: Pierre Bélanger, Landscape as Infrastructure: A Base Primer, Routledge, 2017

The dominant understanding of infrastructure as a neutral, technical system separate from natural processes is precisely what this project seeks to rethink. Pierre Bélanger, argues that the twentieth century's approach to infrastructure produced systems that were efficient under stable conditions but ecologically destructive and spatially impoverished under all conditions. Responding to what he identifies as the under-performance of master planning and the over-exertion of technological systems, his book argues for the strategic design of infrastructural ecologies, describing a synthetic landscape of living, biophysical systems that operate as urban infrastructures to shape and direct the future of urban economies and cultures into the 21st century.

The central proposition is a shift from infrastructure as object to infrastructure as process. Bélanger frames landscape infrastructure as simultaneously material, spatial, biophysical, political, technological, and temporal, resisting any reduction to a single function or discipline. A drainage canal is not merely a pipe. A dike is not merely a barrier. A pumping station is not merely a mechanical node. Each of these elements carries suppressed ecological, productive, and spatial potential that a monofunctional management logic has rendered invisible.

What Bélanger proposes is not the replacement of existing infrastructure but its reconception. The existing systems are not the problem. The way they have been conceived, optimized for a single performance metric at the expense of everything else, is. Within this conceptual framework, Landscape as Infrastructure provides the basis for interpreting Ellewoutsdijk's water system as a landscape-operating infrastructure rather than as a set of discrete technical components. The drainage network, dike, basins, pumping points and polder edges can therefore be understood as spatial mediators between hydrological performance, ecological processes, productive land and collective experience. This reading is central to the project because it shifts the design problem from the optimisation of isolated hydraulic functions toward the reconfiguration of water infrastructure as a multi-scalar landscape system.

2

URBANIZATION OF WATER

Key reference: Erik Swyngedouw, Social Power and the Urbanization of Water: Flows of Power, Oxford University Press, 2004.

The question of who controls water, on what terms, and for whose benefit is as political as it is spatial. In the Ellewoutsdijk peninsula, this condition is fragmented: Rijkswaterstaat controls the Scheldedijk, the waterschap manages the drainage network, and individual farmers hold private access to the sloten on their land. The result is a water landscape managed by institutions and owned by individuals, but rarely accessed, shared or experienced as a collective landscape.
Swyngedouw argues that water is never simply a resource or a technical problem. As he writes in his introduction, "the flow of water and the flow of money and power are, consequently, materially linked" and "controlling the flow of water implies controlling the city". Water infrastructure, in this reading, is always a political arrangement: it decides who benefits, who is excluded, and whose landscape gets produced.

This perspective is useful for reading the current polder logic in Ellewoutsdijk. Freshwater is collected, drained, redirected and discharged through a system that is highly efficient from a technical point of view, but largely invisible as a shared spatial experience. Access to water is shaped by land ownership, institutional responsibility and agricultural use. The water system therefore does not only manage flows; it also produces social and spatial boundaries between public and private, village and field, infrastructure and everyday life. Through Swyngedouw's framework, water can be understood as a hydrosocial relation: a condition shaped simultaneously by material flows, governance structures, property regimes and forms of visibility. This is important because it shifts the discussion from "where can water be stored?" to a broader question of how freshwater storage is organised, accessed and represented within the landscape.

In this sense, the concept of water as commons does not simply mean making all water public. Rather, it provides a critical lens to question the fragmented ownership and management of freshwater infrastructures, and to examine how storage systems might generate collective value. For Ellewoutsdijk, this means reading basins, sloten, drainage corridors and retention spaces not only as technical components, but as spaces where questions of access, responsibility, visibility and shared benefit become central.

3

LANDSCAPE AS PROCESS

Key reference: James Corner, "Ecology and Landscape as Agents of Creativity," in The Landscape Imagination, Princeton Architectural Press, 2014.

James Corner argues that landscape architecture has often appropriated ecology as a technical instrument: a method for measuring land suitability, managing habitat or justifying design through apparently objective criteria. Against this instrumental use of ecology, Corner repositions landscape as an active field of dynamic forces, where design is not only corrective or restorative, but capable of producing new spatial and ecological possibilities.

The key shift is to understand ecology not as a stable condition to be preserved, but as a process of continuous differentiation. Ecological systems, Corner argues, move toward the increased differentiation, freedom, and richness of a diversely interacting whole. Landscape therefore has no final image or fixed state; it unfolds through time. This is why Corner argues that landscape architecture should be "more about the invention of new forms and programs than the merely corrective measures of restoration"

Rather than producing finished objects, Corner proposes catalytic frameworks that might enable a diversity of relationships to create, emerge, network, interconnect, and differentiate. These frameworks are structured enough to be legible, but open enough to evolve. In this sense, landscapes can engage, enable, diversify, trick, emancipate, and elude generating changing relationships between people, ecology and time.

Within this conceptual framework, *Landscape as Process* helps read Ellewoutsdijk as an evolving field of relations between water, agriculture, ecology, infrastructure and settlement. It supports a process-based understanding of the project, where freshwater storage is not conceived as a closed technical object, but as part of a landscape system through which seasonal water dynamics, ecological succession, productive use and collective experience can gradually overlap and transform.

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PRECEDENTS

CURRENT POLICIES: A GOVERNMENT STRATEGY FOR FRESHWATER

- Zeeland's Freshwater Plan 2021
- Progress Report – Zeeland Delta Plan for Freshwater 2025

Province at the edge of freshwater

The *Zeeuws Deltaplan Zoet Water* (2021) defines freshwater availability as a strategic priority for the Province of Zeeland. Its goal is clear: Zeeland must become resilient against freshwater shortages by 2050. Unlike most Dutch provinces, Zeeland has limited access to the national freshwater network, while its islands are surrounded by saline water and affected by brackish groundwater seepage. Freshwater scarcity is therefore not an occasional problem, but a structural condition of the delta landscape.

The temporal problem

The challenge is not only the total amount of available water, but its timing. Zeeland still receives rainfall, yet water is often available when it is least needed and scarce during the dry growing season, when agricultural demand increases. The plan therefore shifts the discussion from simply draining excess water toward retaining, storing and reusing freshwater locally.

What the plan proposes

The provincial strategy organises possible measures through a hierarchy of interventions: strengthening the ecological and soil basis, using water more efficiently, retaining water for longer, storing water, reusing water and, where feasible, supplying water from elsewhere. Within this framework, freshwater basins are presented as one of the instruments for seasonal storage, able to collect rainwater, drainage water or surface water and make it available during dry periods.

From technical measure to spatial question

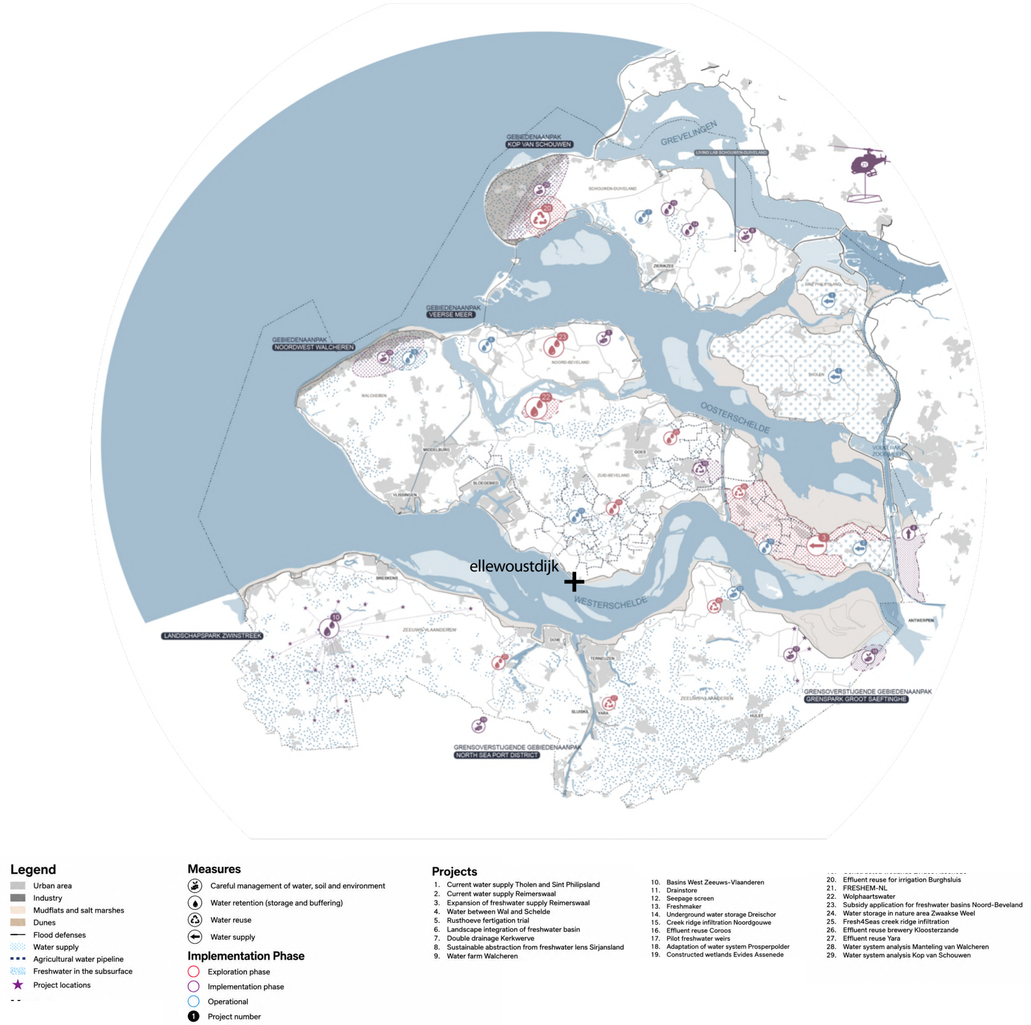
The plan also recognises that artificial basins are not neutral infrastructures. While they can improve freshwater availability, they also raise questions of landscape quality. If treated only as technical reservoirs, they may become isolated and visually disruptive elements within the agricultural landscape. However, the plan also points toward the possibility of better landscape integration and ecological added value.

The missing local scale

The 2025 progress report shows that freshwater measures are already being developed across Zeeland through pilot projects, governance structures and regional cooperation. Yet at the scale of villages such as Ellewoutsdijk, there is no clear project that connects freshwater storage with village edges, public routes, ecological corridors, productive fields or collective spaces. The provincial strategy explains why freshwater storage is necessary, but it does not yet show how it can become part of everyday village landscapes.

Project relevance

This project addresses that missing scale. It takes the provincial need for freshwater resilience and translates it into a local landscape strategy for Ellewoutsdijk. Instead of treating basins only as technical reservoirs for agricultural use, the proposal explores how they can form a connected system that stores water while strengthening green structure, ecological transitions, productive land and collective spaces around the village.



Ongoing freshwater projects and adaptive water infrastructures across Zeeland. © Progress Report – Zeeland Delta Plan for Freshwater 2025.

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CURRENT FRESHWATER STORAGE MODEL: FARM-SCALE BASINS IN ZEELAND

Different Basin Logics

Freshwater basins do not operate in the same way everywhere. In some European contexts, water storage is developed through larger territorial systems, linked to extraction, storage and redistribution networks. In Zeeland, by contrast, the freshwater basin is usually smaller, decentralised and closely tied to the scale of the individual farm.

The Zeeland Basin Model

Within Zeeland's freshwater strategy, above-ground basins are understood as practical storage devices for dry periods. They can be filled with rainwater, drainage water or surface water collected during wetter periods. The *Progress Report – Zeeland Delta Plan for Freshwater* (2025) confirms that these basins are increasingly being built on arable farms to bridge periods of drought, including projects in West Zeeuws-Vlaanderen and Noord-Beveland.

