

Designing MRDH Metropolitan Park Structure

P5 Presentation
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Mentor: Prof. Dr. Steffen Nijhuis, Ir. Marco Lub
Designing Resilient Coastal Landscape Lab





01 Introduction

02 Understanding

03 Application

04 Exploration

05 Reflections





01 Introduction

Fascination

Research Area

Problem Statement

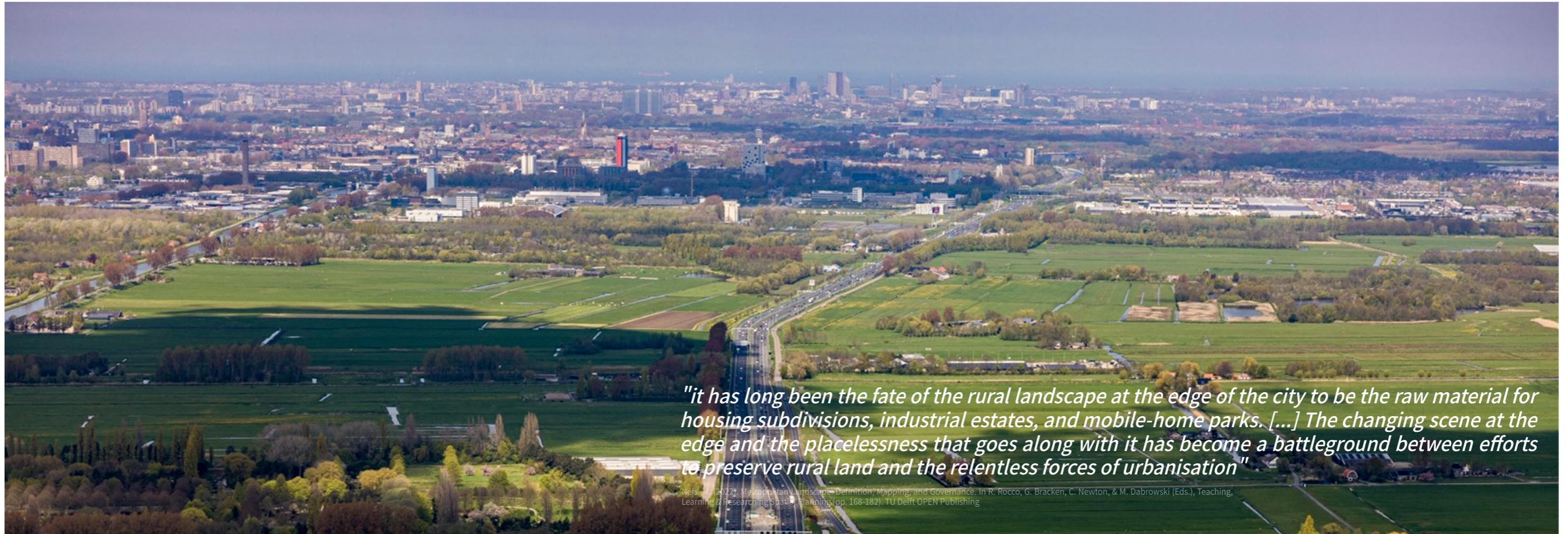
Research Objective & Questions

Theoretical Background

Methodology



Fascination -- The Conflictive Metropolitan Landscape



Source: https://www.a16rotterdam.nl/nieuws_/2468280.aspx?t=beeld-Luchtfotos-april-2023

Fascination -- The Metropolitan Image



Tomorrowland (2015)



Guangzhou Metropolis



Brave New World (2020)



Metropolitan Region Rotterdam-The Hague



Source: https://www.a16rotterdam.nl/nieuws_/2468280.aspx?t=beeld-Luchtfotos-april-2023;
<https://trailersfromhell.com/tomorrowland/>; <https://jonmccoy.artstation.com/projects/kDBq5A>;

Research Area - Metropolitan Region Rotterdam-The Hague (MRDH)



Metropoolregio Rotterdam Den Haag,
economic and transportation-oriented metropolization.

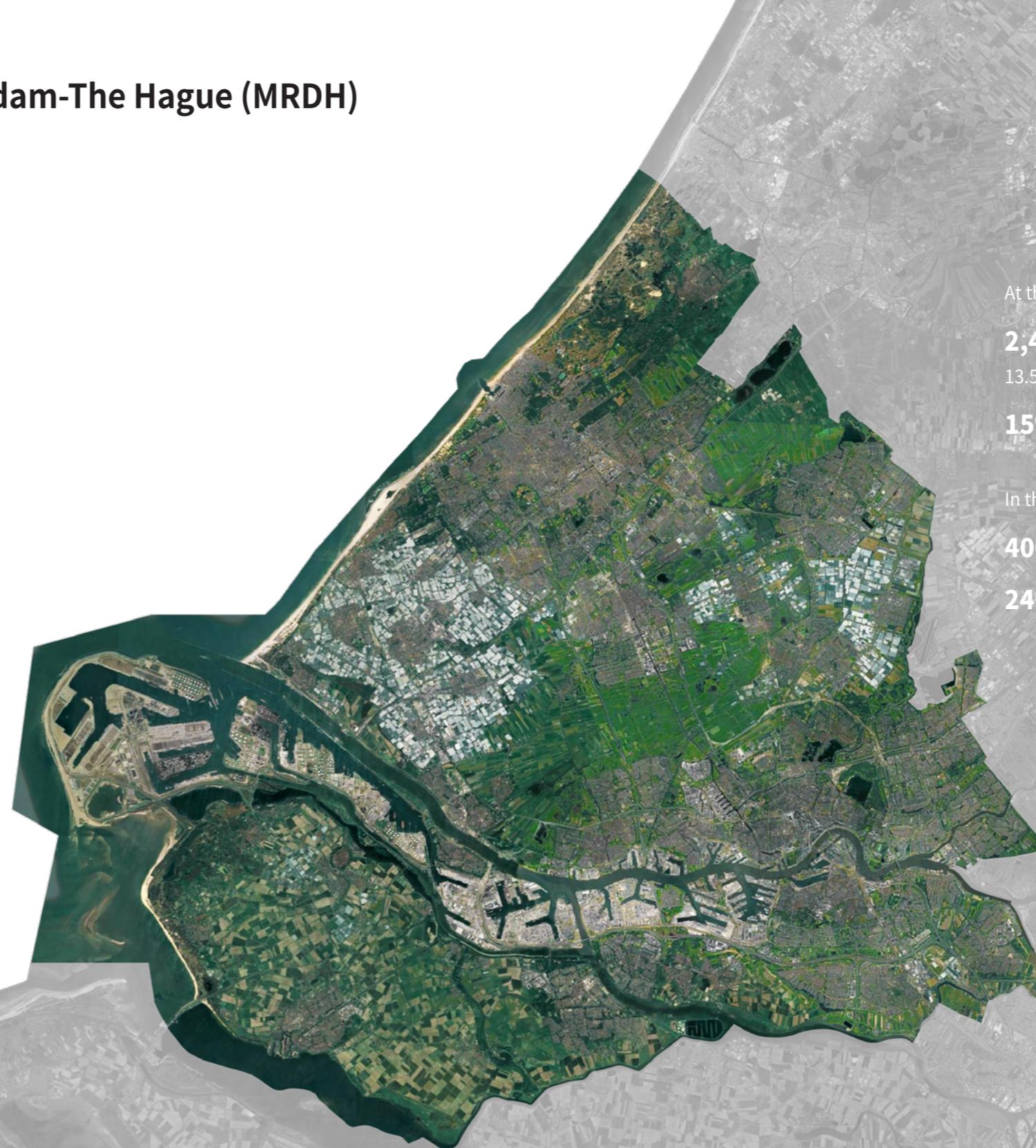


▲ Photo for illustration. © Peter Aquino

Metropolitan region loved and hated

Since the start of the MRDH, the 23 municipalities represented in the Rotterdam The Hague Metropolitan Region (MRDH) have become more convinced of the usefulness of cooperation in driving the region forward. But there is no question of deep love. Many council members say they have little insight into the ins and outs of the MRDH.

Angeliqne Mulders 20-10-17, 14.10



At the moment...

2,400,000 residents

13.5 % national population

15% Gross National Product

In the future...

400,000 new residents

240,000 new homes

The Growth of Metropolitan Region



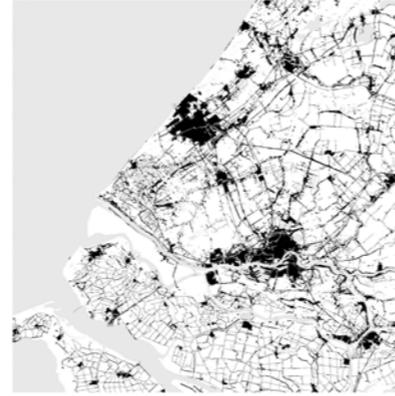
1850
Canal City (before 1850)

1940
Street City (1850-1940)

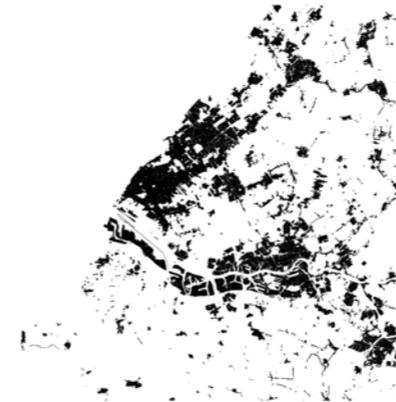
1970
Open City (1940-1970)

2023
Cluster City (after 1970)

Built Environment



Urban Growth



Metropolitan
Landscape
Fragmentation



Map created by author,
Data provided by:
Open-dataportaal Zuid-Holland,
Engel, 2005

The Growth of Metropolitan Region



1850
Canal City (before 1850)

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Built Environment

Urban Growth

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Fragmentation



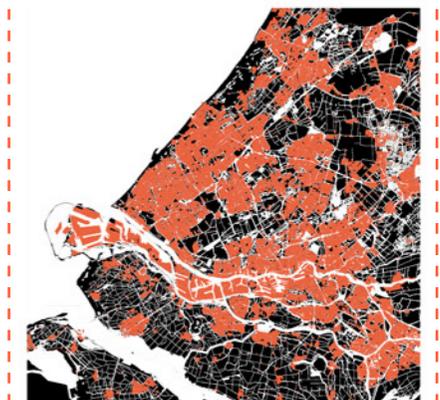
Source: https://www.a16rotterdam.nl/nieuws_/2495414.aspx?t=nieuws-A13-richting-Den-Haag-dicht-van-14-tot-17-juli



Source: https://www.a16rotterdam.nl/nieuws_/2576388.aspx

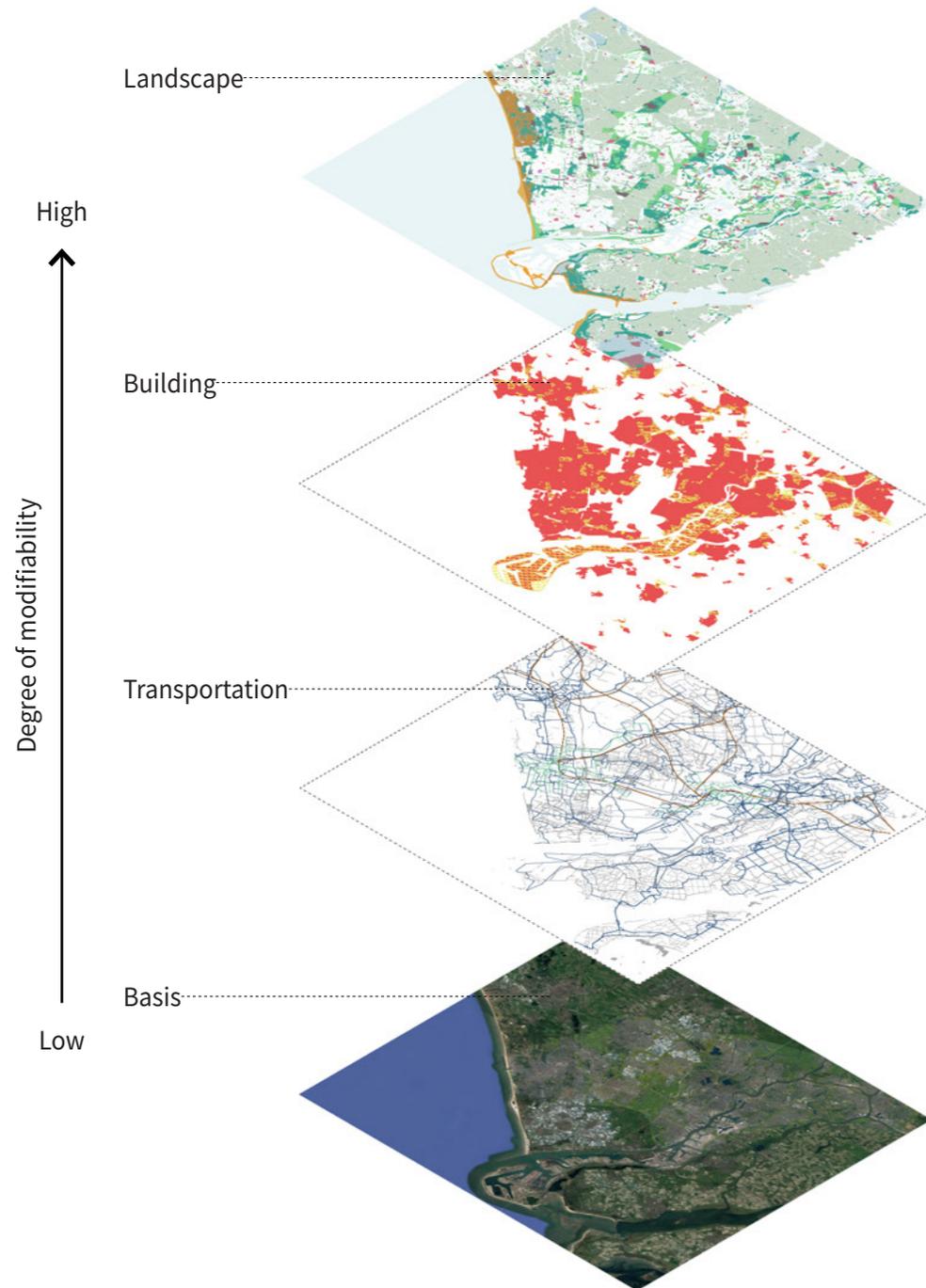


Source: https://www.a16rotterdam.nl/nieuws_/2495414.aspx?t=nieuws-A13-richting-Den-Haag-dicht-van-14-tot-17-juli



Map created by author,
Data provided by:
Open-dataportaal Zuid-Holland,
Engel, 2005

Traditional Economy-oriented Metropolitan Systems



Map created by author,
Data provided by: Open-dataportaal Zuid-Holland, Google Earth

Urban Growth Boundaries

Urban agglomeration, disappearance of transitional metropolitan landscape



Source: <https://www.vhbinfra.nl/over-ons/nieuws/detail/a4-delft-schiedam-geopend>

Turning the back to the landscape



Source: GoogleMap

Landscape Fragmentation

Decreased green accessibility



Source: https://www.a16rotterdam.nl/nieuws_/2495414.aspx?t=nieuws-A13-richting-Den-Haag-dicht-van-14-tot-17-juli

Boundary effect on ecological connectivity



Source: GoogleMap

Landscape Identity

Impact on spatial patterns

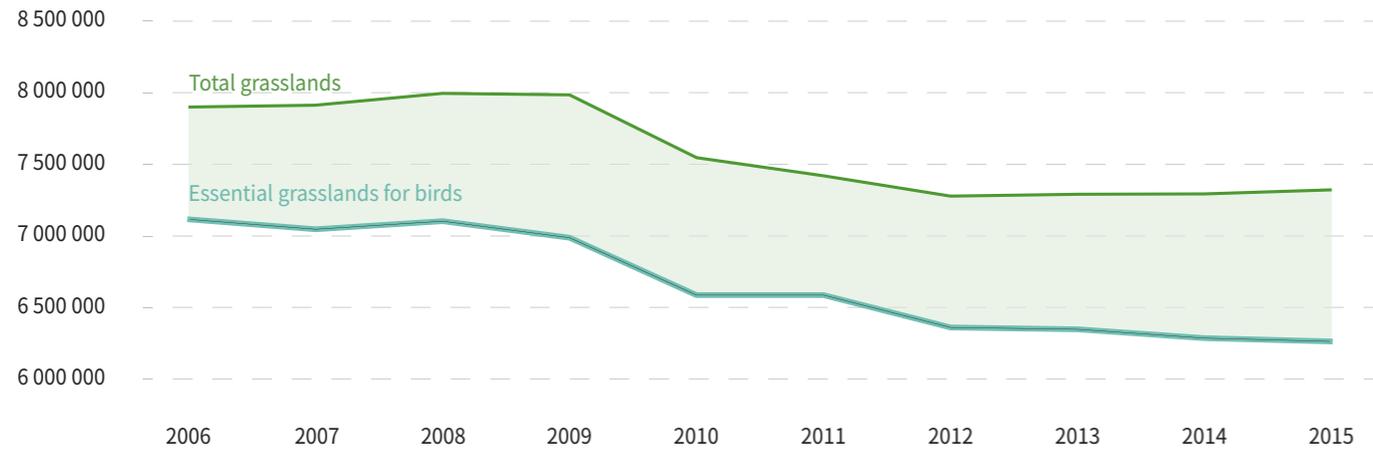


Source: https://www.a16rotterdam.nl/nieuws_/2576388.aspx

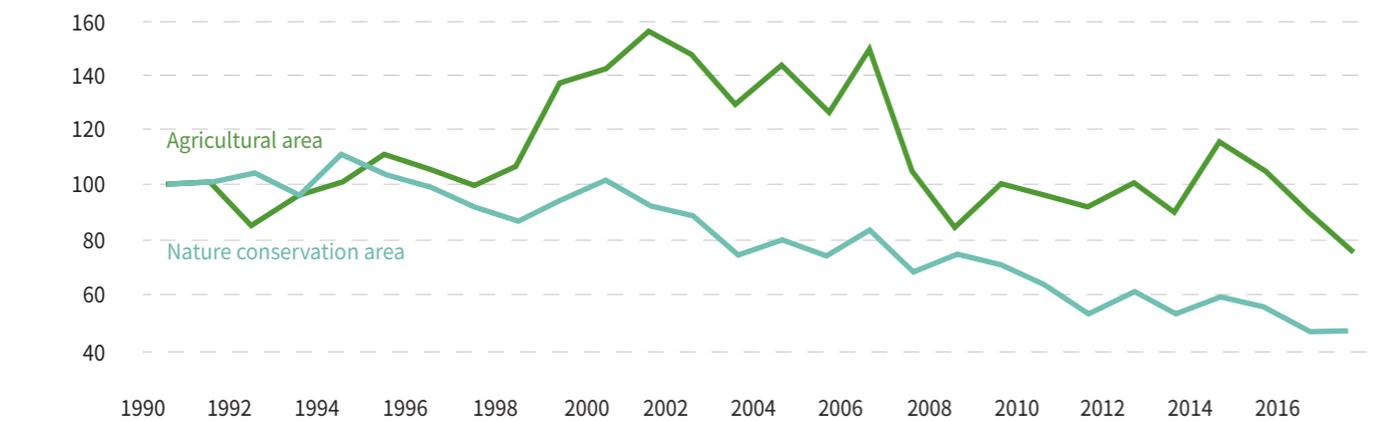
Understanding - Landscape Fragmentation



Total Grassland Area in South Holland (acre)

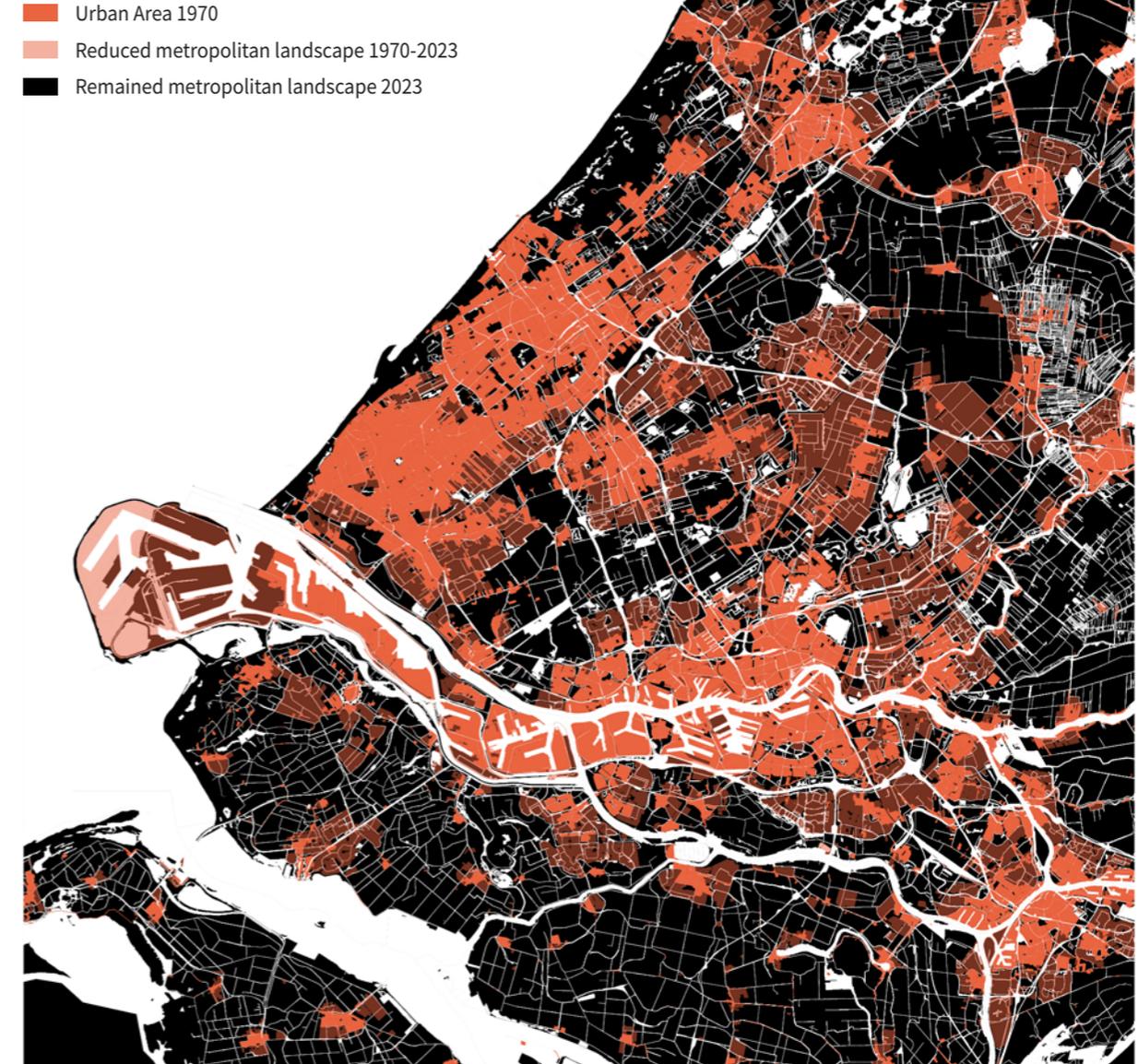


Grassland bird populations in South Holland



Source: Faunabeheerplan Zuid-Holland 2017 - 2023 Vos; Boerenlandvogels Zuid-Holland 2019-2027

Open Greenland Change 1970-2023

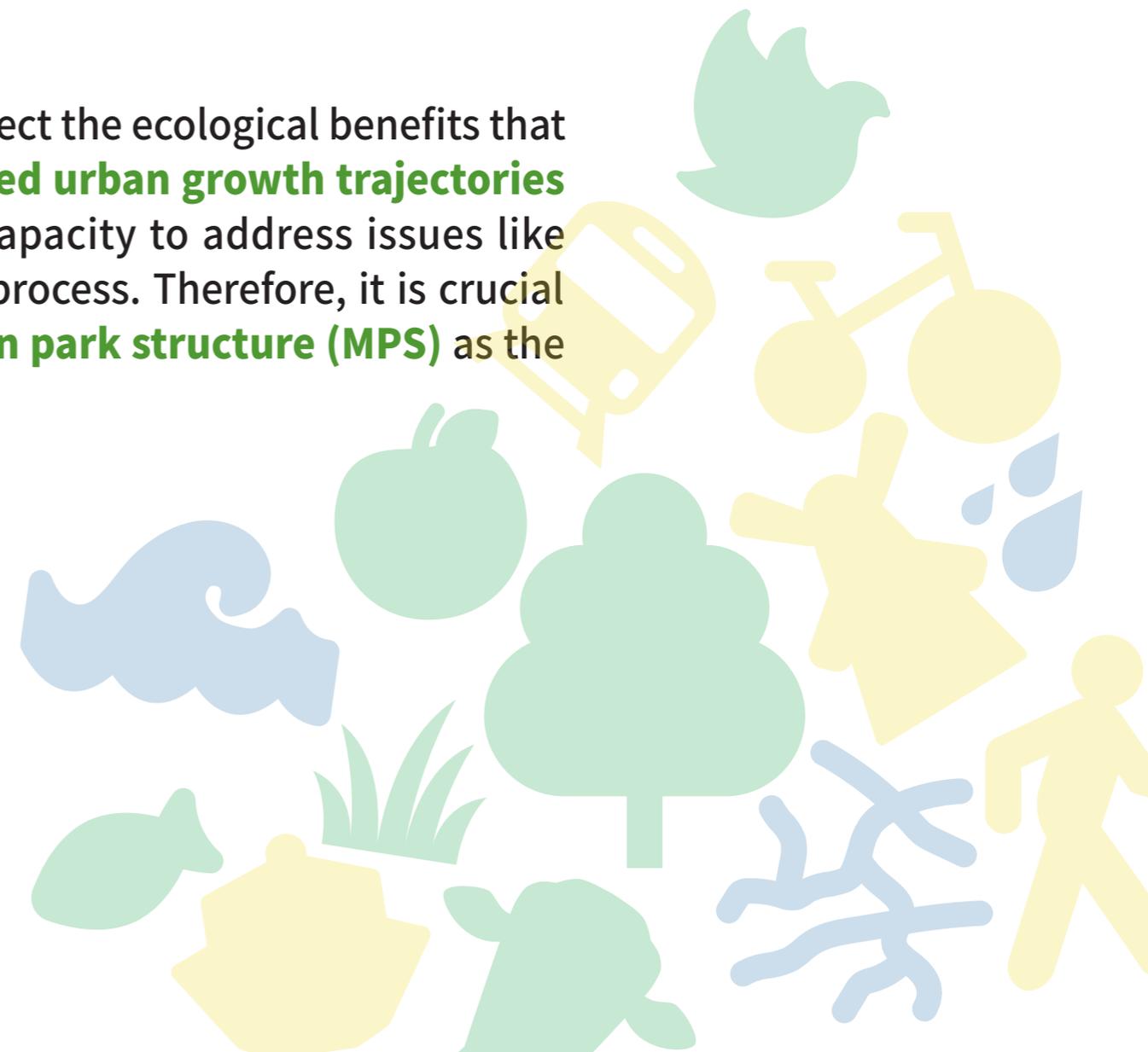


Map created by author, Data provided by: Open-dataportaal Zuid-Holland



The need to holistic metropolitan landscape design solutions

The economy-oriented urban development has the tendency to neglect the ecological benefits that metropolitan landscape can provide, which can lead to **uncoordinated urban growth trajectories and landscape fragmentation**, further challenges the region's capacity to address issues like climate change and biodiversity loss in the future metropolization process. Therefore, it is crucial to develop a landscape-based solutions for MRDH, e.g. **metropolitan park structure (MPS)** as the juncture of city and nature to guide sustainable urban development.





To design a landscape-based MPS that safeguards the **essential landscape values** and guides **sustainable urban development** in MRDH.

Understanding

What are the essential landscape values and challenges in MRDH?

