

# RESTORATIVE URBAN FOREST

Designing a forest park for Amsterdam Sloterdijk  
that contributes to reducing mental stress

Machteld Zinsmeister 4220811



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Examinator: Herman Vande Putte

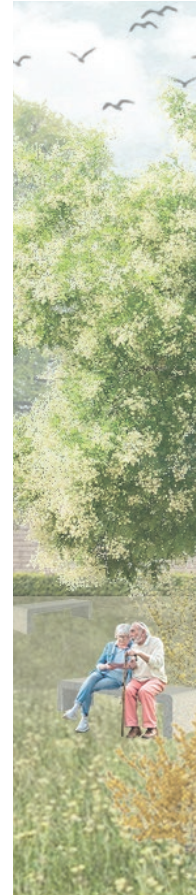
Urban Forest Places Graduation Lab  
Flowscapes Graduation Studio  
MSc Landscape Architecture,  
TU Delft, July 2020



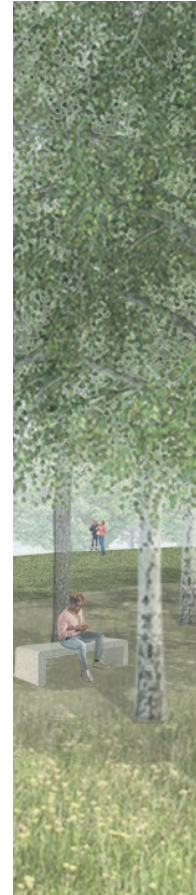
# Structure of the presentation



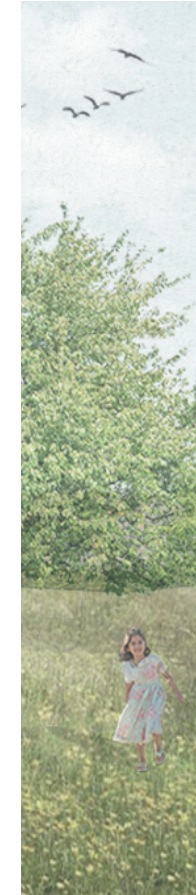
**Introduction**



**Research**



**Design**



**Conclusions**



**Reflection**



# Fascination

urban environments

noise

overcrowded places

heavy traffic

air pollution

lack of contact with nature

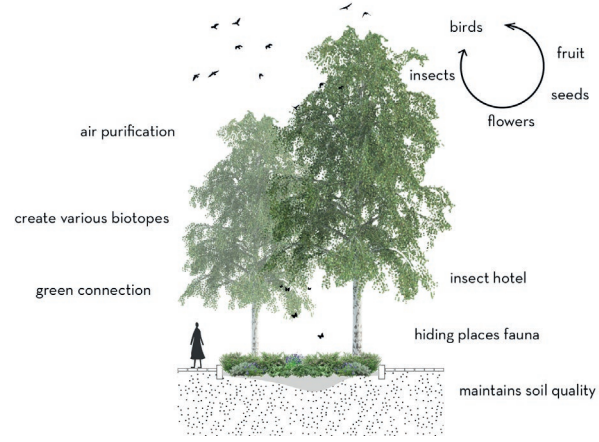


*mental health*

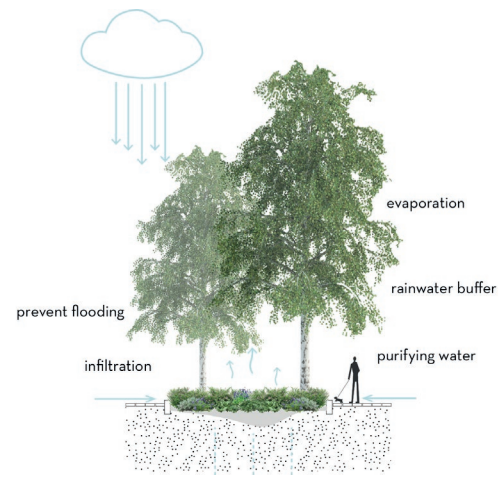
healing aspect of nature



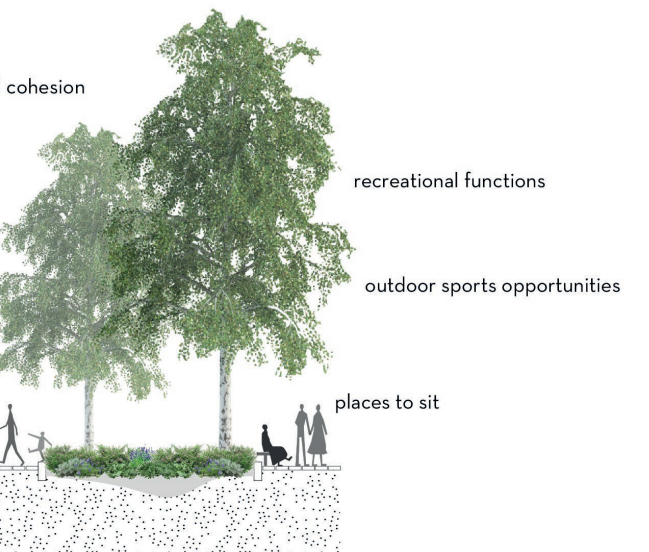
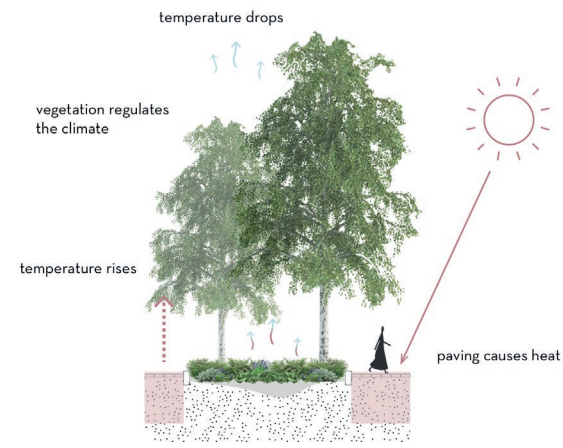
# Urban Forests



ecological benefits



climatic benefits

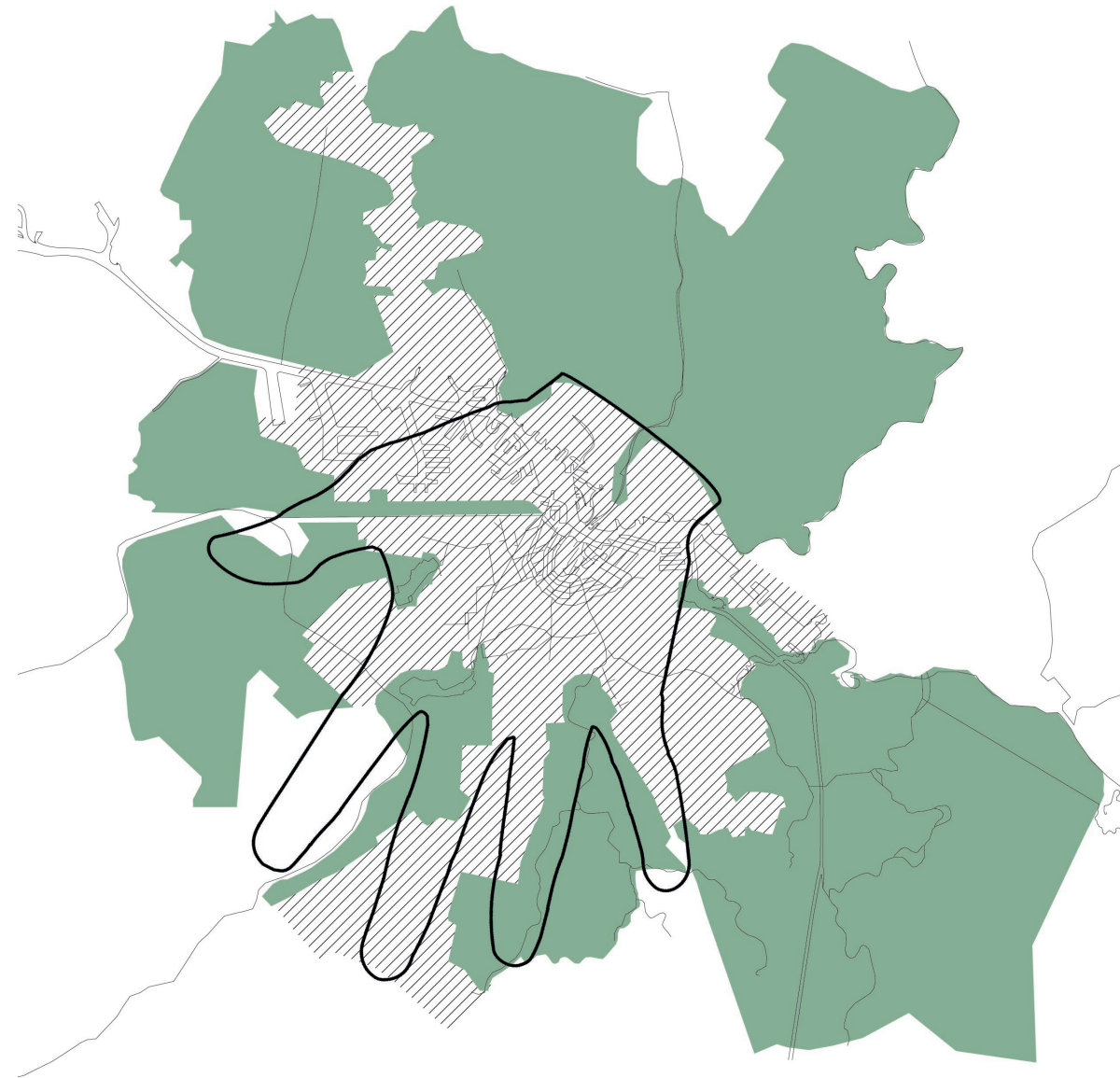


social benefits

↓  
mental health



# Green structure



Amsterdam Green Wedges



Copenhagen Finger Plan

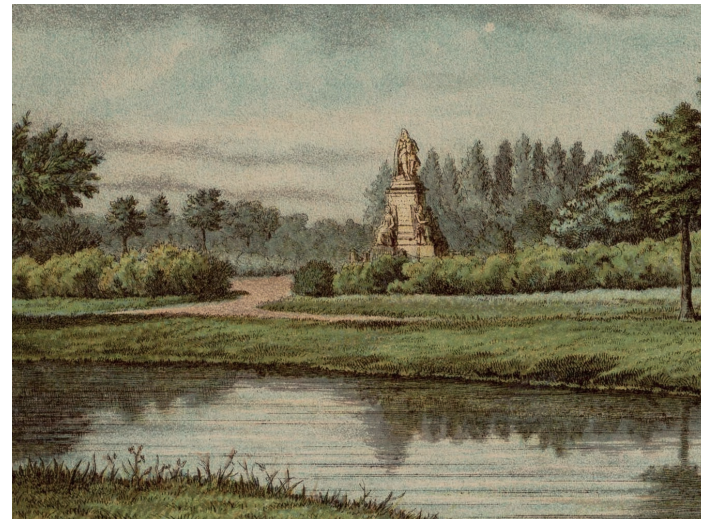


# Timeline



16<sup>th</sup> Century

Trees planted along canals



19<sup>th</sup> Century

City parks



1934

AUP made by van Eesteren

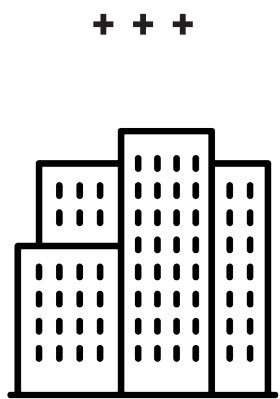


2020

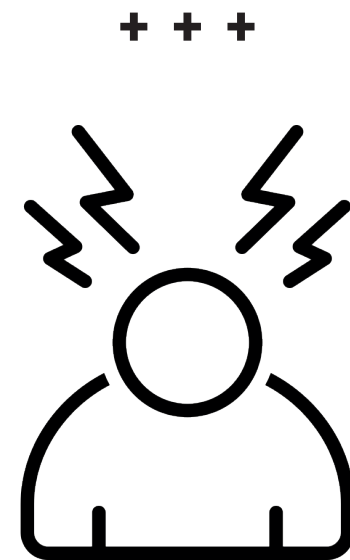
Green structure



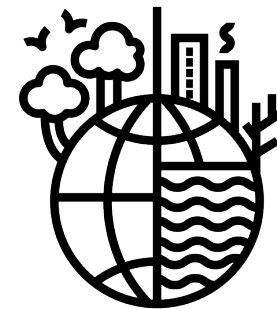
# Problem statement



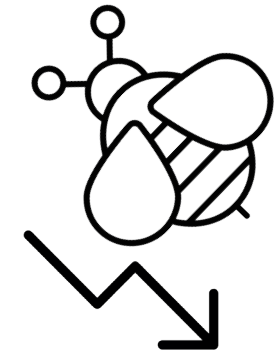
Densification



Stress



Climate change



Biodiversity loss



## Research objective

**How can a forest park be designed in such a way that it contributes to reducing mental stress in an urban environment?**

How can nature contribute to reducing stress?

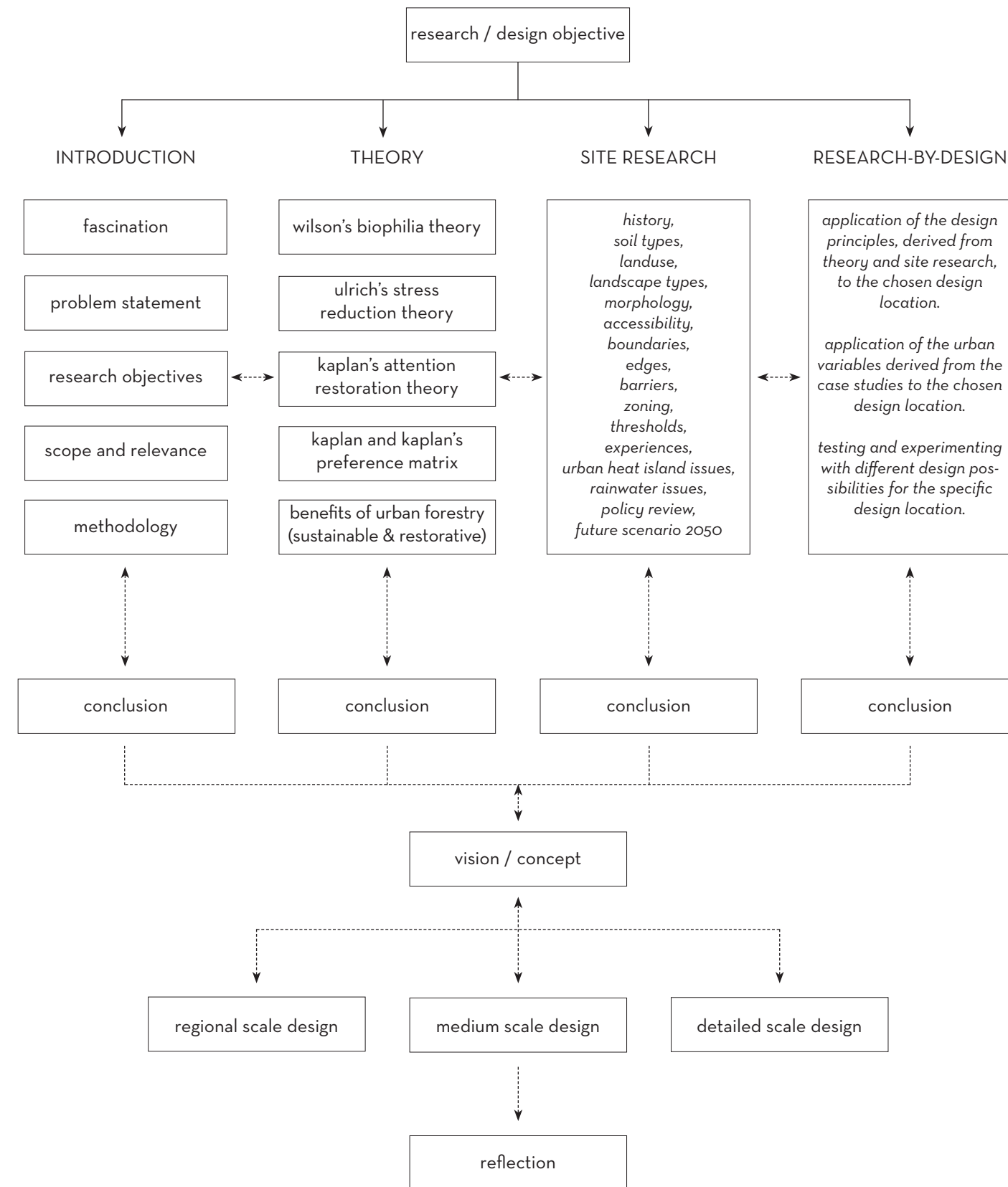
What spatial design principles can be used to design an urban forest park which contribute to reducing stress?