Farm-Based and Single-Functional

The current model is therefore largely farm-based and single-functional. Each farmer or agricultural enterprise tends to develop a separate storage solution for its own land, producing a dispersed landscape of individual reservoirs. While this model can improve water security at farm scale, it does not necessarily create a shared or collective water system.

A Spatial Limitation

The documents also recognise that basins create a landscape-quality issue. Because many are lined with black foil, they can become visually dominant in the open agricultural landscape. More importantly, when designed only as storage devices, they remain isolated technical objects, rarely connected to ecological continuity, public routes, village edges or collective landscape value.

Project Relevance

This project begins from that limitation. It does not reject the Zeeland basin model, but rethinks its spatial role at the scale of Ellewoutsdijk. The proposal explores how freshwater storage can move beyond individual farm infrastructure and become part of a connected village-scale landscape system linking agriculture, ecology, green structure and collective space.
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Existing farm-scale freshwater basins around Ellewoutsdijk. Extracted from © Google Earth, 2026.


News: Water basins festively opened in Zeeuws-Vlaanderen: 'Hoping for more' © omroepzeeland.nl/


Lining a water basin in Zeeland ©hortidaily.com

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PRECEDENTS

STUDY LANDSCAPE INTEGRATION OF FRESHWATER BASINS IN ZEELAND

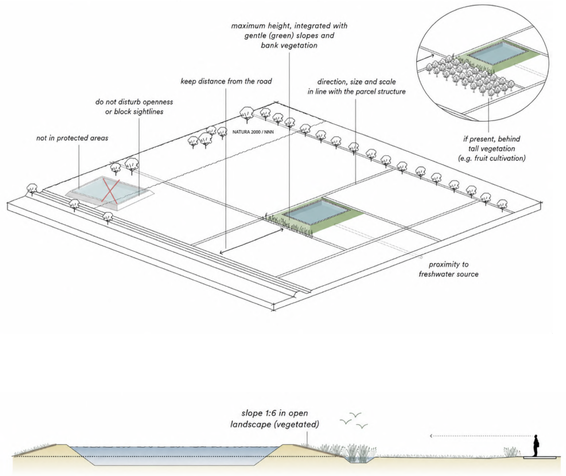
- BoschSlabbers Landscape + Urban Design, commissioned by the Province of Zeeland, 2021

Landscape context & integration principles

The study *Landschappelijke inpassing zoetwaterbassins Zeeland* (BoschSlabbers, 2021) was commissioned by the Province of Zeeland to explore how freshwater basins can be integrated into the landscape. It responds directly to the spatial limitation of farm-scale storage: basins are necessary for freshwater resilience, but if they are treated only as technical reservoirs, they may disrupt the openness, structure and ecological quality of the agricultural landscape.
Rather than understanding basins as isolated engineering objects, the study frames them as landscape elements that should respond to local conditions. Their form, edges, planting and visibility must be adapted to the surrounding landscape structure, including parcel patterns, vegetation lines, creek ridges, settlement edges and existing ecological networks.

Basin typologies & multifunctionality

A key contribution of the study is the development of basin typologies according to different landscape conditions. These include old land, new land, creek polders, pond areas, cover sand areas and settlement edges. E condition suggests different design principles related to scale, plant openness, edge treatment and possible secondary functions.
The study also argues that freshwater basins can support more than w storage. Depending on their location and design, they can contribute biodiversity, ecological stepping stones, recreational value, water buffering, fire-water supply or landscape identity. In this sense, the basin becomes more than a container: it becomes a spatial device within a wider landscape system.



Landscape integration principles for freshwater basins. Basins are positioned and shaped according to parcel structure, vegetation, visibility, road distance and ecological sensitivity. © BoschSlabbers Landscape + Urban Design / Province of Zeeland, 2021.

From General Principles to Local Translation

The study provides a valuable and flexible catalogue of landscape-specific principles for integrating freshwater basins across Zeeland. Its strength lies in showing how basins can respond to different landscape types, rather than imposing one standard solution. For this project, these principles become a starting point for reading the specific conditions of Ellewoutsdijk: its agricultural parcels, village edges, green structure, ecological transitions and existing water landscape.

Project Relevance

This project builds on the study's main premise that freshwater basins should not be treated as isolated technical infrastructures. However, it shifts the focus from the integration of individual basins to the organisation of a connected village-scale system. In Ellewoutsdijk, basins are explored as spatial devices that can link water storage with agriculture, ecology, public routes and collective spaces around the village.

Landscape type	Characteristics	Size/scale	Planting type in the landscape	Suitable multiple/special functions
Old land - small-scale	- small-scale - mixed planting - organic plot structure			recreation
Old land - creek ridges	- tall vegetation - relatively large-scale			
Old land - pond areas	- open area - relatively large-scale			water buffer
New land - small-scale	- relatively small-scale - tall vegetation - organic/straight - embanked			
New land - large-scale	- large-scale - embanked - green "islands" - rational			landscape art
New land - creek polders	- small-scale - low/wet - relatively open			ecological connection zone
Cover sand areas	- streams/sloping terrain - tall vegetation - infiltration through sand			water for firefighting
Settlement edge	- hard or soft - planting/water - recreational zone			catalyst for buffer zone (forest vision), recreation

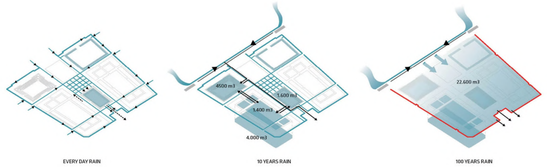
Landscape-specific basin typologies for Zeeland. The study shows how freshwater basins can be adapted to different territorial conditions and combined with ecological, productive or recreational functions. © BoschSlabbers Landscape + Urban Design / Province of Zeeland, *Landschappelijke inpassing zoetwaterbassins Zeeland*, 2021.

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PRECEDENTS

WATER SYSTEMS AS DESIGN FRAMEWORKS

The following six projects demonstrate that the concepts outlined above are not theoretical aspirations — they have been built, tested, and evaluated in contexts directly comparable to the Western Scheldt. Together they cover every spatial dimension of this project: the coastal gradient, the dike as interface, the technical framework for basin integration, the productive landscape, the collective basin as public space, and the territorial reversal of drainage logic.



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Enghaveparken Climate Park
Tredje Natur + SLA | Copenhagen, Denmark | 2019

A climate-adaptive public park redesigned to function as both a recreational landscape and a large-scale stormwater retention system. The project integrates water storage, biodiversity, and public use within a historic urban park, allowing the landscape to temporarily flood during extreme rain events while remaining active as a collective public space under normal conditions.

The project is relevant to the thesis because it demonstrates how climate adaptation infrastructures can be embedded within everyday public landscapes rather than separated as hidden technical systems. Water retention, topography, vegetation, and public occupation operate together as part of a flexible and resilient landscape framework.

This approach influenced the project by reinforcing the idea that basin systems and adaptive water infrastructures can simultaneously support ecological resilience, public life, and seasonal transformation within dynamic territorial landscapes.

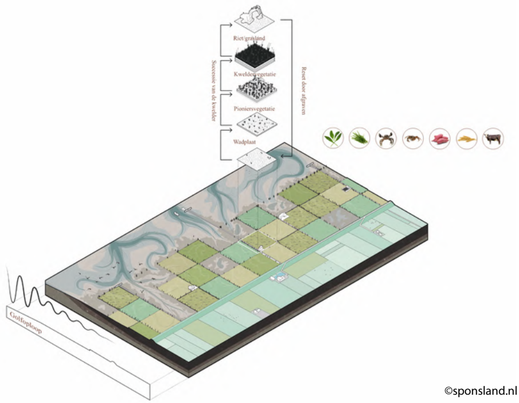


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Edible Coast
FLUX Landscape Architecture + Sponsland | Netherlands | 2023

A productive coastal landscape organized through environmental gradients — from tidal edge to inland agricultural production — that integrates food production, ecological function, and public access through a carefully calibrated spatial sequence. Rather than separating these functions into distinct zones, the project designs their overlap: the same landscape that produces food also supports biodiversity, provides public walking routes, and demonstrates the gradient from saline to fresh conditions.

The project is directly relevant to two dimensions of the Ellewoutsdijk proposal. First, it demonstrates that the salt-freshwater gradient is not an obstacle to productivity but its organizing principle — different positions along the gradient support different crops, different species, and different spatial experiences, all of which can coexist within a coherent landscape design. Second, it demonstrates that public access and agricultural production are not competing uses but complementary ones: the route through the productive landscape gives the production system social legibility and identity, while the production gives the public route meaning and seasonality.



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PARC DES ÎLES
Ilex Landscape Architecture | France | 2013

This project transforms former industrial and extraction territories into a continuous landscape system organized by water, vegetation, and public movement. Rather than dividing technical infrastructure, ecology, and recreation into separate zones, the proposal brings them together through flexible spatial relationships.

The project is useful because it shows how disturbed or residual landscapes can be reimagined as productive ecological systems. Flood management, ecological succession, and public occupation are treated as connected processes, allowing the landscape to change over time instead of remaining fixed.

In relation to Ellewoutsdijk, it reinforces the potential of water infrastructures to organize more than technical functions. Basins, drainage lines, and productive edges can become part of a wider territorial framework where ecology, public use, and adaptation work together.

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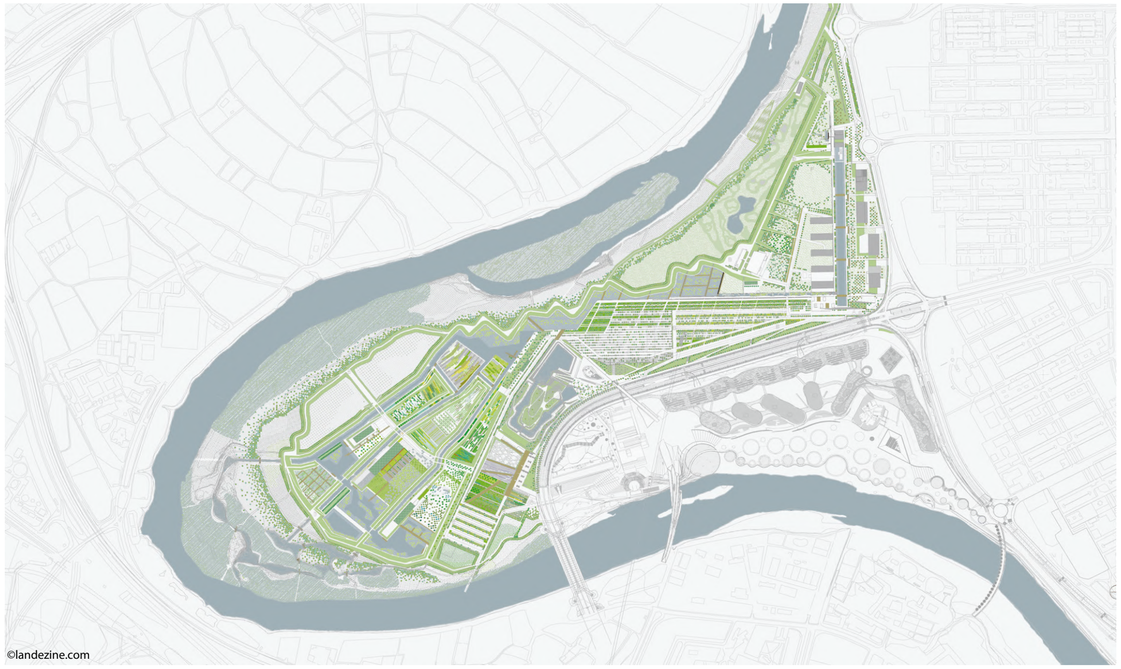
WATER PARK ZARAGOZA
Aldayjover Arquitectura y Paisaje | Spain | 2008

This project works with the seasonal flooding of the Ebro River as the main structure for a public and ecological landscape. Instead of controlling water through a rigid separation between river and land, the proposal accepts changing water levels as part of the spatial experience, allowing different areas to shift between recreation, habitat, and water retention.