Application

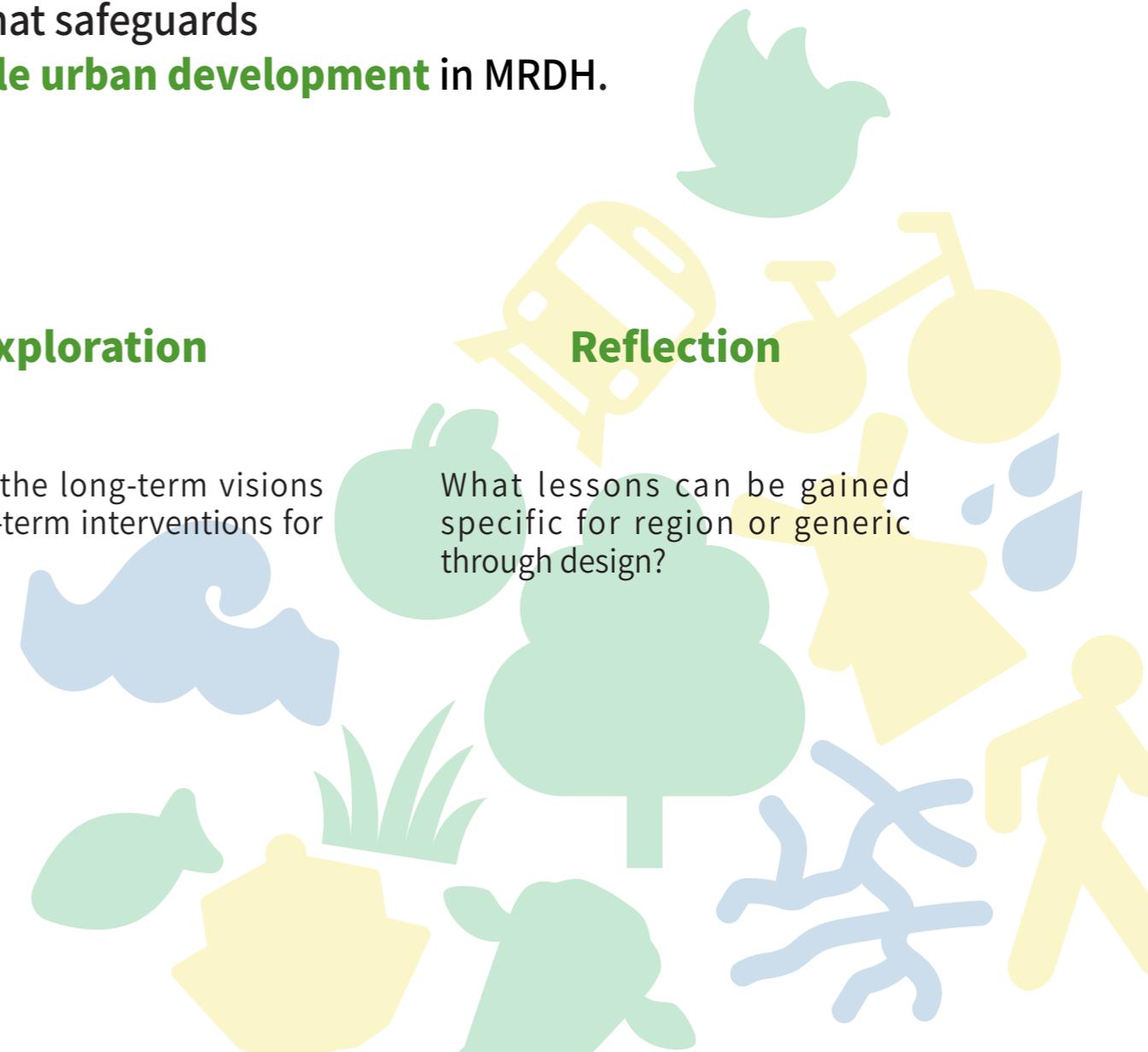
What are the design principles to support a robust MPS framework design?

Exploration

What are the long-term visions and short-term interventions for MRDH?

Reflection

What lessons can be gained specific for region or generic through design?





Source: Natuurinclusief Nederland: natuur overal en voor iedereen, 2022

What is metropolitan park structure?

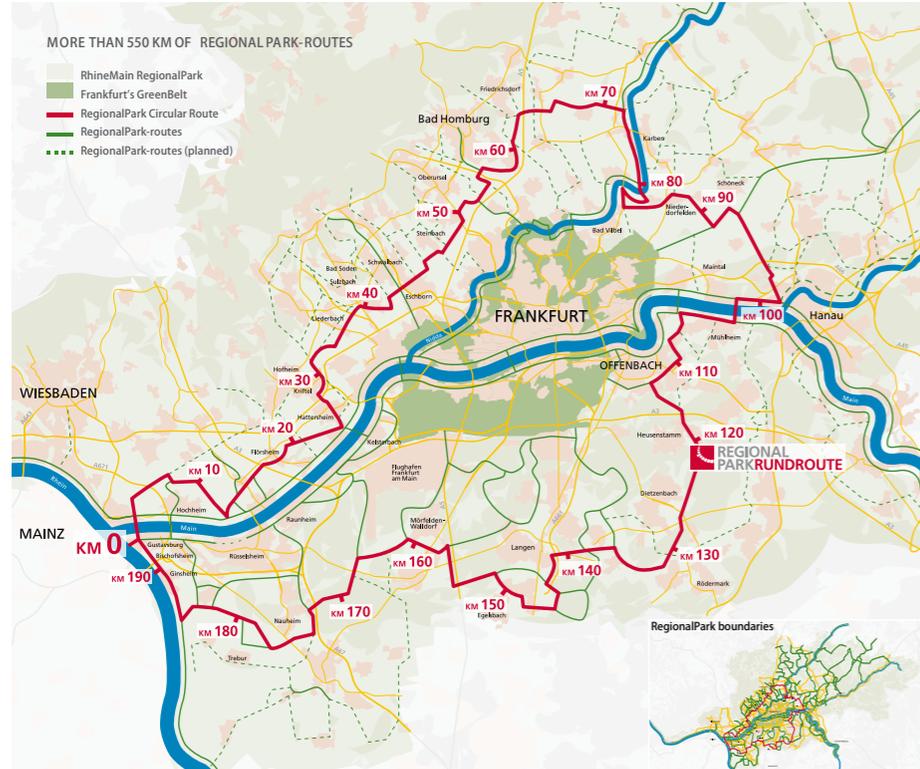
A **socio-ecological design framework** operating at the metropolitan scale.

An **interface between the city and metropolitan area**, strategically designed to integrate, safeguard, and enhance the essential metropolitan landscape resources and inherent values.

It establishes **interconnected open space structures** encompassing nature, agriculture, and urban domains to prevent the depletion of fundamental landscape assets induced by the economy-driven metropolisation process, thereby **supporting sustainable urban development within the metropolitan context**.

Rhein-Main Regional Park, Germany

Interconnected Green Corridor



Landscape as infrastructure to enhance accessibility



Polderr, source: <https://www.fietsen123.nl/route/de-duinen-van-meijendel>

Recreational space for metropolitan experience



Polderr, source: <https://www.fietsen123.nl/route/de-duinen-van-meijendel>

Woodlands as green connection between city and metropolitan area



Polderr, source: <https://www.fietsen123.nl/route/de-duinen-van-meijendel>

Midden-Delfland, the Netherlands

Metropolitan buffer zone



Open polder experience, sustainable farming



Polderr, source: <https://www.fietsen123.nl/route/de-duinen-van-meijendel>

Diverse recreational route network



Polderr, source: <https://www.fietsen123.nl/route/de-duinen-van-meijendel>

Peripheral recreational areas to buffer urban sprawl

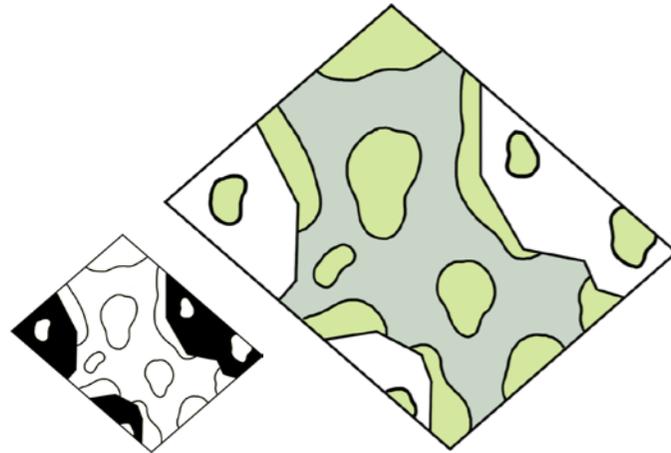


Polderr, source: <https://www.fietsen123.nl/route/de-duinen-van-meijendel>

Landscape-based solutions



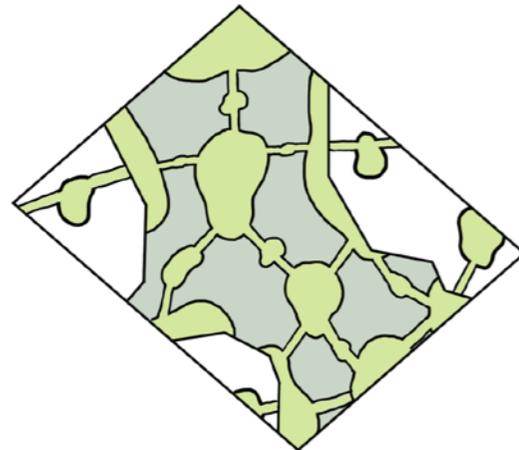
1. Landscape as basis



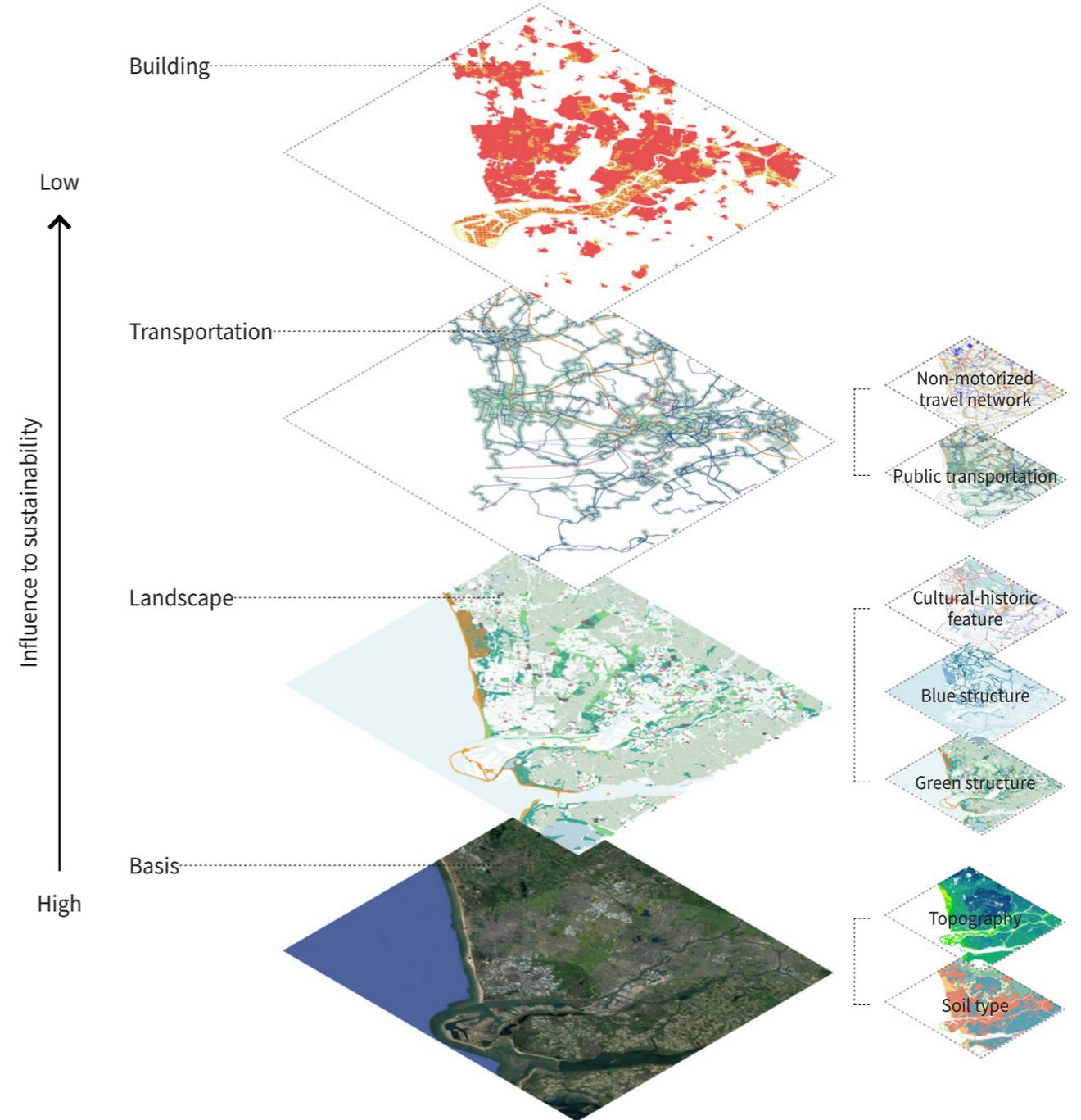
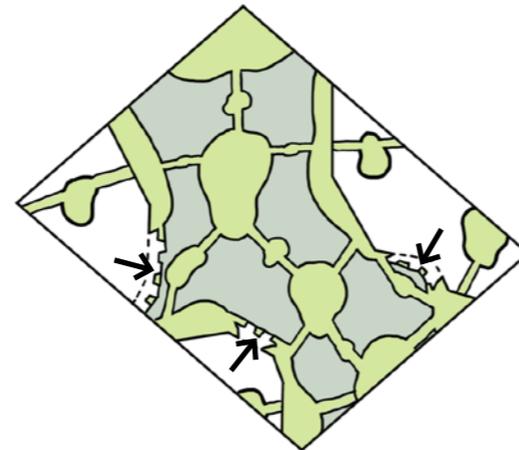
2. Identify essential landscape assets



3. Transform and Interconnect



4. Guide sustainable urban development



Map created by author,
Data provided by: Open-dataportaal Zuid-Holland, Google Earth

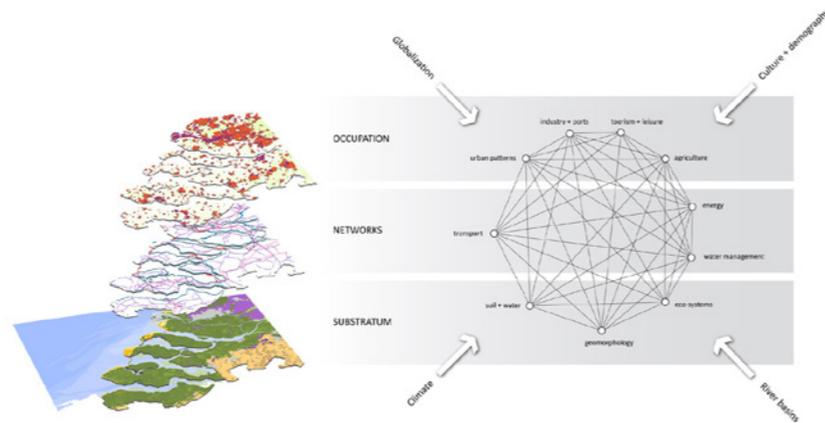
Theoretical Background



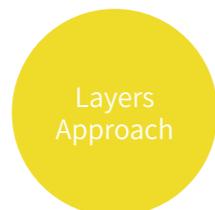
Landscape-based Regional Design

Theory to understand and design complex urban landscape system.

Landscape-based Regional Design follows the landscape logic that views landscape as a social-ecological inclusive, dynamic, and complex system. (Nijhuis, 2022)



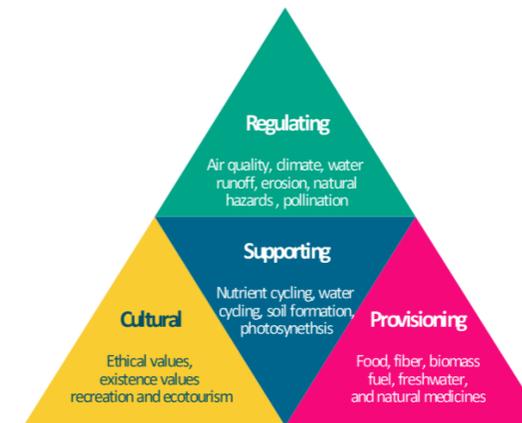
Understanding the urban landscape as a layered and complex system, source: Steffen Nijhuis



Ecosystem services

Theory to design and evaluate landscape values in metropolitan context.

Ecosystem services are defined as the accumulated benefits to human from healthy ecosystems and the natural processes. (MA 2005, Sandifer et al., 2015)



The four main aspects in ecosystem services, source: MA 2005



02 Understanding

What are the essential landscape values and challenges in MRDH?

Metropolitan Landscape Values

- Nature Conservation
- Water Management
- Cultural History
- Recreation
- Food Production
- Metropolitan Experience

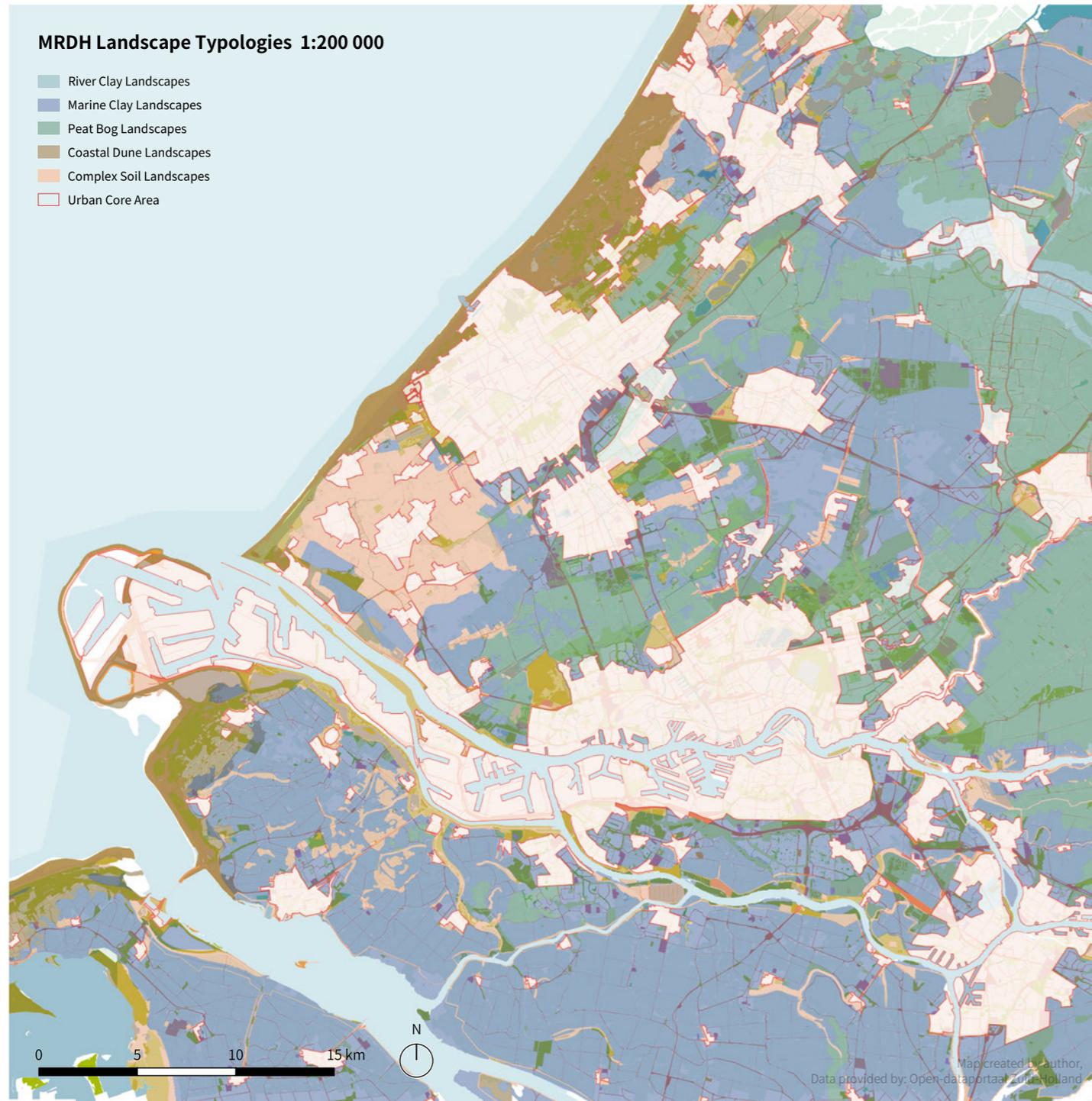
Challenges

- Water Management
- Nature Conservation
- Cultural-historic Recreation

Design Assignments



Metropolitan Landscape Values



Nature Conservation



Polderr, source: <https://www.fietsen123.nl/route/de-duinen-van-meijendel>

Nature recreation



Polderr, source: De Rotte.nl

Water Management



Polderr, source: <https://www.mirandawandelt.nl/recreatiegebied-vlietland/>

Food Production



Polderr, source: Google map

Cultural History



Polderr, source: geschiedenisvanzuidholland

Metropolitan Experience



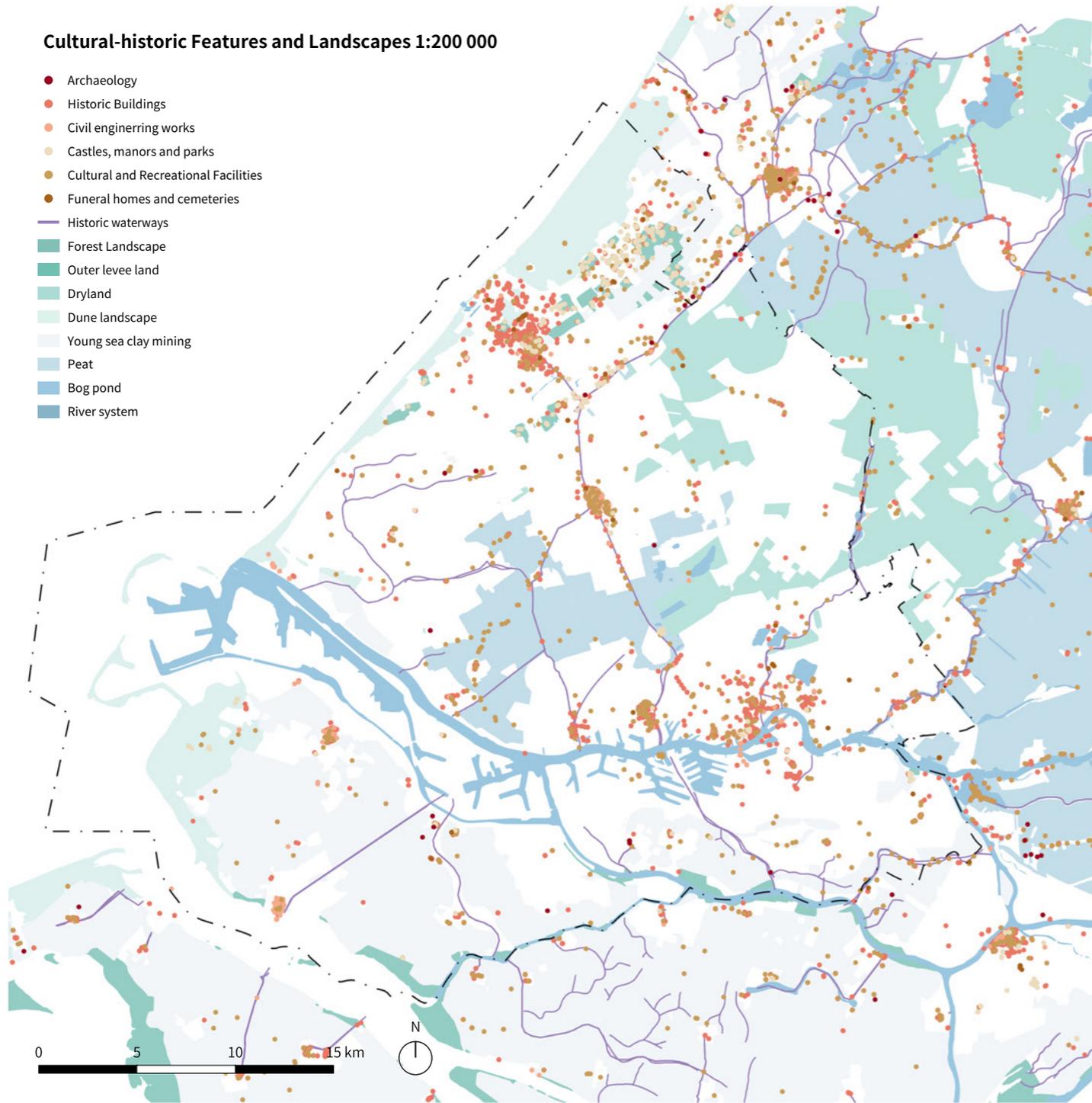
Polderr, source: <https://www.woneninrotterdam.nl/en/overschie/overschie/>

Cultural-historic Features



Cultural-historic Features and Landscapes 1:200 000

- Archaeology
- Historic Buildings
- Civil engineering works
- Castles, manors and parks
- Cultural and Recreational Facilities
- Funeral homes and cemeteries
- Historic waterways
- Forest Landscape
- Outer levee land
- Dryland
- Dune landscape
- Young sea clay mining
- Peat
- Bog pond
- River system