How to apply these design principles to a site specific forest park design for Amsterdam Sloterdijk?

To what extent can the findings of the research and design be applied to other places in the city?

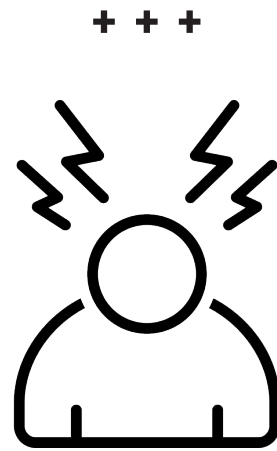


# Methodology

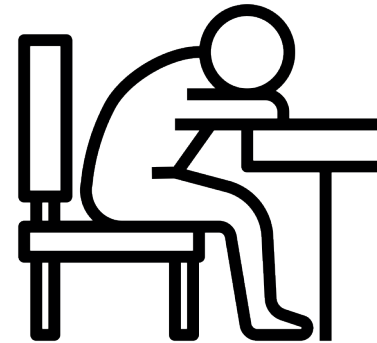




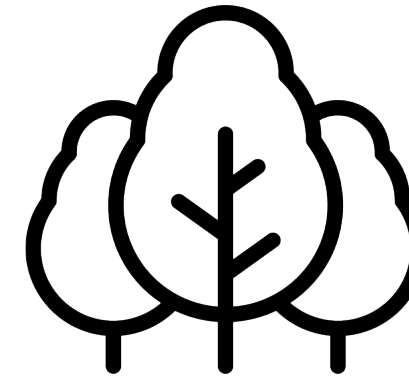
# Literature research



Stress



Mental fatigue

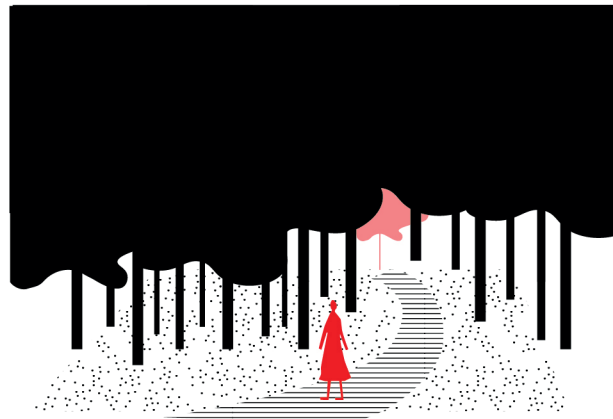


Restorative environments

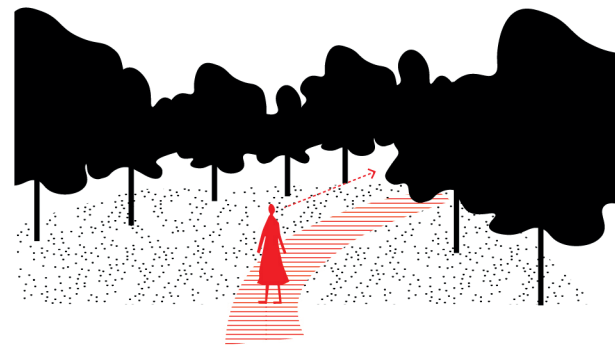


# Restorative environments design principles

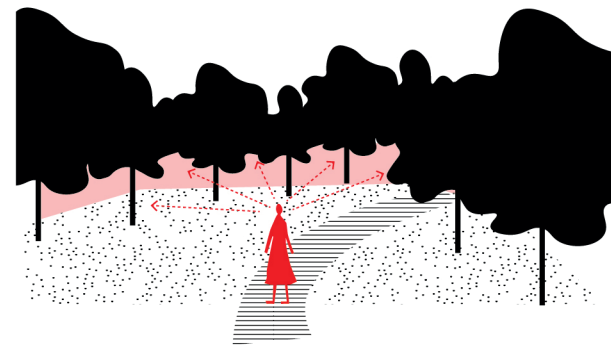
## Preference Matrix



Mystery



Legibility

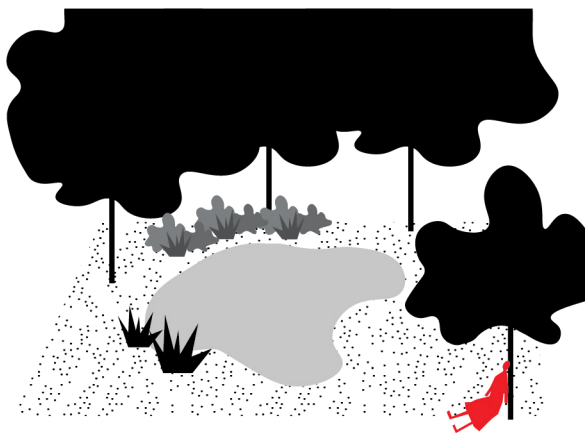


Coherence

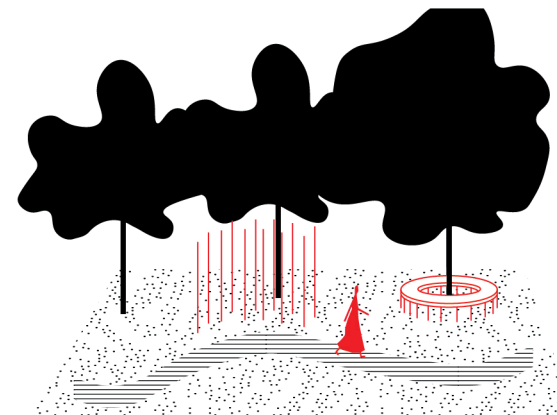


Complexity

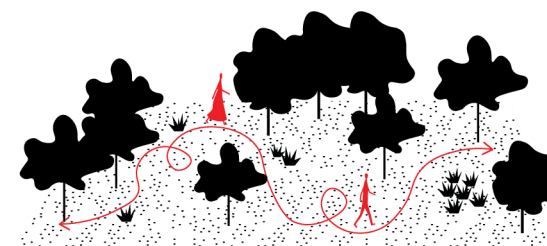
## Attention Restoration Theory



Fascination



Being away



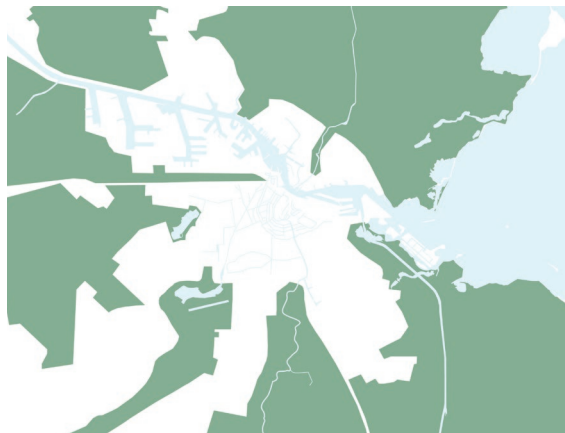
Extent



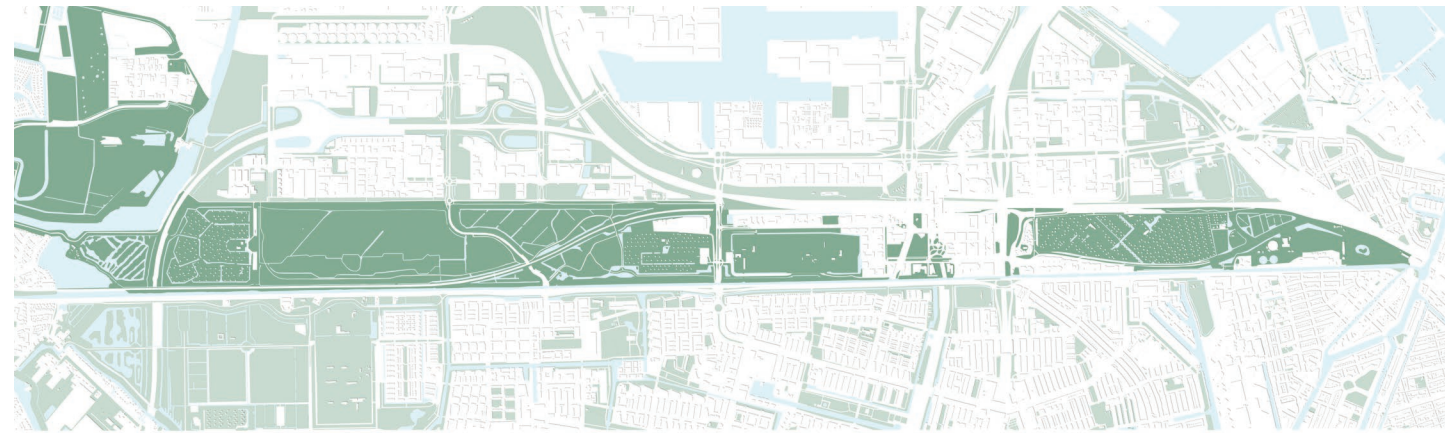
Compatibility



# Site Research



**Large scale**  
The Scheggen  
of Amsterdam



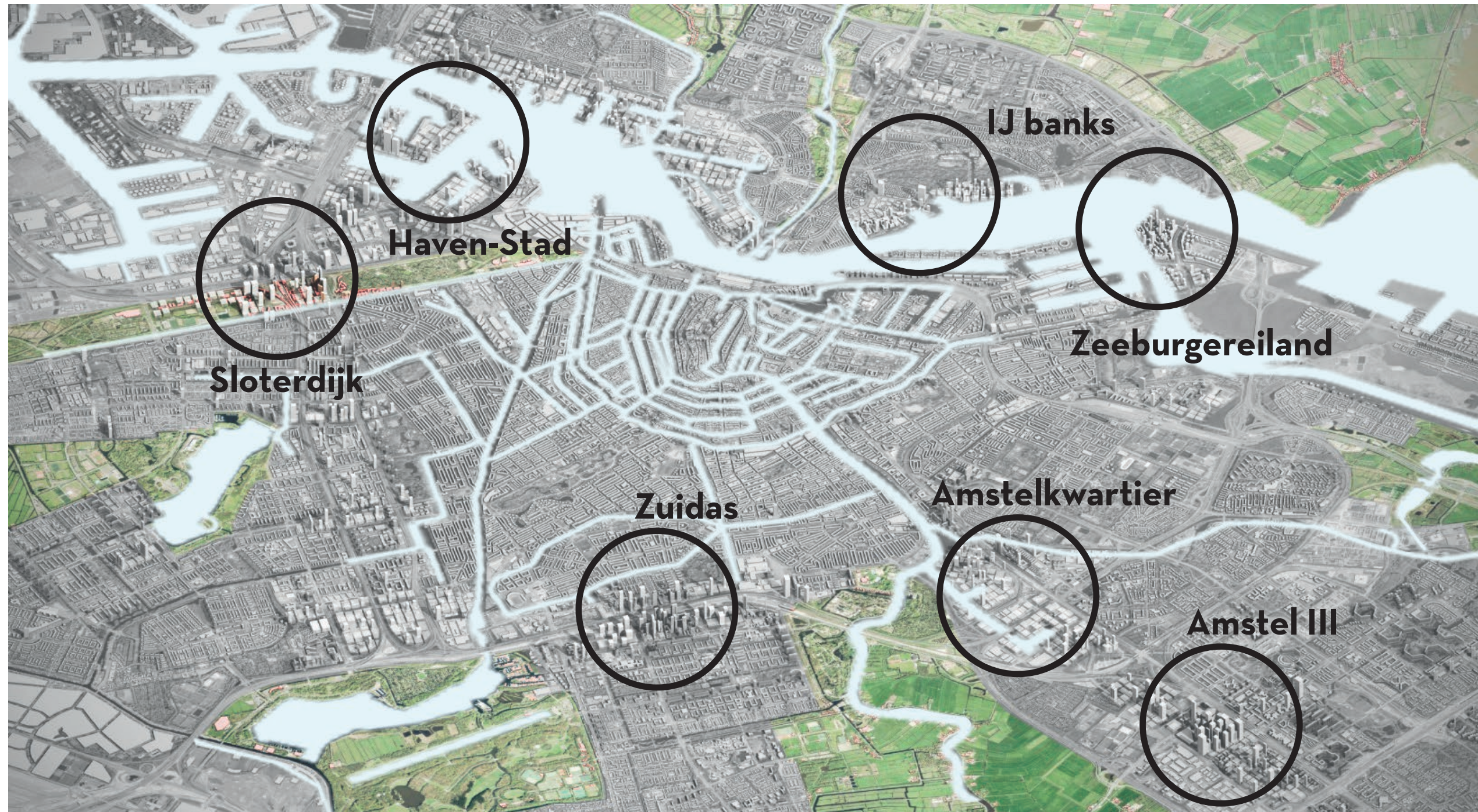
**Medium scale**  
The Brettenscheg  
in Amsterdam-West