Its relevance lies in the way flood adaptation becomes part of everyday landscape use. Water is not treated only as a risk to be contained, but as a dynamic condition that can shape ecological corridors, flexible public spaces, and changing relationships between people and the river.

For Ellewoutsdijk, this precedent supports the idea of designing with seasonal water dynamics. It suggests that basins and low-lying landscapes can become adaptive spaces, capable of storing water while also creating ecological value and collective public life.



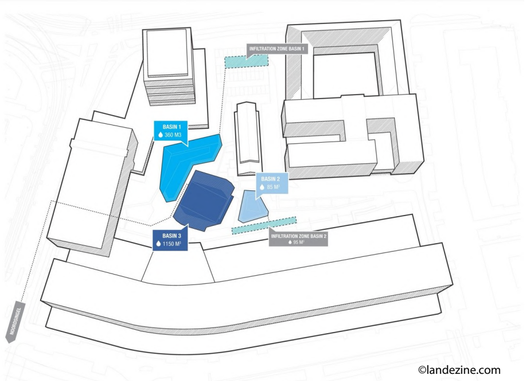


WATER SQUARE BENTHEMPLEIN
De Urbanisten | Rotterdam, Netherlands | 2013

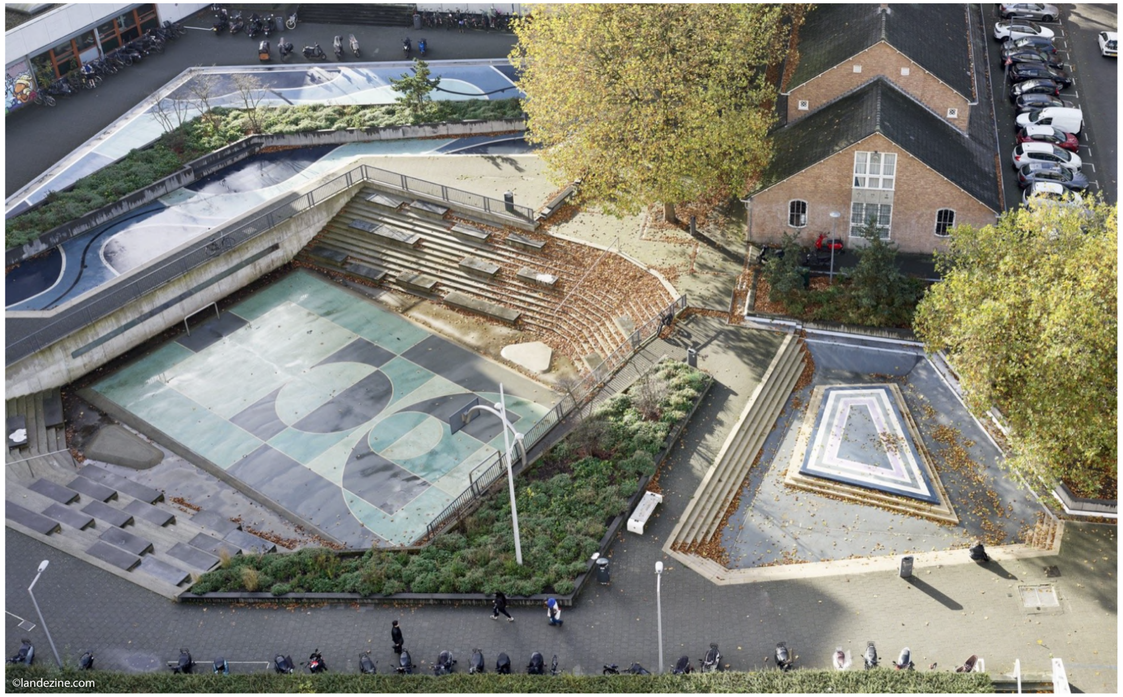
Water Square Benthemplein turns a public square into an active part of Rotterdam's stormwater system. During heavy rainfall, the basins temporarily collect and store water; during dry periods, the same spaces function as sports courts, seating areas, and everyday meeting places.

The value of this precedent lies in its ability to make water management visible at the scale of daily urban life. Instead of separating infrastructure from public space, the project combines drainage, recreation, and social use within one adaptable surface, where changing water levels become part of the spatial experience.

For Ellewoutsdijk, it suggests that water basins do not need to remain purely technical or hidden. They can become recognizable collective spaces, capable of storing freshwater while also supporting public activity, seasonal change, and a stronger relationship between people and water.



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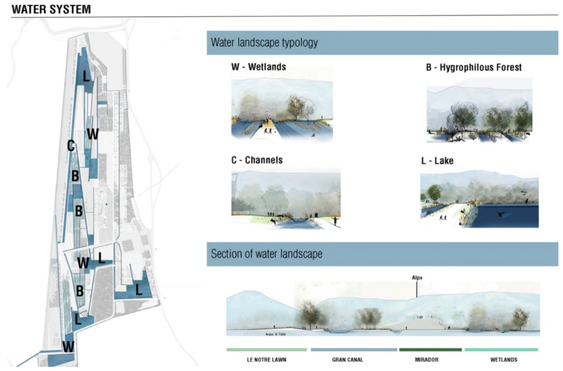
PARCO DELLA PACE
PAN Associati + EMF Estudi Martí Franch | Italy | 2024

Built on the site of a former airport, Parco della Pace reimagines a large vacant infrastructure as an open ecological landscape for the city. Its design is structured through water, soil, vegetation, and slow public routes, turning a previously closed military ground into a shared civic and environmental park.

This precedent is important because it shows how landscape can absorb technical functions without losing its public character. Canals, lakes, wetlands, and floodable areas are not presented as isolated engineering elements, but as part of a continuous ecological system that supports biodiversity, water retention, and everyday recreation.

In relation to Ellewoutsdijk, the project supports the idea of working with basins as evolving landscapes: spaces that can store water, host ecological transitions, and create collective places for the village and its surrounding productive territory.

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SITE ANALYSIS

ELLEWOUTSDIJK — A Territory Surrounded by Water

Ellewoutsdijk occupies the southernmost tip of the Zak van Zuid-Beveland — a narrow peninsula projecting into the Western Scheldt estuary, bounded on nearly all sides by one of Europe's most dynamic tidal systems. With approximately 375 inhabitants and a polder catchment of around 826 ha, it is among the smallest and most exposed settlements in Zeeland.

The peninsula concentrates, within a compact and legible territory, all of the challenges that define the inhabited coasts of the Western Scheldt: a rising estuary pressing against a rigid dike system, a polder interior drained by centralized infrastructure that evacuates the freshwater it should retain, soils under progressive salinization, and a village that has lost its spatial and functional relationship with the water surrounding it on three sides.

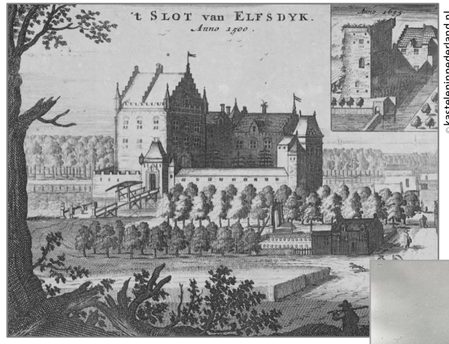
Two contrasting coastal edges define the site. To the west, active sedimentation along the Everingen channel continuously builds new intertidal land at the dike edge — a dynamic process that the current infrastructure suppresses rather than engages. To the east, the Inlaag of 1887 — a protected natural reserve owned by Natuurmonumenten — forms a transitional brackish zone between the estuary and the polder, with plans for a wisselpolder that would reopen controlled tidal exchange with the Westerschelde.

At the tip of the peninsula, Fort Ellewoutsdijk — built between 1835 and 1839 to control the northern shipping route of the Scheldt — anchors the site as its most spatially significant historical element. Its moat, its elevated walls, and its panoramic position above the estuary make it the natural starting point for understanding the peninsula as a water system.

A landscape shaped by reclamation, defense and reconstruction

Ellewoutsdijk's landscape is the result of a long and continuous negotiation with water. The early settlement developed on elevated creek ridges within a tidal landscape, where inhabitation depended on the capacity to manage water collectively. From the medieval period onward, dikes, drainage channels and polder compartments gradually transformed marshy and tidal lands into productive agricultural territory.



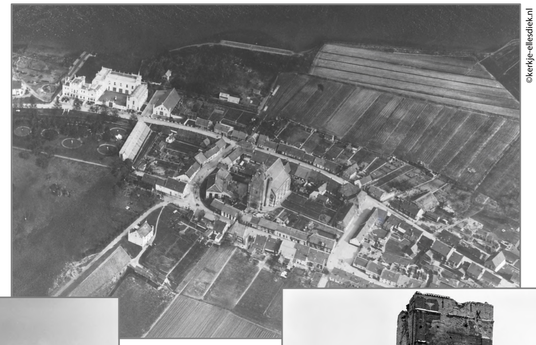


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1200 — Creek-Based Settlement
Early settlement developed on an elevated creek ridge, connected to the estuarine landscape through tidal waterways.



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14th Century — Compartmentalized Polder Landscape
Transversal dikes were built across the Oost-Borsele polder to limit flooding during potential dike breaches

18th Century — Agricultural Polder Consolidation
Ellewoutsdijk developed as a rural polder landscape structured by dikes, drainage channels, and agricultural fields, where water control supported both protection and production.



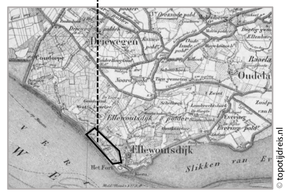
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1839 — Fortified Estuarine Edge
Fort Ellewoutsdijk was built behind the sea dike as part of the defensive system along the Western Scheldt.



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1887 — Creation of Inlaag 1887
Clay extraction for dike reinforcement generated a sheltered landscape between the dikes, later evolving into a brackish marsh ecosystem with pools and wet grasslands supporting migratory birds and breeding habitats.



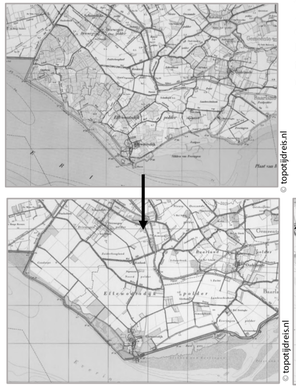
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1944 — Evacuation and Reconstruction
The village was evacuated and heavily damaged during the Battle of the Scheldt. After liberation, residents returned and rebuilt Ellewoutsdijk.



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1953 — North Sea Flood
The area around Ellewoutsdijk was fully flooded, triggering major post-flood repair, replanting, road improvements, and hydraulic modernization.


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2005 — Creation of Inlaag 2005
A new 35-hectare ecological inlaag was constructed as environmental compensation linked to the Westerschelde Tunnel project, transforming former agricultural land into a restored wetland landscape.