Civil Engineering Work



De Prinsmolen, Source: ookditsiderotte.nl

Cultural and Recreational Facility



Atlantikwall Museum, Source: geschiedenisvanzuidholland

Castle, Manor and Park



Voorburg, Source: geschiedenisvanzuidholland

Levee



Hoek V. Holland, Source: opentoptroulocatieroute

Dike



Noordzeeweg, Source: Google map

Painting



Lentelandschap, Source: Chabot Museum

Historic Waterway



River Rotte, Photo by Author

Dunes



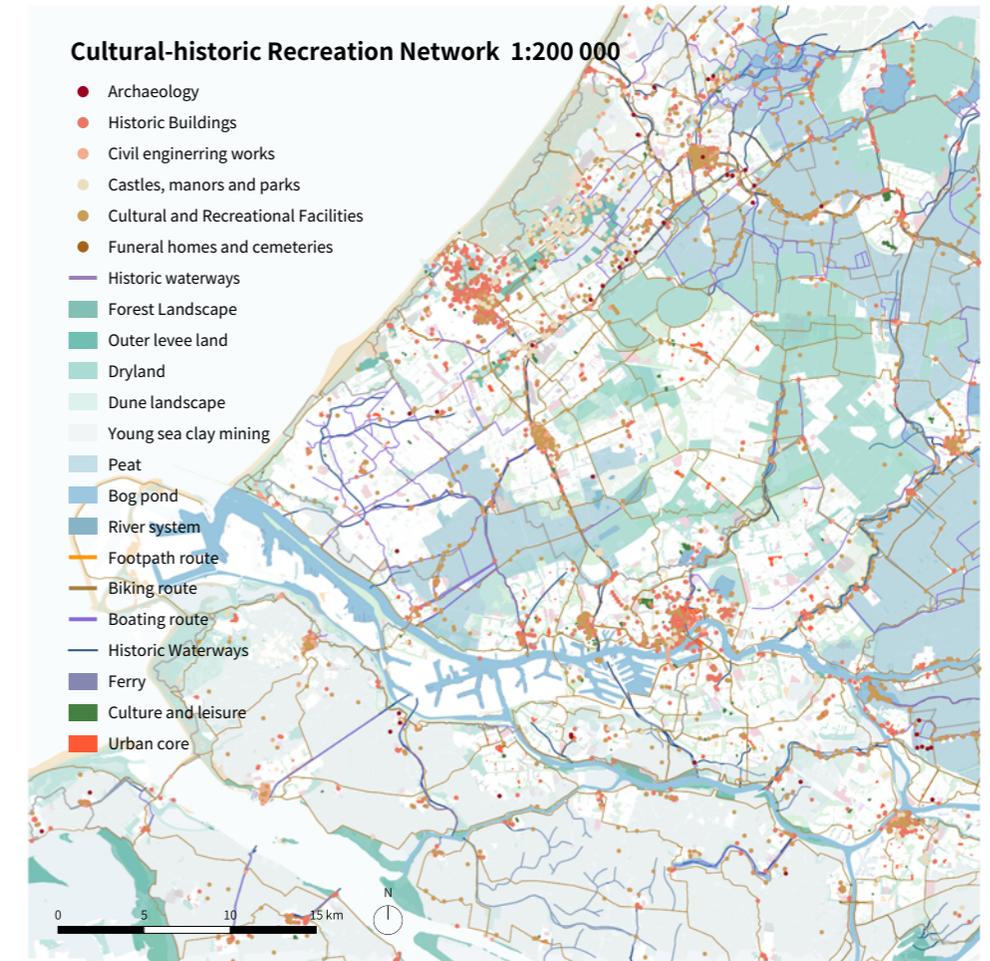
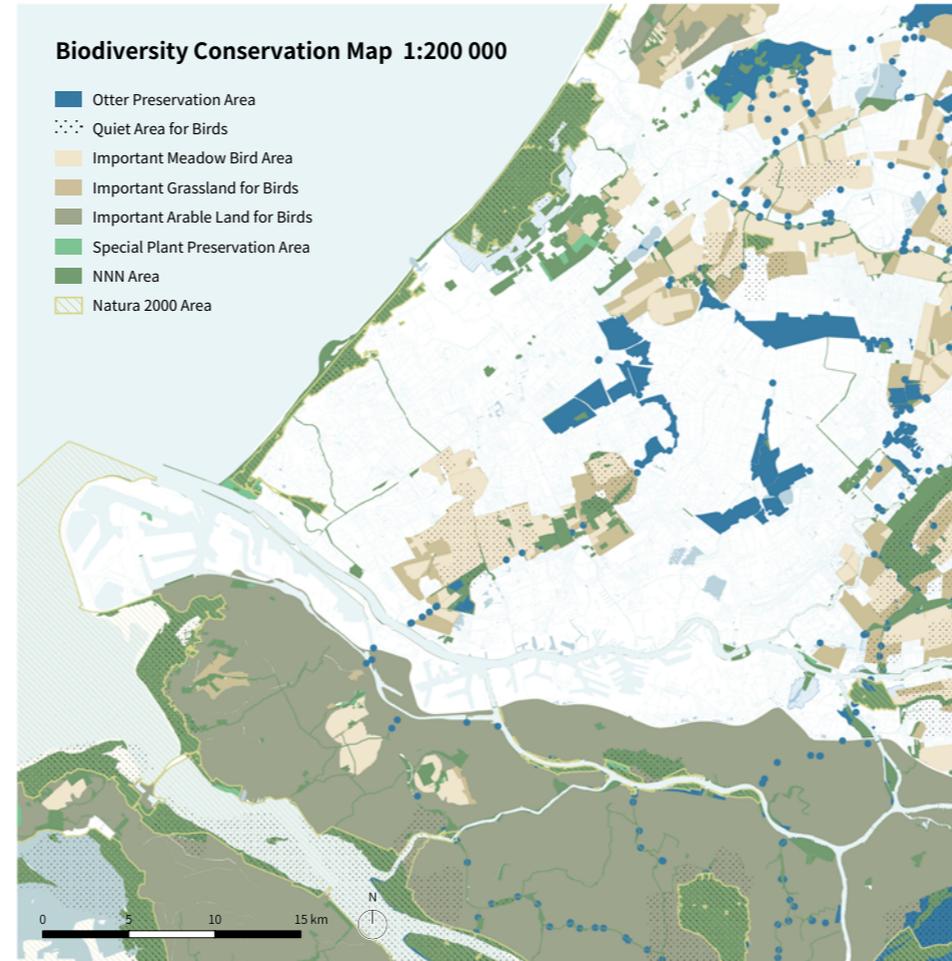
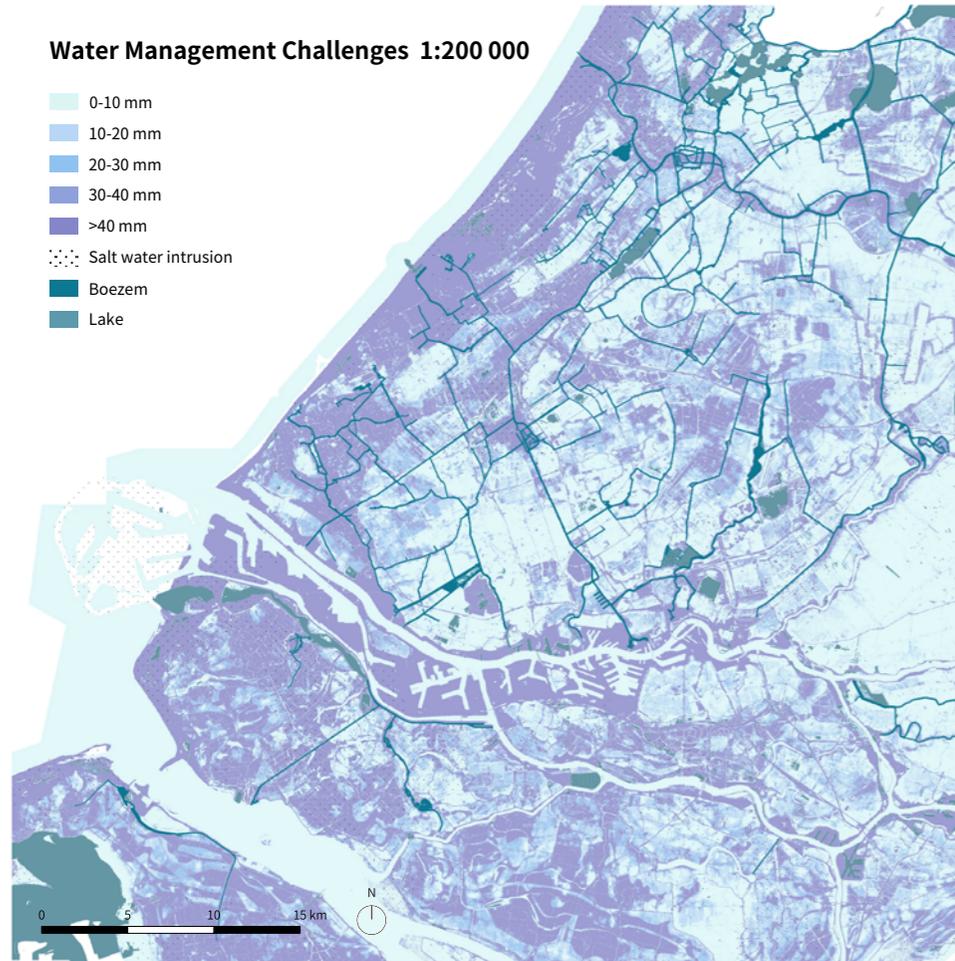
Bierlap, Source: photo by author

Polders



Farmland in Den Hoorn Source: GoogleMap

What aspects should MPS contribute to for achieving **sustainable urban development** in MRDH?



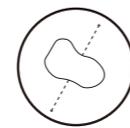
Extended heat & drought

- Extended hot weather duration and higher fresh water demand.
- Less precipitation in dry season.



Extended heat & drought

- Irreversible damage to drought-prone wetland.



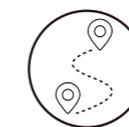
Habitat fragmentation

- Isolated habitats lacking connections.
- Lacking diverse stepping stones to build up connections.
- Incompatible food source.



Human disturbance

- Increasing human visit.
- Noise from recreational activities and transportation.
- Incompatible vegetation abundance for sheltering.



Slow traffic accessibility

- low connectivity between recreational greenlands.
- Demand for diverse travel routes and modes to alleviate current travel pressure.



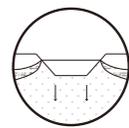
Metropolitan experience

- Clear image to increase metropolitan landscape attractiveness



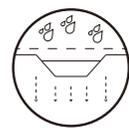
Increasing demand on recreation

- Increasing need to more open space supply



Declined groundwater storage

- Decreased permeable land.
- Lowered groundwater table due to subsidence.



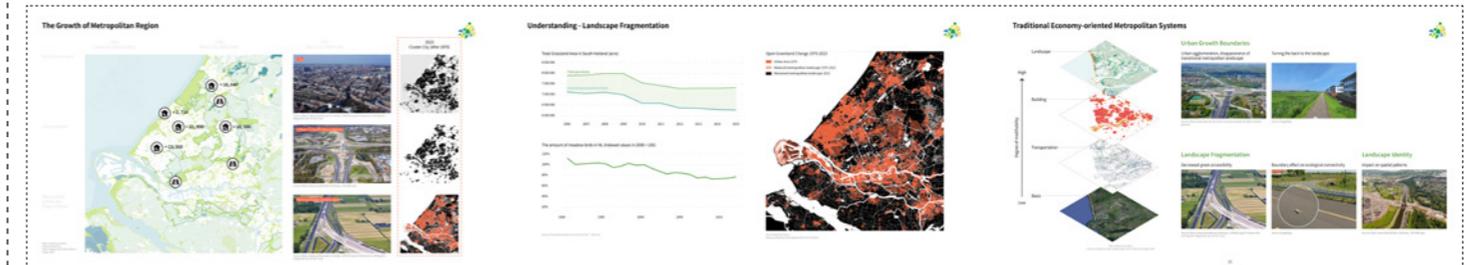
Demand on more water retention areas

- Increased precipitation.
- Incompatible area for temporal water retention.
- Increasing salt-water intrusion

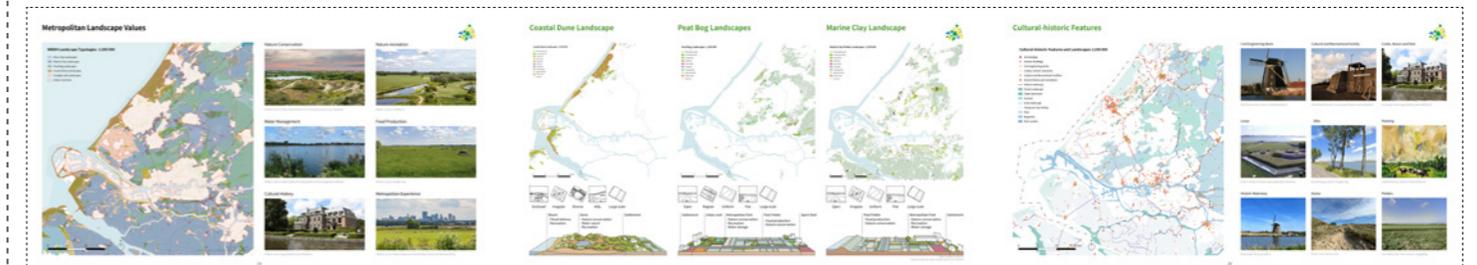
Design Assignments



Metropolitan system



Metropolitan landscape values



Metropolitan landscape challenges





03 Application

What are the design principles to support a robust MPS framework design?

Case Study

Park Lingezege
Landschapspark de Rotte
Midden-delfland
Emscher Park
Rhein-Main Regional Park

MPS Design focus & Principles

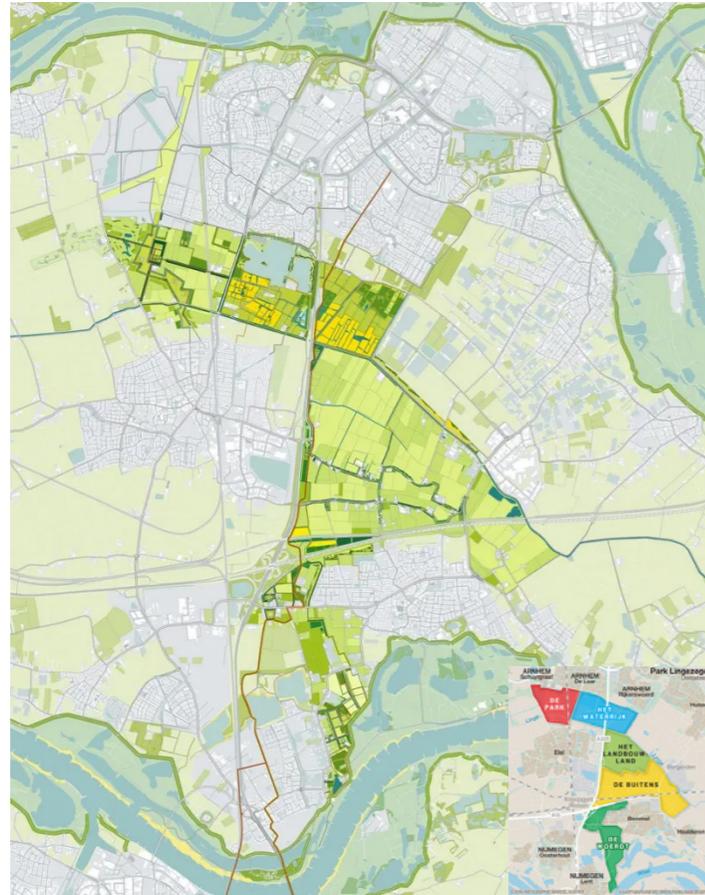
Water and Climate Adaptation
Biodiversity and Ecology
Recreation and Cultural-history



Case Study



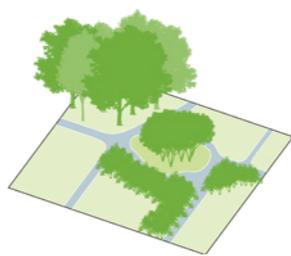
Lingezege Park, the Netherlands



Inundated land for seasonal water storage



Heterogeneous stepping stone

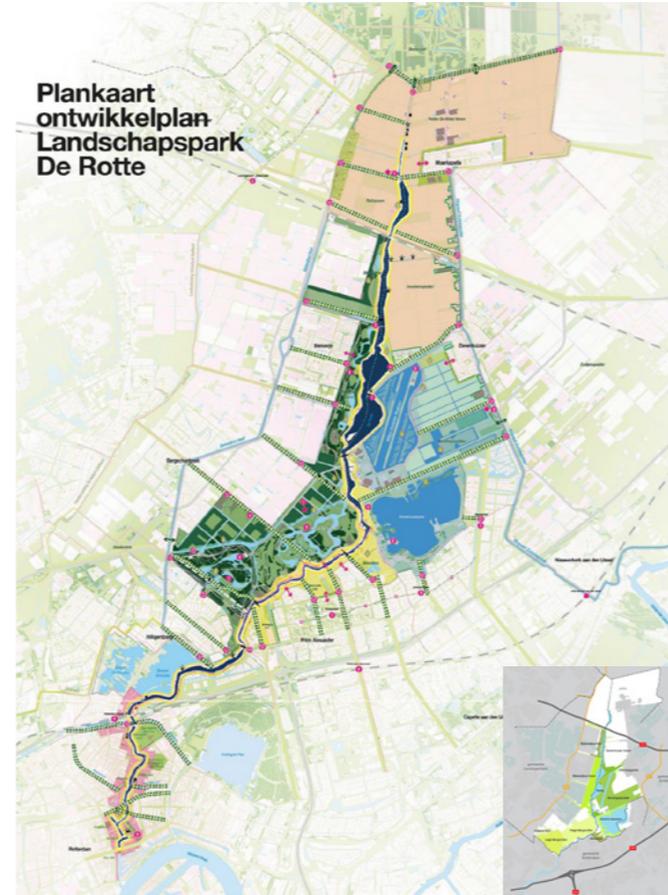


Circular historic experience route

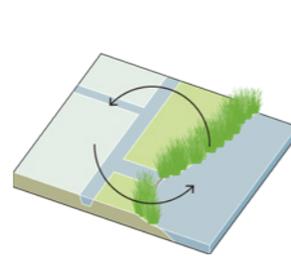


Source: https://veenenbosbosch.nl/portfolio_page/waterrijk-park-lingezege/, <https://www.gelderlander.nl/lingewaard/er-komt-meer-en-strenger-toezicht-in-park-lingezege-abc80d75/>

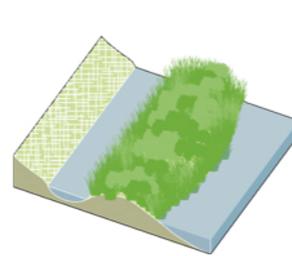
Rotte Landscape Park, the Netherlands



Agri-nature water circulation

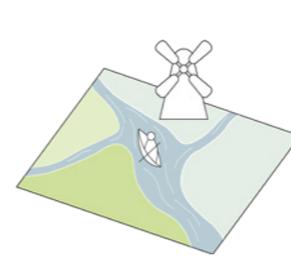


Diverse embankments for diverse species



Source: Strootman Landschapsarchitecten, Natuur-en Vogelwacht Rotta

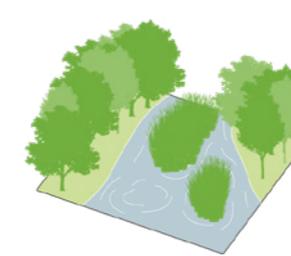
Water-based experience route



Midden-Delfland, the Netherlands

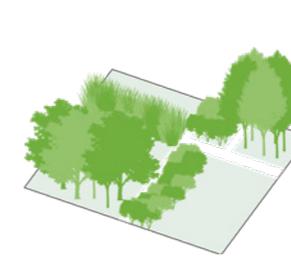


Wetland to enhance water adaptivity

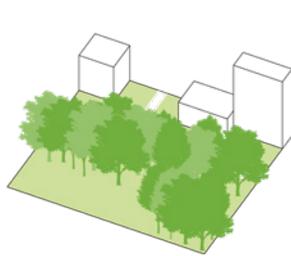


Source: Gemeente Midden-Delfland

Sustainable agriculture



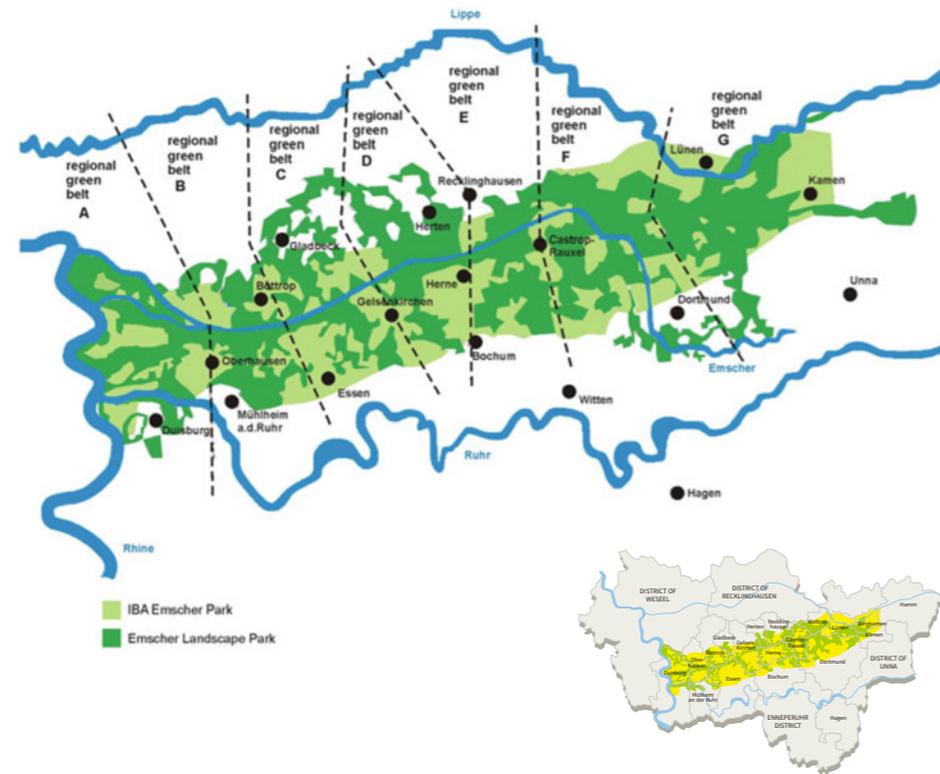
Woodlands as city-nature buffer



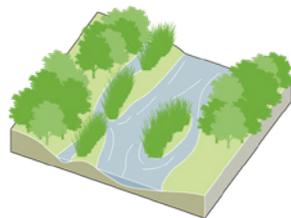
Case Study



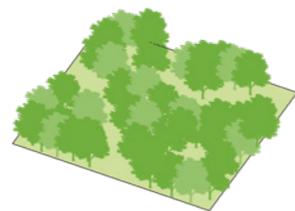
Emscher Park, Germany



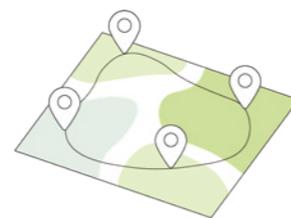
Water ways as core structure for development



Forest as connective structure

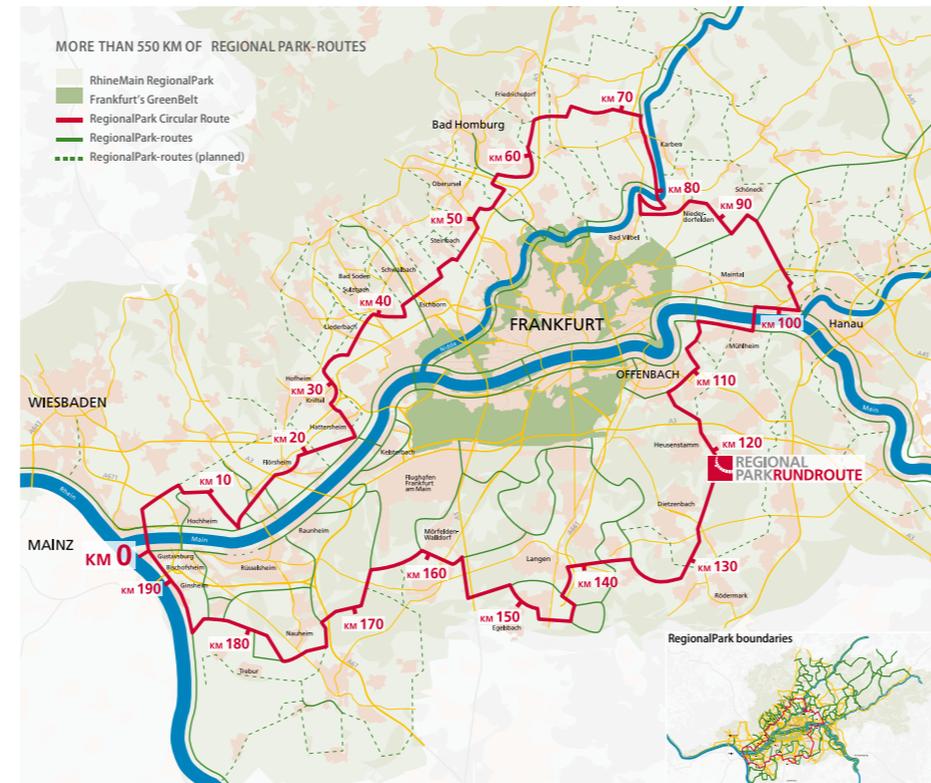


Landscape art for stressing local feature

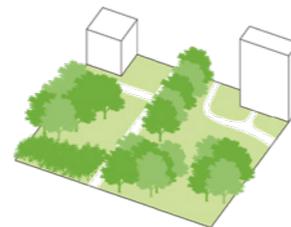


Source: IBA, SILO

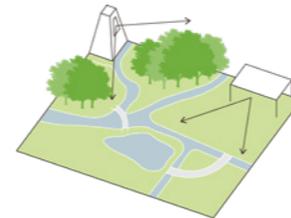
Rhein-Main Regional Park, Germany



Continuous green corridors



Spots for representing landscape quality



View points and site-specific landmarks



Source: <https://www.regionalpark-rheinmain.de/>

Design Focuses and Strategies

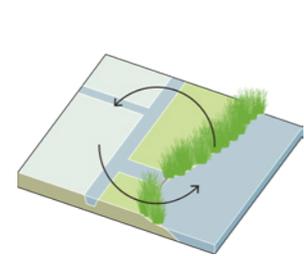


Water and Climate Adaptation

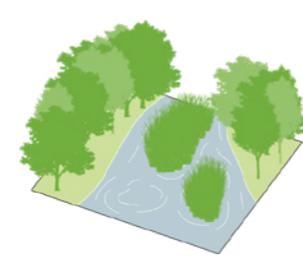
Inundated land for seasonal water storage



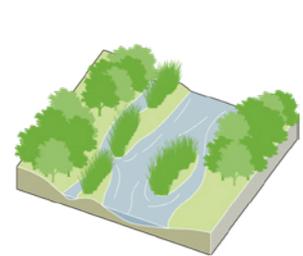
Agri-nature water circulation



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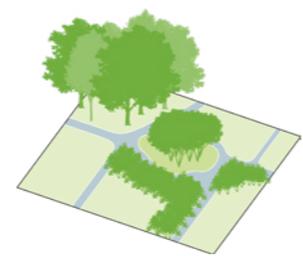


Water ways as core structure for development

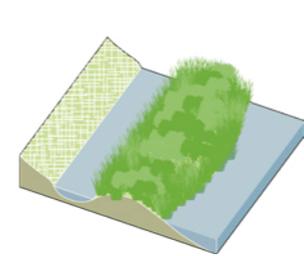


Biodiversity and Ecology

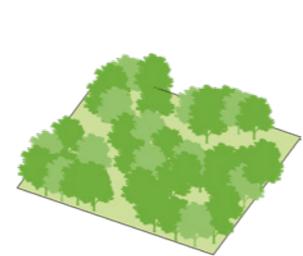
Heterogeneous stepping stone



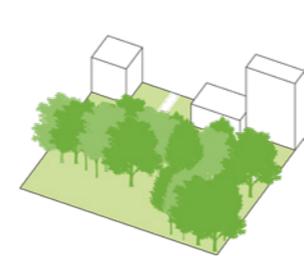
Diverse embankments for diverse species



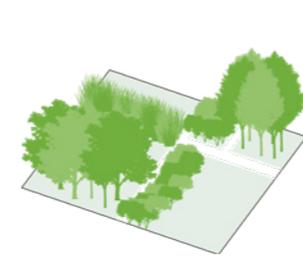
Forest as connective structure



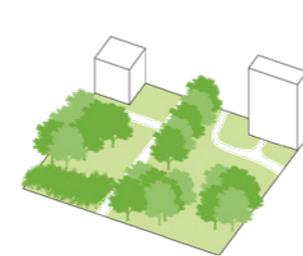
Woodlands as city-nature buffer



Sustainable agriculture

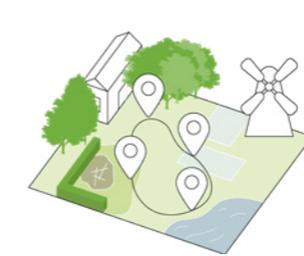


Continuous green corridors

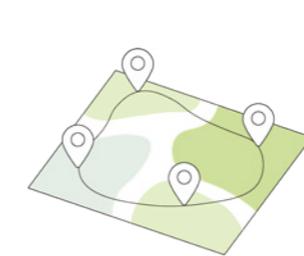


Recreation and Cultural-history

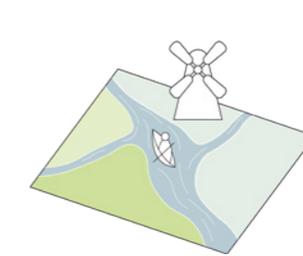
Circular historic experience route



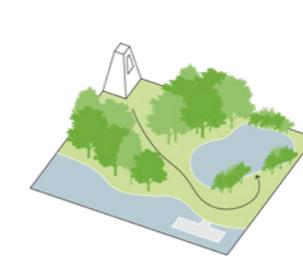
Landscape art for stressing local feature



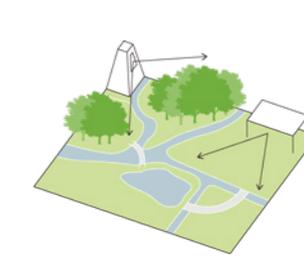
Water-based experience route



View points and site-specific landmarks



Spots for representing landscape quality





04 Exploration

What are the long-term visions and short-term interventions for MRDH?

Long-term Vision

MRDH MPS vision map
Strategic projects

Site-specific Design

The urban boundaries
Urban scale design
Local scale Design





To design a robust landscape-based MPS that safeguards the **essential landscape values** and guide **sustainable urban development** in MRDH.