**Small scale**  
Sloterdijk within  
the Brettenscheg



# Structural Vision 2040: densification areas





# Evaluation of the Scheggen



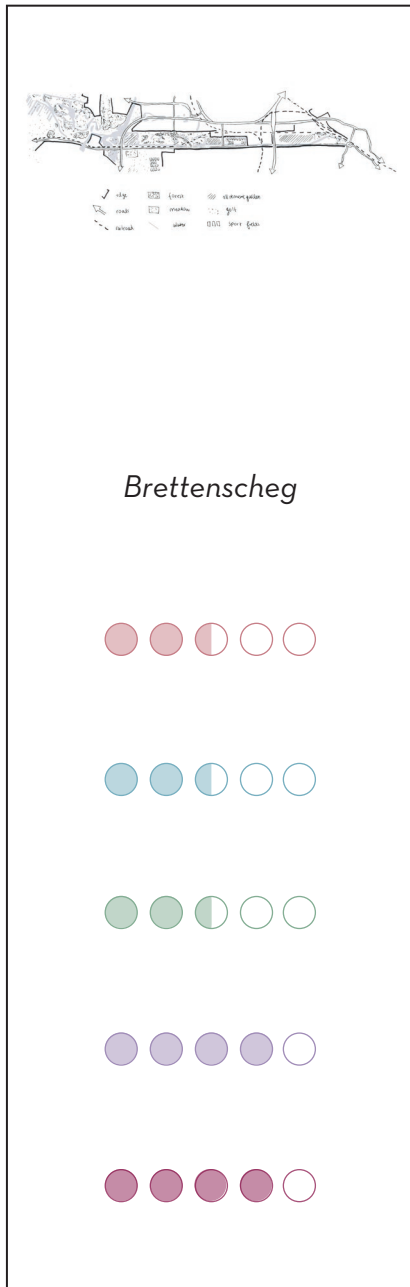
Amstelscheg



Amsterdamse Bosscheg



Sloterscheg



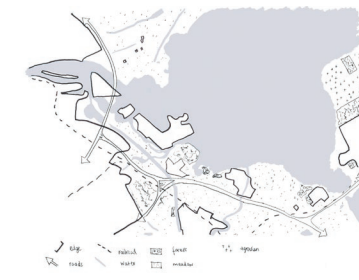
Brettenscheg



Zaansescheg



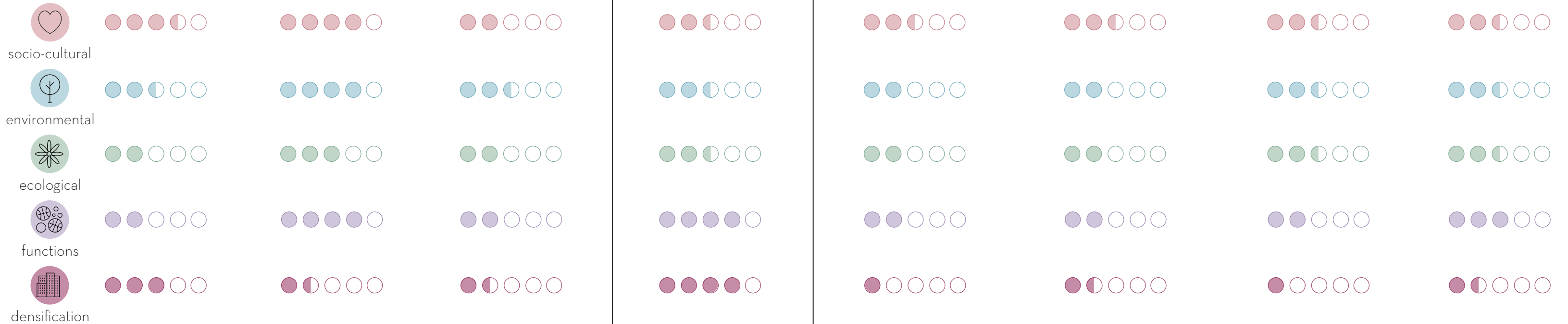
Waterlandscheg



IJmeerscheg



Diemerscheg





# Brettenscheg



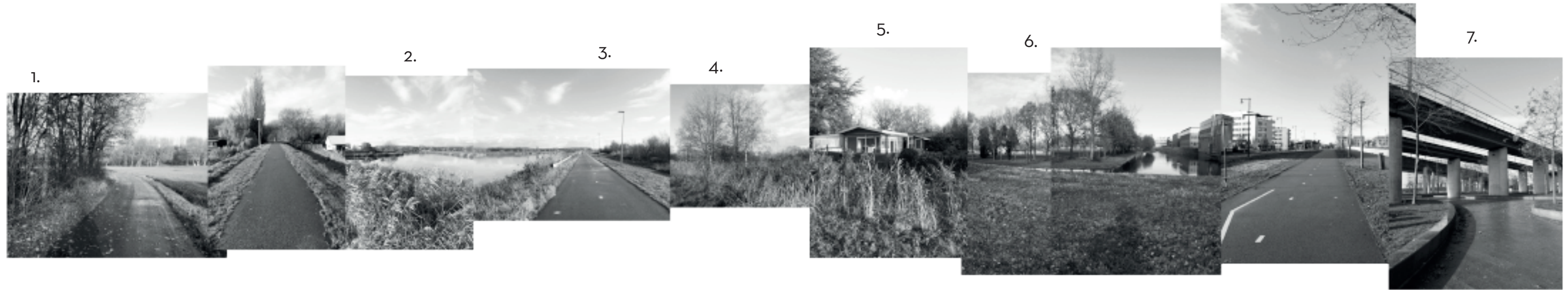
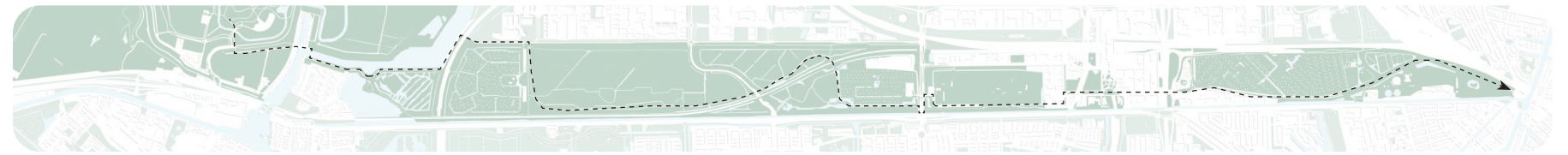


# Landscape characteristics of the area





# Characteristics of the area



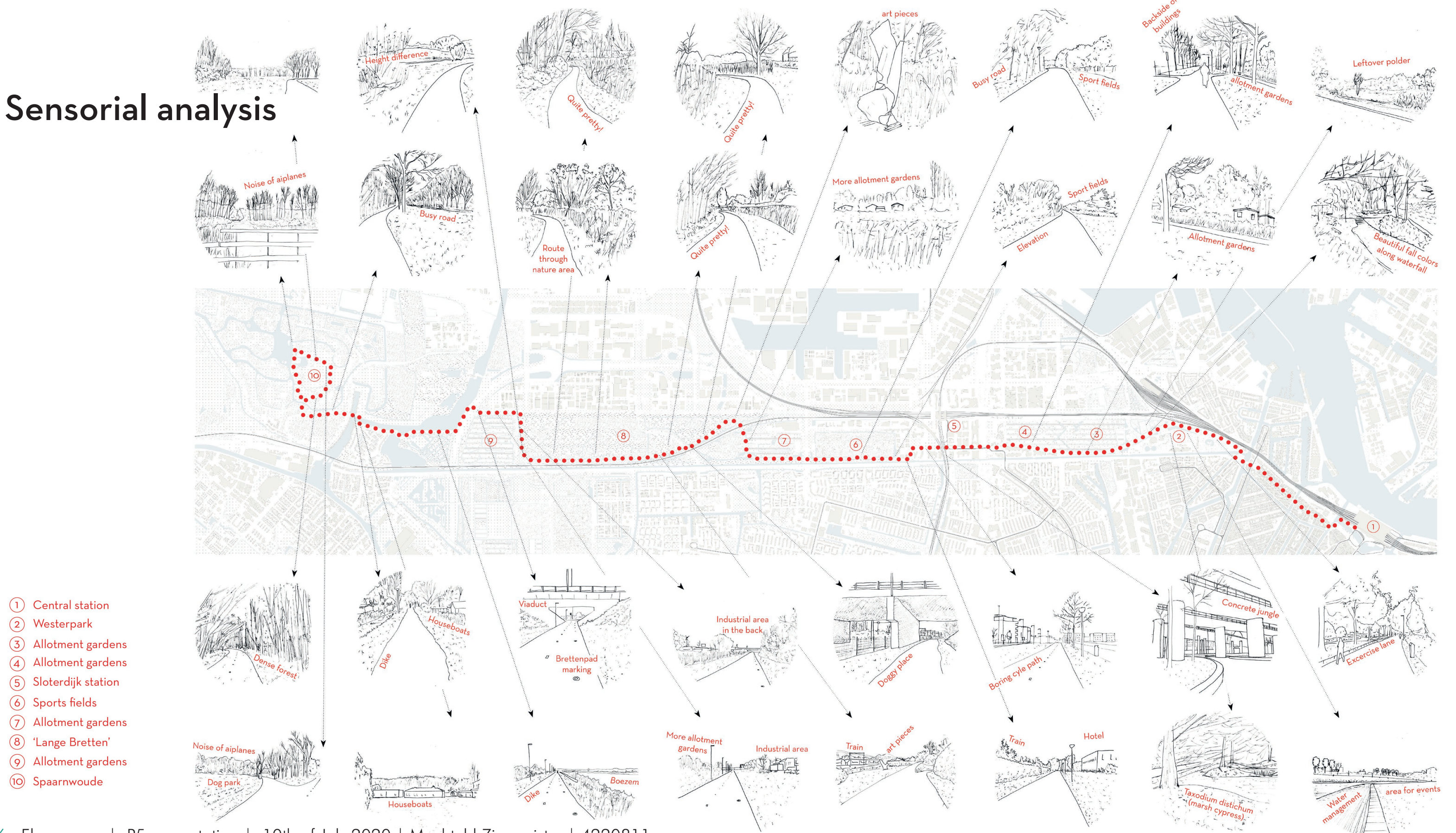
gradient from nature to culture



- 1. forest park Spaarnwoude
- 2. nature reserve Groote Braak
- 3. allotment gardens Groote Braak
- 4. nature reserve Lange Bretten
- 5. allotment gardens De Bretten
- 6. sports fields complex Spieringhorn
- 7. station Sloterdijk
- 8. allotment gardens Sloterdijkmeer and Nut en Genoegen
- 9. city park Westerpark



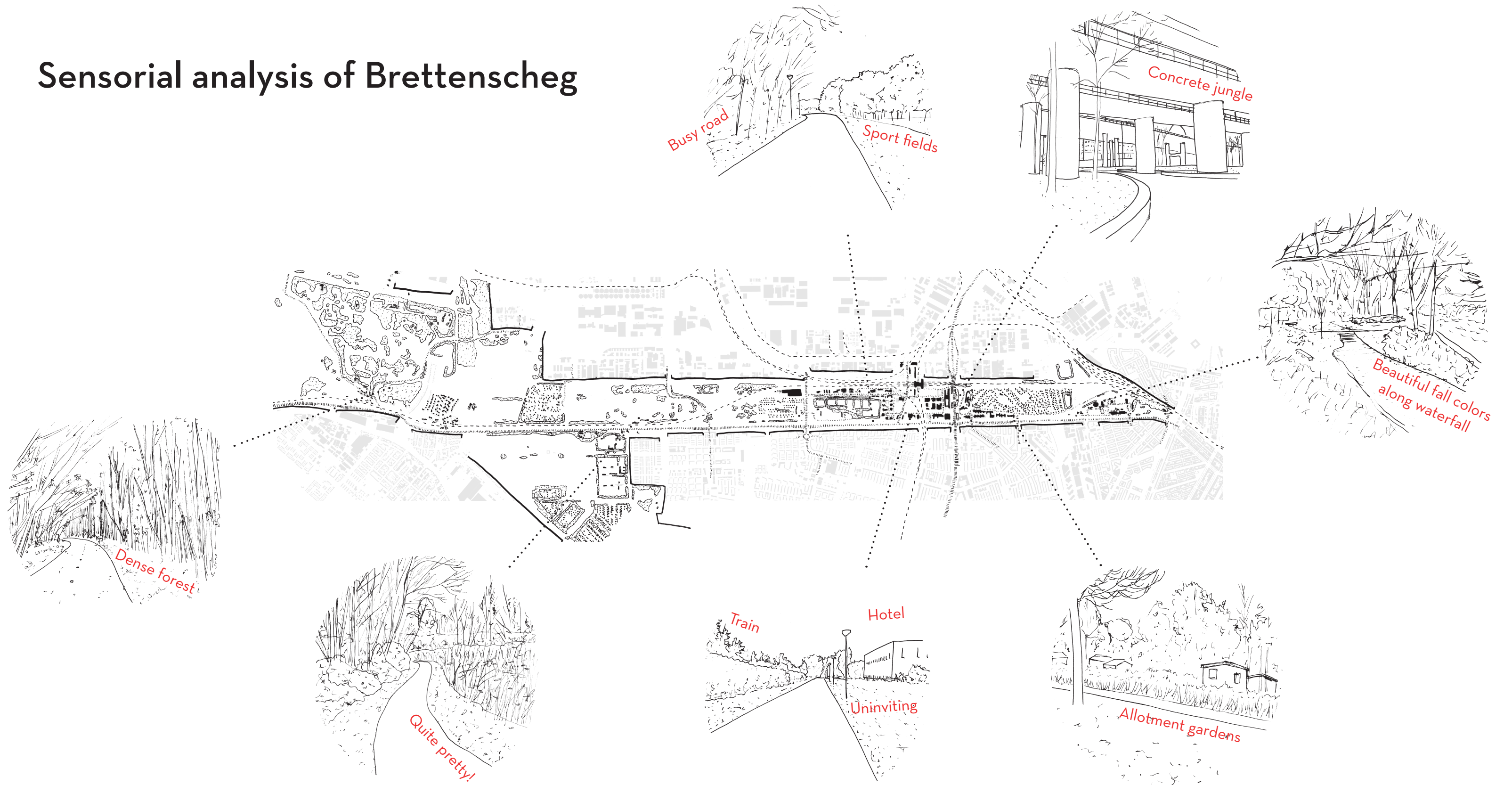
# Sensorial analysis



- ① Central station
- ② Westerpark
- ③ Allotment gardens
- ④ Allotment gardens
- ⑤ Sloterdijk station
- ⑥ Sports fields
- ⑦ Allotment gardens
- ⑧ 'Lange Bretten'
- ⑨ Allotment gardens
- ⑩ Spaarnwoude