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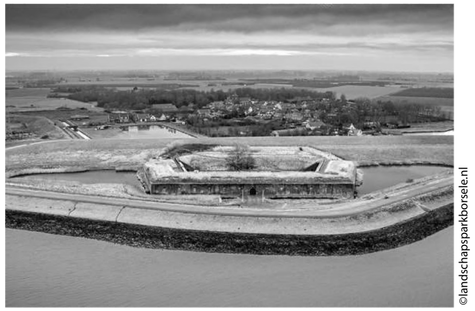
FROM SETTLEMENT TO CONTROLLED LANDSCAPE

The historical evolution of Ellewoutsdijk through creeks, polders, dikes, war, and flood protection



© ellewoutsdijk.wordpress.com

Harbour —*port*



©landschapsparkborsele.nl

Fort Ellewoutsdijk — *1835–1839*



© natuurgebieden.com/

Inlaag — *nature reserve since 1887*



©hollandluchtfoto.nl

Village — *375 inhabitants*



©kasteleninnederland.n

Kasteelberg — *medieval castle ruins*



CURRENT CONDITION

ELLEWOUTSDIJK AS A WATER-STRUCTURED VILLAGE

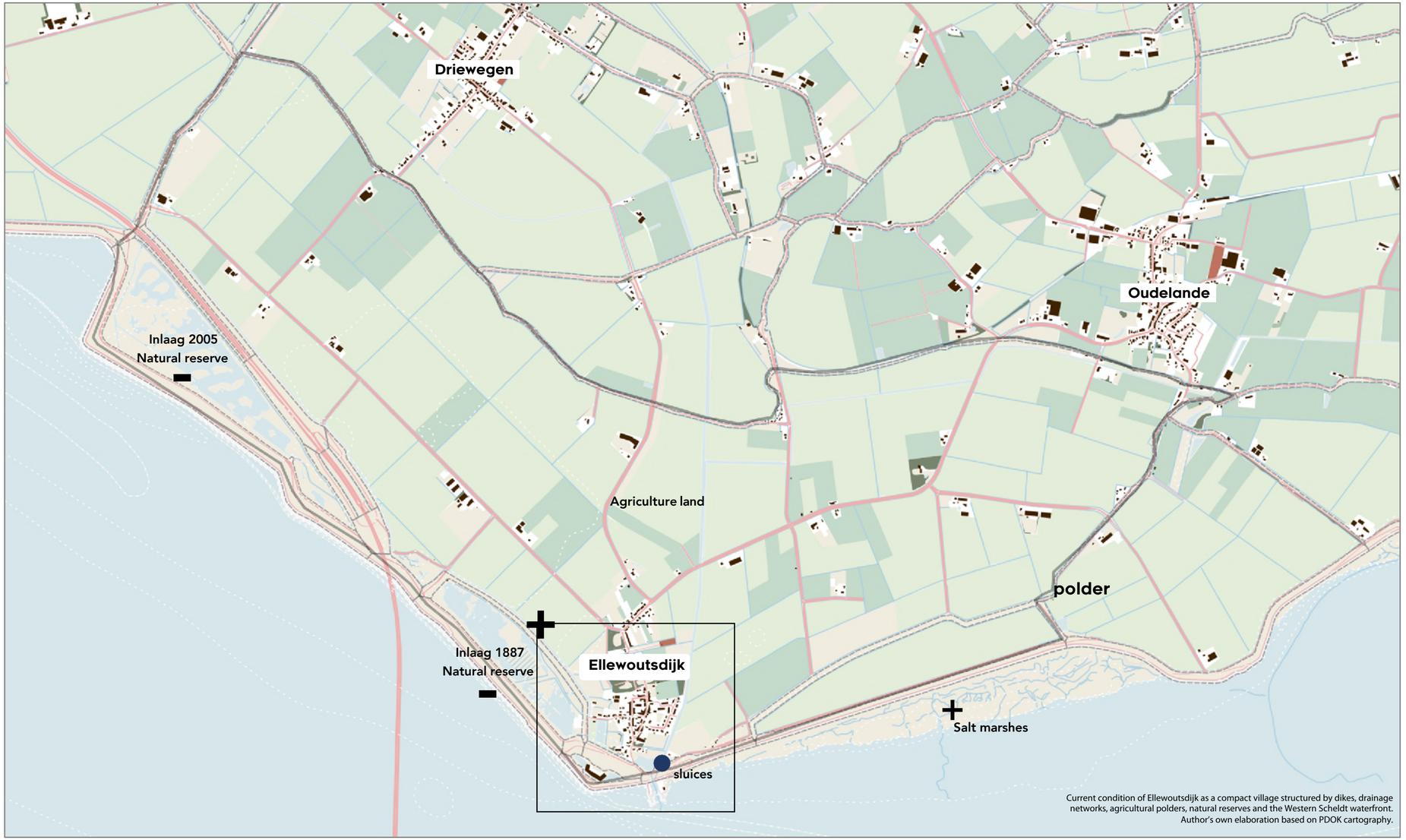
Ellewoutsdijk is a small rural village on the southern edge of Zuid-Beveland, positioned between the Western Scheldt estuary and the agricultural polder landscape. Its spatial identity is shaped by a continuous relationship with water: the village is protected by the Scheldedijk, drained through a network of channels and ditches, and surrounded by landscapes that reveal different forms of water management, from productive farmland to wet ecological buffers.

The village itself is compact, with a historic core located close to the estuarine edge. Its southern side concentrates several key water-related elements: the harbour basin and spuikom, Fort Ellewoutsdijk, the Scheldedijk, Inlaag 1887 and the views toward the Western Scheldt. These elements make the edge of the village not only a protective line, but also a landscape of heritage, access, ecology and memory.

To the west, Inlaag 2005 introduces a more recent wetland landscape linked to ecological compensation and the transformation of former agricultural land. At a larger scale, the Westerschelde Tunnel crosses the surrounding polder, adding a regional infrastructural layer to a territory that otherwise remains relatively rural and locally connected.Today, Ellewoutsdijk can be read as a layered water-structured village where agriculture, drainage, heritage, ecology, infrastructure and public access overlap. This condition makes it a strategic site to understand how small polder settlements can adapt to changing relationships between land and water



Zoom-in: Ellewoutsdijk Village and Waterfront Edge

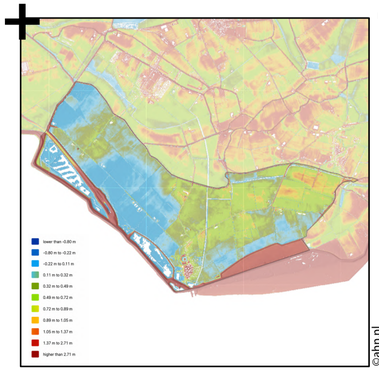


Current condition of Ellewoutsdijk as a compact village structured by dikes, drainage networks, agricultural polders, natural reserves and the Western Scheldt waterfront. Author's own elaboration based on PDOK cartography.


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TOPOGRAPHY + SOIL

Low grounds, creek ridges and polder relief
Ellewoutsdijk is located within an old polder landscape shaped by former tidal creeks, creek ridges and low wet grounds. The village originated on a **kreekrug**, a slightly elevated sandy ridge within the Oost-Borsele polder, while the surrounding land contains lower and wetter areas historically associated with poelgronden and former creek beds.
The map reveals a subtle but important topographic gradient: higher and drier grounds around the village and inland ridges, and lower-lying areas toward the coastal edge, the Inlaag and parts of the agricultural polder. Although post-1953 drainage improvements and land consolidation reduced the visible distinction between wet poelgronden and dry creek ridges, this underlying relief still structures the relationship between settlement, agriculture and water.



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HYDROLOGY + WATER INFRASTRUCTURE

Drainage spine, dikes and the controlled polder system
Ellewoutsdijk's landscape is structured by a controlled water infrastructure system. The Westerscheldedijk forms the dominant southern edge, separating the agricultural polder and village from the Western Scheldt. Behind this protective line, a dense network of drainage channels and ditches organizes the agricultural compartments. Water from the surrounding fields is collected through smaller canals and gradually directed toward a main drainage spine near the village. This central line concentrates the polder's excess water before conveying it toward the harbour, where it is discharged through the pumping station into the estuary. The village therefore occupies a critical hydrological position where drainage, dike protection, harbour infrastructure and estuarine water meet.


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AGRICULTURE + LAND USE

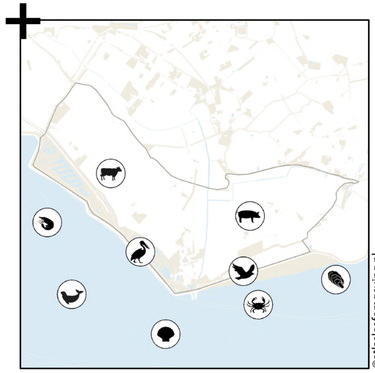
Productive fields shaped by drainage /enclosure
The polder around Ellewoutsdijk is mainly structured as an agricultural production landscape. Large open fields, drainage ditches and straight parcel boundaries reveal a highly managed territory where farming depends on continuous water control. The area is mostly used for arable crops typical of Zeeland, such as potatoes, sugar beet, onions and cereals, together with grassland and occasional fruit-related landscapes in the wider Borsele region. This productive system is closely linked to the drainage network: excess water must be removed to keep the fields workable, while dry periods increase dependence on water availability. Agriculture is therefore not separate from the hydrological system; it is one of the main land uses shaped by dikes, canals and controlled drainage. and polder already create a basis for future collective


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ECOLOGY + HABITAT

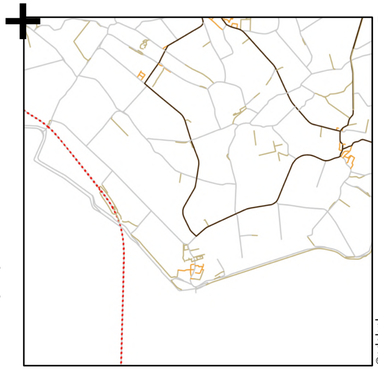
Wetlands, grazing fields and estuarine habitats
Although Ellewoutsdijk is largely surrounded by agricultural land, several ecological habitats are concentrated along the Western Scheldt edge. The Inlaags functions as a wet nature reserve, combining wet grasslands, brackish conditions and shallow water areas that support birds and other water-related species. The coastal edge also includes salt marshes, tidal mudflats and aquatic habitats connected to the estuary. Within the polder, grasslands and grazing areas form part of the ecological mosaic, linking farming practices with habitat management. These landscapes reveal a different relationship with water: not only drainage and protection, but also wetness, buffering, seasonal change and biodiversity. Ecology here is therefore closely connected to water levels, soil conditions and the managed openness of the polder landscape


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MOBILITY + ACCESS

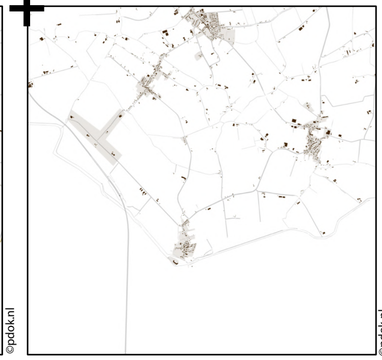
Lost connections, regional infrastructure and landscape access
Ellewoutsdijk is currently connected through a network of local roads, polder roads, walking routes and dike paths that link the village with the fort, harbour, Inlaag 1887 and the Western Scheldt edge. Historically, however, the village had stronger territorial connections through former ferry and tram-related mobility, which linked it more directly to nearby settlements and the estuarine network. Today, these connections are no longer active, making the village feel relatively peripheral and dependent on local access routes. At the same time, the Westerschelde Tunnel crosses part of the polder as a major regional infrastructure. This creates large-scale connectivity, but contrasts with the limited everyday accessibility of the village and its surrounding water landscapes.


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DEMOGRAPHY + PUBLIC LIFE

Small village scale and limited collective spaces
Ellewoutsdijk is a small rural settlement where public life is concentrated in a limited number of spaces: the village core, the church area, the Markt, the cemetery, the playground, the harbour edge, the fort route and informal green spaces. The Groenstructuurplan notes that the historic core has very little public green, while the main green structure is largely formed by private estates, the cemetery and the green dike bodies. Public green therefore plays a modest but important role in everyday village life. This condition makes collective landscapes significant: future basins could become more than water storage infrastructure, acting as shared spaces for recreation, gathering, walking, landscape experience and renewed contact with water.