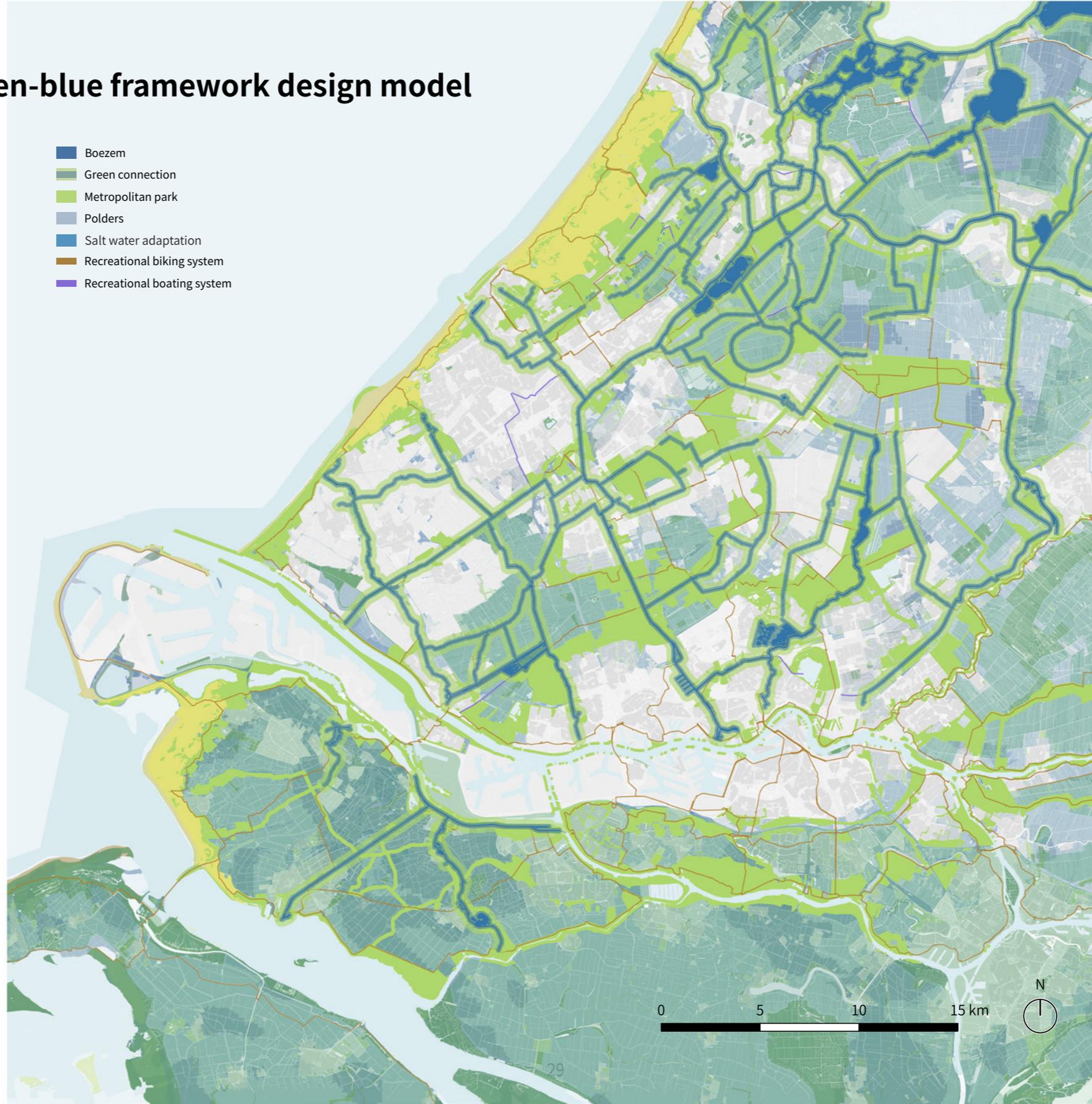


MPS Vision - Robust Green-blue framework design model

**Water-resilient basis
to address climate
challenges**

**Connective green
network for nature
to thrive**

**Diverse recreational
routes to experience
cultural-historic
landscape features**



Water and Climate Adaptation

Water-resilient basis for addressing climate challenges

Connective green network for nature to thrive

Diverse recreational routes to experience cultural-historic landscape features



Strategy 1

Use boezem system as powerful backbone for fresh water management.



Strategy 2

Develop more open spaces for water storage to mitigate flood and drought.



Strategy 3

Raise water levels and develop reservoirs in certain snalinization-prone spaces.



Map created by author,
Data provided by: Open-dataportaal Zuid-Holland

Biodiversity and Ecology

Water-resilient basis for addressing climate challenges

Connective green network for nature to thrive

Diverse recreational routes to experience cultural-historic landscape features



Map created by author, Data provided by: Open-dataportaal Zuid-Holland



Strategy 1

Develop green spaces along boezem system to enhance ecological connectivity for aquatic habitats.



Strategy 2

Integrate nature conservation areas into park structure to promote socio-ecological benefits



Strategy 3

Promote nature-inclusive or circular agriculture to improve agricultural ecology

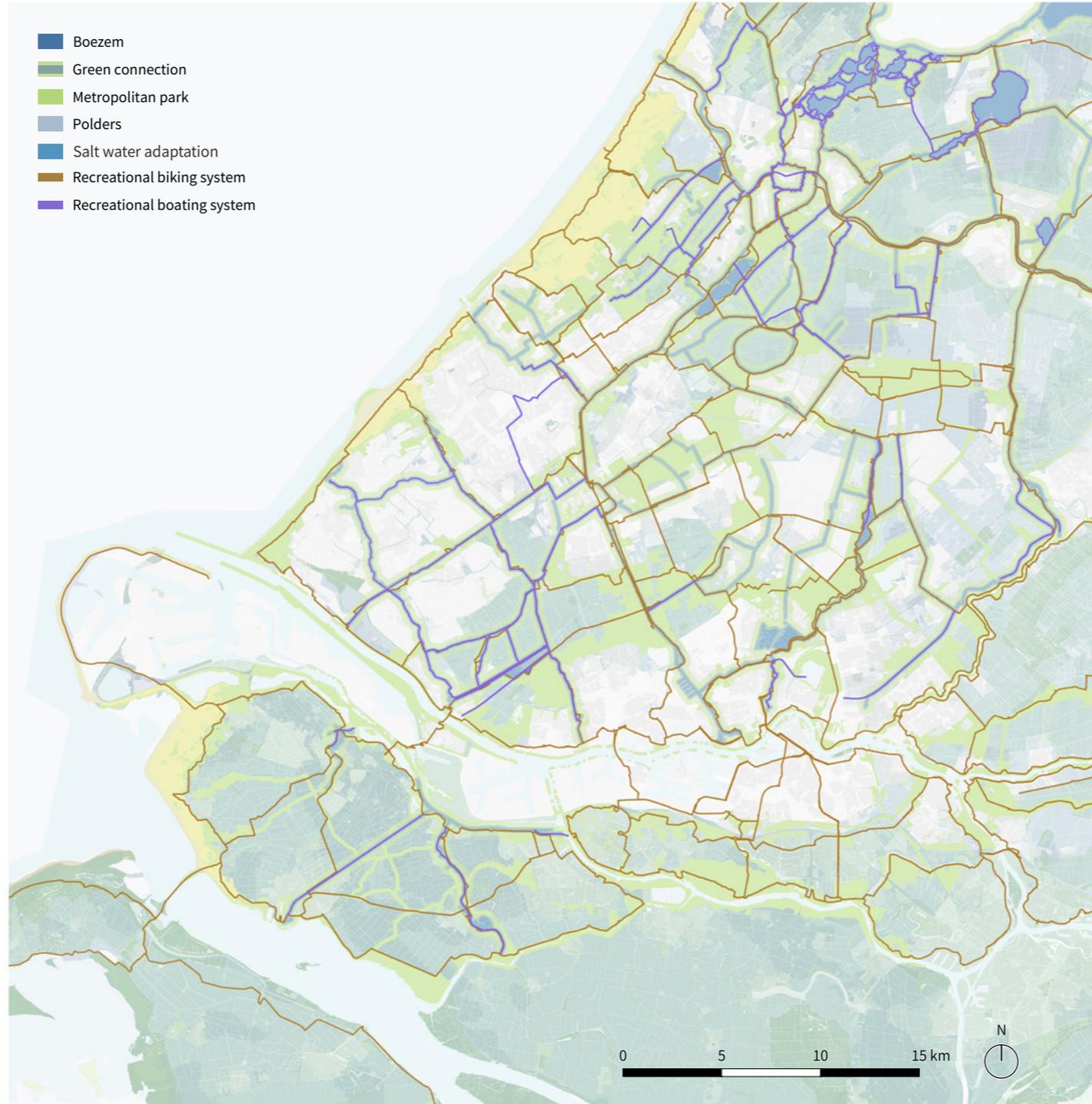


Recreation and Cultural-history

Water-resilient basis for addressing climate challenges

Connective green network for nature to thrive

Diverse recreational routes to experience cultural-historic landscape features



Map created by author, Data provided by: Open-dataportaal Zuid-Holland



Strategy 1

Develop high connective recreational route networks among MPS

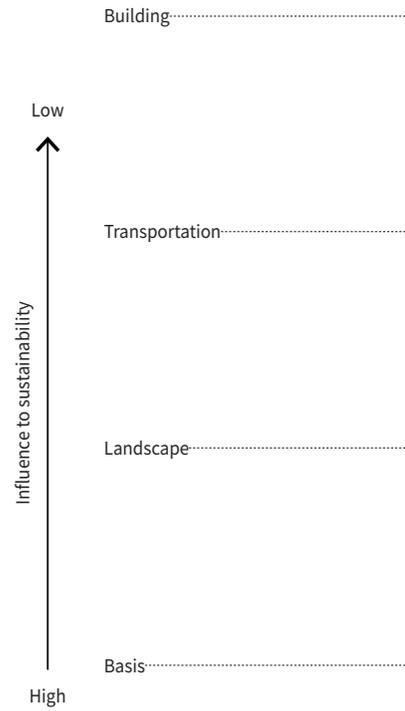


Strategy 2

Recreational areas as cores for strengthening metropolitan experience



Landscape-based MRDH Metropolitan System: Open-ended Scenarios



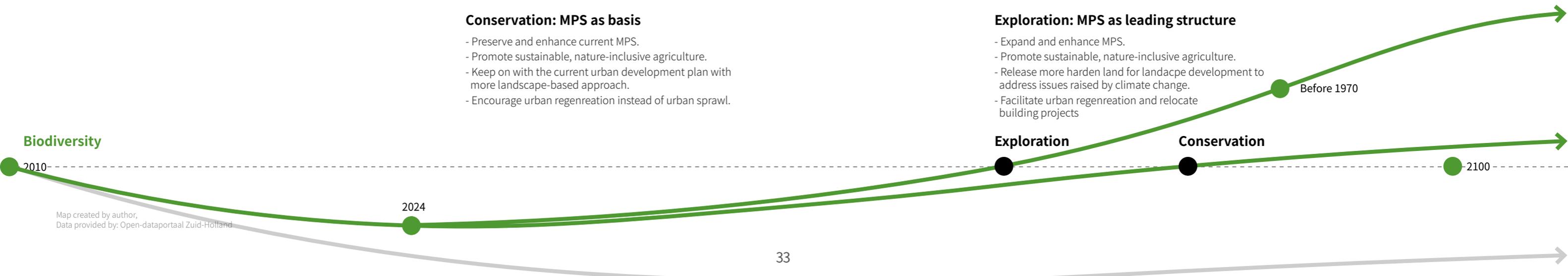
Conservation: MPS as basis

- Preserve and enhance current MPS.
- Promote sustainable, nature-inclusive agriculture.
- Keep on with the current urban development plan with more landscape-based approach.
- Encourage urban regeneration instead of urban sprawl.



Exploration: MPS as leading structure

- Expand and enhance MPS.
- Promote sustainable, nature-inclusive agriculture.
- Release more harden land for landacpe development to address issues raised by climate change.
- Facilitate urban regeneration and relocate building projects



Map created by author,
Data provided by: Open-dataportaal Zuid-Holland

Strategic Projects



Map created by author,
Data provided by: Open-dataportaal Zuid-Holland

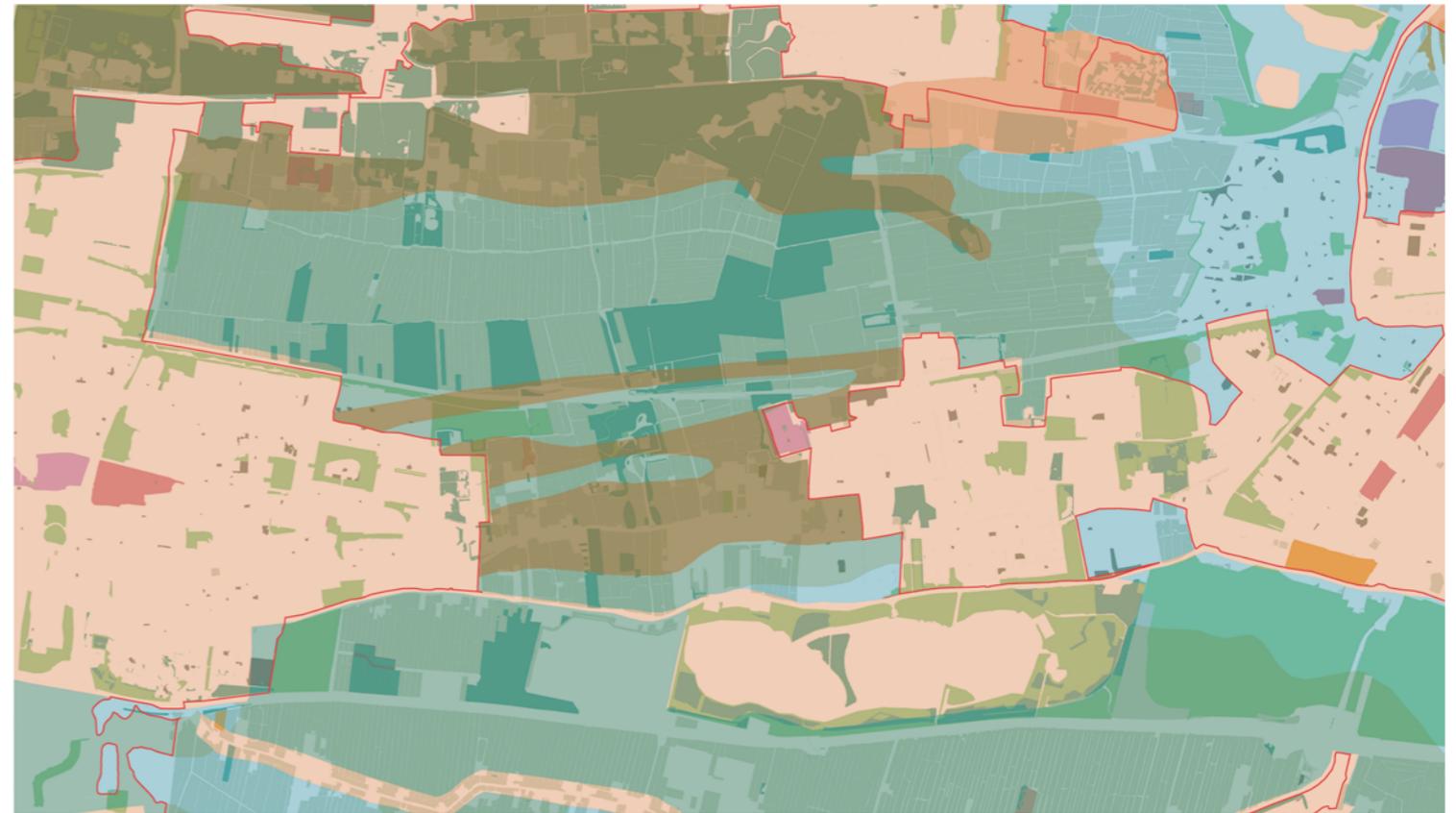
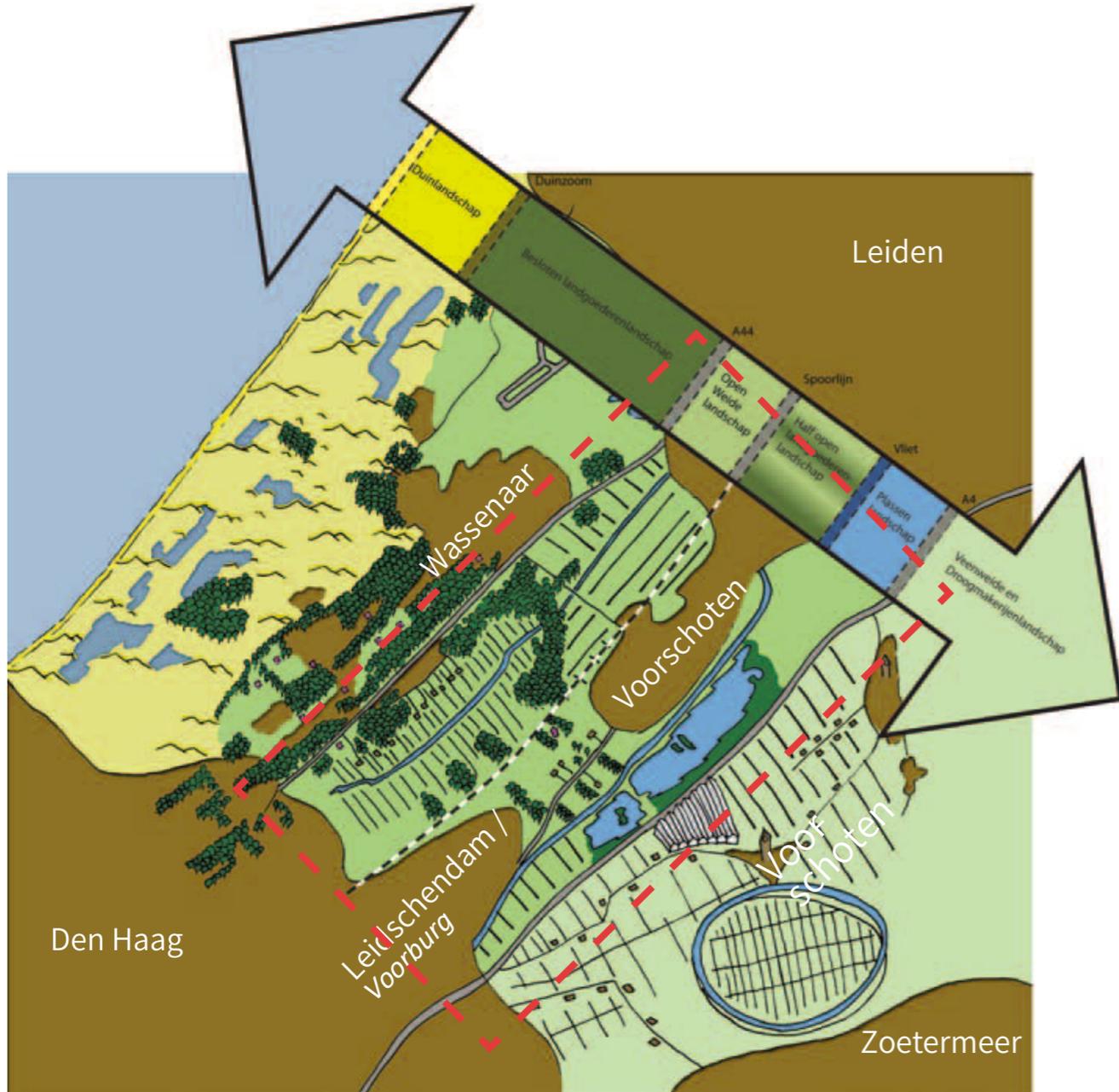
Duin Horst en Weide



Source: <https://zoetermeer.nieuws.nl/cultuur/1957/duin-horst-en-weide/>

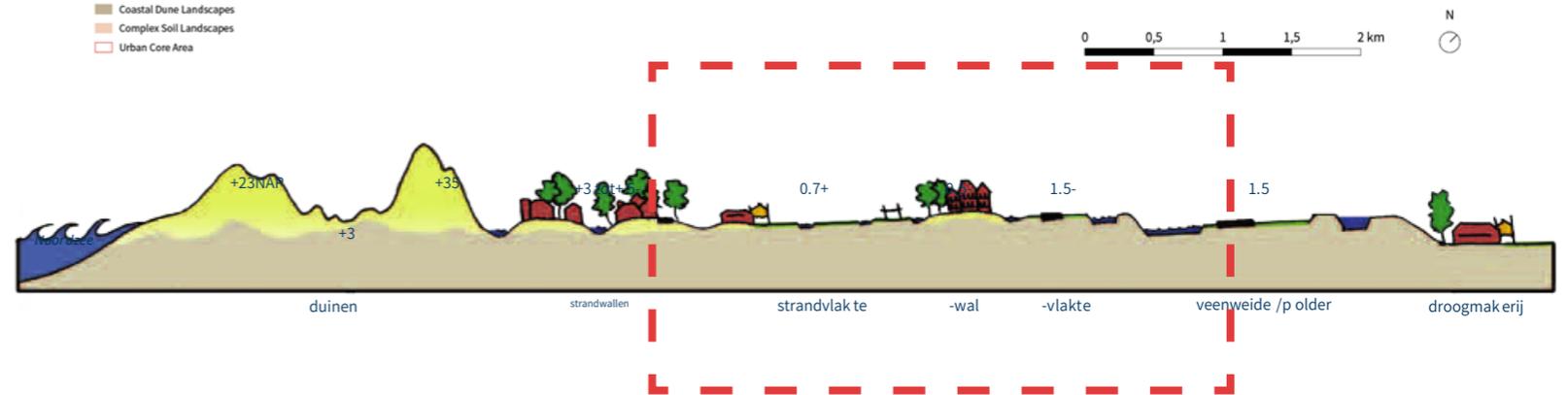


"Barcode Landscape"



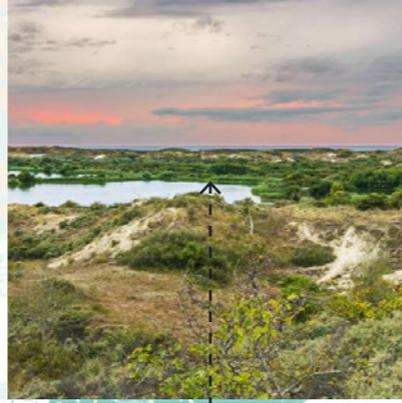
Landscape Typologies 1:25 000

- River Clay Landscapes
- Marine Clay Landscapes
- Peat Bog Landscapes
- Coastal Dune Landscapes
- Complex Soil Landscapes
- Urban Core Area



The barcode landscape, source: Westerink, 2016; Brons + partners landschapsarchitecten bv, 2012
 Map created by author,
 Data provided by: Open-dataportaal Zuid-Holland

Dune



The Hague



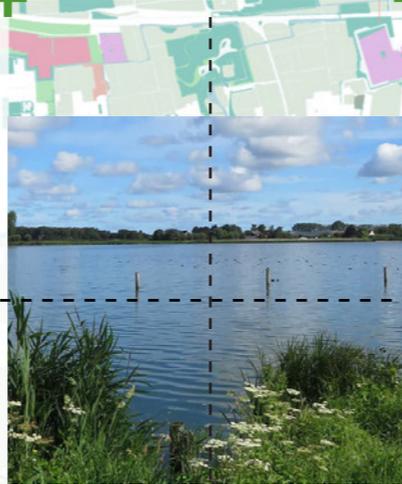
The green cross road



Leiden



Vlietland



Marine clay polders



Map created by author,
Data provided by: Open-dataportaal Zuid-Holland;
Image sources: <https://www.fietsen123.nl/route/de-duinen-van-meijendel/>;
<https://www.cbs.nl/nl-nl/corporate/2018/44/den-haag-bouwt-smart-city-ambitie-verder-uit>;
<https://zoetermeer.nieuws.nl/cultuur/1957/duin-horst-en-weide/>;
<https://www.nationaalparkhollandseduinen.nl/bundel/rolstoelvriendelijke-wandelpaden/>;
<https://www.in12uur.nl/de-hoogtepunten-van-leiden/>; GoogleMap

Open Space Structure



Landscape Features



Duivenvoorde,
Source: kasteelduivenvoorde.nl



Duivenvoordse en Veenzijdse
Polder, photo by author



Vlietland, photo by author



Kasteel Duivenvoorde



Landgoed Ter Horst



Eikenhorst



De Horsten



Historic Waterway



Zuidwijksemolen

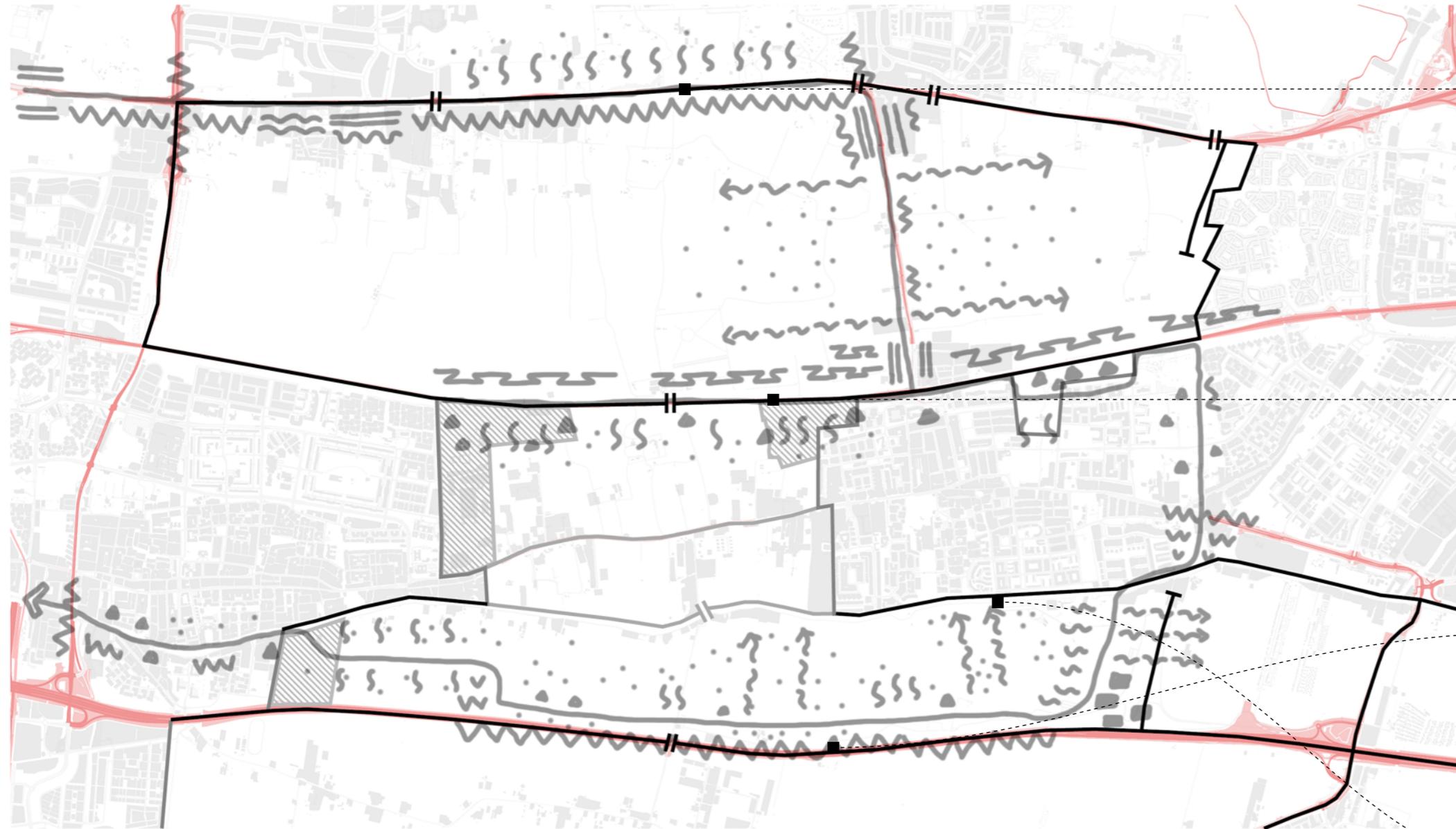


Knipmolen



Vliet

Urban Boundaries



Highway

Photo by author



Train line

Photo by author



Highway

Photo by author



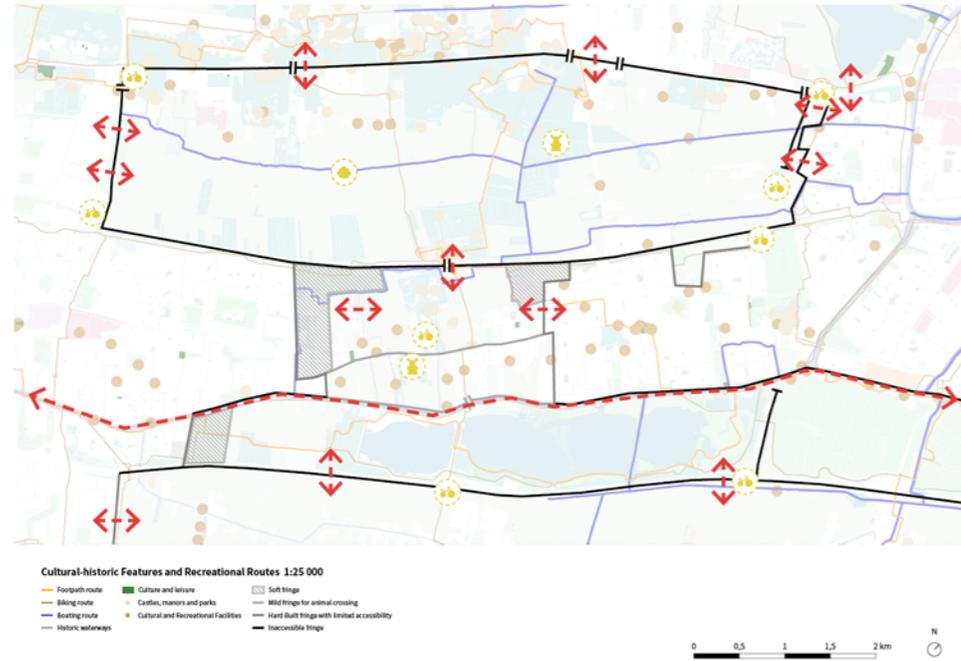
Building

Photo by author

Boundary Effects

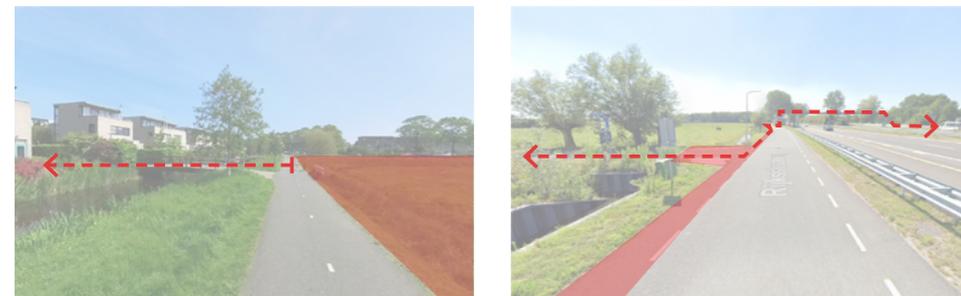


Cultural-historic Accessibility

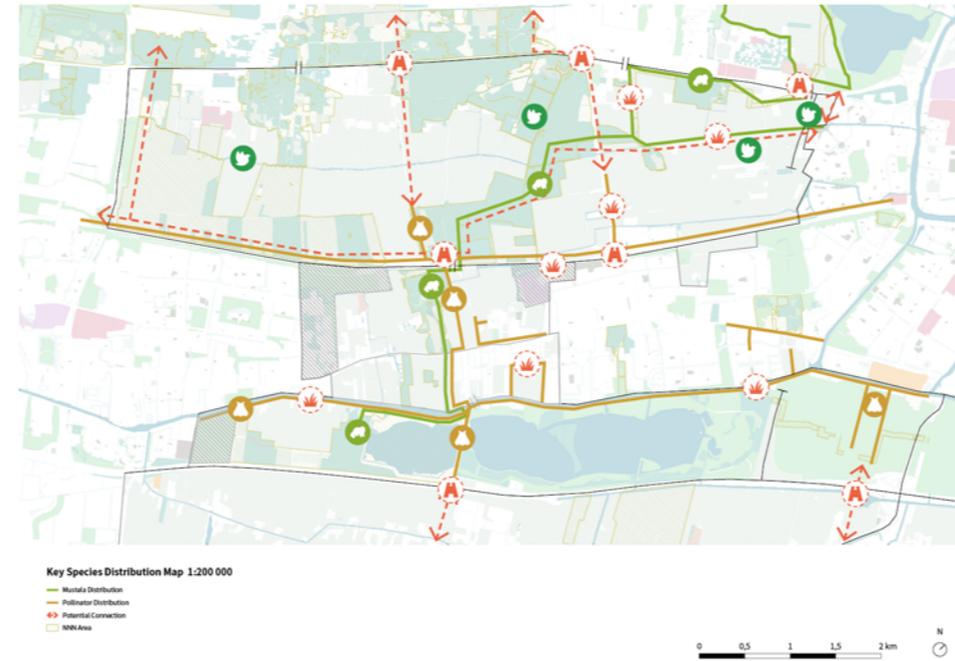


- Improve accessibility
- Improve local characteristics

- Strengthen accessibility of recreational route networks
 - Set up clear entrances to the area
 - Set up clear-guided routes among local cultural-historic features.