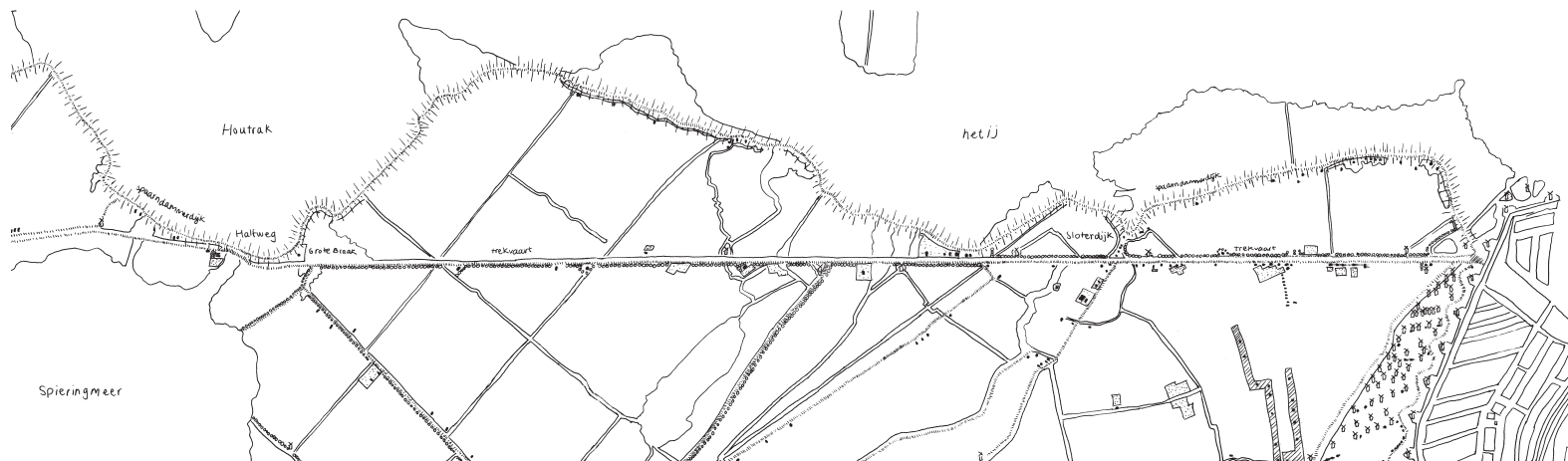
# Sensorial analysis of Brettenscheg



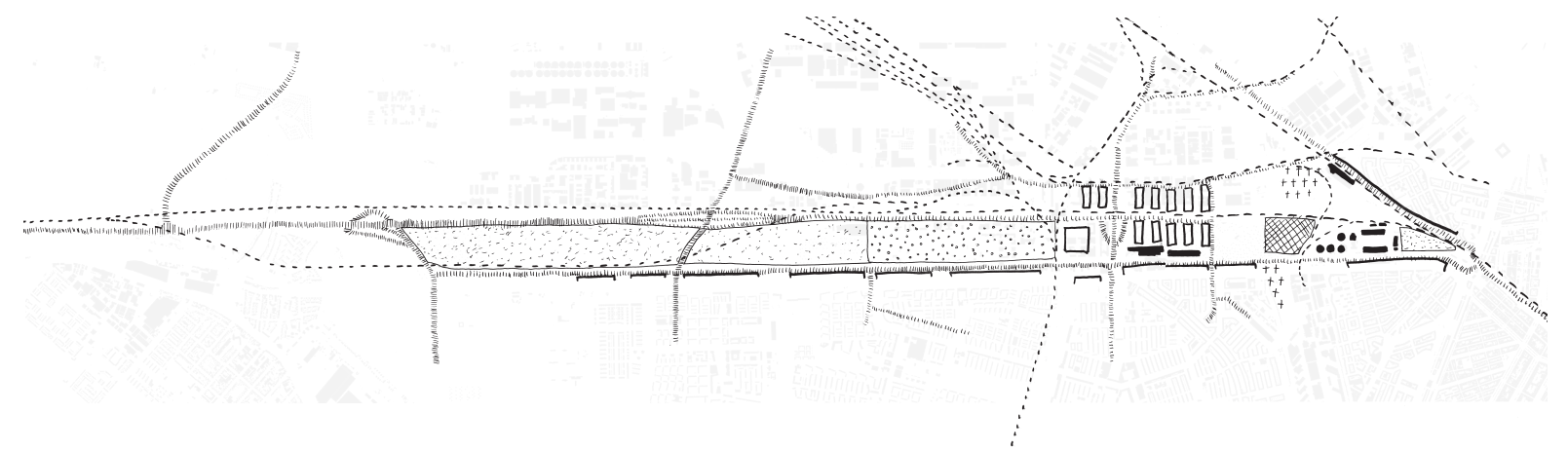


# Historical overview of Brettenscheg

Infrastructure and estate development 1600-1800



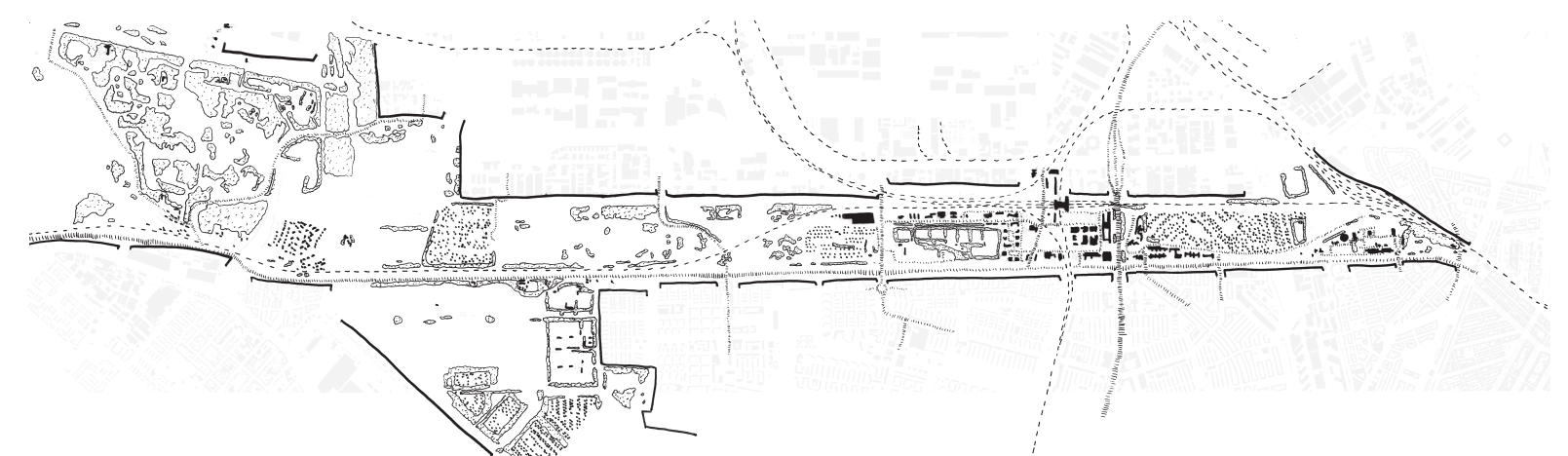
The General Expansion Plan 1928-1939



Development of the outskirts 1800-1934



Green zone in urbanized landscape 1939-present





# Cultural historical elements



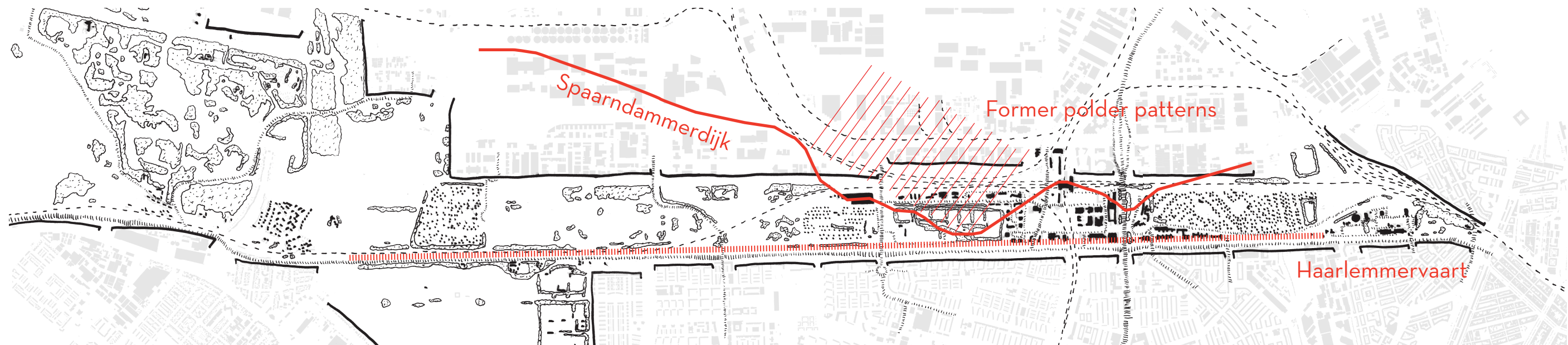
Spaarndammerdijk, 1826



Former polder structure, 1921

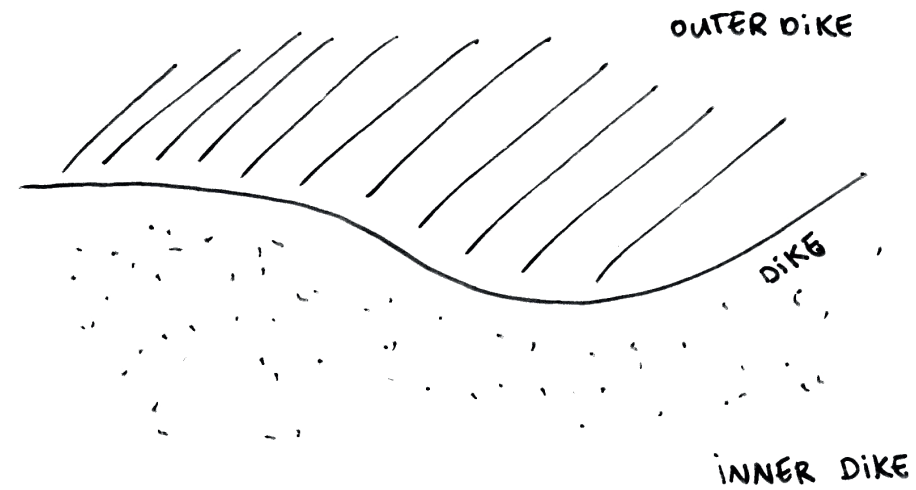


Haarlemmertrekvaart, 1750-1800



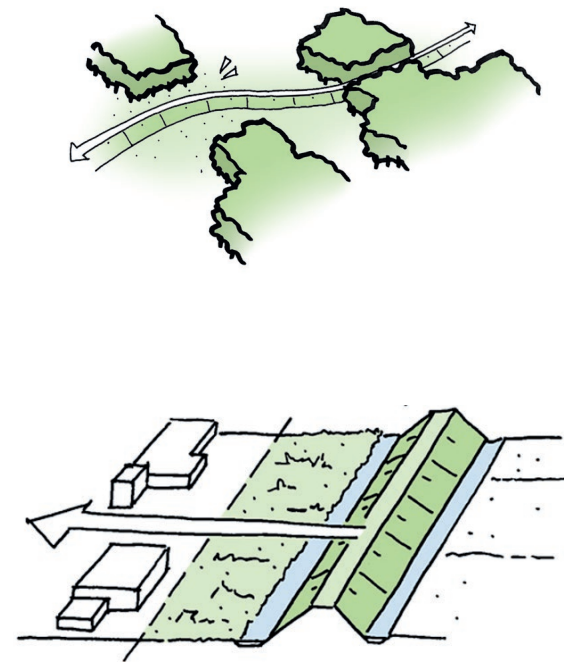


# Cultural historical element: Old IJ dike



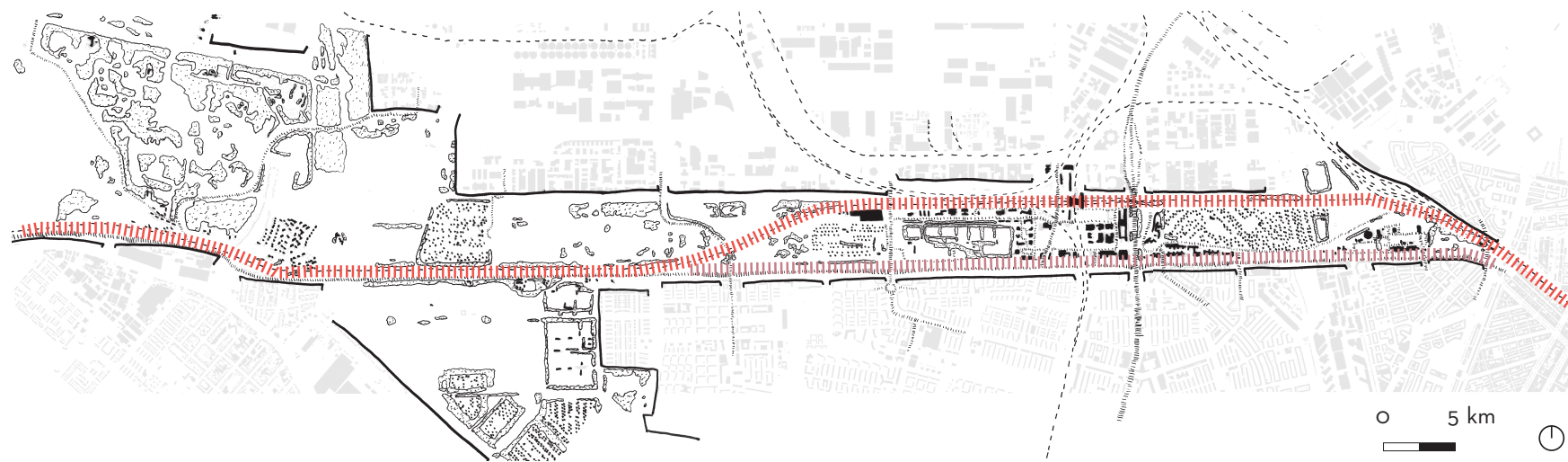
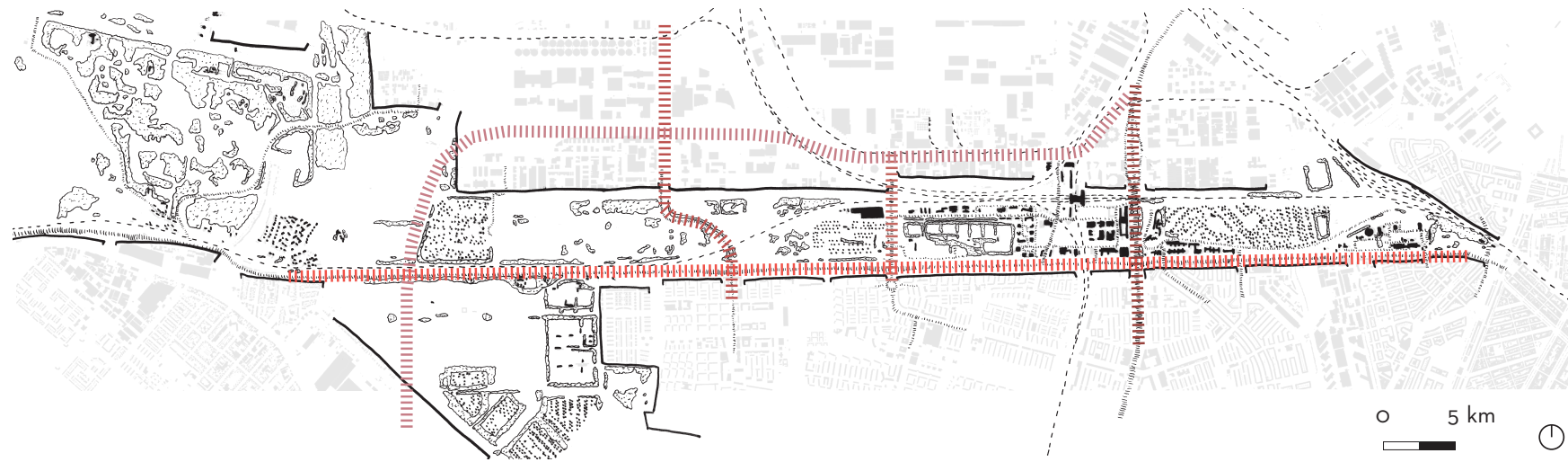
outer dike  
lake bed polder  
structured ditch pattern

inner dike  
peat polder  
less structured ditch pattern



# Fragmented Brettenscheg

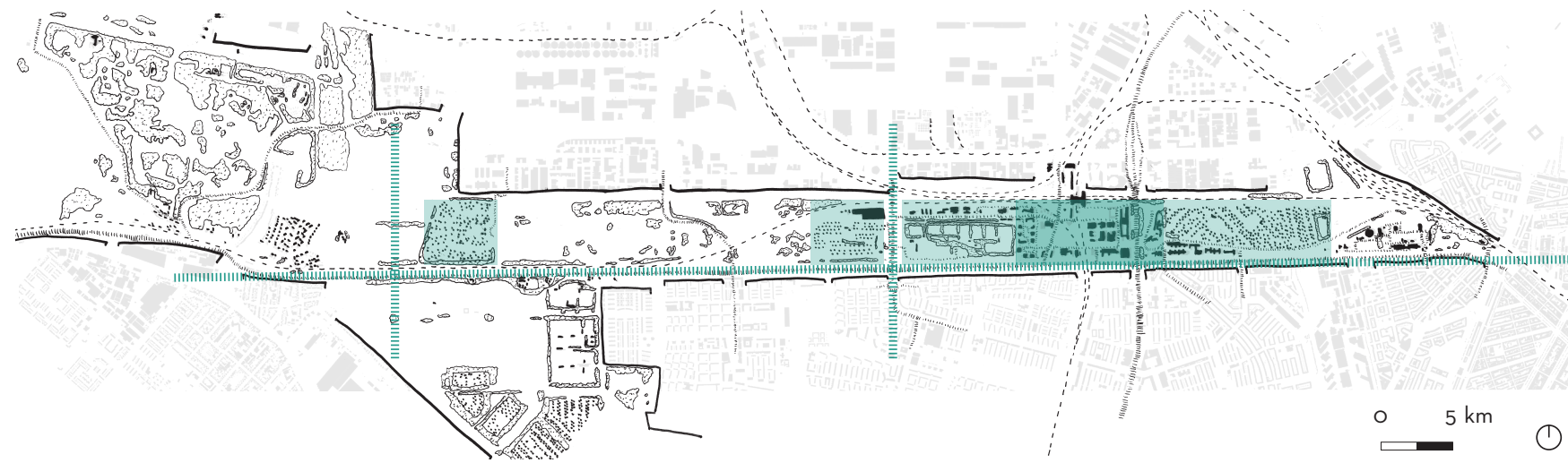
Infrastructure





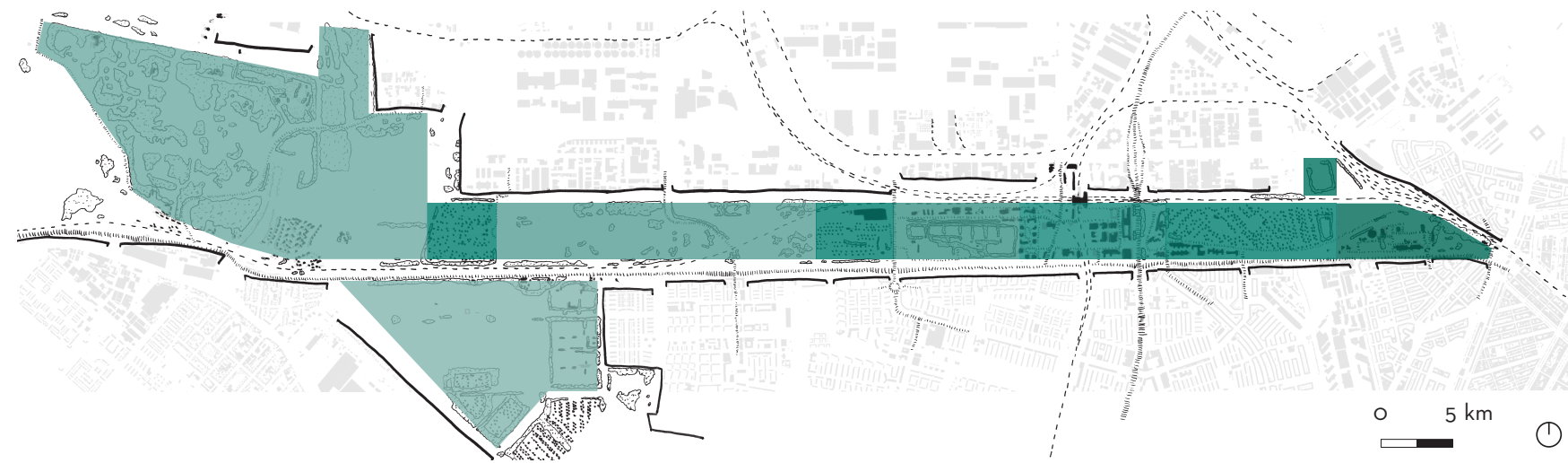
# Spatial functional structure of the Brettenscheg