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SECTION 04
Ellewoutsdijk Peninsula
Carolina Mía Gonzales Gallegos

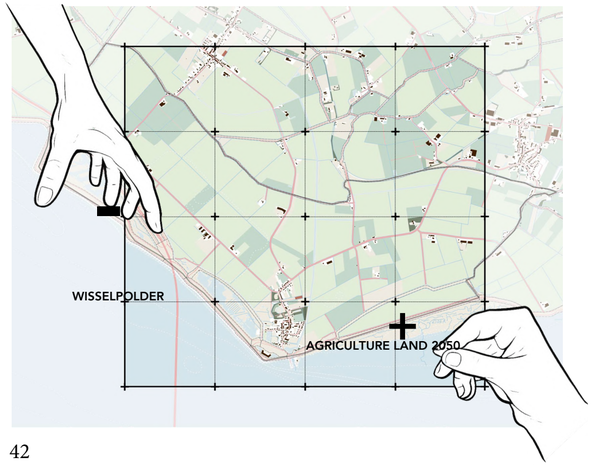
DESIGN STRATEGY

CONNECTING COASTAL MOBILITY AND FRESHWATER STORAGE

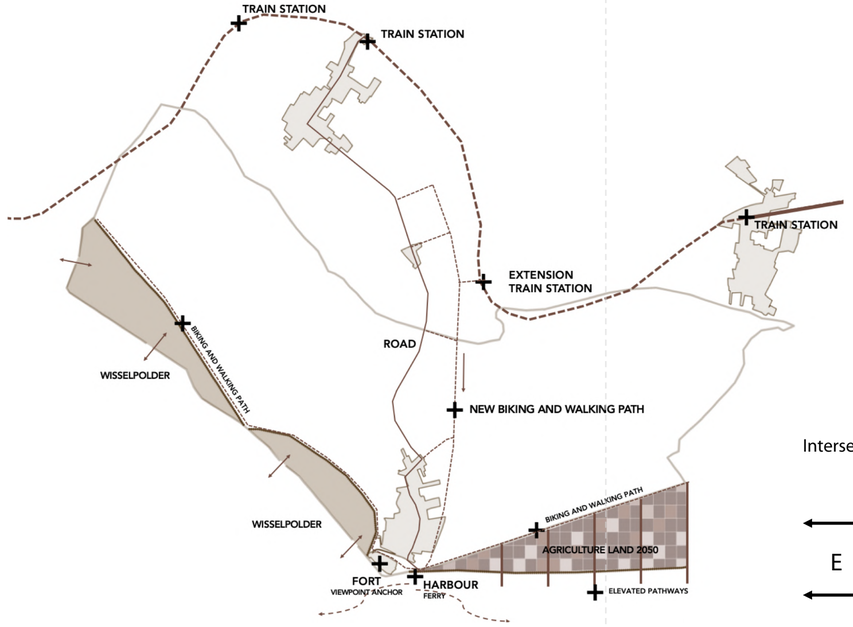
The proposal builds upon the broader coastal strategy for the Ellewoutsdijk peninsula, which already establishes two major territorial conditions: on one side, the implementation of the Wisselpolder along the coastal edge; and on the opposite side, the projection of a future agricultural landscape. Rather than presenting these conditions as separate interventions, this project explores how they can be locally connected, experienced and supported through water infrastructure.

The design strategy works through the intersection of two main systems. The first is an east–west coastal structure composed of two parallel layers: an inland mobility layer, extending the former train station connection to link surrounding villages and create new access to Ellewoutsdijk; and a coastal landscape layer, connecting the village with the dike, the Wisselpolder, the harbour, the fort and the Western Scheldt edge. The second system is a north–south freshwater and mobility spine, which connects these two east–west layers. Following the existing main drainage canal, this spine links the train station extension, agricultural fields and a distributed network of basins with the village and the coastal edge.

Through this intersection, the project translates a territorial coastal strategy into a village-scale landscape structure. It connects coastal adaptation with freshwater storage, productive land and collective life, turning water infrastructure from a hidden technical system into a visible and accessible part of Ellewoutsdijk's everyday landscape

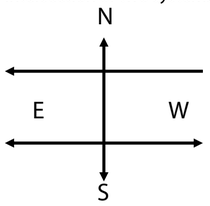


1+ COASTAL CONNECTIVITY



This strategy defines the east–west structure of the project through two parallel layers: an inland mobility connection that links the former train station and surrounding villages, and a coastal landscape route that connects Ellewoutsdijk with the dike, the Wisselpolder, the fort, the harbour and the Western Scheldt.
Together, these two layers transform the coastal edge into a continuous cycling and walking system, where the fort becomes a heritage viewpoint, the harbour a recreational node, and the dike a public promenade.

Intersection of two systems



2+ BASINS AS COLLECTIVE WATER LANDSCAPES



This strategy develops the north–south system between the main water canal and the main road, transforming this in-between corridor into a collective water infrastructure. Along this axis, a sequence of basins connects drainage, mobility, agriculture and public space.
Rather than functioning as isolated reservoirs, the basins create a distributed landscape network that stores, filters and regulates freshwater while making water management visible and accessible within everyday village life.

MASTERPLAN

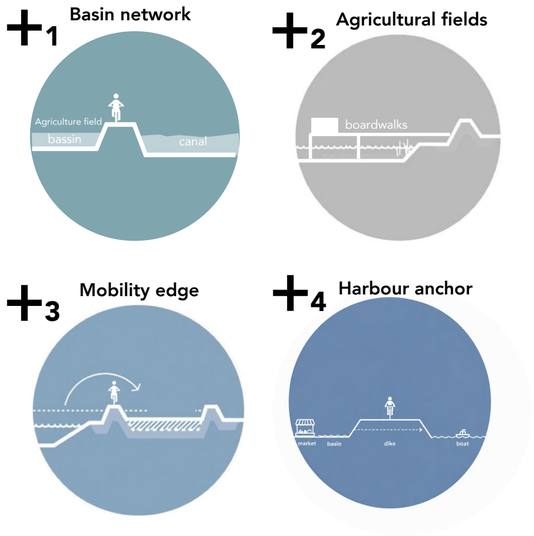
A CONNECTED WATER AND MOBILITY SYSTEM

The masterplan translates the design strategy into a territorial framework for Ellewoutsdijk. It connects the coastal edge, the village, the agricultural interior and the projected train station extension through a continuous system of water, mobility and productive landscapes.

The main north–south axis is structured by the existing drainage canal and the main road. Between them, a sequence of freshwater basins forms a new collective infrastructure, linking agricultural fields, public routes and water management. These basins retain, filter and regulate water while remaining accessible along their vegetated edges.

Along the coast, the dike, the Wisselpolder, the fort and the harbour are reactivated as public and ecological thresholds. Together, they create a continuous coastal route that connects protection, recreation, heritage and everyday movement.

Water is therefore kept within the landscape for as long as possible: stored during wet periods, gradually reused during dry periods, and made visible as part of the daily landscape of Ellewoutsdijk.



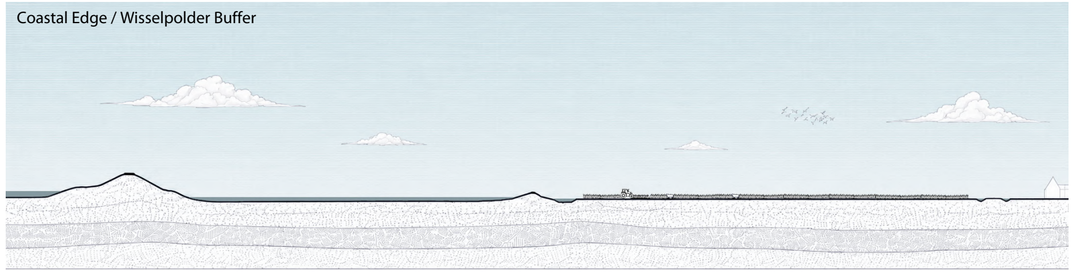


TERRITORIAL SECTIONS: EXISTING CONDITION AND SPATIAL TRANSFORMATION

FROM DRAINAGE INFRASTRUCTURE TO COLLECTIVE WATER LANDSCAPES

Existing Condition

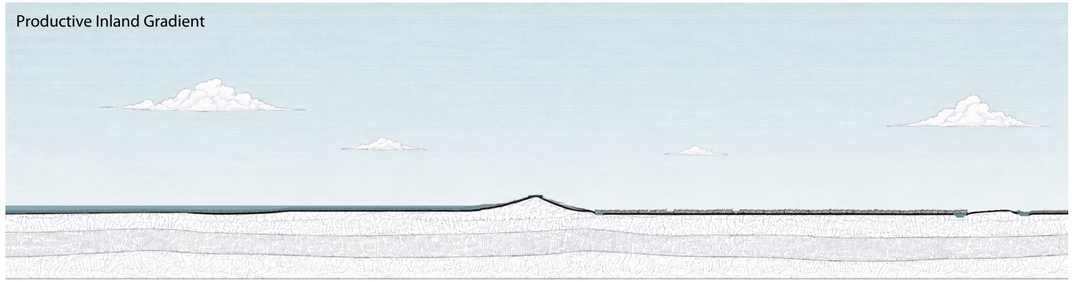
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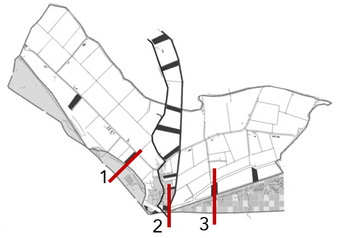
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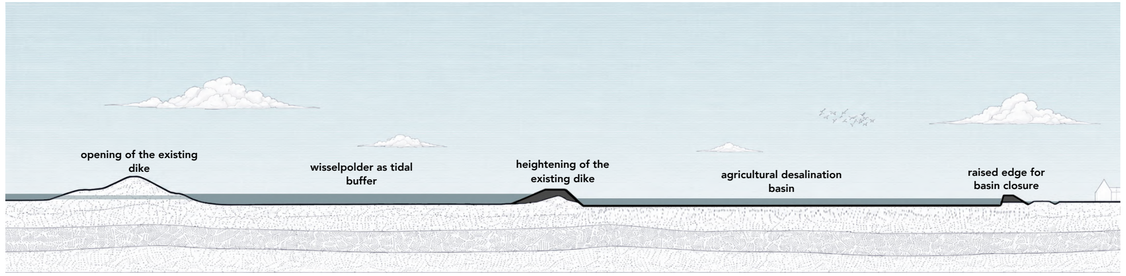


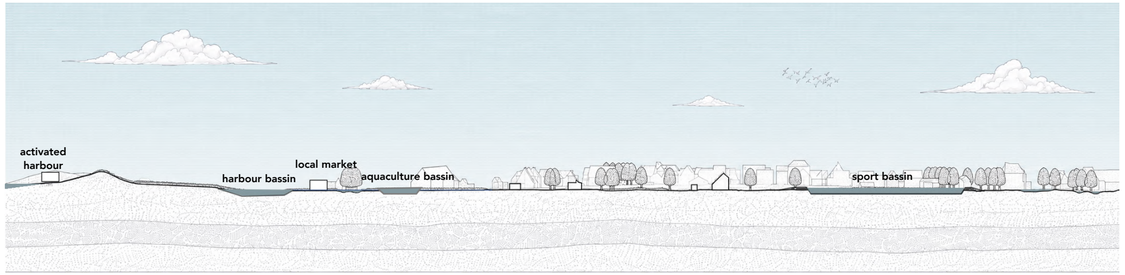
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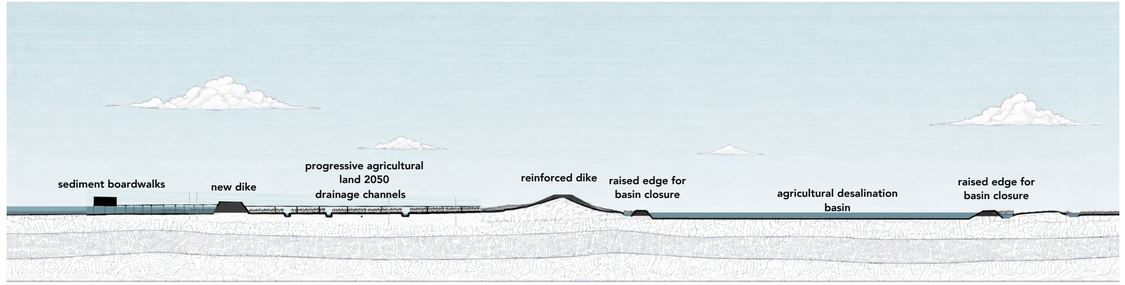


Proposed scheme









BASIN SYSTEM OPERATION

COLLECTING, STORING AND REUSING FRESHWATER ACROSS THE PRODUCTIVE LANDSCAPE

HOW DOES THE SYSTEM WORK?