Ecological Connectivity

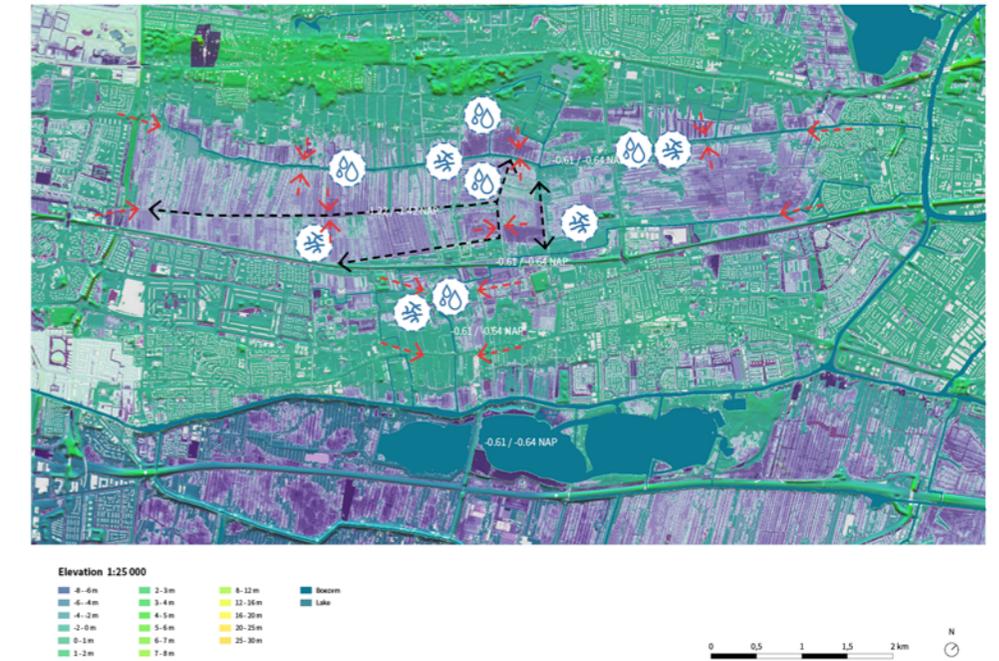


- Improve ecological corridor quality for key species
- Enhance road-crossing safety
- Reduce human disturbance

- Enhance ecological connections

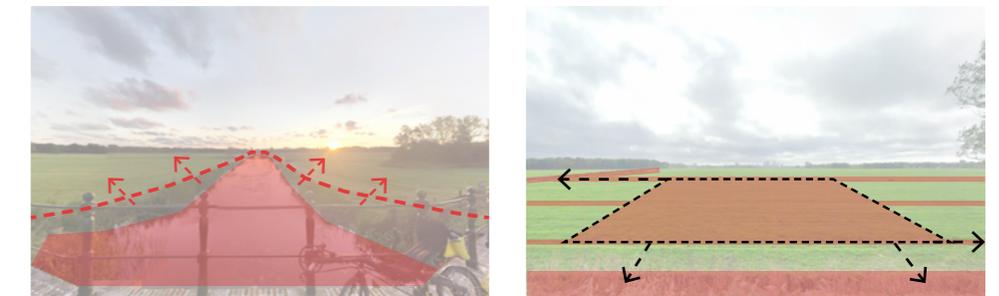


Water logging

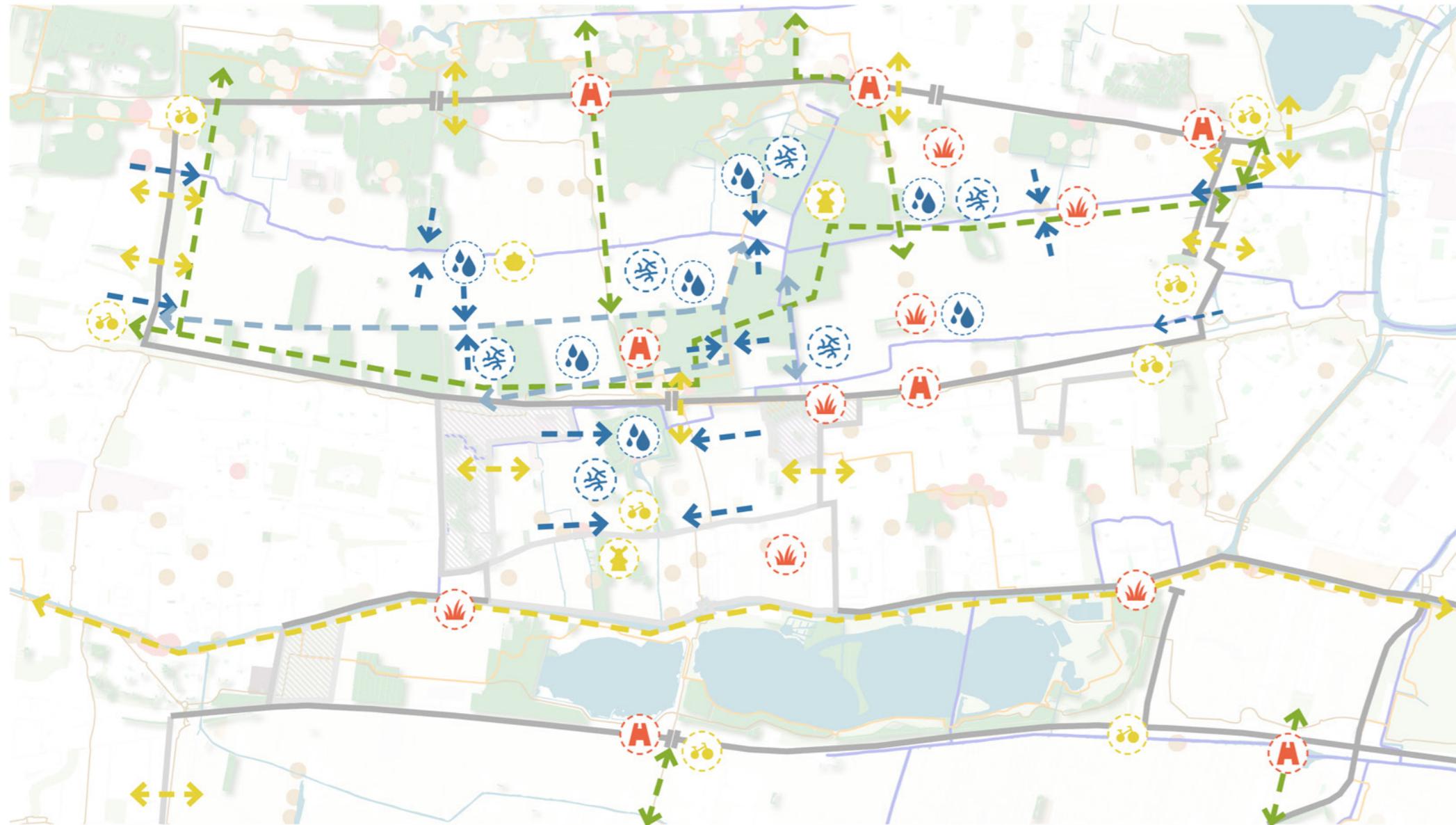


- Increase wetland area
- Increase water retention area

- Enhance water storage capacity
- Enhance potential wetland connection



Design Assignment



Open Space Structure 1:25 000

- | | | |
|--------------------|--------------------------------------|--|
| Metropolitan park | Culture and leisure | Boating route |
| Forest Park | Castles, manors and parks | Soft fringe |
| Sport Field | Cultural and Recreational Facilities | Mild fringe for animal crossing |
| Cemetery | Footpath route | Hard Built fringe with limited accessibility |
| Agricultural field | Biking route | Inaccessible fringe |
| Urban Voids | | |

Map created by author,
Data provided by: Open-dataportaal Zuid-Holland

Water Management

- Increase wetland area
- Increase water retention area
- Enhance potential wetland connection
- Enhance water storage capacity

Nature Conservation

- Improve ecological corridor quality for key species
- Enhance road-crossing safety
- Reduce human disturbance
- Enhance ecological connections

Cultural-historic Recreation

- Improve accessibility
- Set up clear entrances to the area
- Set up clear-guided routes among local cultural-historic features.
- Improve local characteristics (nature, cultural-history)
- Strengthen accessibility of recreational route networks



Metropolitan Park Duin Horst en Weide



Map created by author,
Data provided by: Open-dataportaal Zuid-Holland





Green Structure 1:25 000

- | | | |
|--------------------------|-------------------|-------------------|
| Recreational Area | Entrance | Museum |
| Wetland Area | Proposed Entrance | Manor |
| Sustainable Farming | Boat Rental | Windmill |
| Urban Green Corridor | Bus Stop | Historic Building |
| Proposed Animal Crossing | Train Stop | |

Map created by author,
Data provided by: Open-dataportaal Zuid-Holland



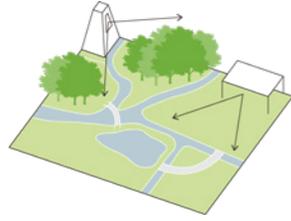
Metropolitan Park Structure Stretching from Polder to Sea, and City to City



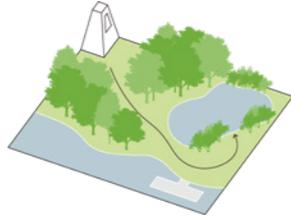
Cultural-historic Recreation



Spots for representing landscape quality



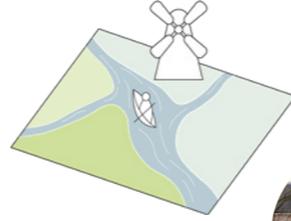
View points and site-specific landmarks



Circular historic experience route



Water-based experience route



M Kasteel Duivenvoorde

C Eikenhorst

C De Horsten

M Zuidwijksemolen

C Landgoed Ter Horst

W Historic Waterway

M Knipmolen

M Zuidwijksemolen

W Vliet

M Voorschoten

B Boat Rental

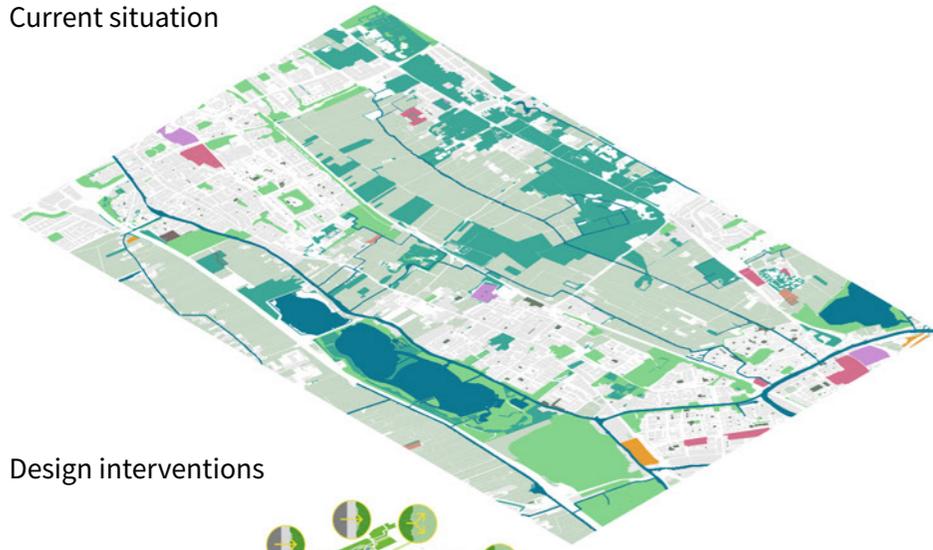
B Boat Rental

Vlietland

Spatial Orientation



Current situation

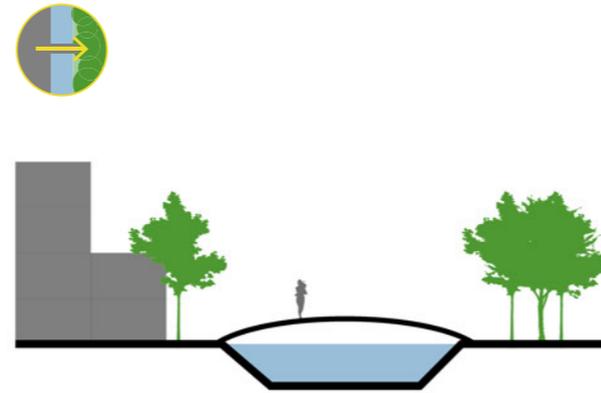
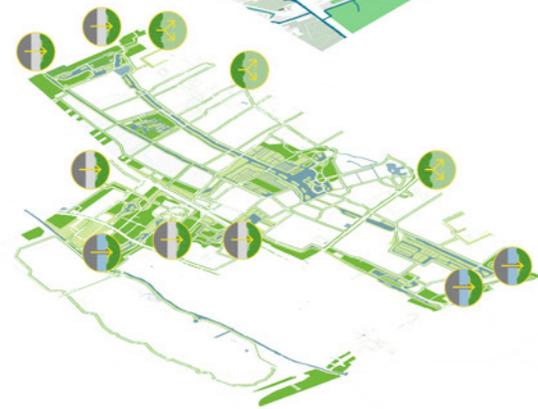


Contrast between built-ups and nature



- ✂ Selectively pruning low branches
1x / year
- ✂ Selectively pruning overgrown parts
1x / year
- 🌱 Planting perennial nectar plants

Design interventions

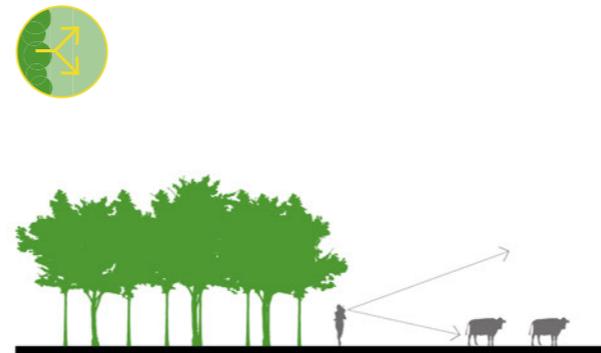


Going through actual gates



- ✂ Selectively pruning low branches
1x / year
- 🌱 Rotational mowing
2x / year
- 🌱 Spreading flower seeds
1x / year

Design vision



Contrast between enclosure and openness



- ✂ Selectively pruning low branches
1x / year
- 🌱 Animal grazing or rotational mowing
2x / year

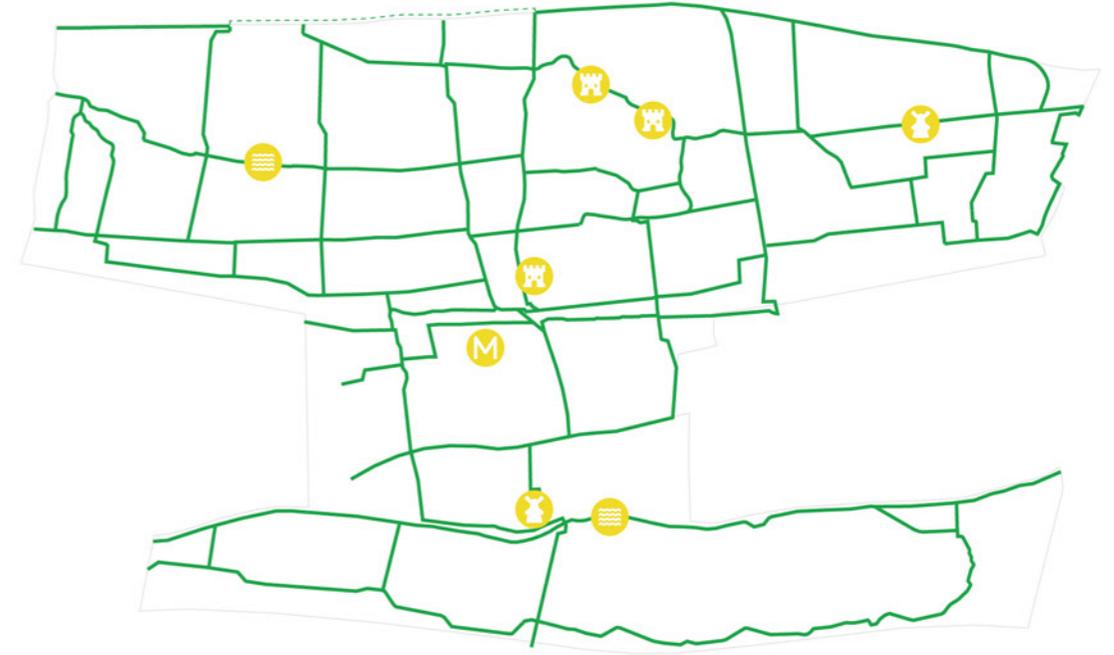
Recreational Route Networks



Hiking Route



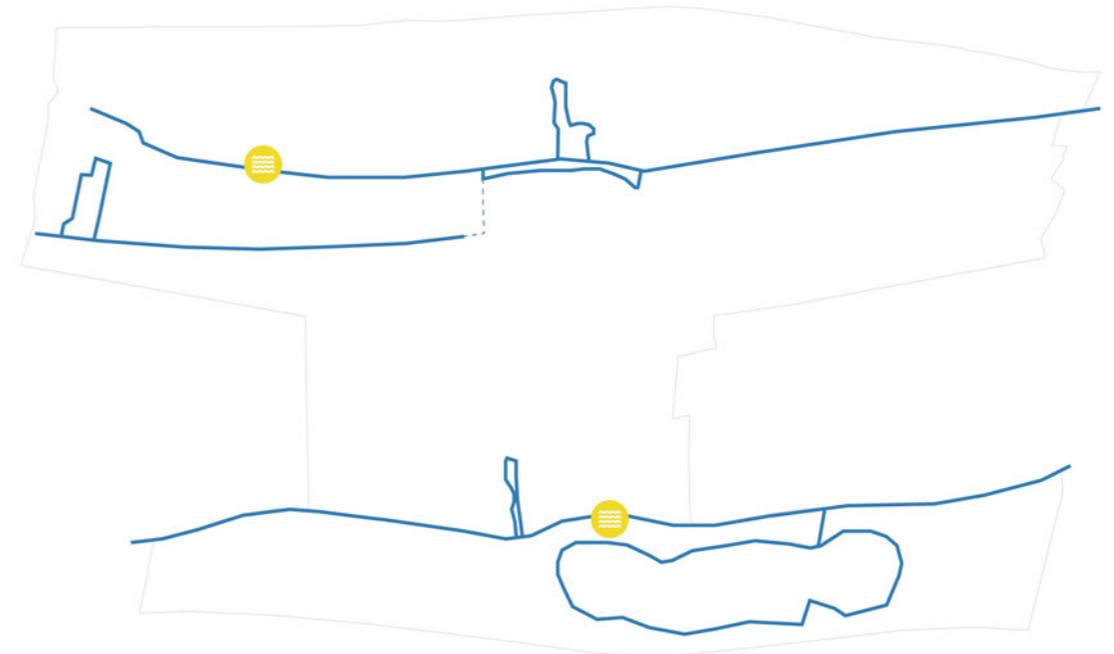
Biking Route



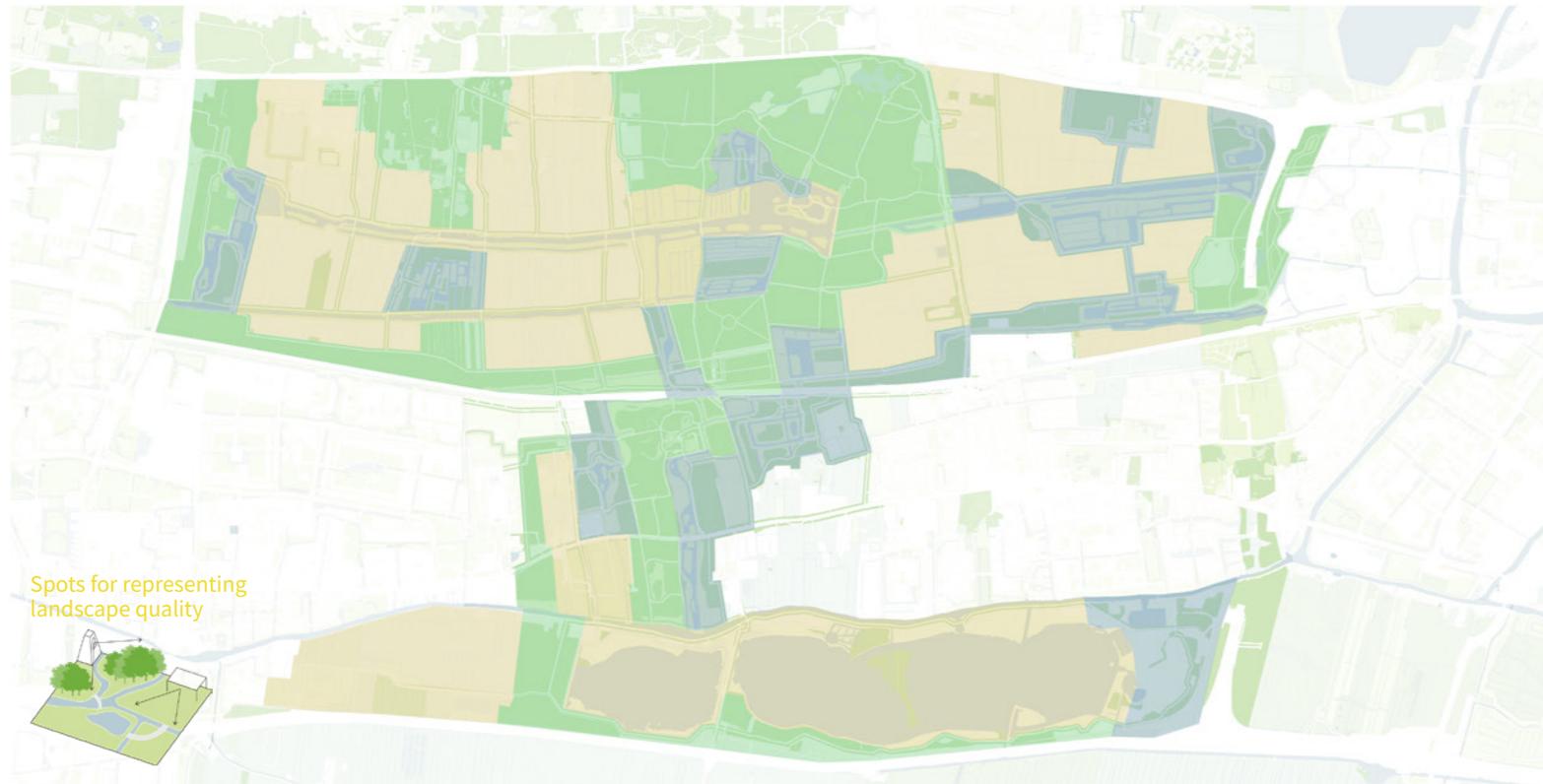
Bridle Route



Boating Route



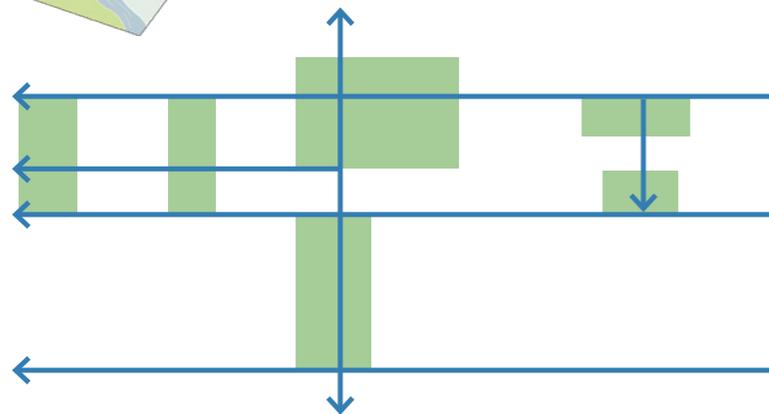
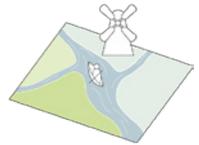
Spatial Experience