## Boundaries and Edges Brettenscheg



- edges
- visual barriers (semi-private spaces)
- spatial / sensorial barriers
- physical barriers (infra-structure)

## Zones

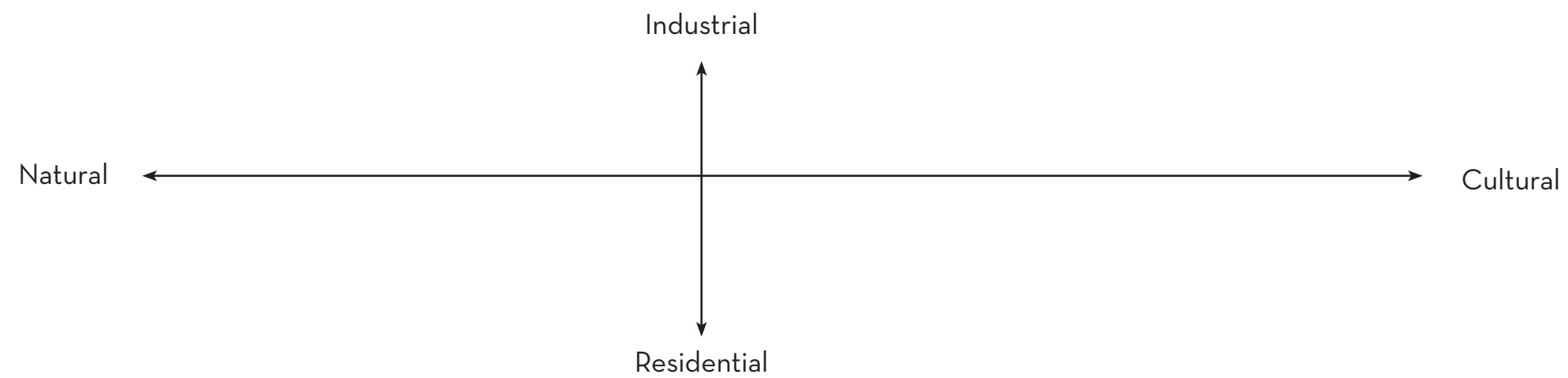
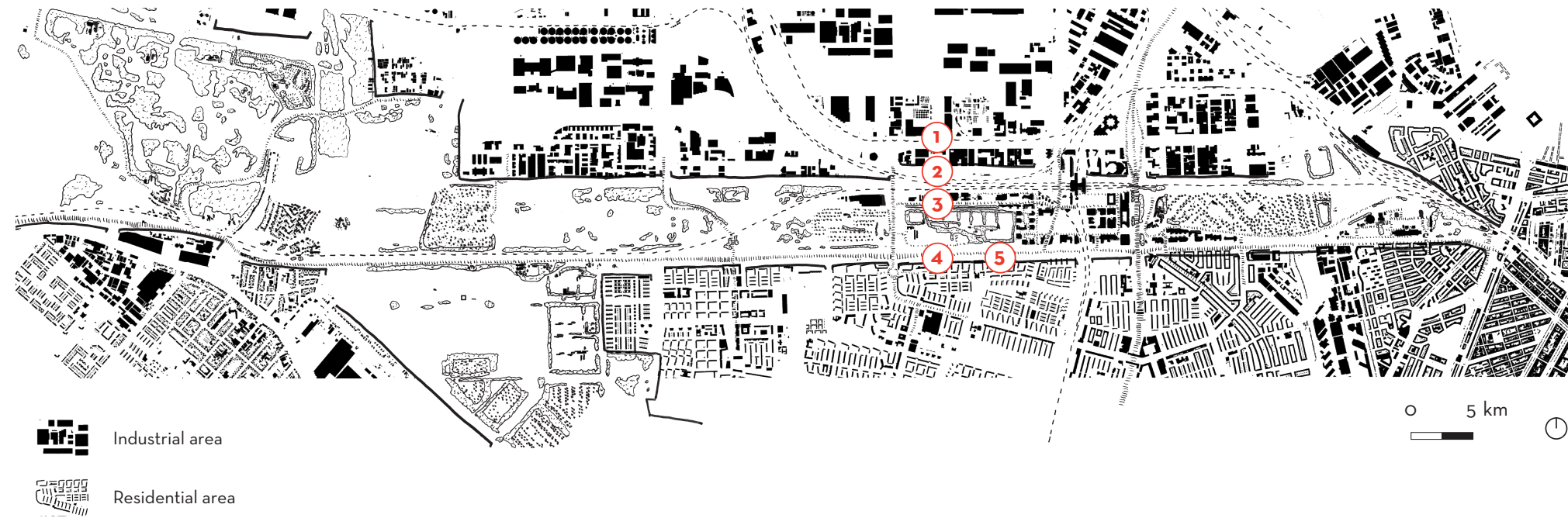


- westerpark
- cemetery
- allotment gardens
- office area Sloterdijk
- sports park
- nature reserve
- spaarnwoude
- eendrachtspolder



# Morphological gradient

Morphology



1 Basisweg



2 Rhoneweg



3 Naritaweg



4 Anton Struikstraat



5 Coronelstraat





# SWOT analysis

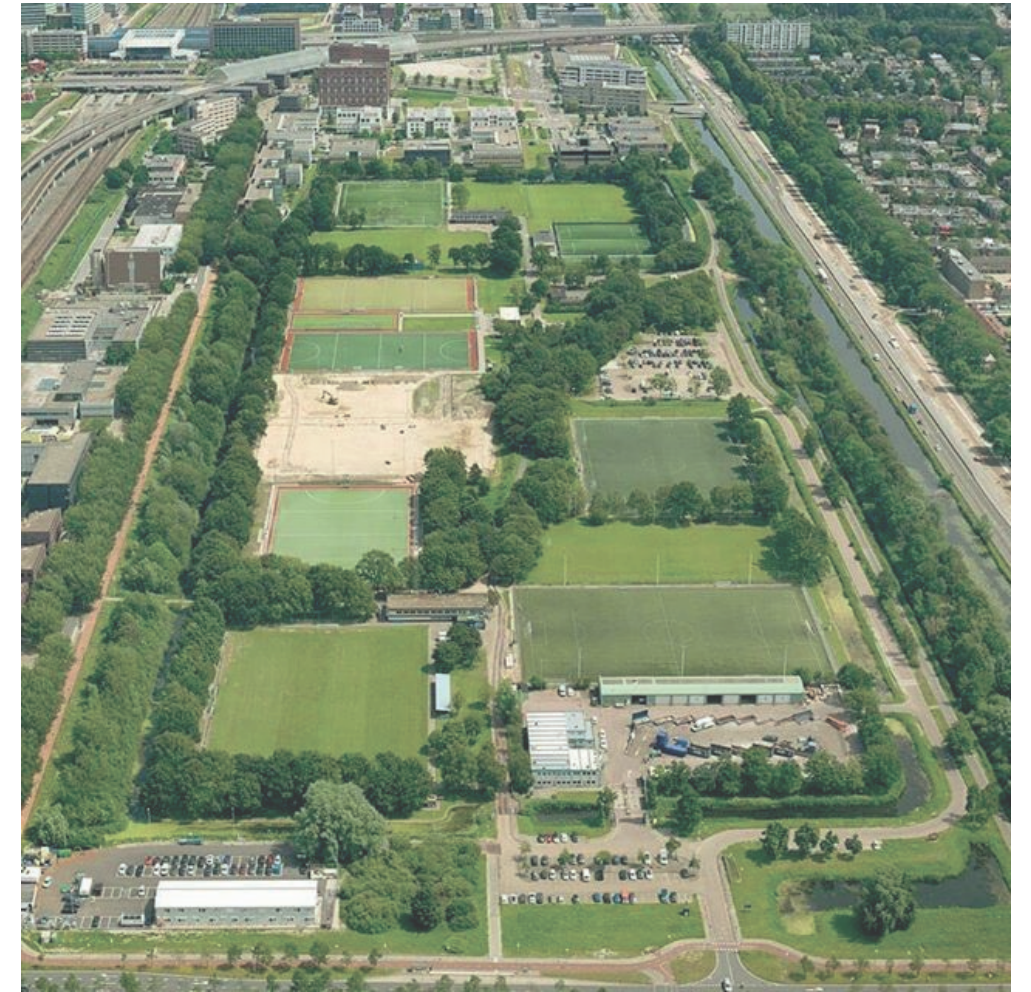




# Sloterdijk as test case



sports park Spieringhorn





# Sports park Spieringhorn





# Sports park Spieringhorn





# Planting analysis species



Acer maple



Aesculus horse chestnut



Alnus alder



Betula birch



Carpinus hornbeam



Crataegus hawthorn



Fraxinus ash



Platanus plane



Populus poplar



Prunus cherry



Quercus oak



Salix willow



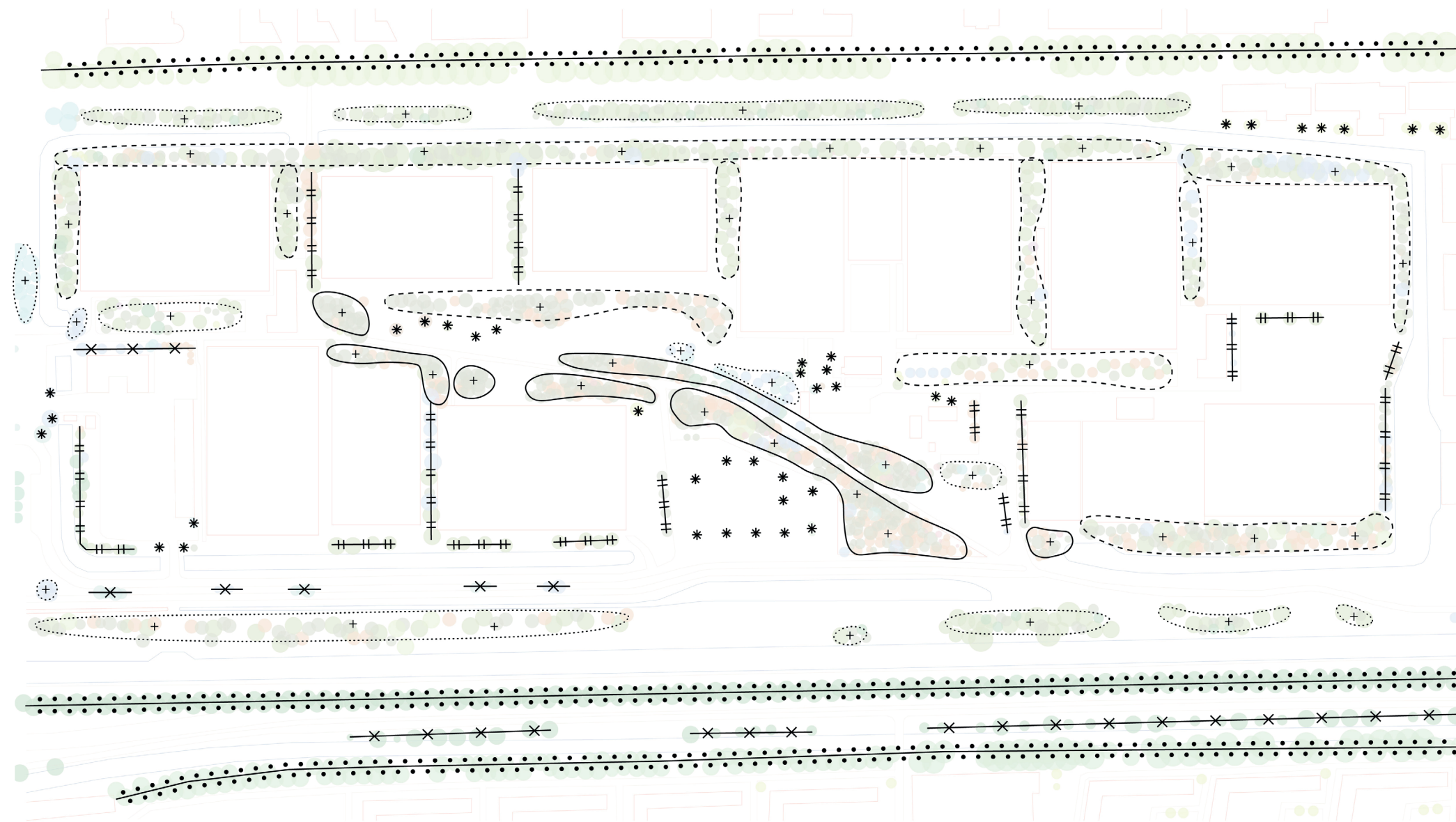
Tilia linden



Ulmus elm



# Planting analysis composition

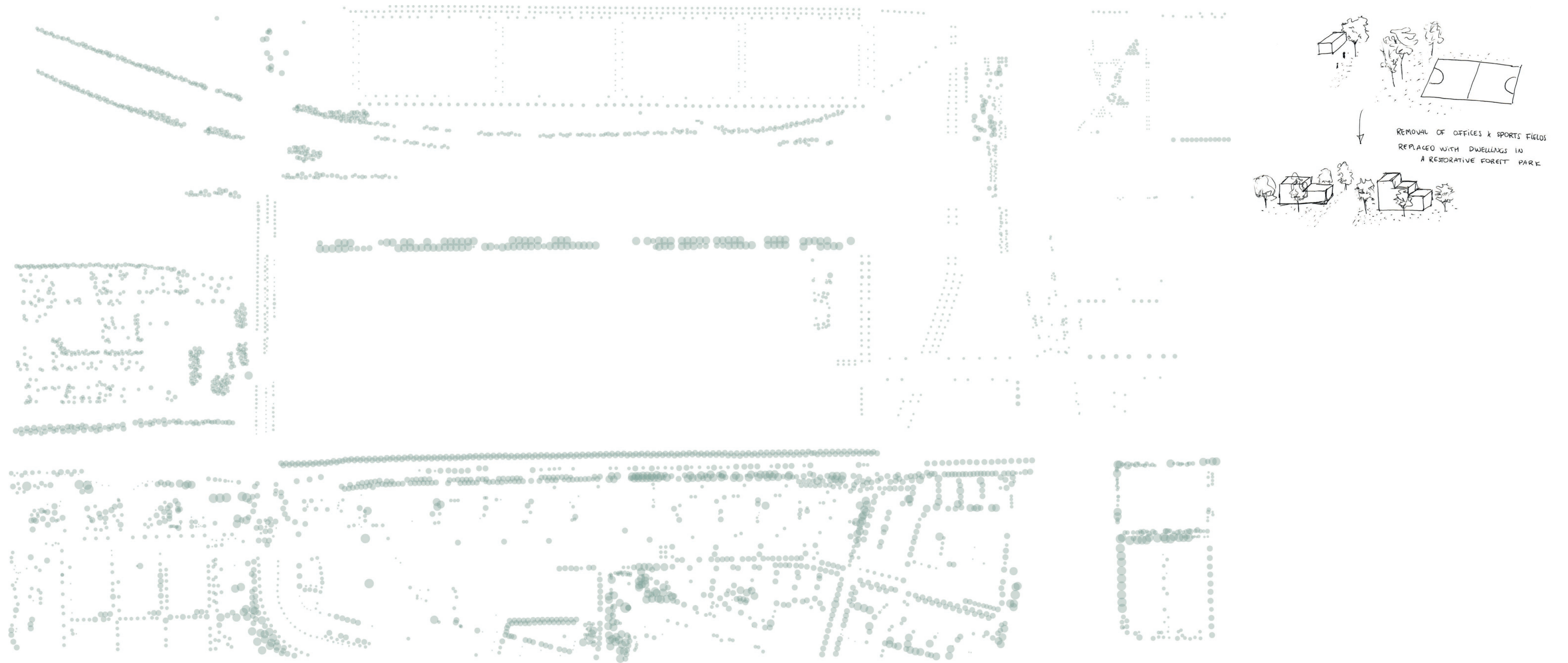


**Arrangement typologies:**

- |   |                                  |   |                                       |
|---|----------------------------------|---|---------------------------------------|
| ⊕ | Double regular line along road   | ⊕ | Group of mixed trees along dike       |
| ⊕ | Double irregular line along road | ⊕ | Group of mixed trees forming a screen |
| ⊕ | Single irregular line along road | ⊕ | Group of mixed trees                  |
| ⊕ | Single irregular line as screen  | * | Singular tree                         |