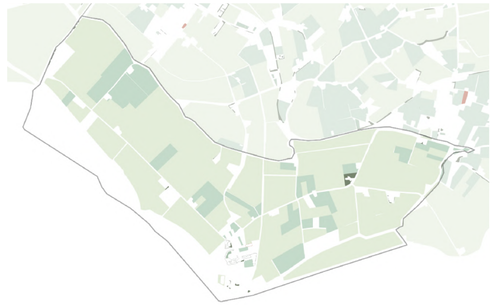
The basin network operates as a seasonal freshwater reserve. During wet periods, rainwater and drainage water are collected from roofs, paths, agricultural fields and existing drainage lines. Before entering the basins, water is slowed down and filtered through vegetated strips, planted ditches and sedimentation edges.

During dry periods, stored freshwater is gradually drawn down and redirected through existing canals, irrigation channels and controlled pumping points. Rather than being drained away, water remains within the landscape for as long as possible, supporting irrigation, ecological moisture and collective public spaces.

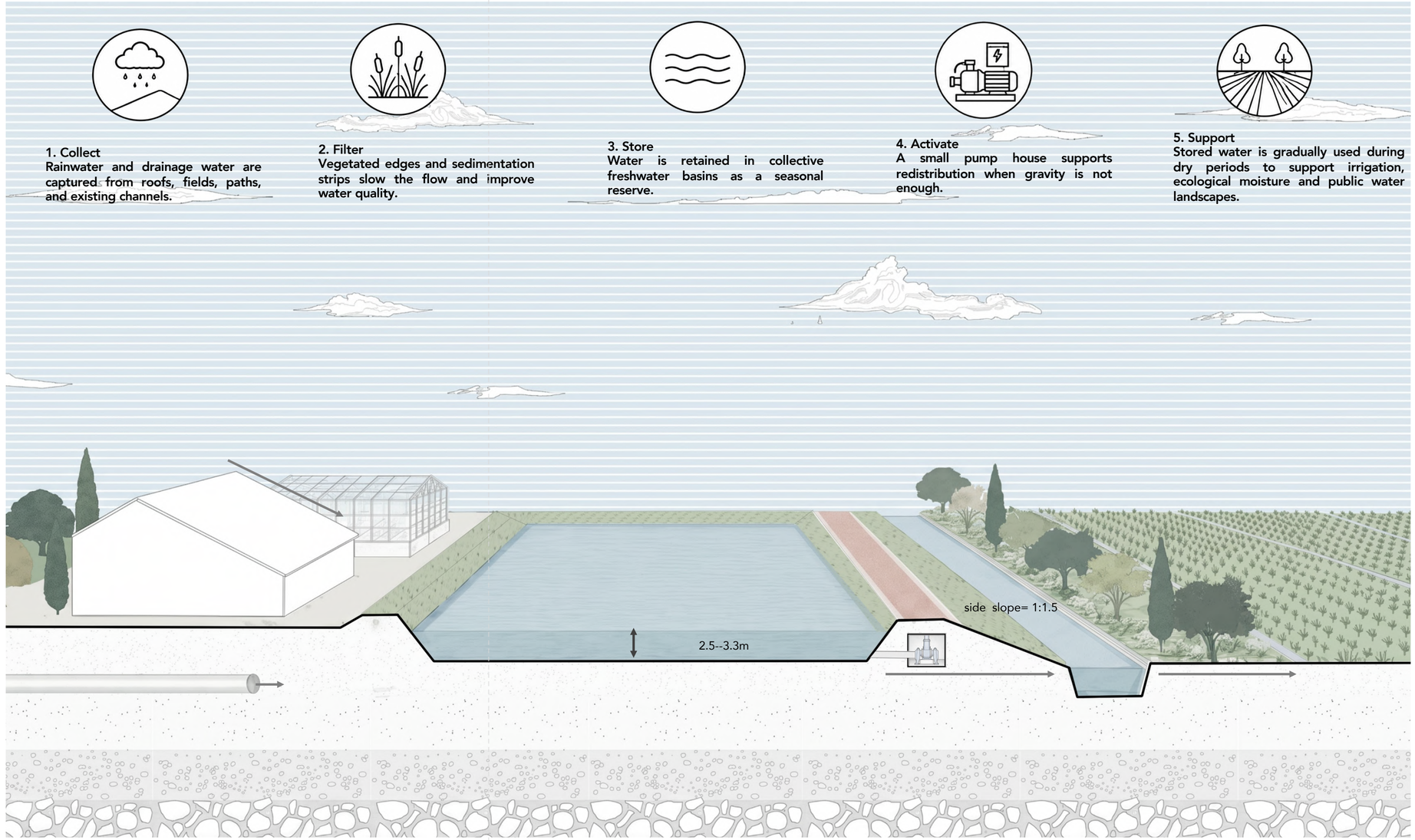
The system works through five actions: collect, filter, store, activate and support.

STORAGE REQUIREMENT*

Irrigated agricultural land: **700 ha**
Irrigation demand: **100 mm**
Required storage volume: **700,000 m³**
Operational basin depth: **3.3 m**
Required basin surface: **~21 ha**
Equivalent to: **~3% of irrigated land**



*Author's calculation based on the indicative basin sizing method presented in *Zeeuws Deltaplan Zoet Water* by Provincie Zeeland (2021, p. 32).



BASINS AS COLLECTIVE WATER LANDSCAPES

A DISTRIBUITED BASIN NETWORK

The basin network is composed of seven typologies, each adapted to a specific territorial condition within the Ellewoutsdijk peninsula. Together, they respond to different relationships between the coast, the village, productive fields and public routes.

Rather than concentrating freshwater storage in a single reservoir, the project distributes water across coastal, recreational and agricultural landscapes. Each basin is therefore shaped by its surrounding hydrological, spatial and productive context.

Beyond their hydraulic role, the basins also create new public, ecological and productive spaces. They support irrigation, reinforce ecological continuity and make water storage visible and accessible within everyday life.

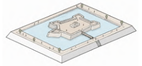
Together, the seven typologies form a connected landscape infrastructure that collects, stores, filters and gradually reuses freshwater. In this way, the system operates both as a water reserve and as a territorial structure for adaptation.



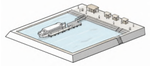
TYPOLOGIES AND STORAGE

The distributed network is composed of seven basin typologies grouped across coastal, community and productive landscapes. Together, they provide an estimated storage capacity of ±693,000 m³, equivalent to approximately 3% of the irrigated agricultural land.

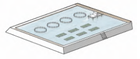
1+ **FORT BASIN**
Coastal / Heritage
Storage: 1 basin / 19,800 m³



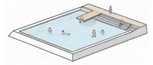
2+ **HARBOUR BASIN**
Coastal / Waterfront
Storage: 1 basin / 21,450 m³



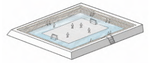
3+ **AQUACULTURE BASIN**
Coastal / Productive
Storage: 1 basin / 9,900 m³



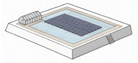
4+ **RECREATIONAL BASIN**
Community / Recreation
Storage: 1 basin / 23,100 m³



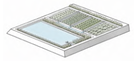
5+ **SPORT / SEASONAL BASIN**
Community / Flexible use
Storage: 1 basin / 24,750 m³



6+ **AGRICULTURE + SOLAR BASIN**
Productive / Energy
Storage: 5 basins / 396,000 m³

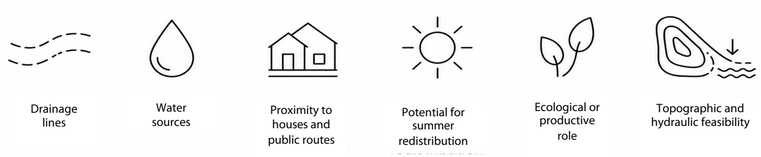


7+ **AGRICULTURAL DESALINATION BASIN**
Productive / Adaptation
Storage: 4 basins / 198,000 m³



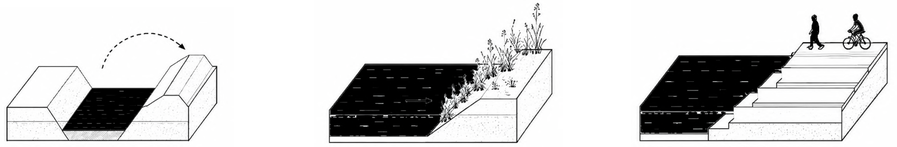
LOCATION CRITERIA

Basin locations respond to hydrological, spatial and productive conditions. Their placement is determined by existing drainage lines, water availability, proximity to houses and public routes, potential for seasonal redistribution, ecological or productive roles, and topographic and hydraulic feasibility.



BASIN DESIGN PRINCIPLES

The freshwater basins are not conceived as isolated reservoirs, but as landscape structures shaped by three design principles: cut and fill, filtering edges and accessible edges. Excavated soil is reused to reinforce the dikes, planted margins support ecological filtration, and selected basin edges become public thresholds that connect storage, mobility and collective life.



Cut and fill

Filtering edges

Accesible edges

BASIN TYPOLOGIES

A DISTRIBUTED FRESHWATER SYSTEM FOR COASTAL, RECREATIONAL AND PRODUCTIVE LANDSCAPEs

The basin network is composed of seven typologies, each responding to a specific territorial condition within the Ellewoutsdijk peninsula. Rather than repeating a single reservoir model, the project adapts water storage to different relationships between the coast, the village, the harbour, agricultural fields and public routes.

The seven basins are organised into three main families. Three coastal and waterfront basins — the Fort Basin, Harbour Basin and Aquaculture Basin — activate the edge of the Western Scheldt through heritage, public life and productive water uses. Two recreational and community basins create accessible spaces for everyday activities, sports, gatherings and seasonal public use. Two productive agricultural basins support irrigation, solar energy, soil recovery and adaptive farming.

Together, these typologies form a distributed freshwater infrastructure. Each basin has a different spatial role, but all contribute to collecting, storing, filtering and gradually reusing water within the landscape.

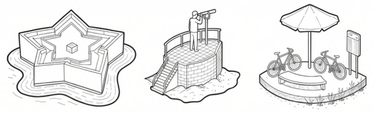


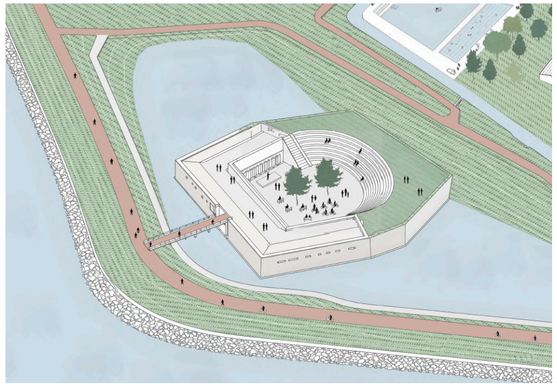
1+ FORT BASIN
heritage

Where: Fort and coastal edge

Water role: Seasonal freshwater storage
Spatial role: Heritage anchor, viewpoint, cultural meeting space and cycling stop

Transformation: The existing moat is expanded into a larger water space, recovering the fort's historical relationship with water while increasing its reservoir capacity. The original form of the fort is preserved and reinforced as a central heritage element. At the same time, the site is activated as a public node with viewing points, cultural activities, community gathering spaces and supporting facilities for cyclists and visitors, transforming the fort into an active collective landscape anchored in memory and water.