Spots for representing landscape quality

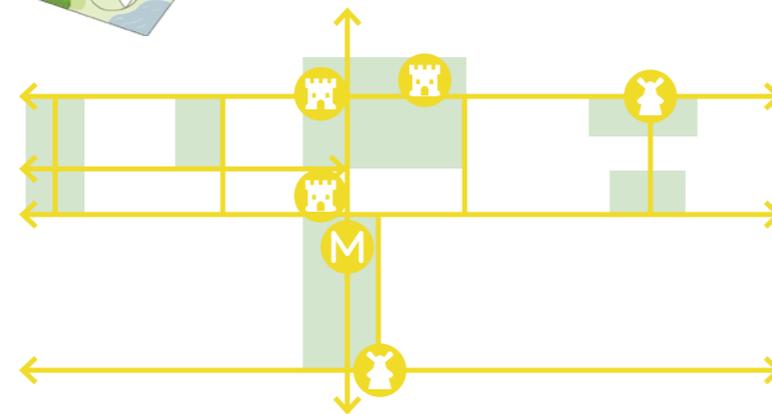


Water-based experience route



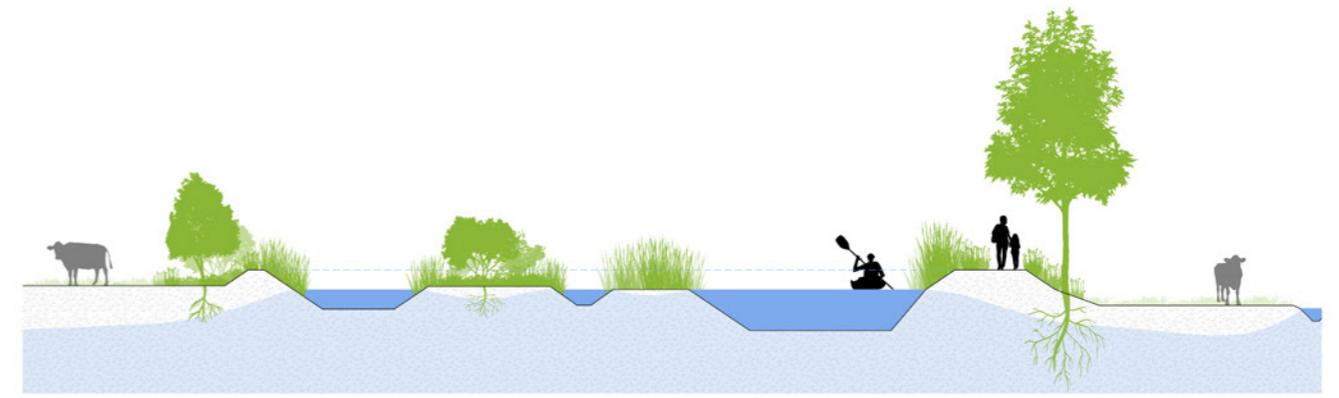
Water structure and wetlands as way guiding infrastructure

Circular historic experience route

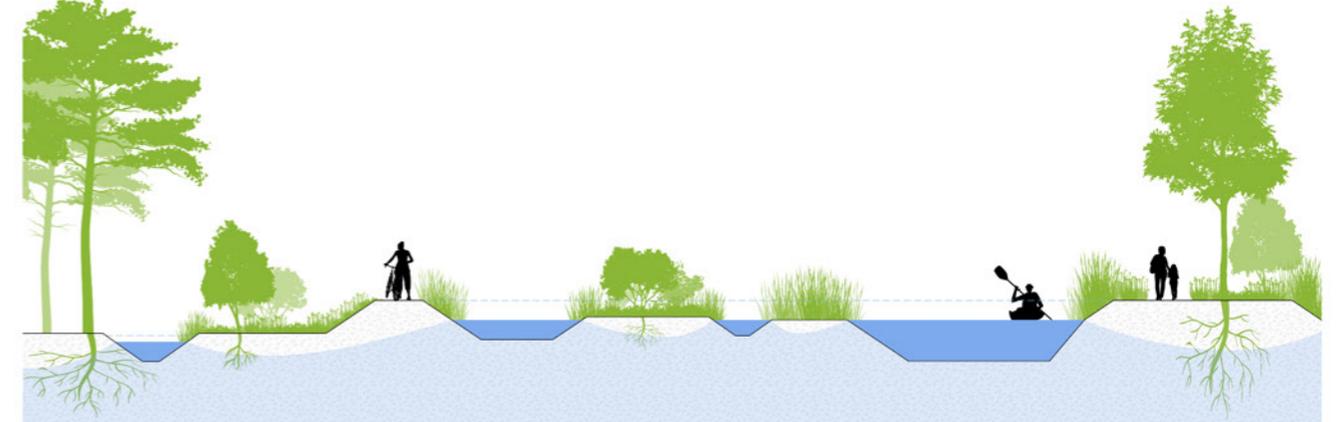


Landmarks as way finding elements, road structure as connecting structure

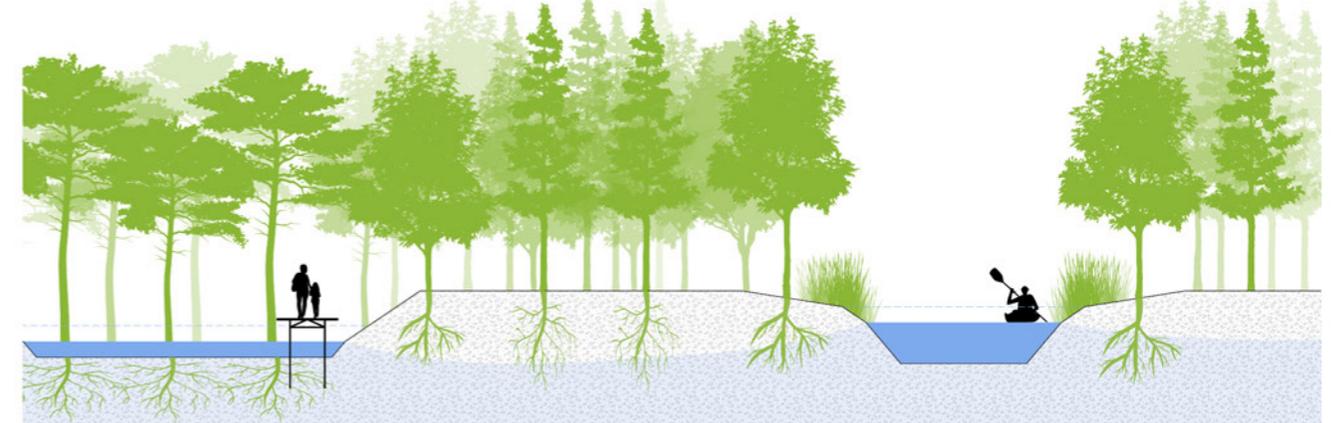
Open space - polders



Semi-open space - wetlands



Enclosed space - forest



Map created by author,
Data provided by: Open-dataportaal Zuid-Holland

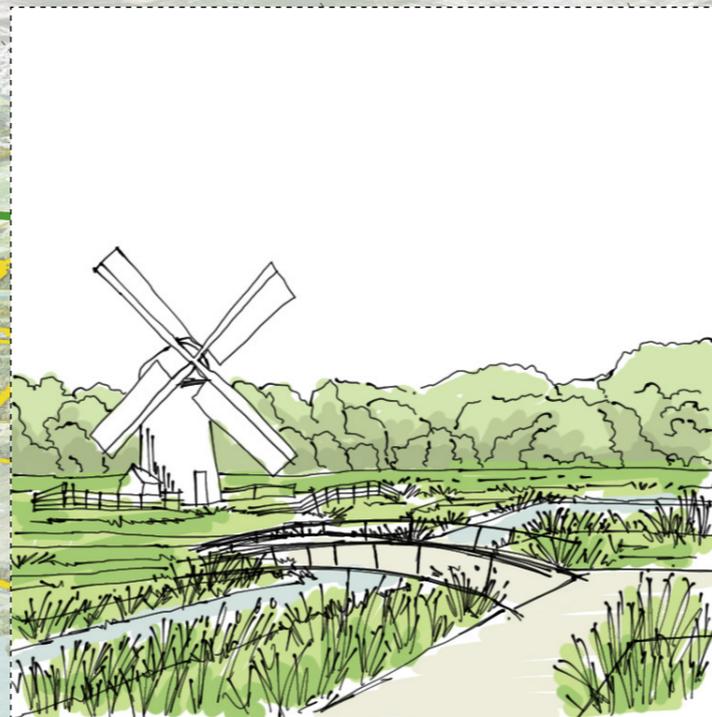
Green Transitions



The Hague

Leiden

Green Transitions



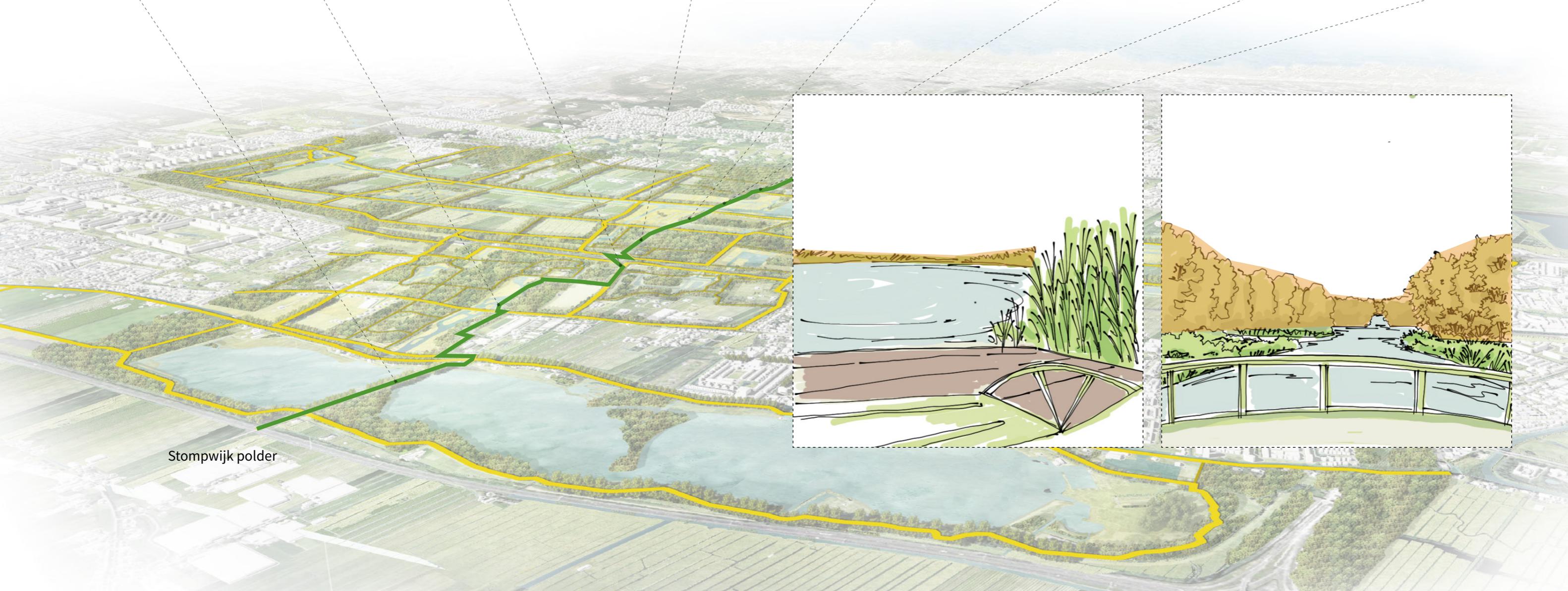
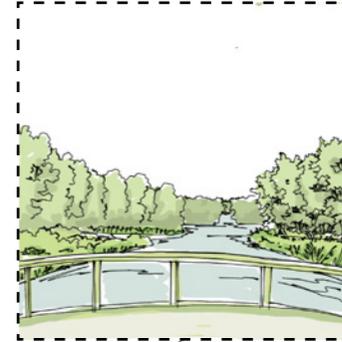
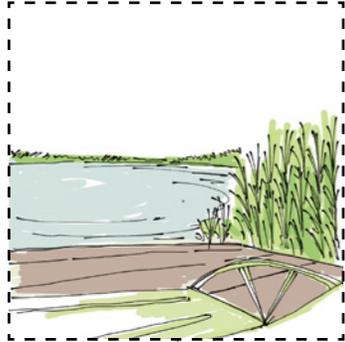
From Openness to Exclosure



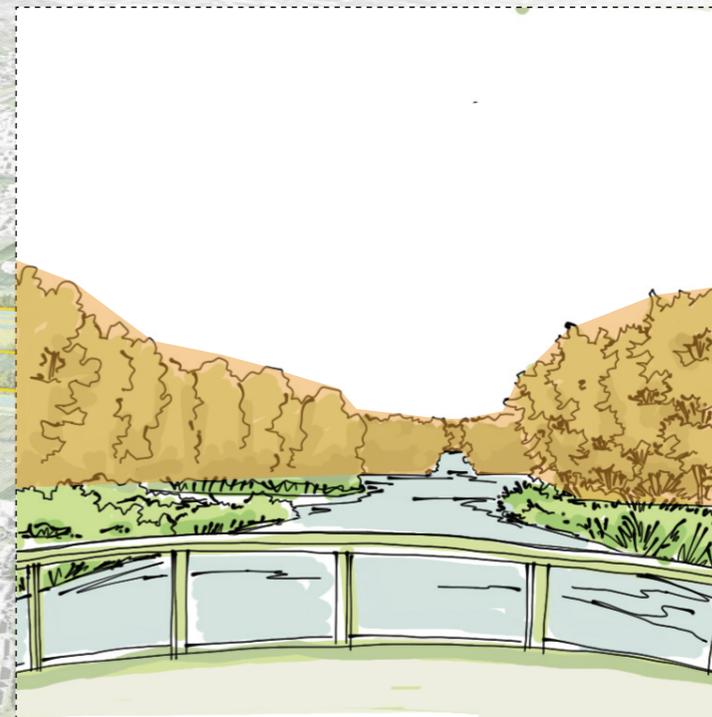
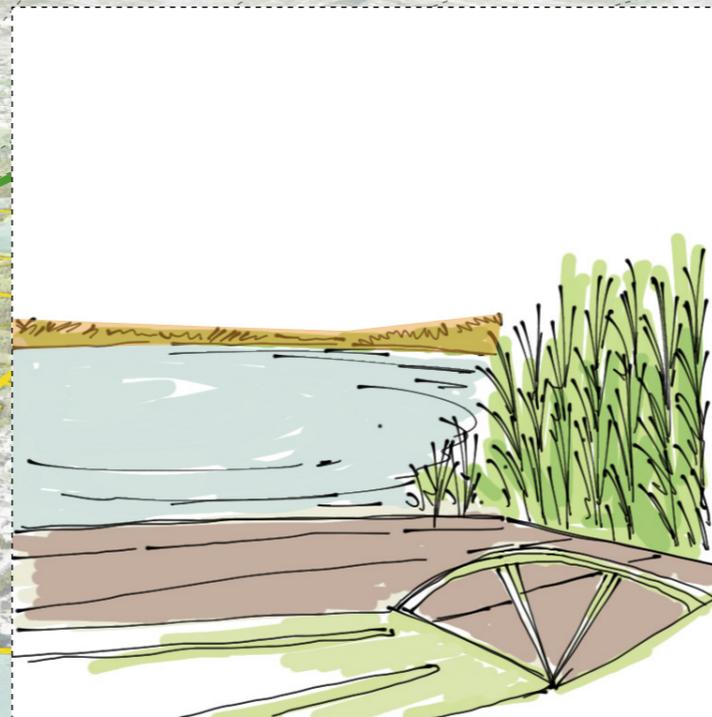
Stompwijk polder

Wassenaarse Bos

From Openness to Enclosure



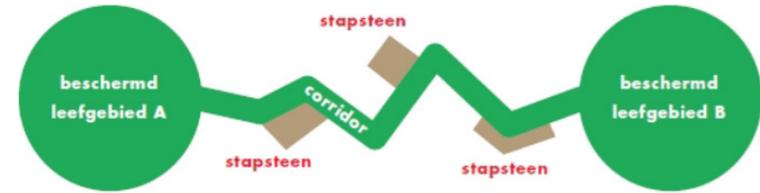
Stompwijk polder



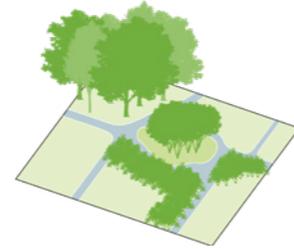
Biodiversity and Ecology



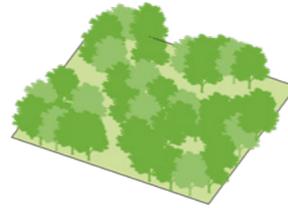
Connective corridor-stepping stone structure



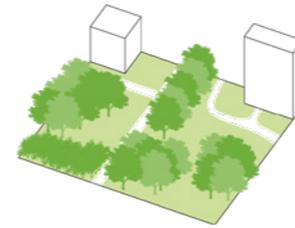
Heterogeneous stepping stone



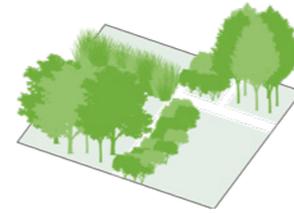
Forest as connective structure



Continuous green corridors



Sustainable agriculture



Biodiversity and Ecology



Bird (open grassland)



Luscinia svecica

Indicative species



Picus viridis



Acrocephalus



Spatula clypeata



Podiceps cristatus

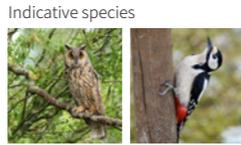


Tinca tinca



Cobitis taenia

Bird, bat (forest)



Asio otus



Dendrocopos major



Nyctalus noctula

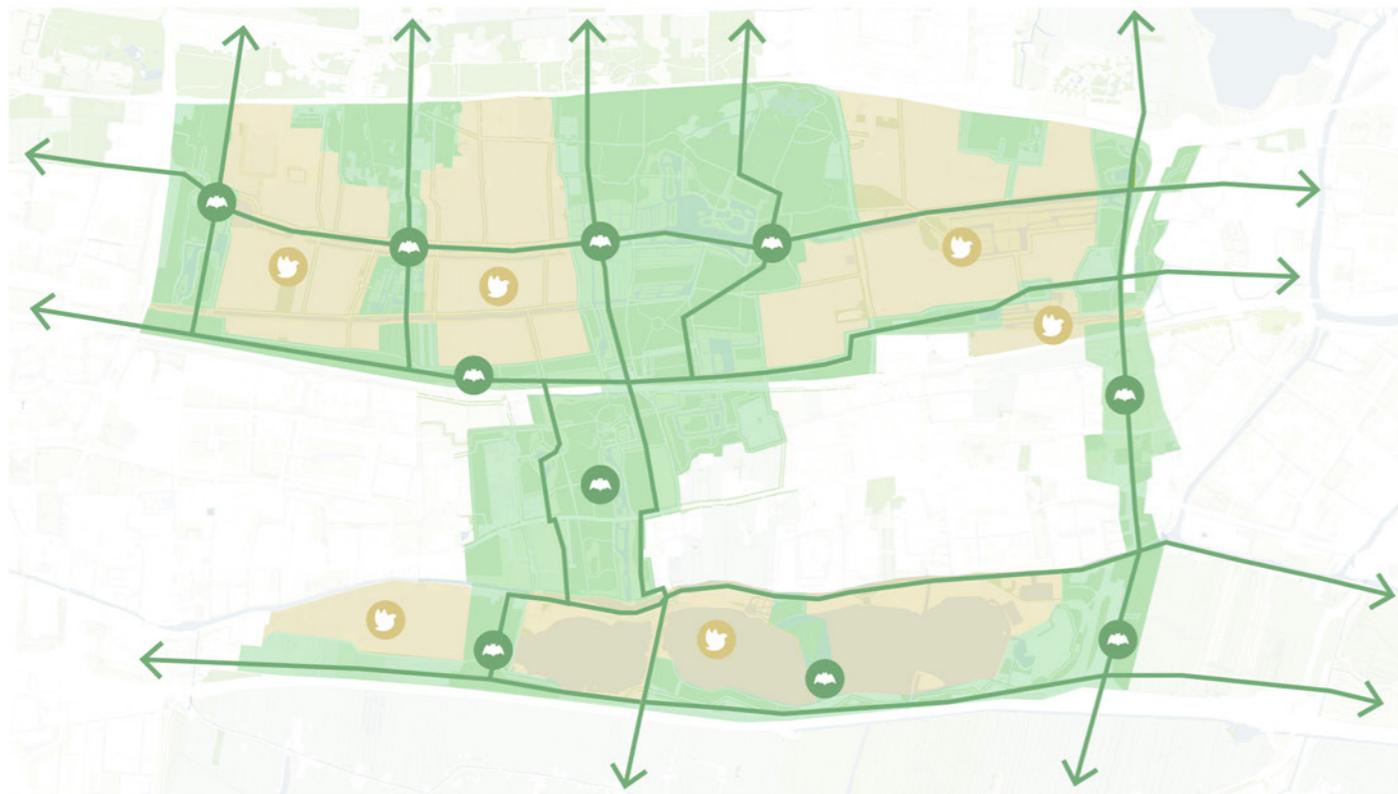


Myotis dasycneme



Sciurus vulgaris

Source: natuurmonumenten.nl; ravn.nl; waarneming.nl; zoogdierveniging.nl



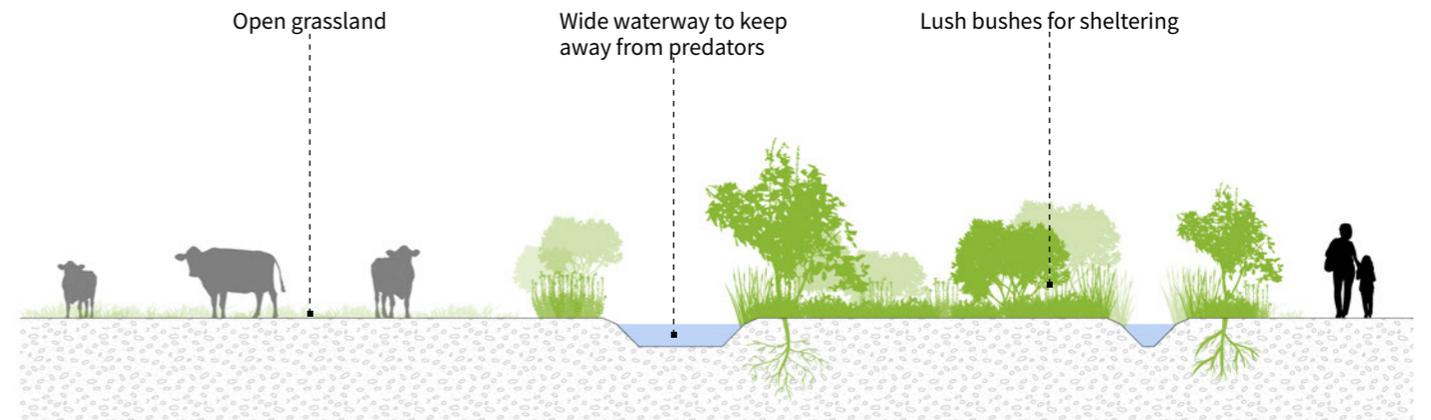
Map created by author,
Data provided by: Open-dataportaal Zuid-Holland

Targeted Habitat, Stepping stone and Corridor for Open Grassland Bird

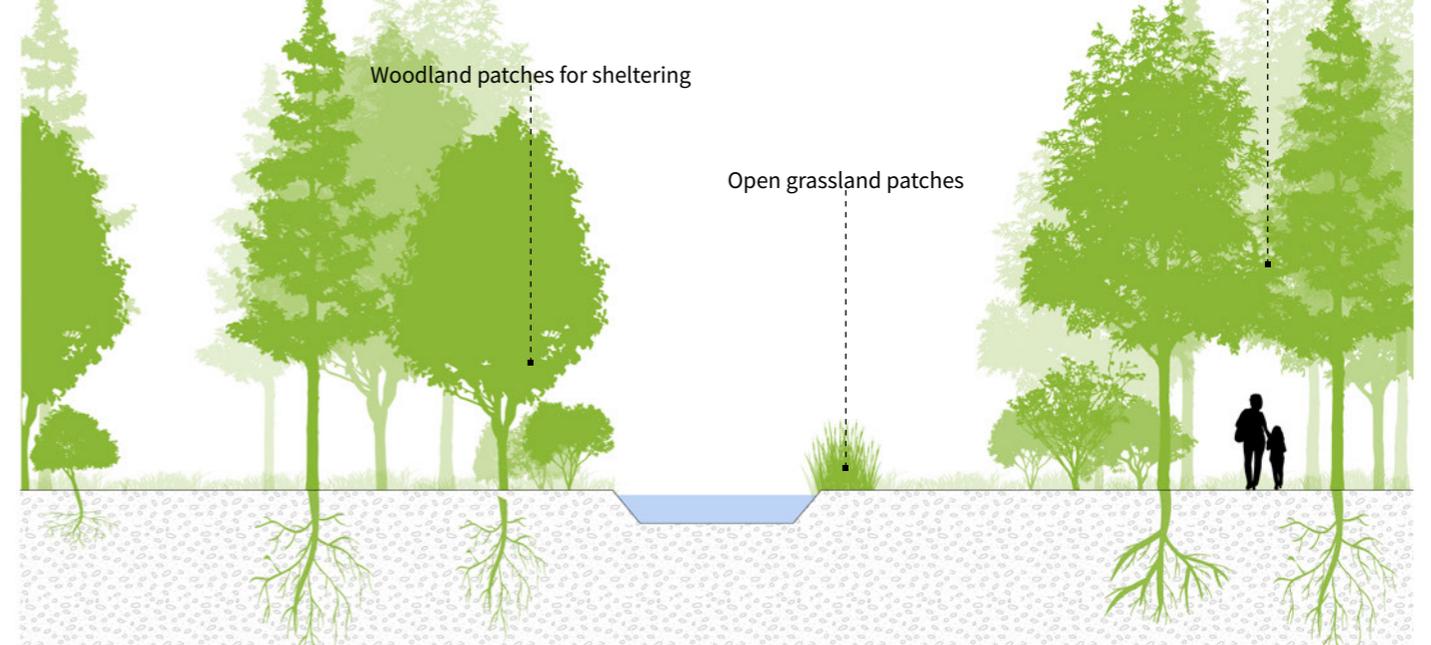
Trees



Shrubs & herbs



Targeted Habitat, stepping stone and corridor for Forest Bird and Bat





Woodland patches for sheltering

Lush bushes for sheltering

Continuous woodlands

Biodiversity and Ecology

Stoat



Mustela erminea



Mustela putorius Mustela nivalis

Source: natuurmonumenten.nl; ravon.nl; waarneming.nl; zoogdierveniging.nl

Indicative species



Neomys fodiens Micromys minutus Apodemus sylvaticus Myodes glareolus



Epidalea calamita Anax imperator Coenagrion pulchellum Sympetrum sanguineum Brachytron pratense

Sciurus vulgaris

Distribution Map

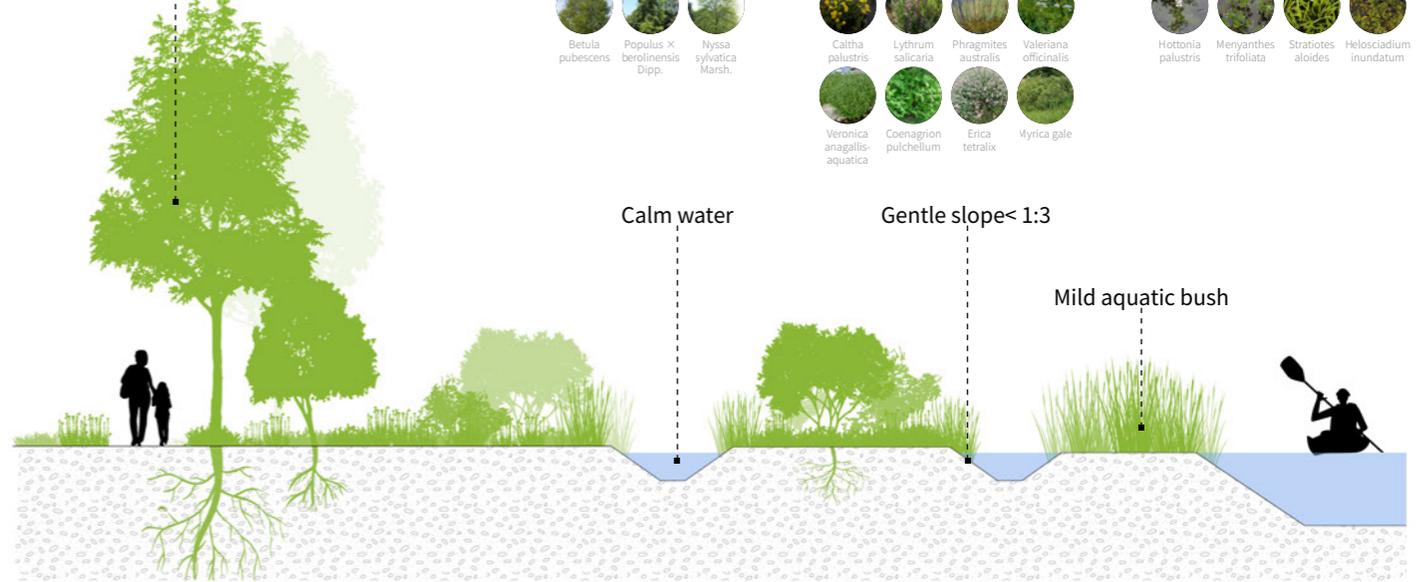


Map created by author, Data provided by: Open-dataportaal Zuid-Holland



Targeted Habitat

Lush vegetation to reduce human disturbance



Trees



Betula pubescens Populus X berolinensis Dipp. Nysa sylvatica Marsh.