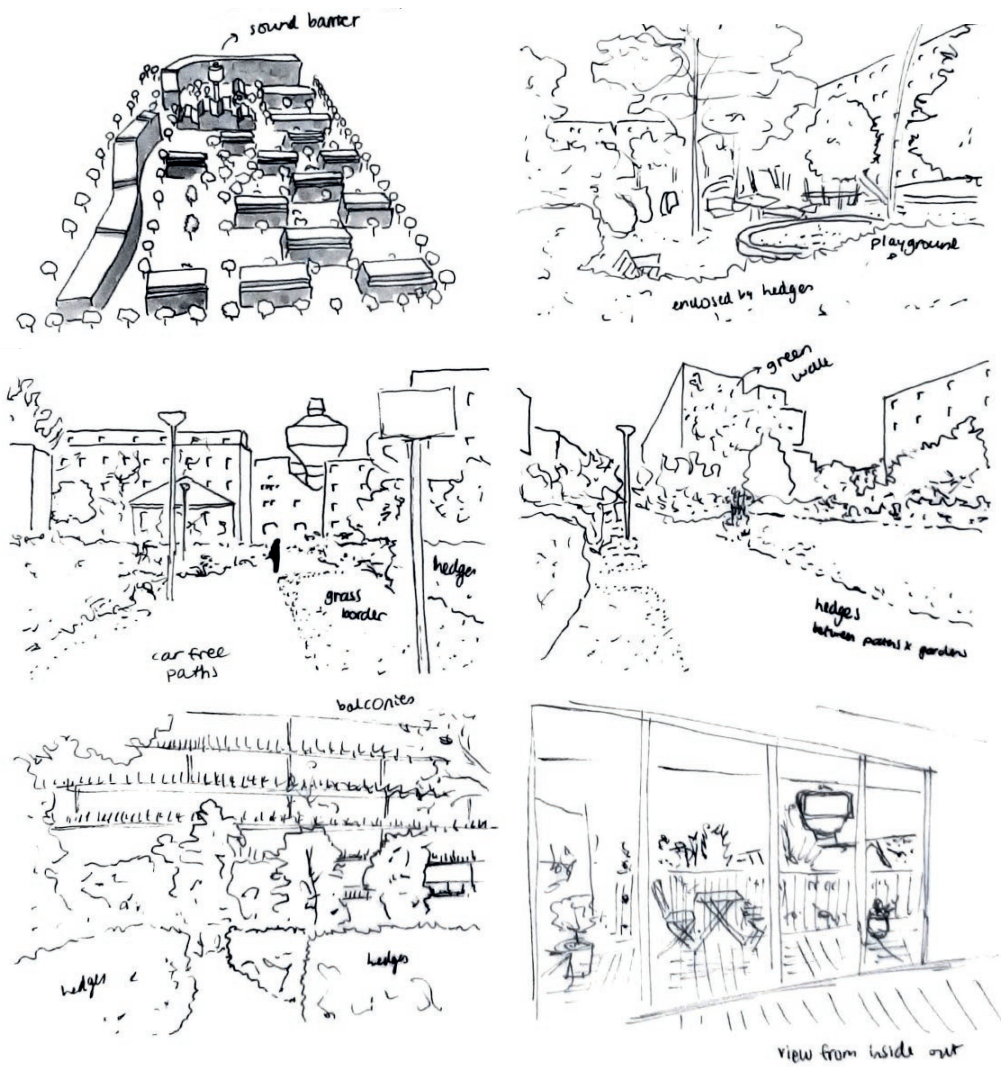
# Planting transformation





# Reference projects

GWL terrein (1997)  
location: Amsterdam  
Architects: KCAP + West 8



Bosrijk (2008-present)  
location: Eindhoven, Vinexwijk Meerhoven  
Architect: Karres en Brands



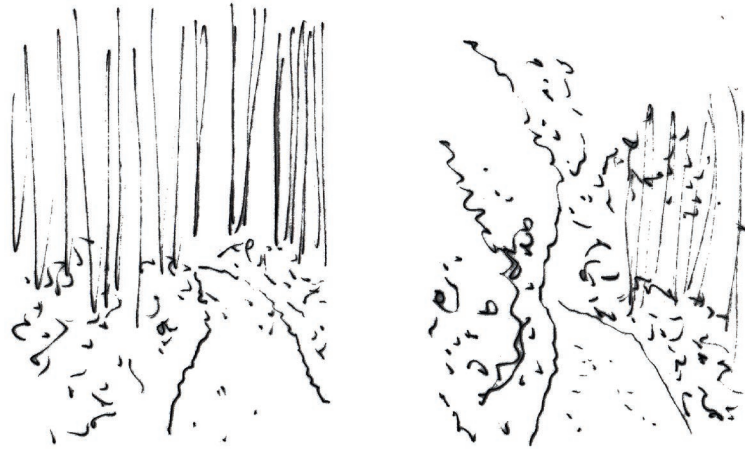
## variables for urban design:

- collective and private spaces
- threshold between private and public spaces
- promote slow traffic

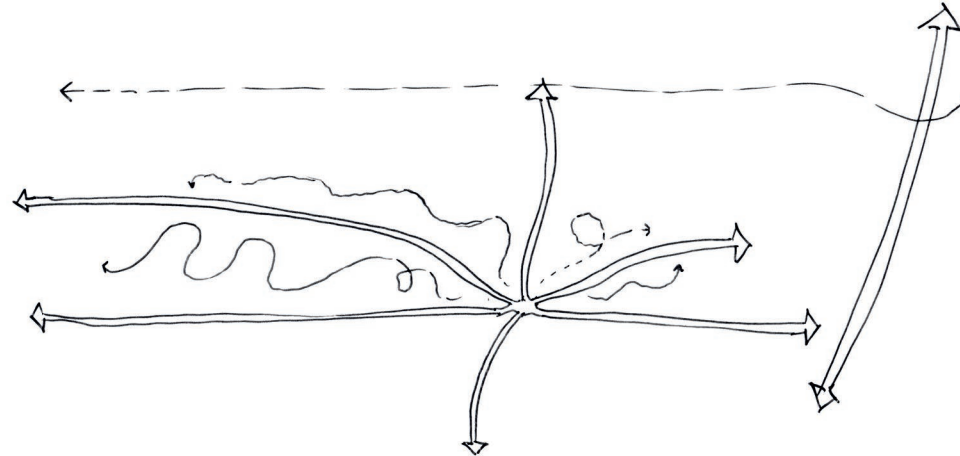


# Design principles derived from site research

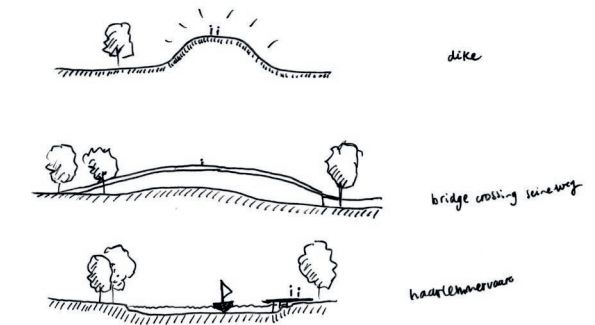
1. create a restorative environment



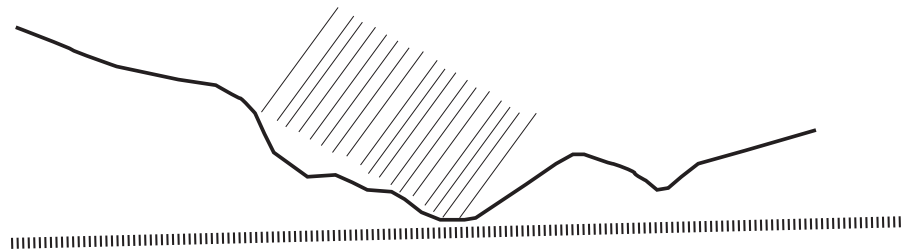
2. improve accessibility of the park



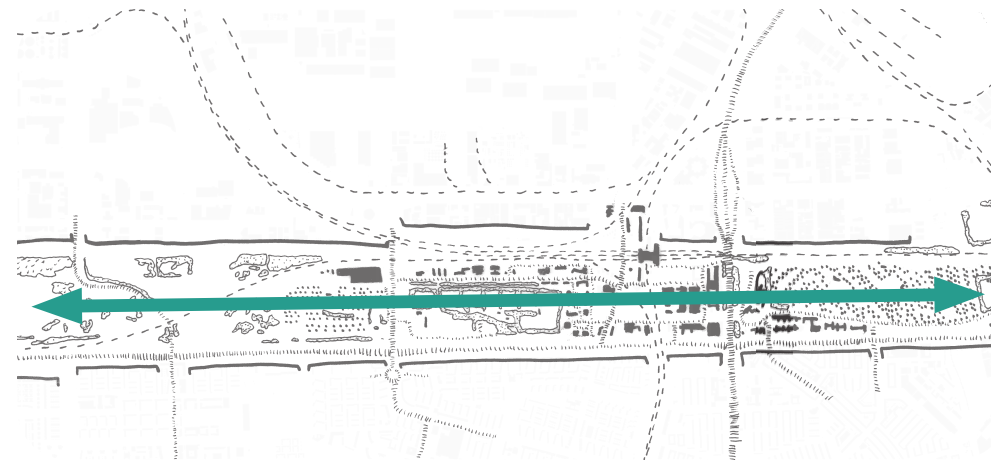
3. overcome barriers



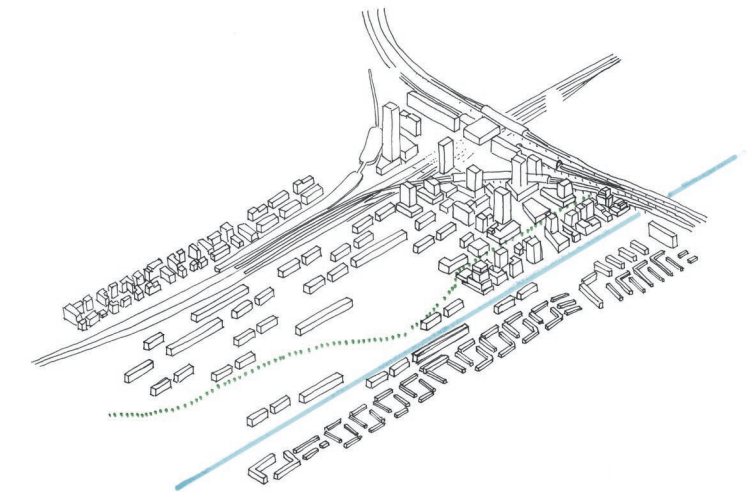
4. make use of the valuable cultural historical elements



5. enhance ecological green corridor



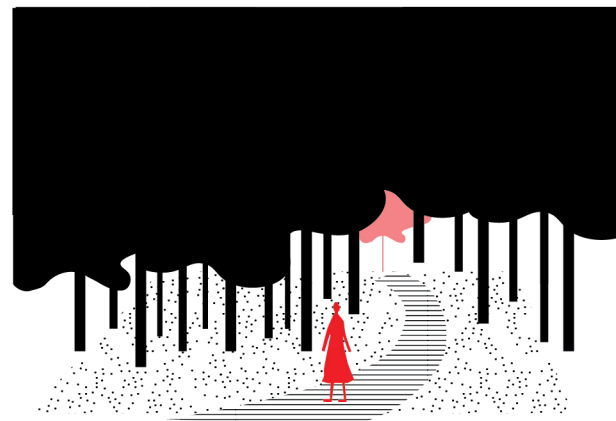
6. integrate housing development with park design