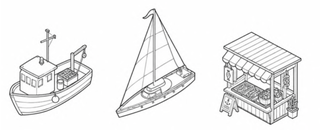


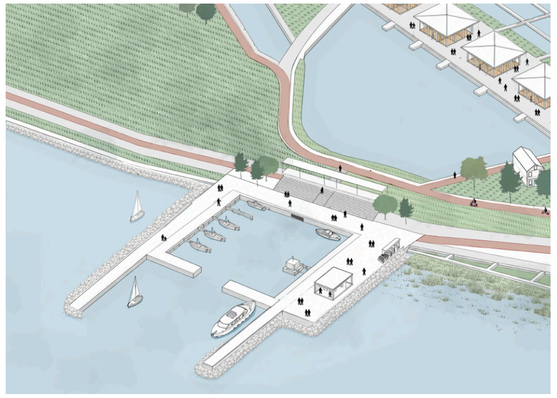
2+ HARBOUR BASIN
waterfront

Where: Harbour and former ferry landing

Water role: Controlled freshwater and tidal exchange
Spatial role: Public waterfront, market space, small-scale fishing harbour and collective meeting point

Transformation: The harbour basin is reshaped and reactivated as a mixed-use waterfront connected to the village and the coastal route. New public edges, docks and working platforms accommodate leisure boats, sailing activities and small-scale fishing, while market spaces support the sale of local agricultural products and daily catches. More than a technical basin, the harbour becomes an important social threshold where water, mobility, local economy and collective life come together.





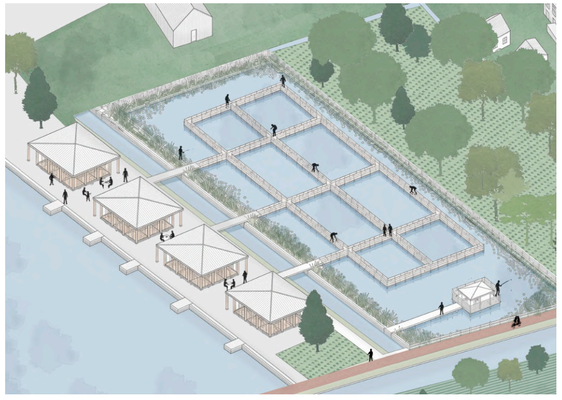
3+ AQUACULTURE BASIN
production

Where: Harbour edge and brackish water interface

Water role: Controlled brackish water management
Spatial role: Productive aquaculture landscape, educational space and extension of the harbour economy

Transformation: Located behind and connected to the harbour basin, the aquaculture basin is developed as a controlled productive water landscape for low-impact species selected to avoid excessive water contamination. A system of filtering edges helps improve water quality and mediates between production and the surrounding landscape. Working platforms, small support structures and educational spaces connect aquaculture with public learning, while the basin remains directly linked to the harbour and local market as part of a broader coastal production system.





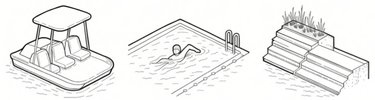
4+ RECREATIONAL BASIN
community recreation

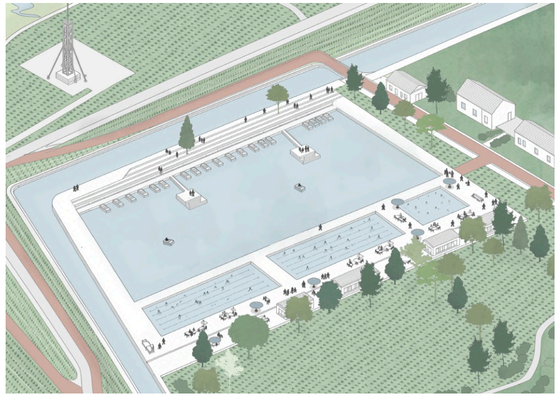
Where: Village edge and public route

Water role: Seasonal freshwater storage for community use

Spatial role: Everyday recreation, seasonal swimming areas and collective waterfront space

Transformation: This basin provides direct access to water for the village community. It is designed as a recreational landscape with pedal boats, seasonal swimming areas and stepped edges that allow people to sit, gather and interact with the water. Rather than functioning only as a storage basin, it becomes a public space that supports everyday community life and seasonal recreation around the water.





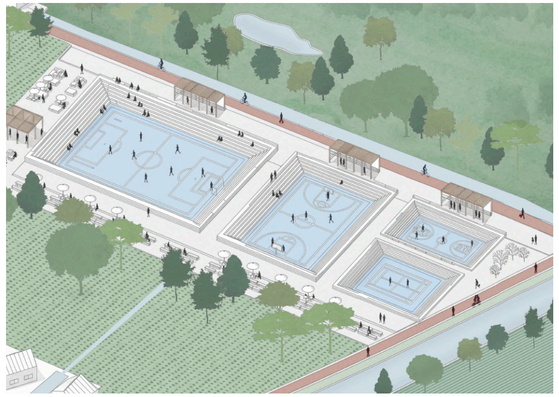
5+ SPORT/SEASONAL BASSIN
flexible civic space

Where: Open collective fields near the village

Water role: Temporary rainwater retention and seasonal storage
Spatial role: Sunken sports fields and flexible public space

Transformation: The sport basin is conceived as a system of connected sunken courts that can temporarily retain runoff from the surrounding residential areas. Its filling level depends on the water needs of the surrounding agricultural fields, allowing stored water to be redistributed when irrigation demand increases. According to seasonal conditions and agricultural requirements, the basin can alternate between water storage and active sports use. In dry periods, it functions as a collective space for sports and community activities; when water storage is needed, it operates as a flexible retention basin that supports both the freshwater system and agricultural production.





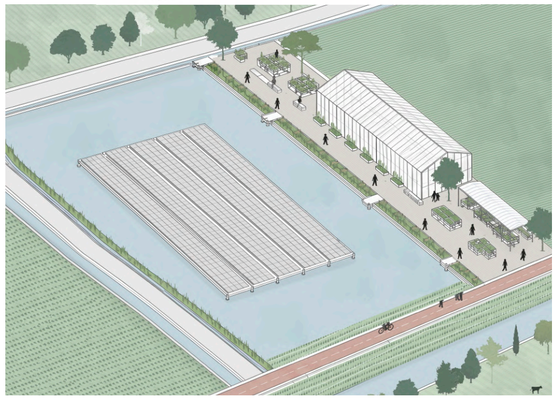
6+ AGRICULTURE + SOLAR BASIN
productive energy landscape

Where: Productive fields at the intersection of drainage and irrigation lines

Water role: Irrigation water storage and controlled redistribution to agricultural land
Spatial role: Productive basin, greenhouse interface and energy-support landscape

Transformation: This basin is located where the main drainage and irrigation lines intersect, allowing stored water to be redistributed back to the agricultural fields when needed. A greenhouse is introduced as a space of interaction and exchange between farmers, local residents and visitors, supporting cultivation, experimentation and learning. Solar panels are integrated for two purposes: to reduce overheating and evaporation during extreme summer conditions, and to generate energy for the pumping systems that return water to the fields.



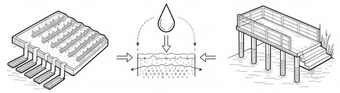


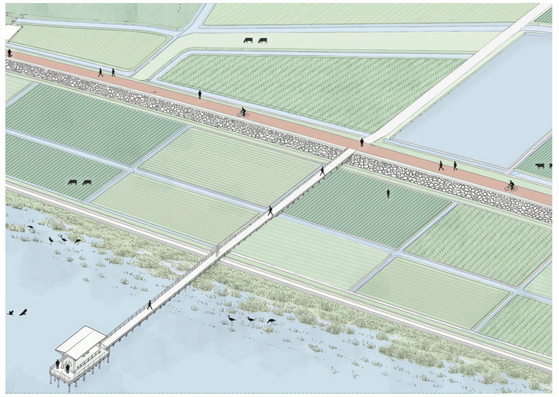
7+ AGRICULTURAL DESALINATION BASIN
adaptive agriculture

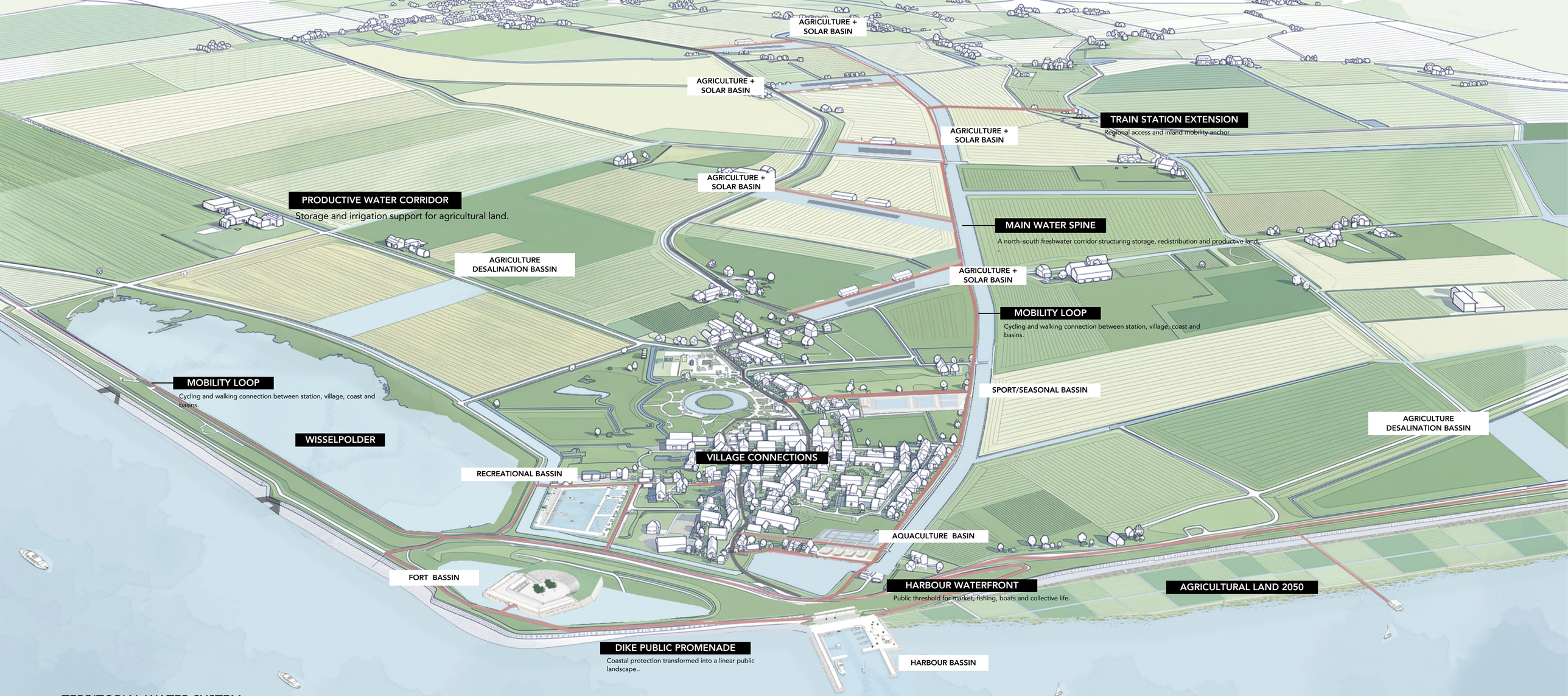
Where: Saline-stressed agricultural fields

Water role: Freshwater retention, soil desalination and future cultivation
Spatial role: Adaptive agricultural landscape

Transformation: This basin continuously collects and retains freshwater to support the gradual desalination of the surrounding agricultural land. It contributes to the future transformation of both the polder edge and the Agricultural Land 2050 area, improving cultivation conditions over time. A raised boardwalk crosses the basin, providing access and circulation for farmers. Its structural columns and foundations encourage sediment deposition where sedimentation naturally occurs, supporting the formation of new wetlands. The boardwalk also functions as a viewing platform, offering panoramic views toward the sea and strengthening the relationship between agricultural production, ecological restoration and the coastal landscape.