Shrubs



Calluna palustris Lythrum salicaria Phragmites australis Valeriana officinalis



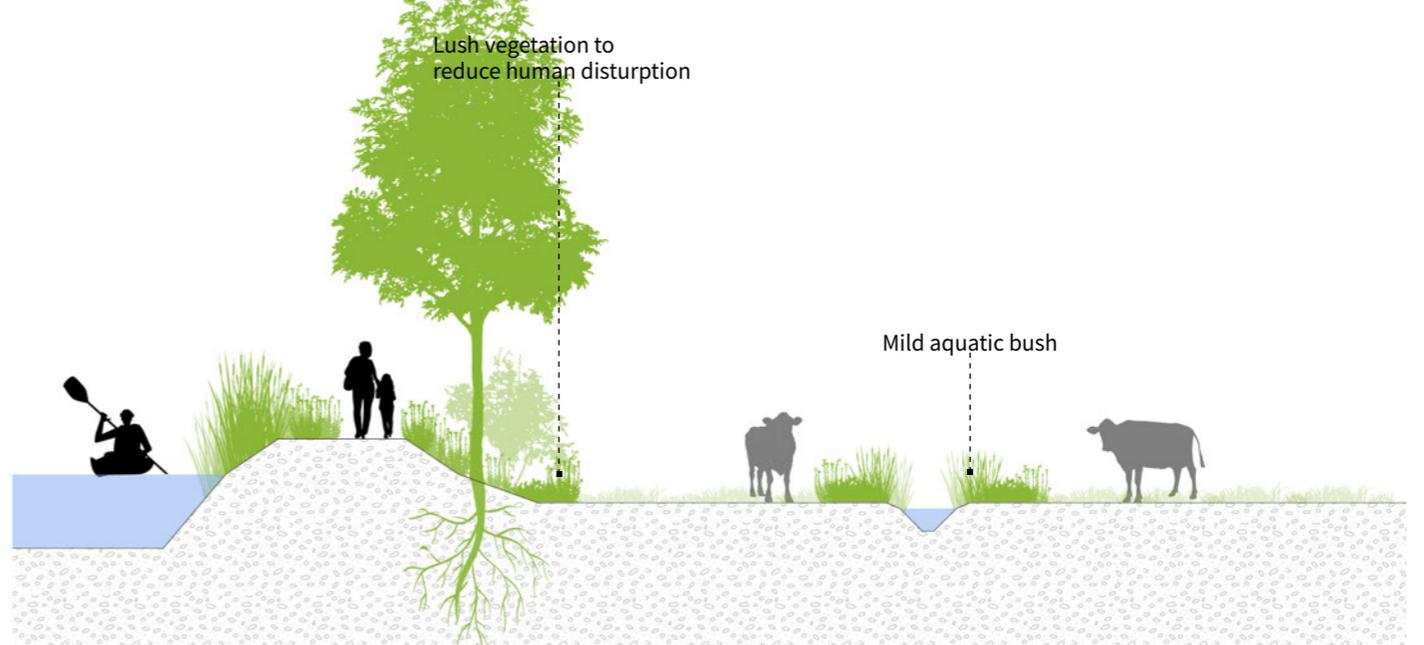
Veronica anagallis-aquatica Coenagrion pulchellum Erica tetralix Myrica gale

Water plant



Hottonia palustris Menyanthes trifoliata Stratiotes aloides Helosciadium inundatum

Targeted Stepping Stone, Corridor





Lush vegetation to
reduce human disturbance

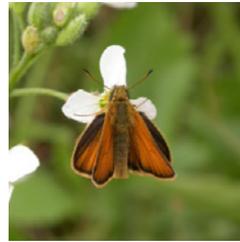
Calm water

Mild aquatic bush

Biodiversity and Ecology



Pollinator



Thymelicus lineola

Indicative species



Ochlodes sylvanus
Coenonympha pamphilus
Anthocharis cardamines



Aricia agestis
Lasiommata megera
Thymelicus lineola



Bombus veteranus

Indicative species



Bombus soroeensis



Simosyrphus grandicornis

Source: bestuivers.nl; natuurmonumenten.nl; ravon.nl; waarneming.nl; zoogdiervereniging.nl

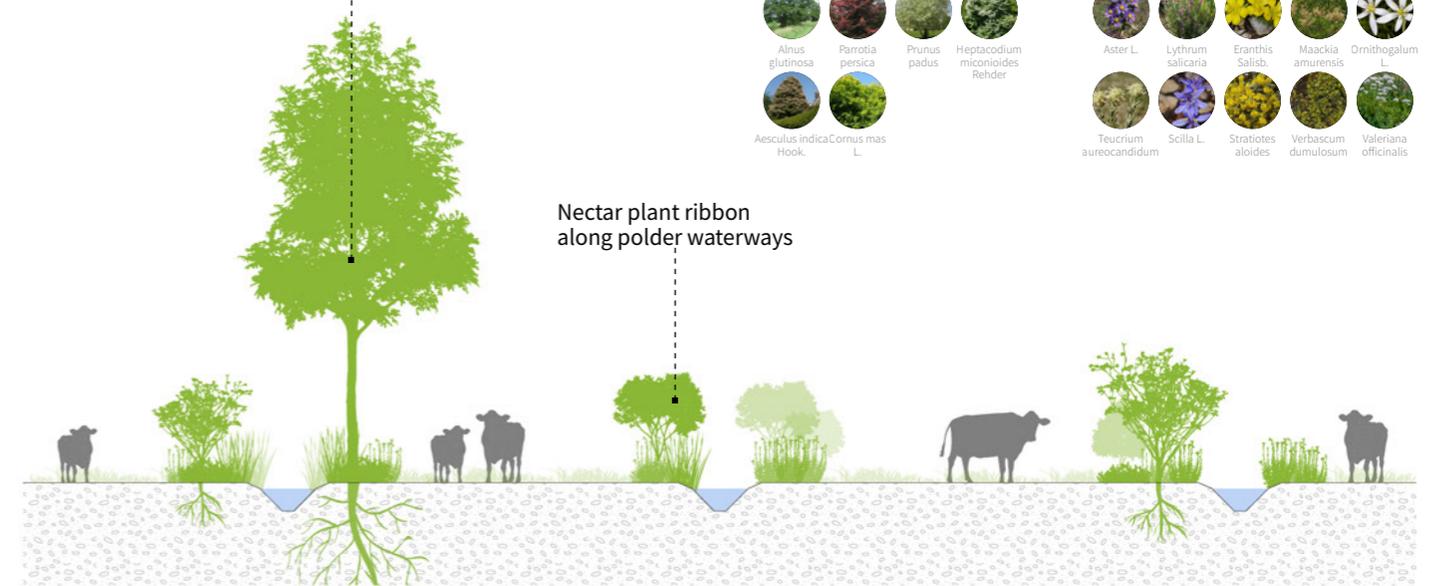
Distribution



Map created by author,
Data provided by: Open-dataportaal Zuid-Holland

Targeted Stepping Stone, Corridor

Vertical vegetation structure



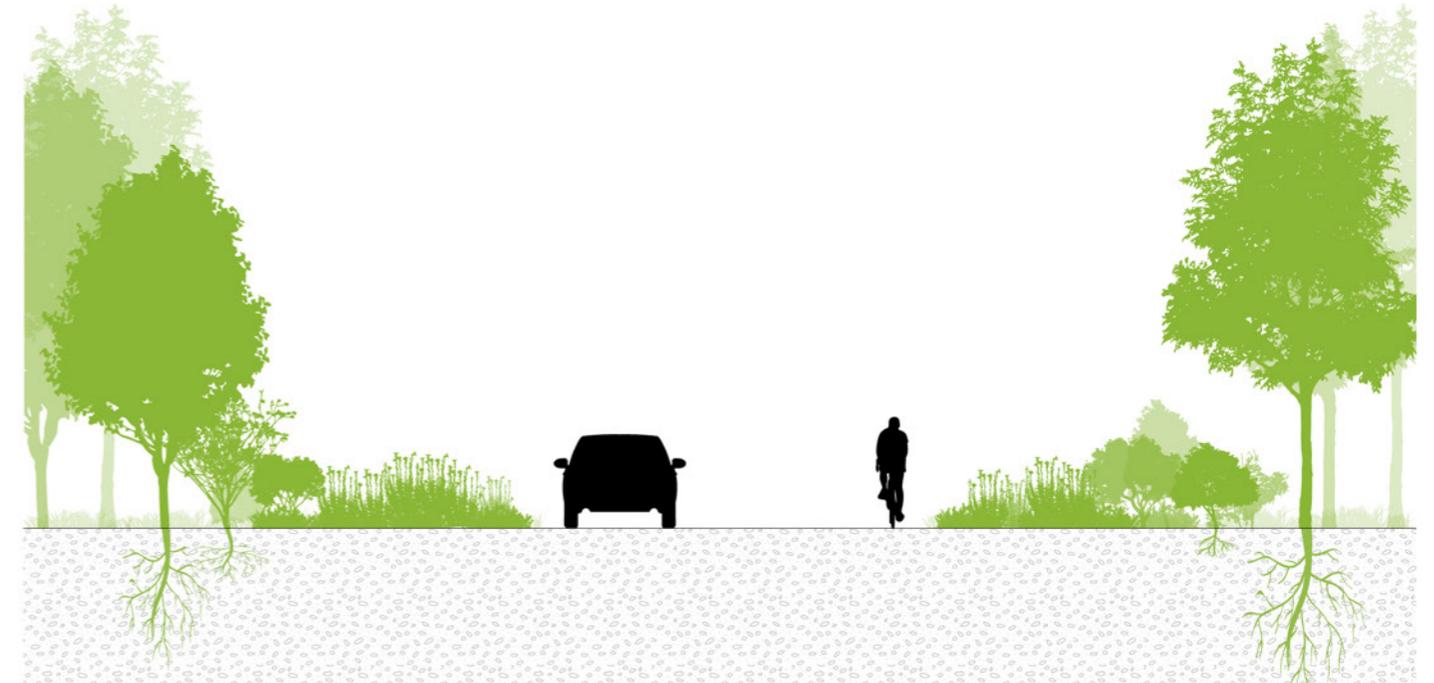
Trees



Shrubs & Herbs



Nectar plant ribbon
along polder waterways

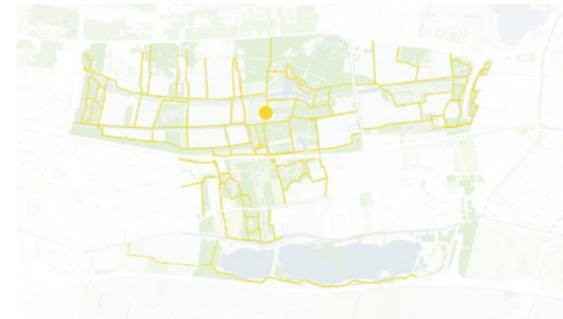
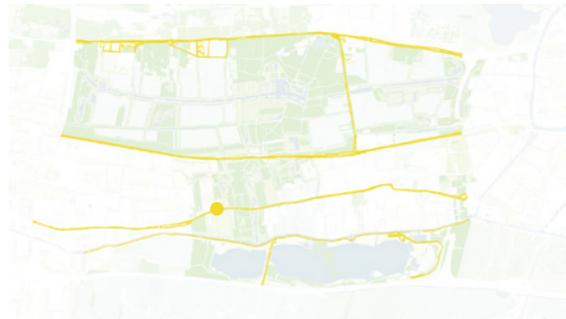




Vertical vegetation structure

Nectar plant ribbon
along polder waterways

Biodiversity and Ecology



Water and Climate Adaptation



1. Widen existing water way to enhance water storage capacity



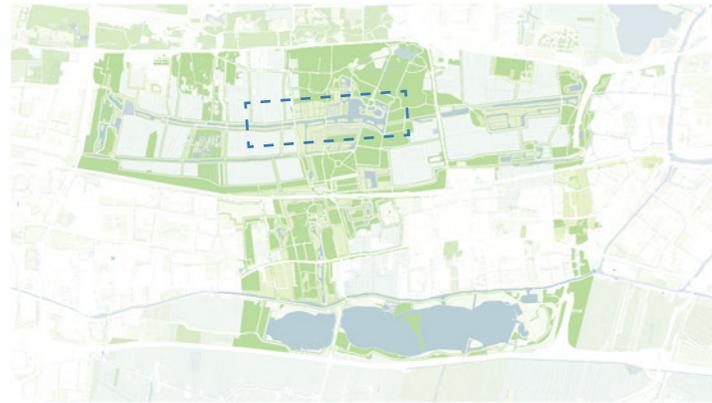
2. Increase water retention areas to reduce pressure on main waterways to adapt to extreme weather events.



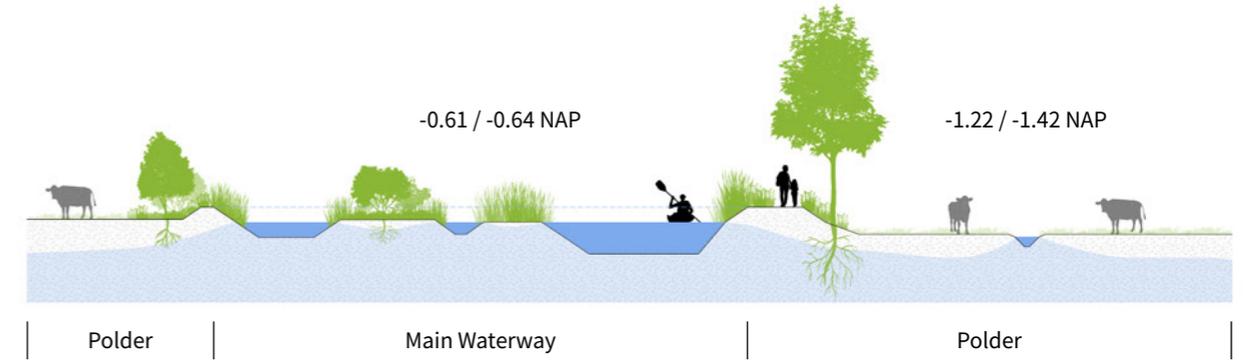
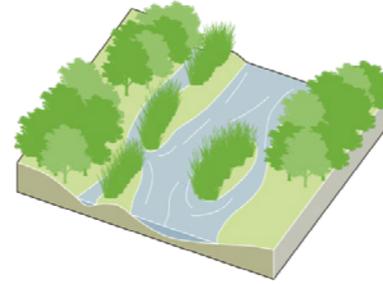
3. Develop wetlands among water systems to sustain water quality and increase floodability.



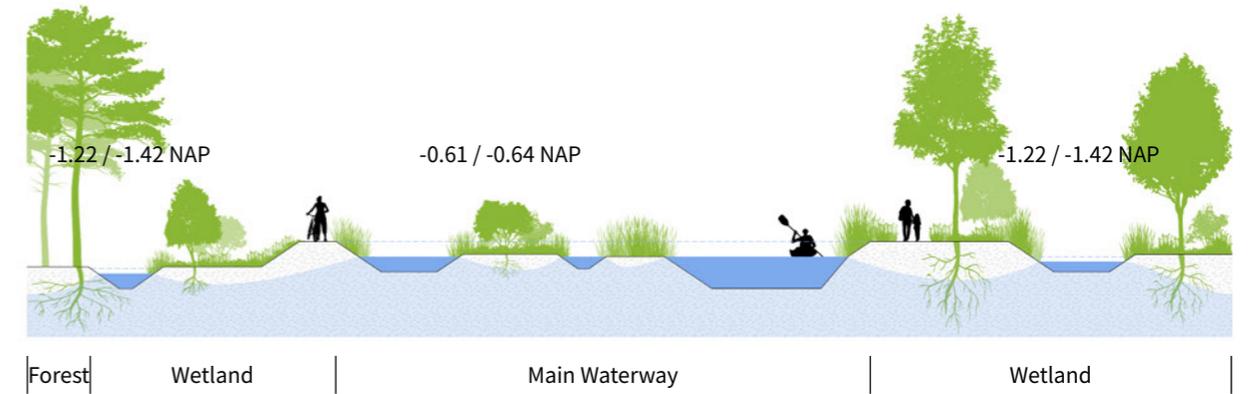
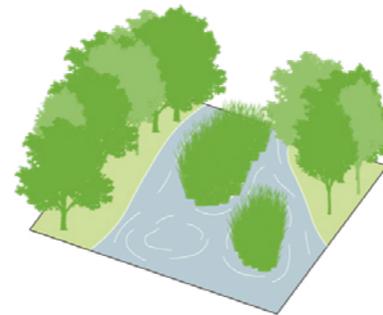
Water and Climate Adaptation



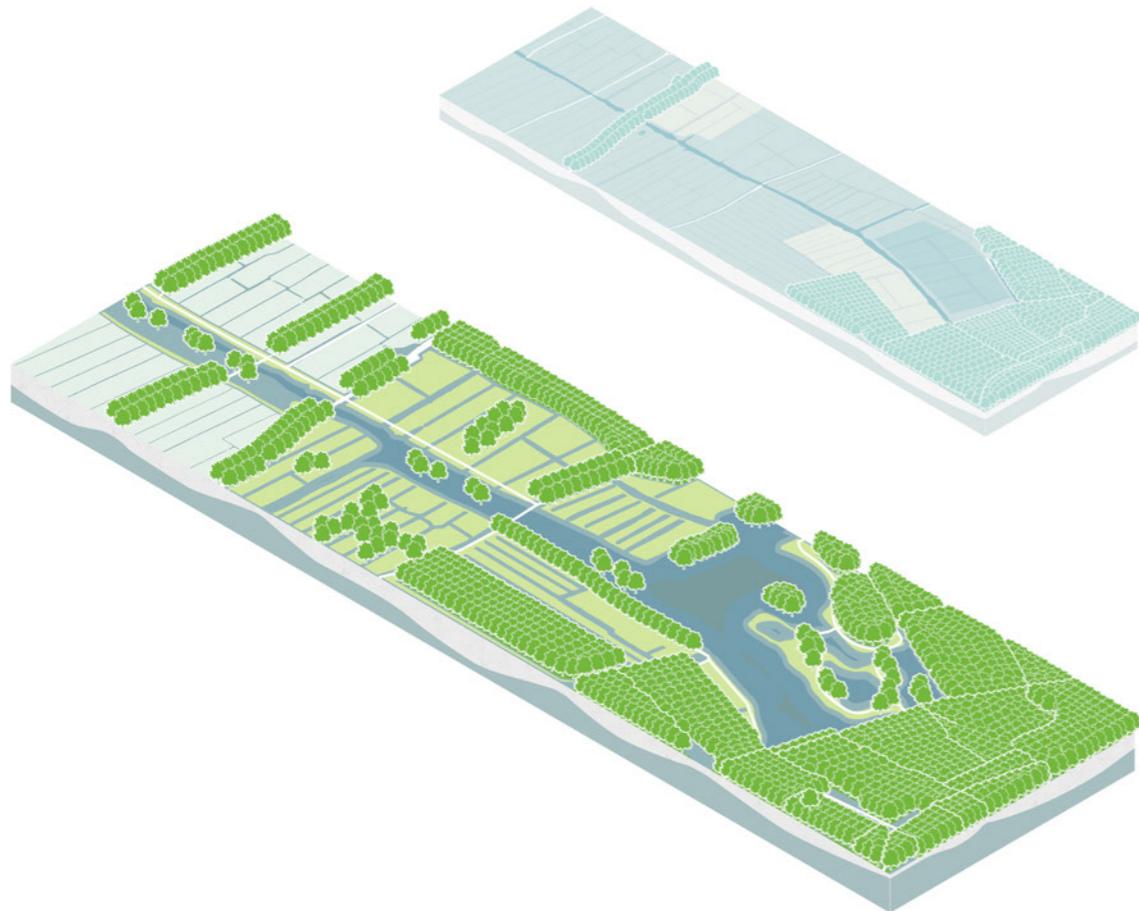
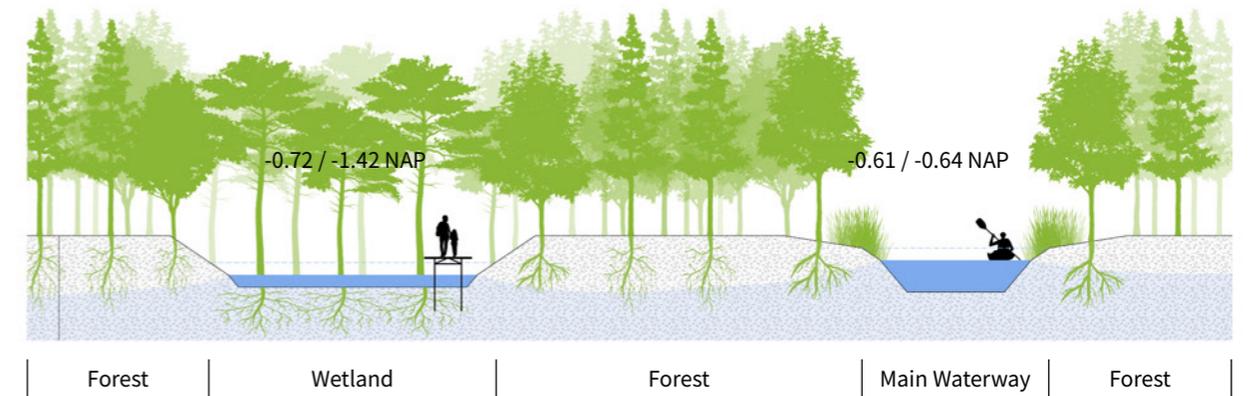
Water ways as core structure for development



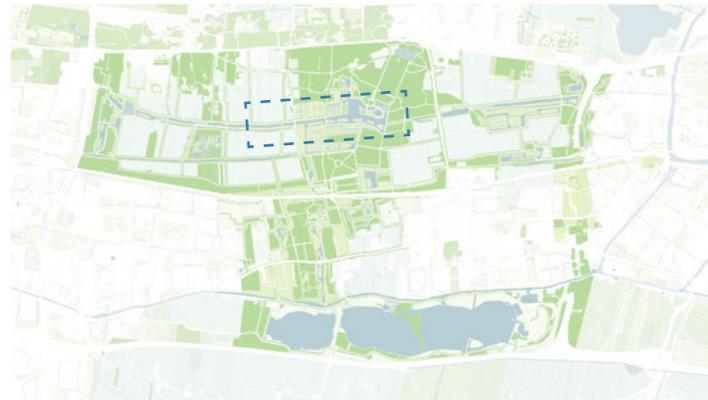
Wetland to enhance water adaptivity



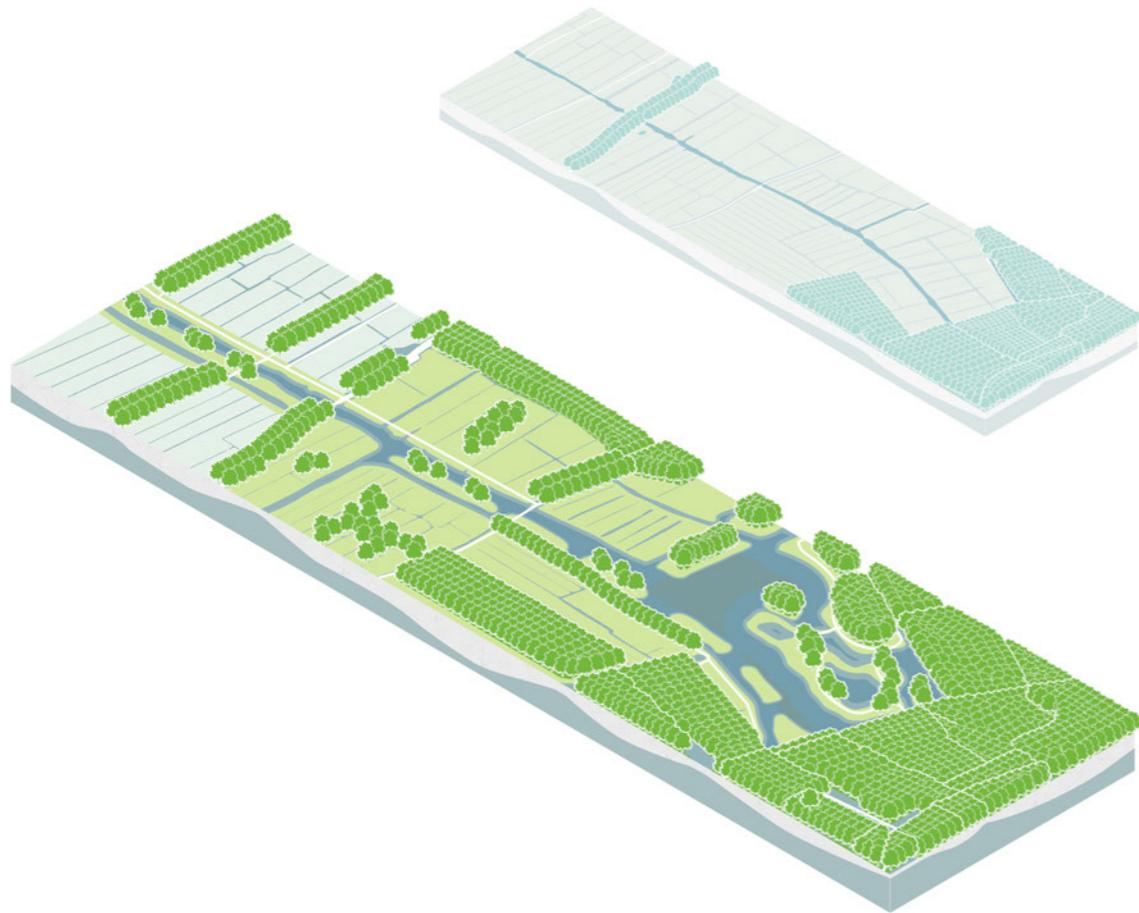
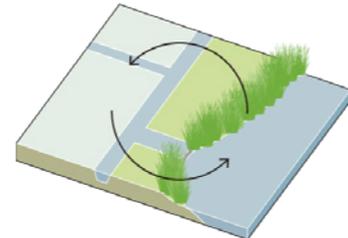
Innundated land for seasonal water storage



Water and Climate Adaptation



Agri-nature water circulation



Water Distribution & Circulation Map

- Water Distribution
- Water Circulation
- Main Waterway
- Secondary Waterway
- Wetland



Landscape Development



2030



2035



2050



2100



- Build up animal-crossing facilities.
- Increase nectar plant species along route networks.

- Introduce aquatic plants and fruit bushes for wetlands.
- Introduce trees in new recreational areas.

- Build up more woodlands along traffic lines as sound buffer.
- Enhance connectivity of the tree-based habitats by complementing the tree corridors and stepping stones.

- Promote nature-inclusive agriculture to realize the full ecological structure of the metropolitan park

- Strengthen the identifiability of the existing route networks.
- Enhance the spatial characteristics of the existing entrances.

- Develop recreational areas.
- Increase recreational routes for new recreational areas.

- Develop diverse route choices for different experiential themes.

- Widen main water structure.
- Construct water bypasses along main water structure.
- Develop inundable spaces.

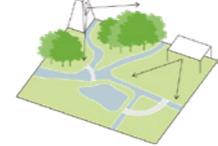
- Develop wetland for water storage.
- Expand water network for future woodlands.
- Complete full water networks by realizing water circulation.