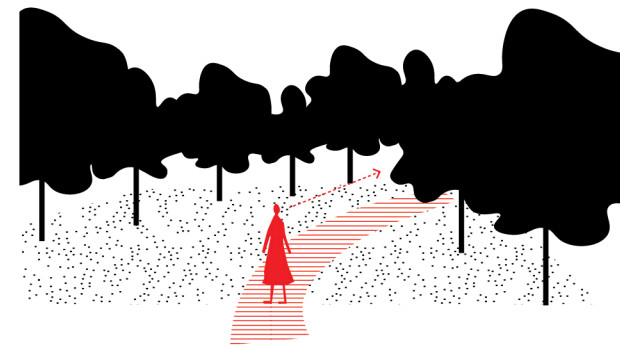


# Design principles derived from theory study

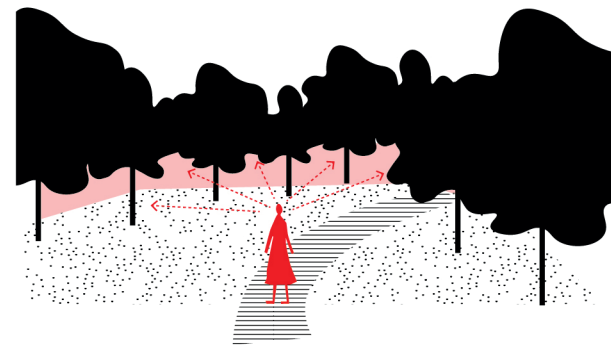
## Preference Matrix



Mystery



Legibility

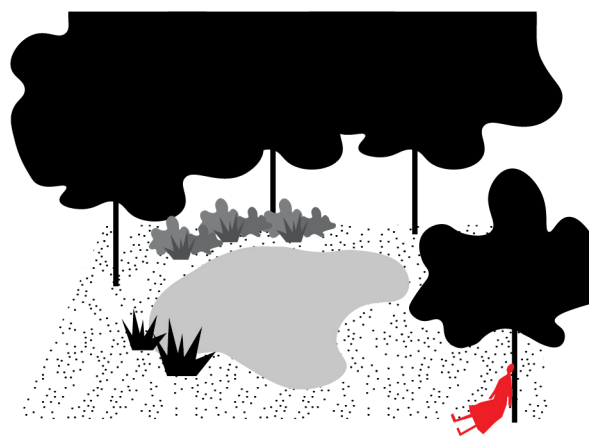


Coherence

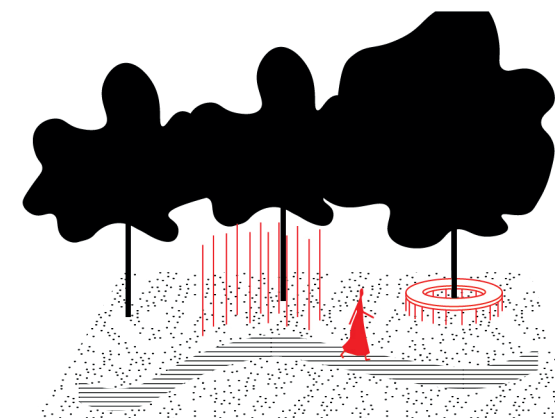


Complexity

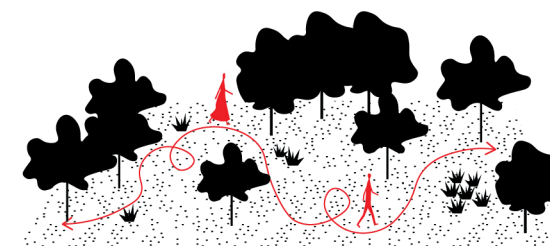
## Attention Restoration Theory



Fascination



Being away



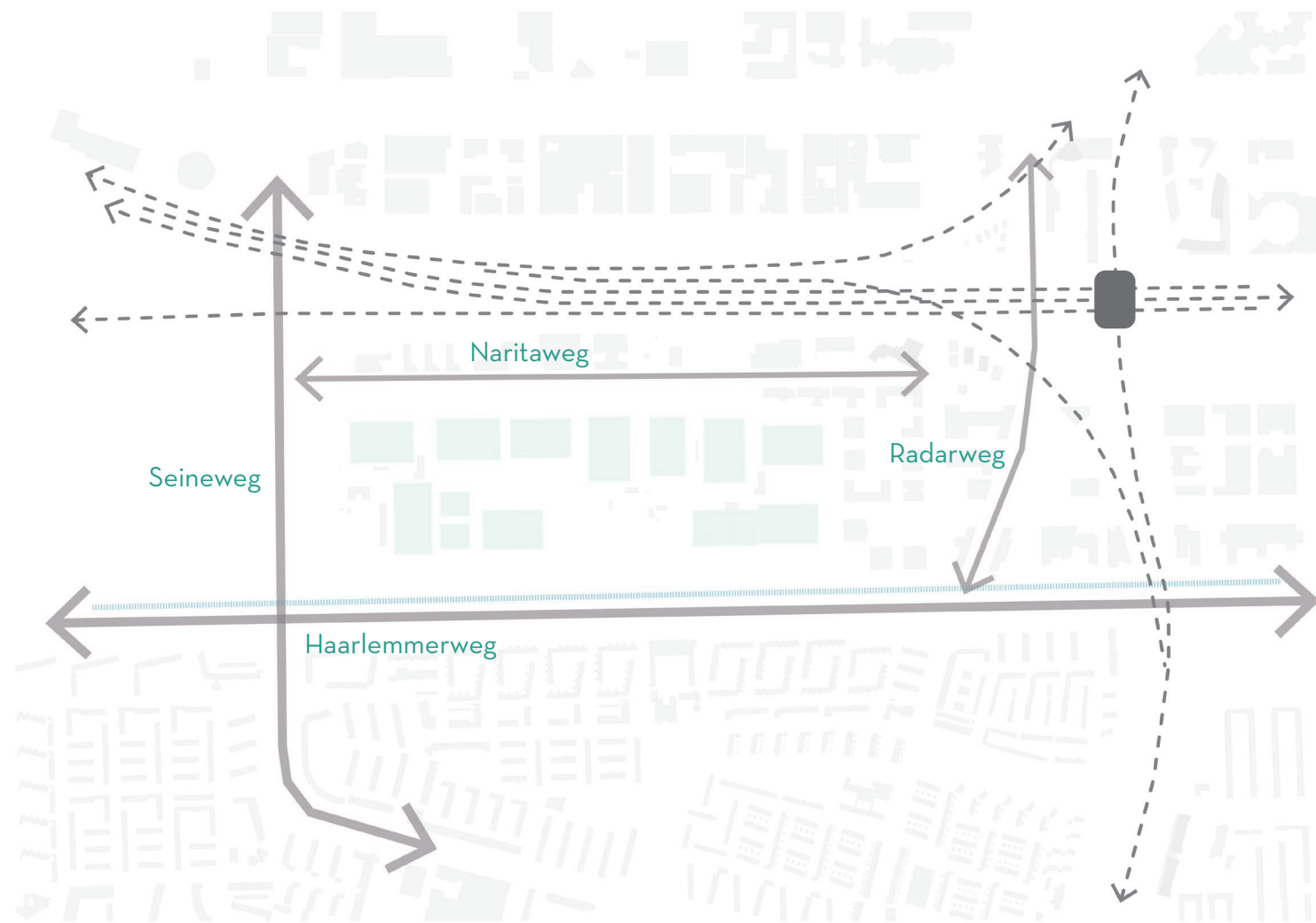
Extent



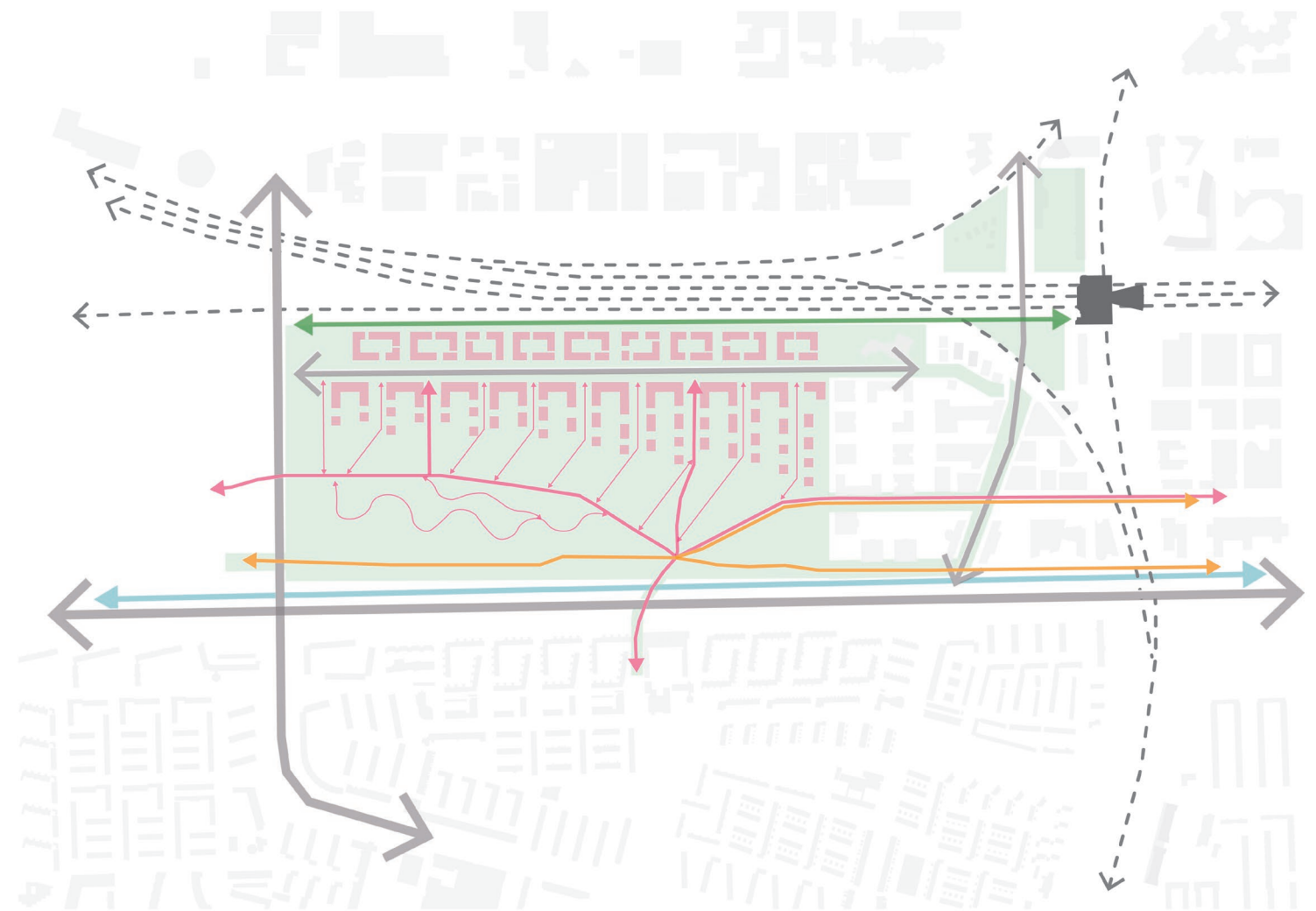
Compatibility



# Structural vision









before



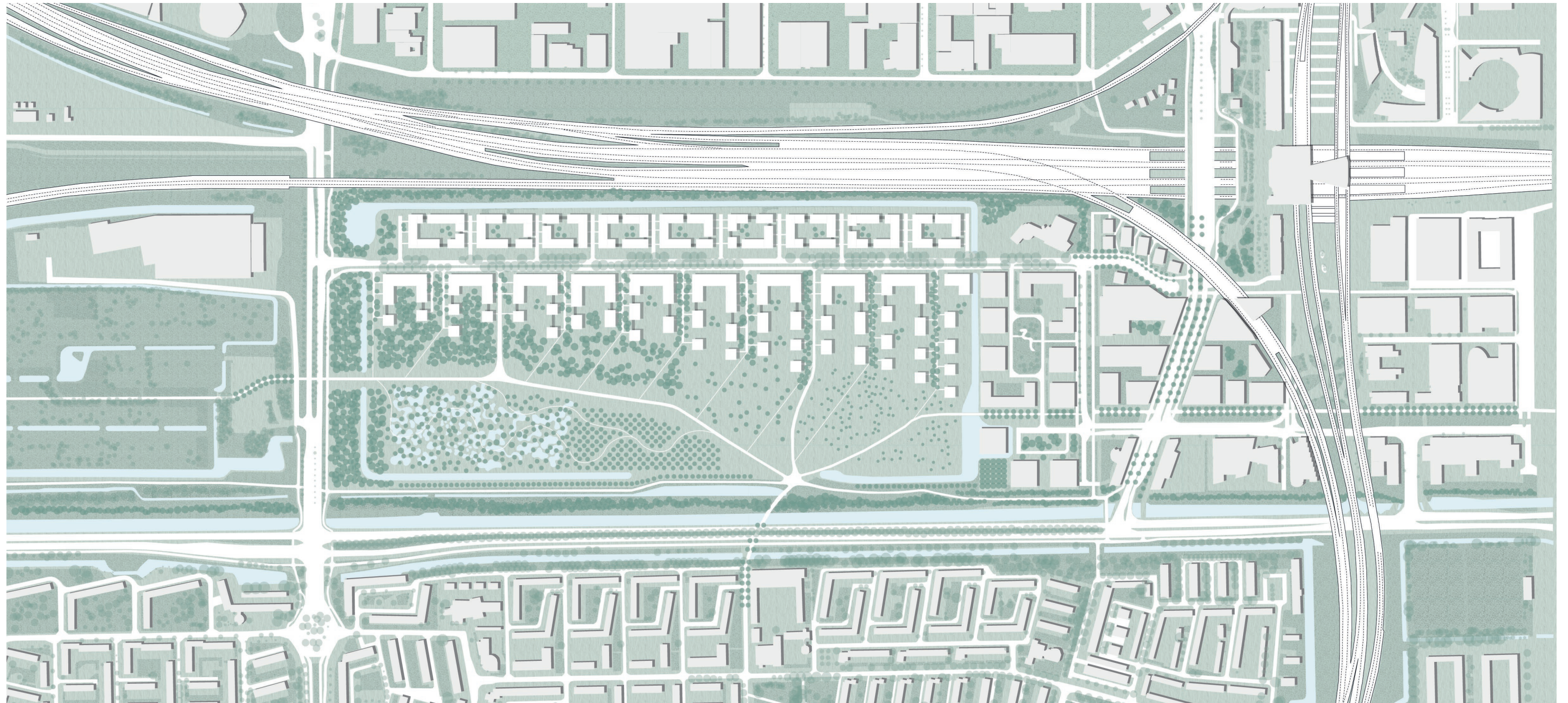
after

Legend:

- |   |                    |   |               |
|---|--------------------|---|---------------|
|  | Sloterdijk Station |  | Walking route |
|  | Existing structure |  | Cycling route |
|  | New structure      |  | Sailing route |
|  | Forest park        |  | Railroads     |
|  | Ecological zone    |  | Roads         |



# Masterplan Het Brettenbos





# Program

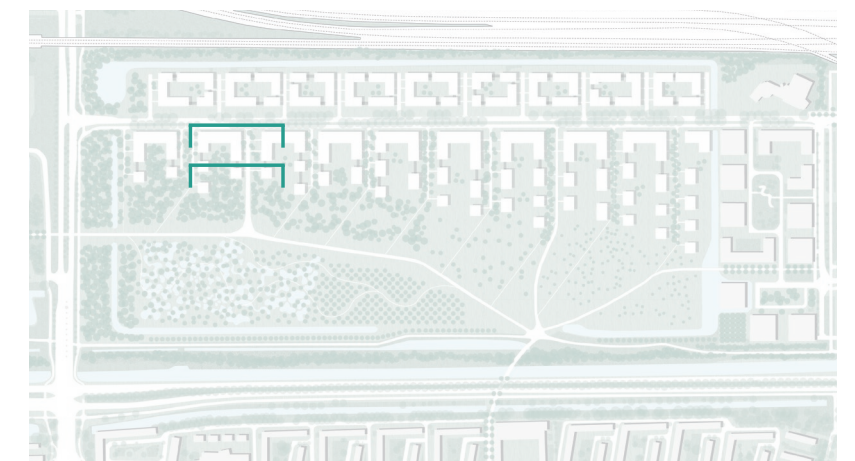
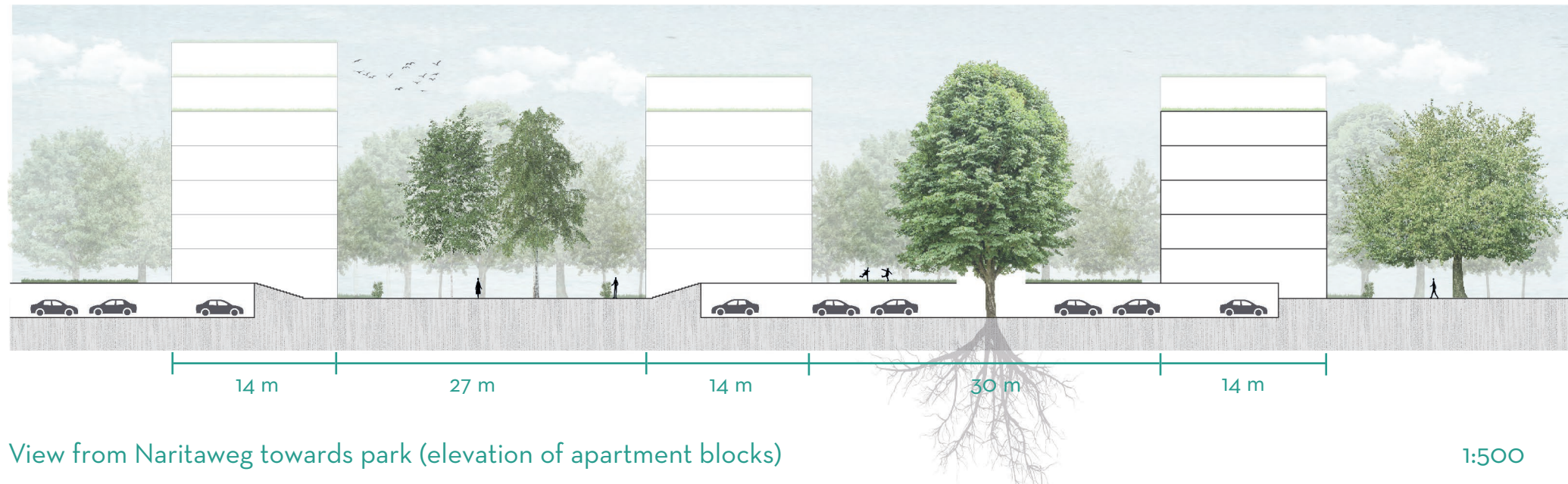




# Building typologies

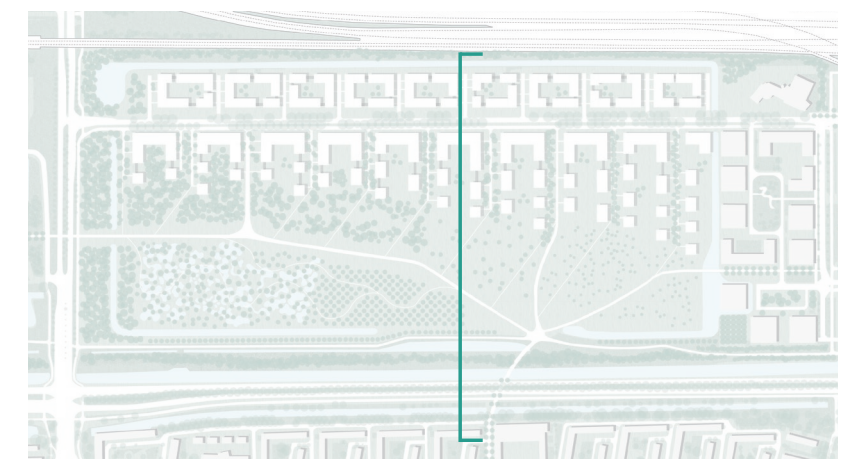
View from Naritaweg towards park (section of apartment blocks)

1:500



View from Naritaweg towards park (elevation of apartment blocks)