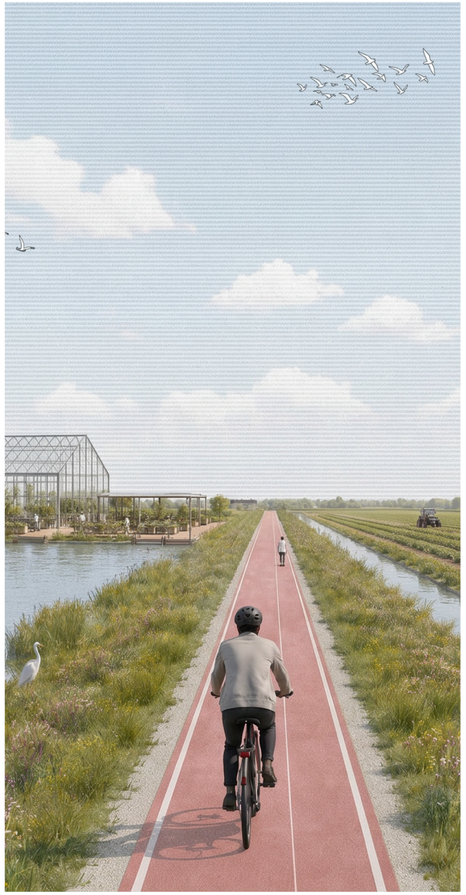






TERRITORIAL WATER SYSTEM

Freshwater storage, productive basins and public connections around Ellewoutsdijk



Opening productive fields to public movement



Structuring agricultural gradients with boardwalks



Transforming the dike into a coastal route



Activating the harbour as a collective waterfront threshold

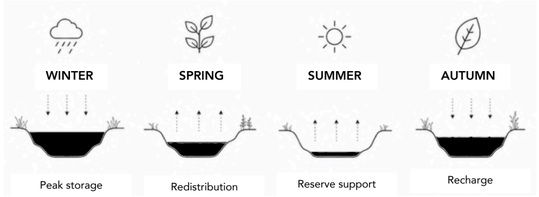
TEMPORAL STRATEGY

From seasonal water storage to long-term landscape adaptation

The project is not conceived as a fixed final image, but as a system that evolves through time. Its temporal strategy works across three interconnected scales: the seasonal cycle of water storage and reuse, the medium-term transformation of agricultural and ecological edges, and the long-term adaptation of the coastal territory to sea-level rise, salinisation and changing freshwater availability.

1.Seasonal cycle — water storage and reuse

During wet periods, rainwater and drainage water are collected, filtered and stored in the basin network. During dry periods, this stored freshwater gradually supports irrigation, ecological moisture and public water spaces. The system therefore keeps water within the landscape for longer, instead of evacuating it immediately through drainage.

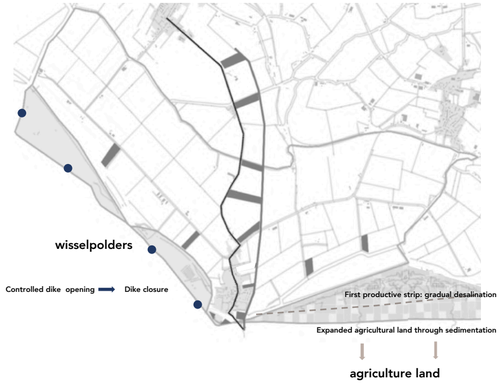


2. Medium-term transition — productive and ecological adaptation

In the medium term, the wisselpolder is allowed to fill completely as a temporary tidal buffer, helping the territory absorb sea-level rise pressure while creating space for sedimentation. Inland, the first agricultural strip begins a gradual process of soil recovery and desalination, supported by freshwater retention and controlled irrigation. Vegetated edges, sedimentation zones and accessible paths transform technical water infrastructure into productive corridors, ecological habitats and collective spaces.

3. Long-term transformation — coastal resilience and spatial continuity

In the long term, after sufficient sediment accumulation, the wisselpolder is progressively closed, allowing the flooded area to evolve into mudflat conditions and later into new land. At the same time, sedimentation and freshwater management support the gradual expansion of agricultural land beyond the first productive strip. The dike, wisselpolder, harbour, agricultural fields and inland water spine work together as a continuous landscape system, creating new relationships between water storage, productive land, ecological succession and everyday public life.



REPLICABLE SYSTEM

A transferable framework for inhabited coastal polders

Ellewoutsdijk is not an exceptional case, but a legible one. Its conditions — a small inhabited settlement on a tidal estuary, protected by a rigid dike system, dependent on rainfall for freshwater supply, and exposed to salinization, drought and sea-level rise — are shared by many communities along the Western Scheldt and the wider Southwest Delta. The peninsula therefore works as a specific case through which broader estuarine vulnerabilities can be read and spatially addressed.

The project proposes a spatial framework rather than a fixed solution to be copied. Its principles can be reinterpreted according to settlement size, harbour presence or absence, salinity levels, soil conditions, landscape type, water infrastructure and local governance capacity. Instead of prescribing one form, the framework defines adaptable relationships between basins, dikes, settlements, agricultural fields and ecological corridors, creating a transferable strategy for adaptive estuarine landscapes.



Settlements and Drainage Network.
The map shows the recurring relationship between village footprints, drainage channels across the Western Scheldt, highlighting the territorial conditions where a basin-based water strategy could be replicated.

REFLECTION

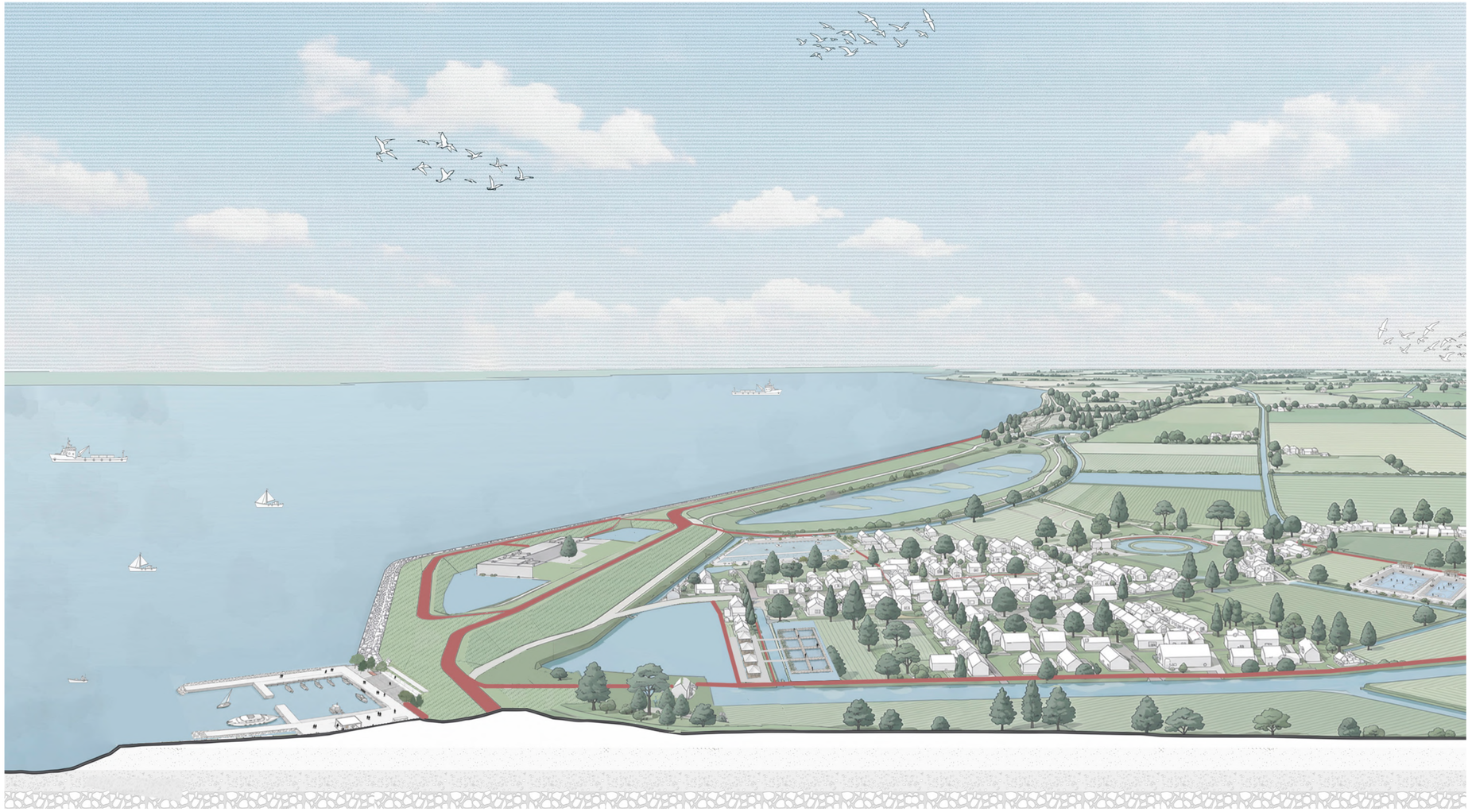
From Technical Necessity to Collective Landscape

The project started from a condition that is both technical and social: the increasing need to secure freshwater within inhabited coastal polders. Across the Zeeland delta, this need is intensified by seasonal drought, salinisation, changing rainfall patterns and the pressure placed on agricultural land, conditions that converge with particular clarity in Ellewoutsdijk. Yet the infrastructures that manage water — dikes, drainage canals, pumping systems and basins — have largely been conceived as technical devices, separated from the spatial and everyday life of the village.

This thesis reflects on the possibility of rethinking these infrastructures not as isolated hydraulic objects, but as landscape structures that can organise new relationships between water, land and settlement. The project does not propose to replace the existing system. Instead, it works with the latent spatial potential of what is already there: the dike, the drainage network, the harbour edge, the low-lying fields and the agricultural compartments.
Through this approach, freshwater storage becomes more than a response to scarcity. It becomes a framework for spatial transformation. The dike is reinterpreted as a public and ecological promenade; the drainage canal as a freshwater spine; the harbour as a collective threshold; and the basins as multifunctional spaces where storage, production, ecology, mobility and public life overlap.

In doing so, the project responds to the research question by showing that water infrastructures can be redesigned as collective landscapes when their technical performance is combined with spatial, social and ecological roles. A basin is not only a reservoir; a dike is not only a line of defence; a canal is not only a drainage device. Each can become part of an inhabited landscape that supports both adaptation and everyday life.

In this sense, the proposal shifts the discussion from water management as control toward water infrastructure as a shared territorial framework. It suggests that adaptation in coastal polders should not only be measured by protection or storage performance, but also by the capacity of infrastructure to produce public value, support productive land and strengthen the relationship between settlements and their changing water landscapes. In Ellewoutsdijk, this means that the future of the polder depends not only on how much water it can hold, but on how fully that water can be woven back into the shared life of the village.



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