- Forest as connective structure
- Water-based experience route
- View points and site-specific landmarks

Woodlands as city-nature buffer



Spots for representing landscape quality



Waterways as core structure for development



Heterogeneous stepping stone



Circular experience route



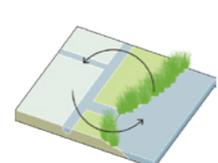
Agri-nature water circulation



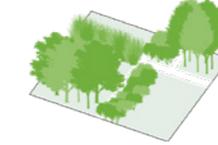
Inundated land for seasonal water storage



Wetland to enhance water adaptativity



Sustainable agriculture





05 Reflections

What lessons can be gained specific for region or generic through design?

Conclusions

Understanding
Application
Exploration

Reflections

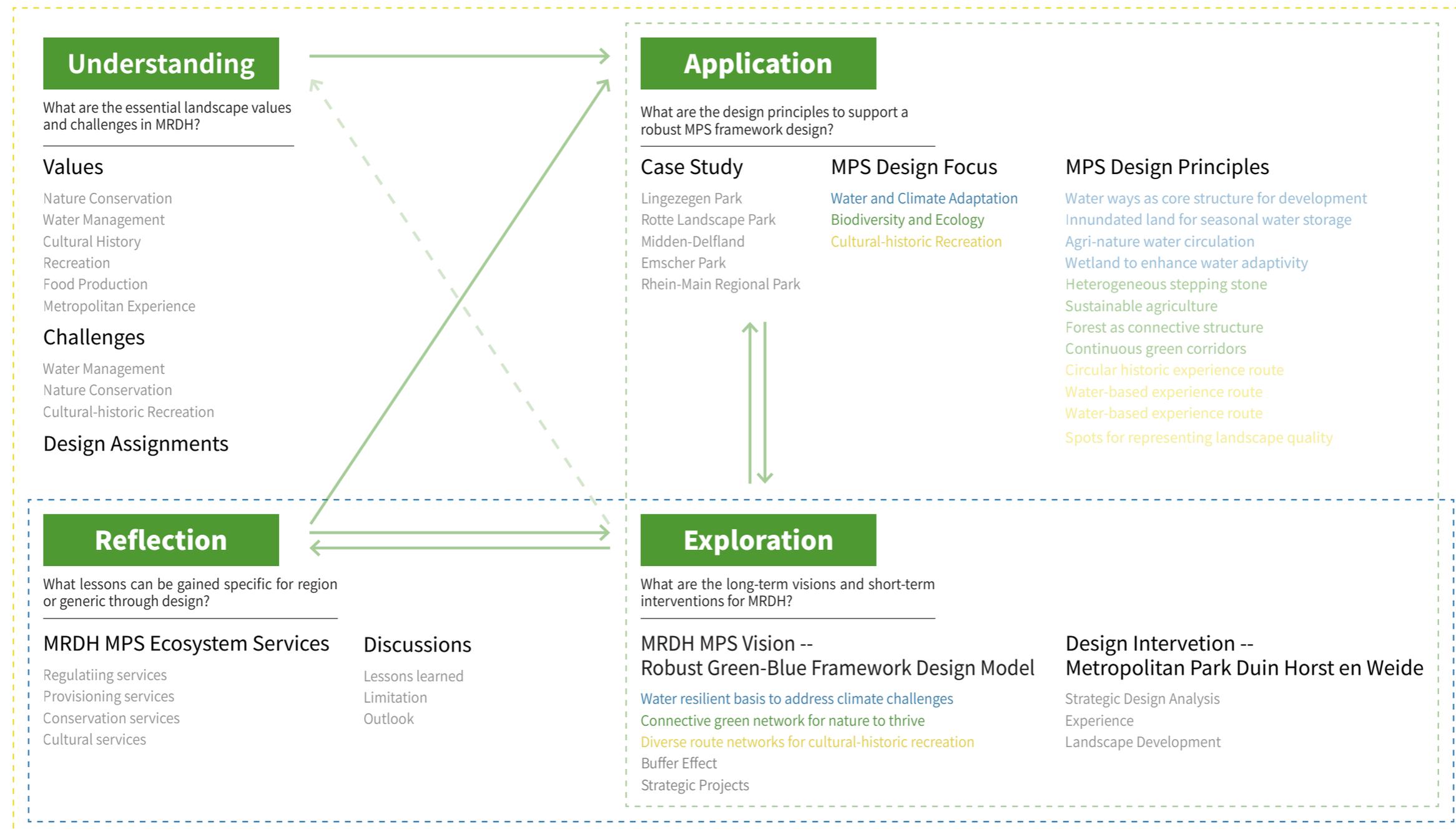
Theoretical relevance
Practical relevance



Conclusions



Landscape-based Regional Design



Ecosystem services

Metropolitan Parks Study

What are the design principles to support a robust MPS framework design?



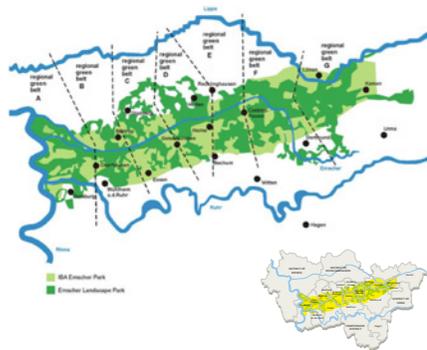
Lingezege Park, the Netherlands



Rotte Landscape Park, the Netherlands



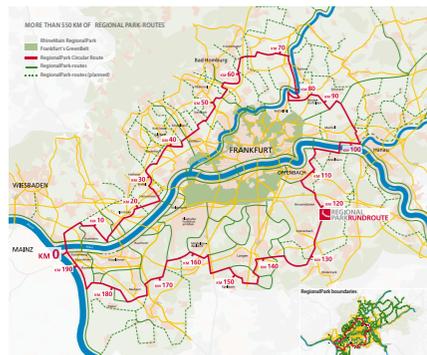
Emscher Park, Germany



Midden-Delfland, the Netherlands



Rhein-Main Regional Park, Germany

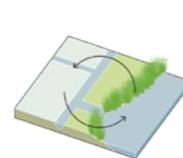


Water and Climate Adaptation

Inundated land for seasonal water storage



Agri-nature water circulation



Wetland to enhance water adaptivity



Water ways as core structure for development



Biodiversity and Ecology

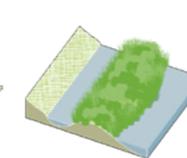
Heterogeneous stepping stone



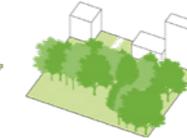
Forest as connective structure



Diverse embankments for diverse species



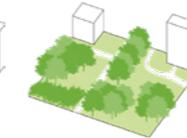
Woodlands as city-nature buffer



Sustainable agriculture



Continuous green corridors



Recreation and Cultural-history

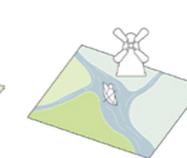
Circular historic experience route



Landscape art for stressing local feature



Water-based experience route



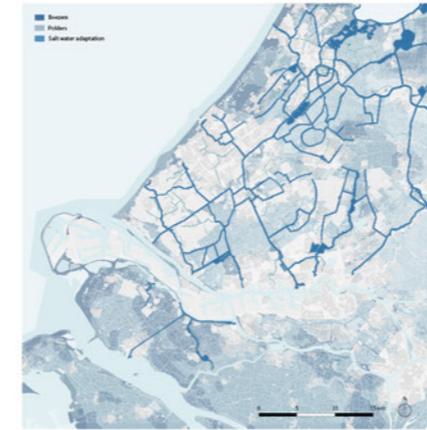
View points and site-specific landmarks



Spots for representing landscape quality



What are the long-term visions and short-term interventions for MRDH?



Strategy 1
Use boezem system as powerful backbone for fresh water management.



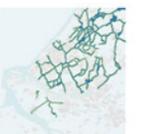
Strategy 2
Develop more open space for water storage to mitigate flood and drought.



Strategy 3
Raise water levels and develop reservoirs in certain salinization-prone spaces.



Strategy 1
Develop green spaces along boezem system to enhance ecological connectivity for aquatic habitats.



Strategy 2
Integrate nature conservation areas into park structure to promote socio-ecological benefits.



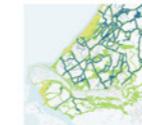
Strategy 3
Promote nature-inclusive or circular agriculture to improve agricultural ecology.



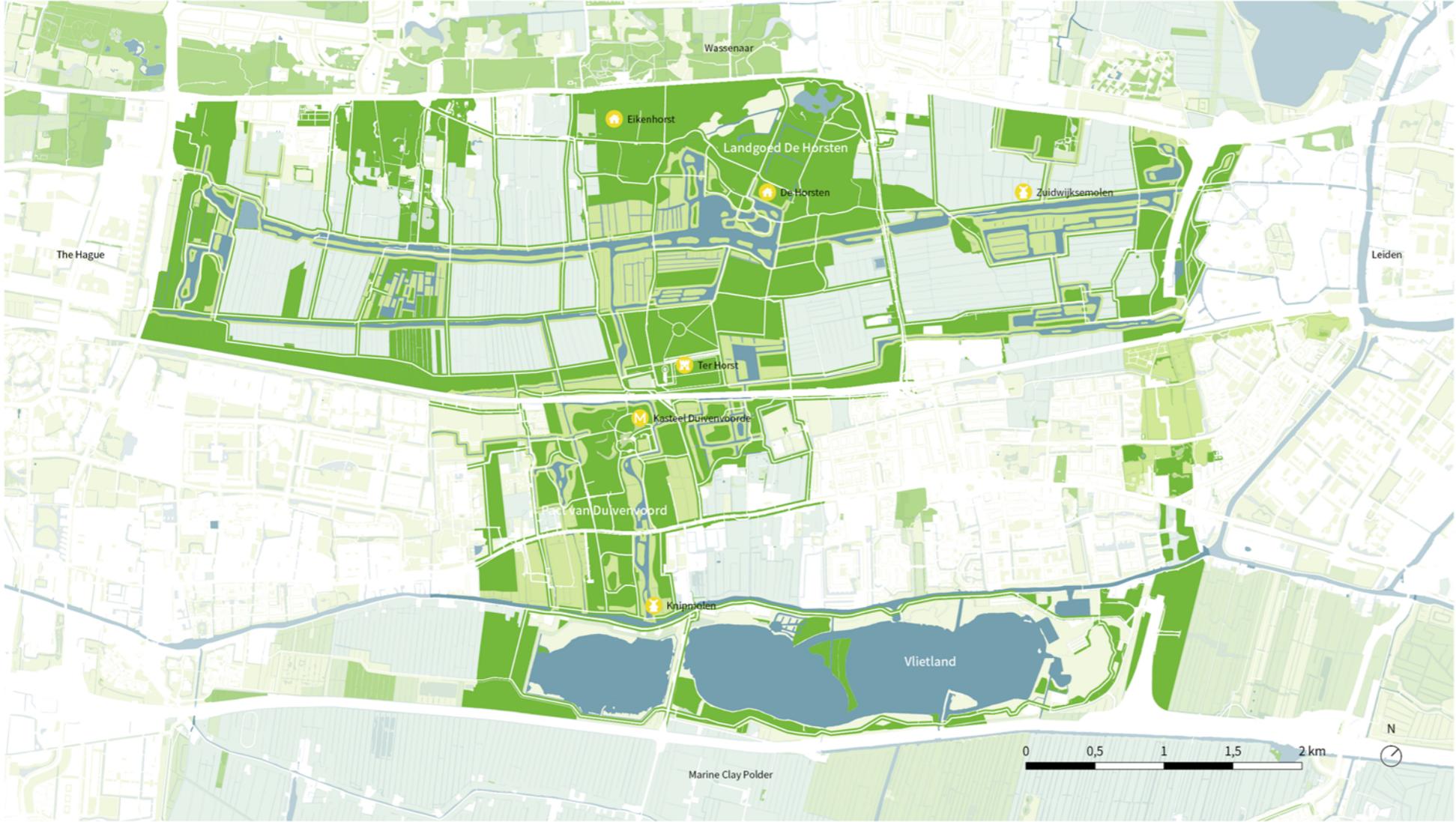
Strategy 1
Develop high connective recreational route networks among MPS.



Strategy 2
Recreational areas as cores for strengthening metropolitan experience.



What are the long-term visions and short-term interventions for MRDH?

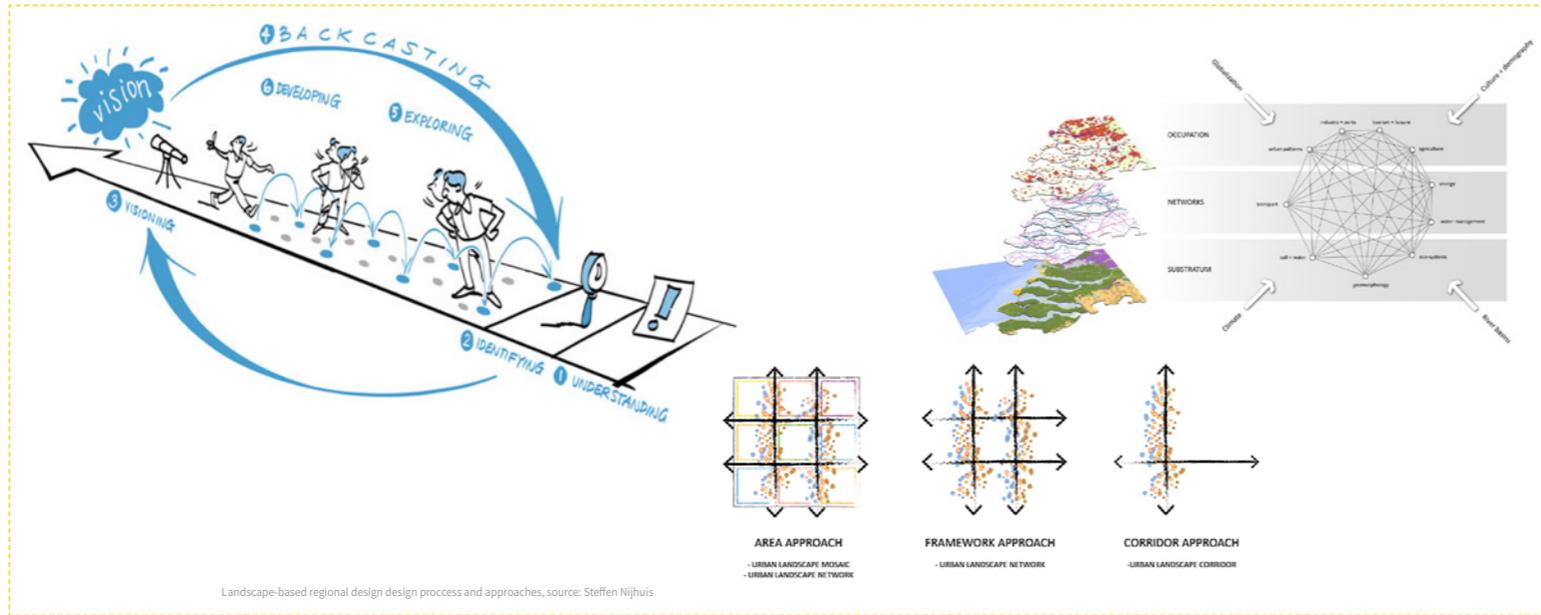


Map created by author,
Data provided by: Open-dataportaal Zuid-Holland

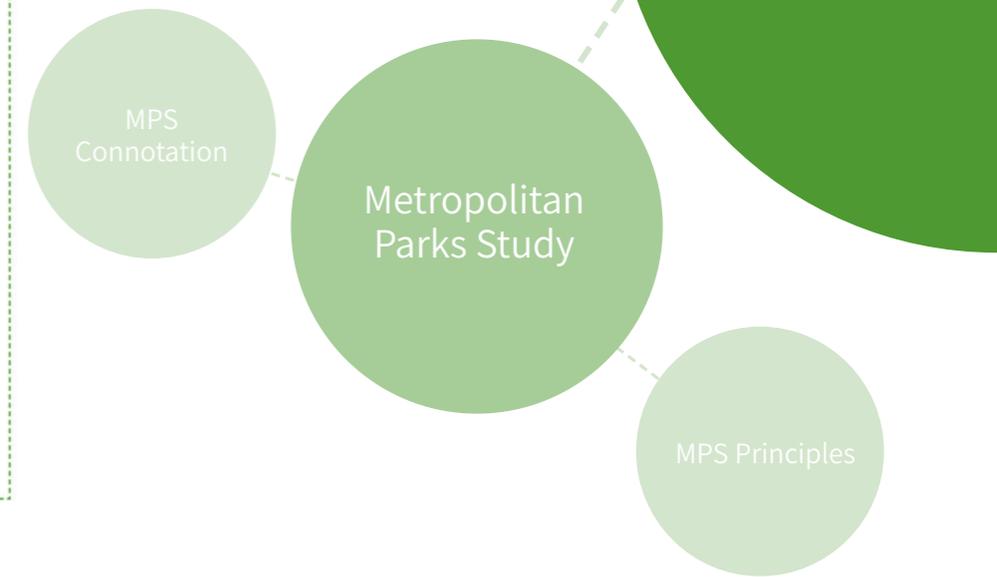
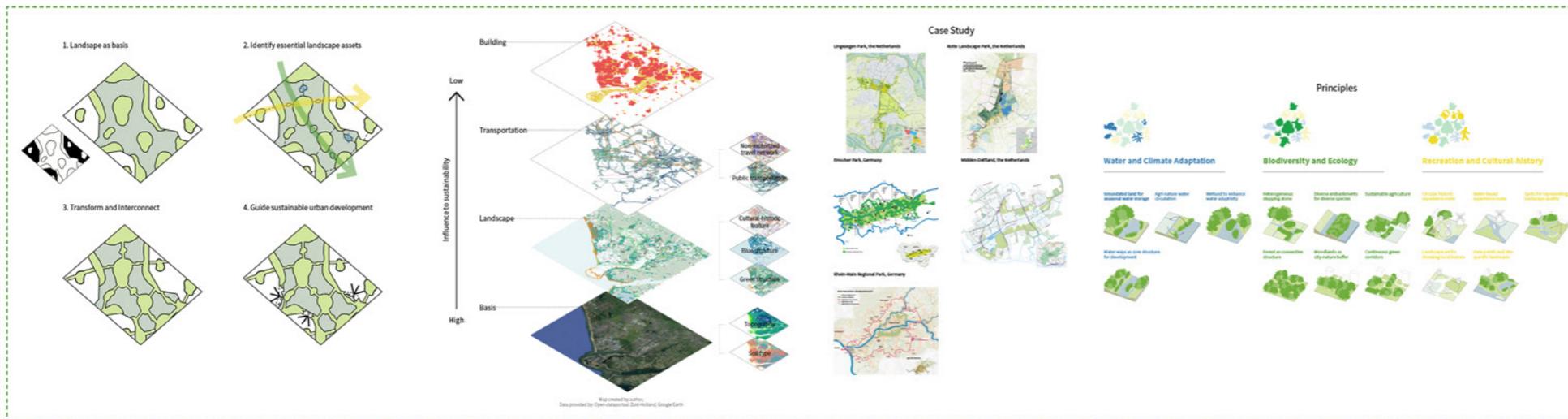
What lessons can be gained specific for region or generic through design?



Offering a series of systematic research-through-design approaches for the design of MPS



Offering a fundamental design perspective and abundant experiences in designing MPS

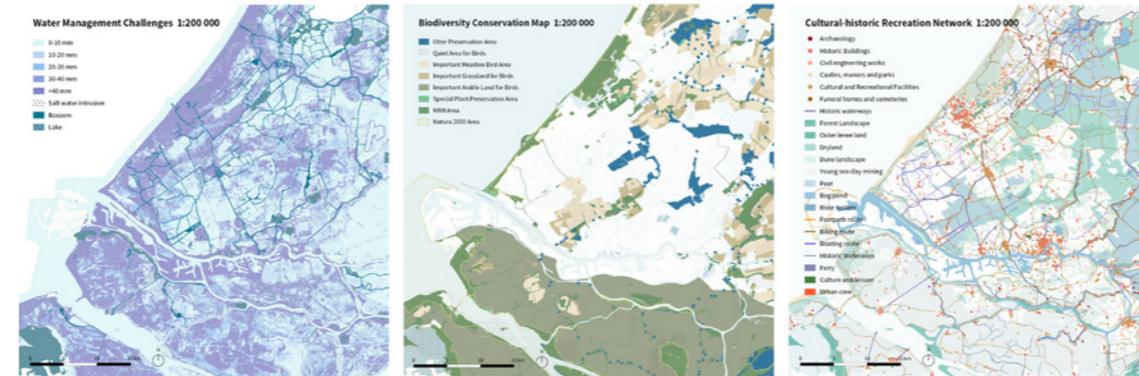


What lessons can be gained specific for region or generic through design?



Recognizing the capabilities of landscape-based MPS design in addressing urban unsustainability in an integrative manner

Challenges that can never be solved in isolation



- Extended heat & drought**
 - Extended hot weather duration and higher fresh water demand.
 - Less precipitation in dry season.
- Declined groundwater storage**
 - Decreased permeable land.
 - Lowered groundwater table due to subsidence.
- Demand on more water retention areas**
 - Increased precipitation.
 - Incompatible area for temporal water retention.
- Irreversible damage to drought prone wetland**
- Habitat fragmentation**
 - Isolated habitats lacking connections.
 - Lacking diverse stepping stones to build up connections.
 - Incompatible food source.
- Human disturbance**
 - Increasing human visit.
 - Noise from recreational activities and transportation.
 - Incompatible vegetation abundance for objectives.
- Slow traffic accessibility**
 - Low connectivity between recreational greenlands.
 - Demand for diverse travel routes and modes to alleviate current travel pressure.
- Metropolitan experience**
 - Clear image to increase metropolitan landscape attractiveness.
- Increasing demand on recreation**
 - Increasing need to more open space supply.



Values that can never be achieved in isolation

Nature Conservation



Polder, source: <https://www.fetsen123.nl/route/de-duinen-van-meijndel>

Nature recreation



Polder, source: De Rotta.nl

Water Management



Polder, source: <https://www.mirandawandijk.nl/recreatiegebied-vlieland/>

Food Production



Polder, source: Google map

Cultural History

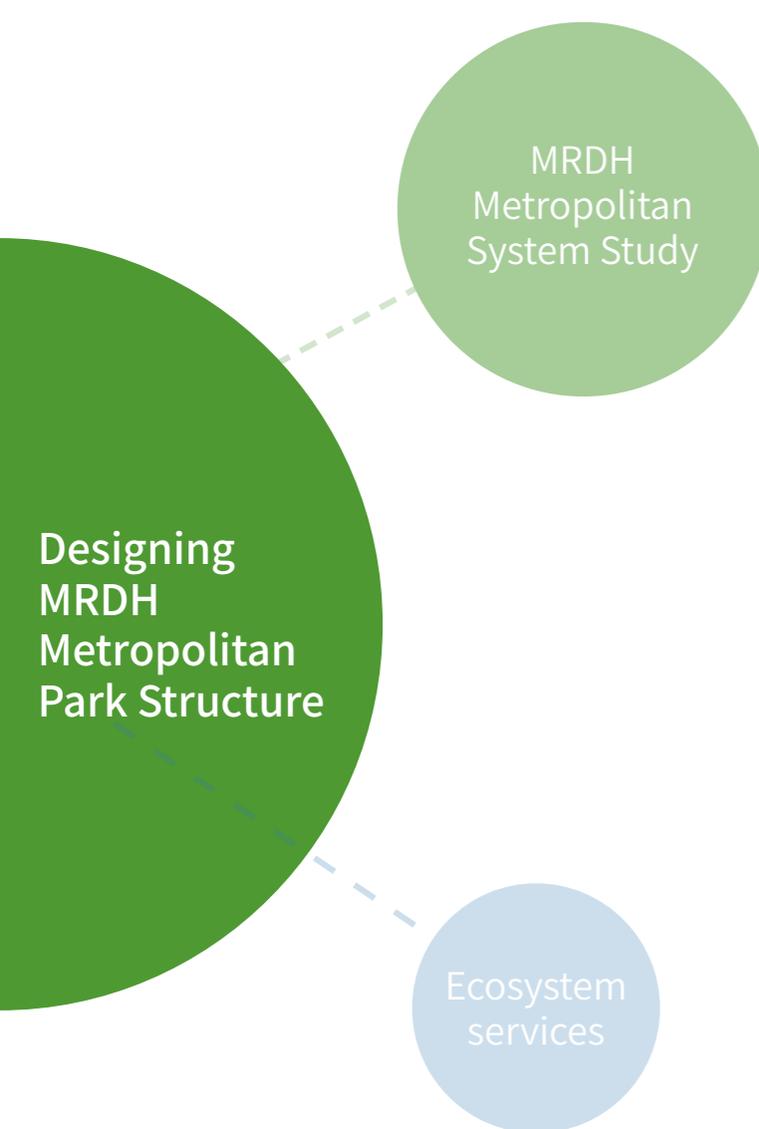


Polder, source: geschiedenisvanzuidholland

Metropolitan Experience



Polder, source: <https://www.wonenierottendam.nl/en/overschie/overschie/>

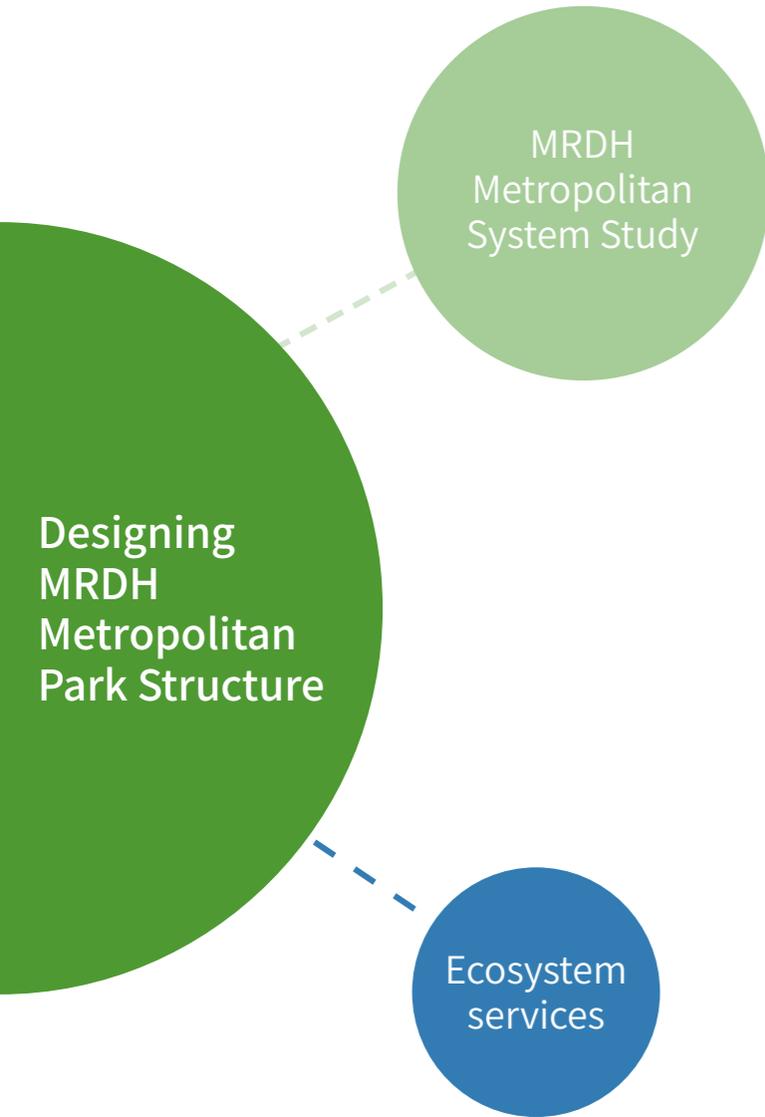


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What lessons can be gained specific for region or generic through design?



Recognizing landscape as an indispensable part of metropolitan system, not a supplement



Flexibility in terms of scale, time, and future scenarios



Power in improving urban sustainability for human and beyond

Regulating Services

Enhancing water systems to be more resilient to hydrological processes and climate change.

Conservation Services

Designing resilient water systems and complete ecological networks to protect critical habitats from urban development, enhancing biodiversity.

Provisioning Services

Promoting sustainable agriculture, connecting agroecology to larger networks, reducing agricultural vulnerability to climate change, and ensuring food production.

Cultural Services

Integrating nature with cultural history, recreation, and sustainable transportation, preserving the character and context of landscapes, and safeguarding the metropolitan recreational experience.

Designing MRDH Metropolitan Park Structure

P5 Presentation
Junjian Yu
Mentor: Prof. Dr. Steffen Nijhuis, Ir. Marco Lub
Designing Resilient Coastal Landscape Lab