1:500



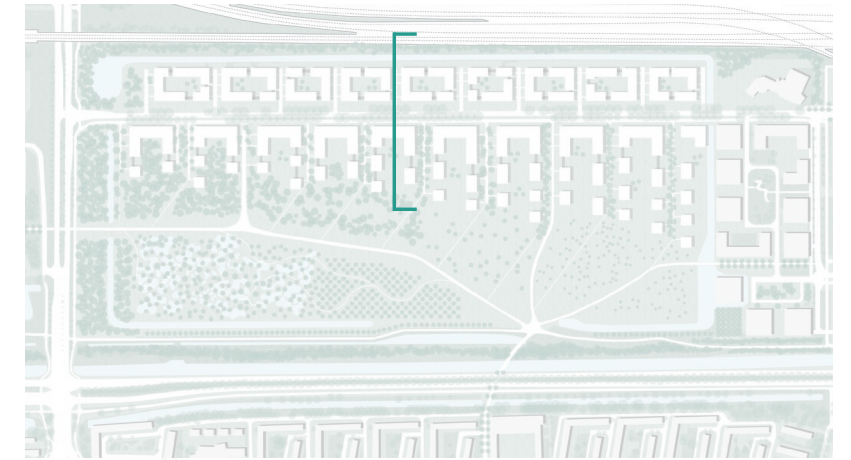
Section from Ecological zone to Western Garden Cities

1:1.000





# Transition from collective to public spaces



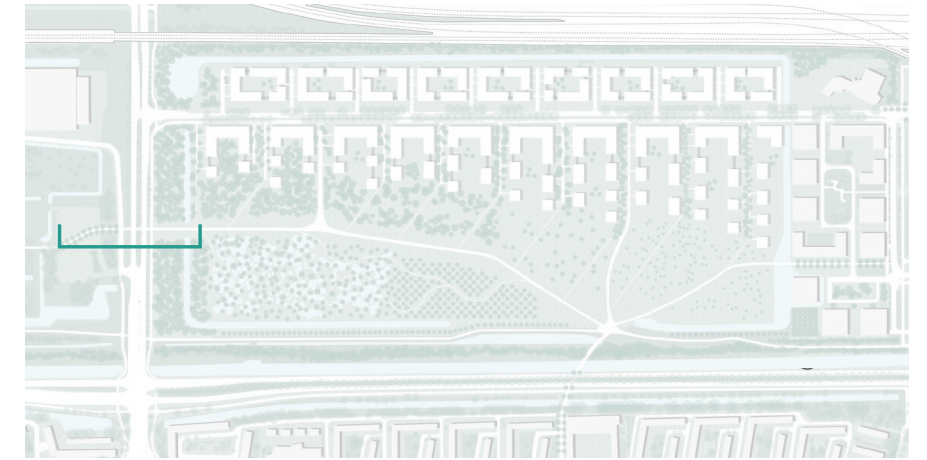
Naritaweg before 1:500



Naritaweg after 1:500



# Extension of the dike



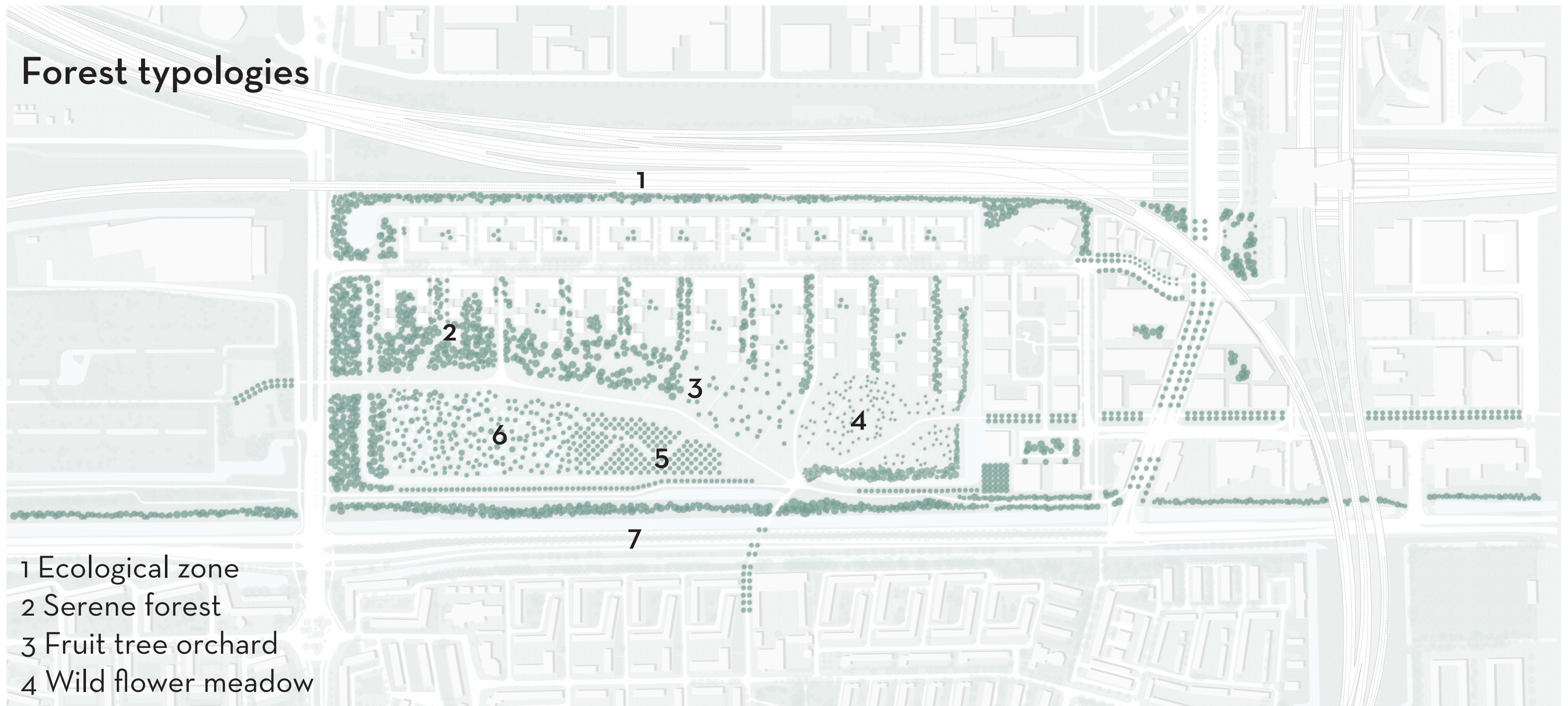
Seineweg before 1:500



Seineweg after 1:500



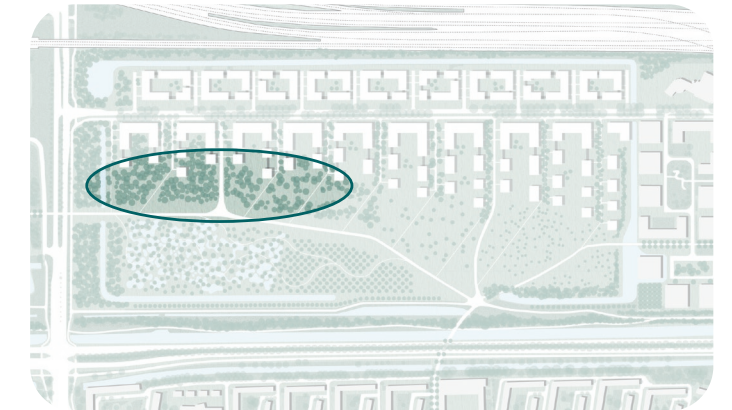
# Forest typologies



- 1 Ecological zone
- 2 Serene forest
- 3 Fruit tree orchard
- 4 Wild flower meadow
- 5 Birch forest
- 6 Swampy forest
- 7 Haarlemmervaart zone



# Serene forest



*Juglans regia*  
walnut



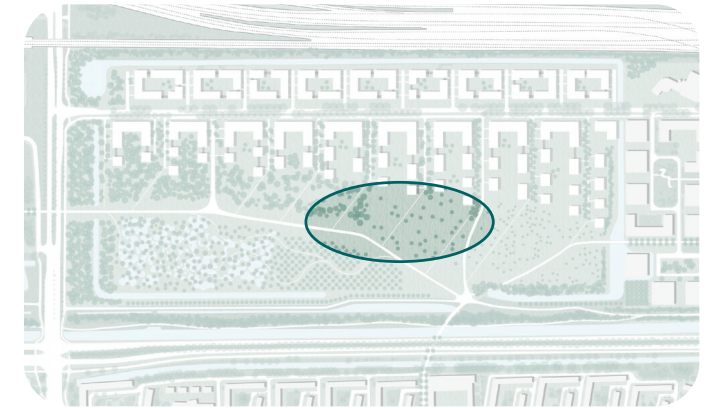
*Gleditsia triacanthos*  
honey locust



*Sophora japonica*  
japanese pagoda



# Fruit tree orchard



Malus domestica  
*apple*



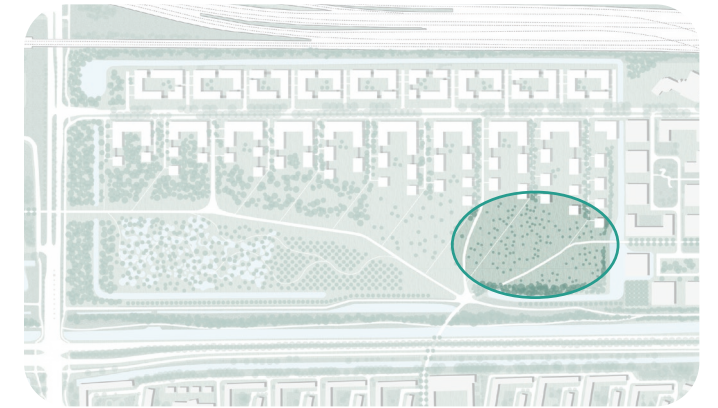
Prunus avium  
*cherry*



Prunus domestica  
*plum*



# Wild flower meadow



*Juglans regia*  
walnut



*Quercus robur*  
oak



*Tilia platyphyllos*  
linden



# Birch forest



Betula pubescens  
*birch*



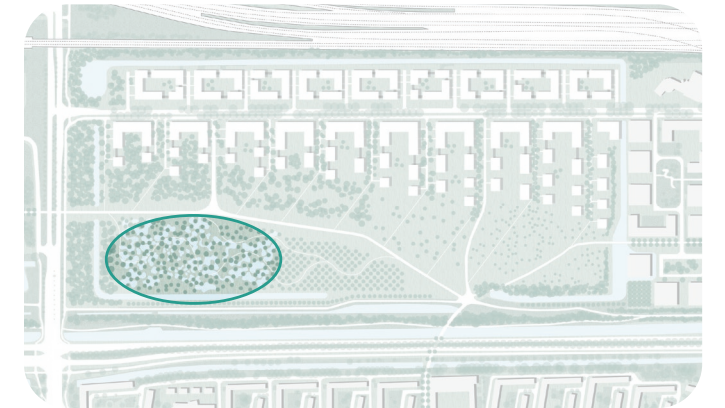
Betula pendula  
*birch*



Alnus cordata  
*alder*



# Swampy forest



Betula pendula  
*birch*



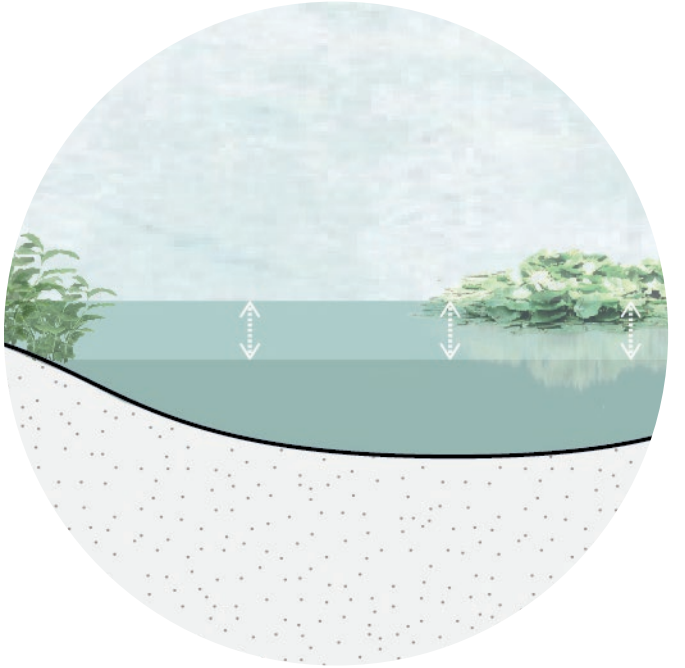
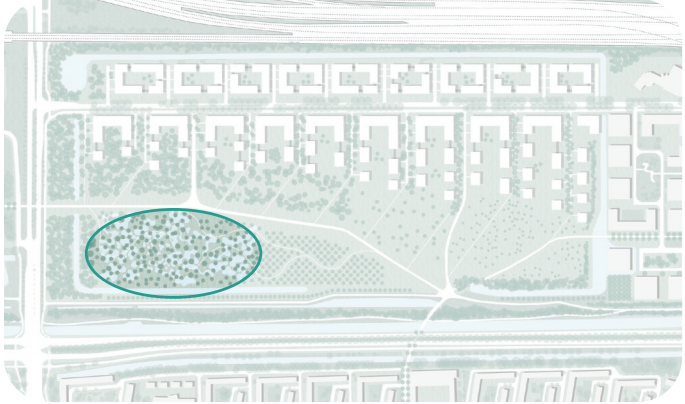
Alnus cordata  
*alder*



Salix  
*willow*



# Swampy forest water level





# Sensorial aspects seasonal changes



Winter



Spring



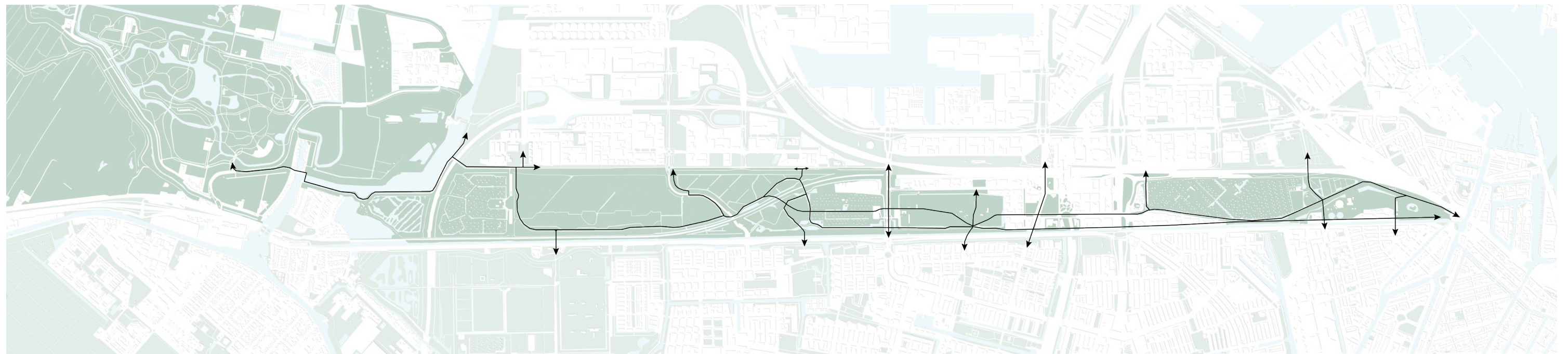
Summer



Autumn



# Brettenscheg vision





**Regional vision** to what extent can these findings be applied to other places in the city?





# Conclusions

## **How can a forest park be designed in such a way that it contributes to reducing mental stress in an urban environment?**

This project showed that nature contributes to reducing mental stress in an urban environment.

### **Literature research:**

- important relation between nature and reducing stress
- create a restorative environment
- landscape characteristics create such a place

### **Site research:**

- overview of challenges and qualities of the site
- provided site specific design principles

### **Design:**

- not only contributes to reducing mental stress, but also increases biodiversity, and acts as a climate buffer
- possible to add restorative forests near business centres or densification areas
- possible to build in the Scheggen
- urban expansion should always be integrated with the development of public green spaces



# Reflection

**Desk analysis:** the Brettenscheg, as turned out, had a very rich history

**Site research:** made me understand what I needed to address in the design

**Design:** the densification of Sloterdijk, gave me a great opportunity to reflect on the relationship between urban environments and the healing aspects of nature.

**Design process:** has demonstrated the complexity of landscape architecture (climate, soil, geomorphology, hydrology, ecology, vegetation, animals, natural processes, social aspects, human influences, site specific elements and conditions, context, urban developments, et cetera)

# Outlook

Further develop detailed design, how it is made, with which specific plants and materials

Further develop the scale of the Brettenscheg, and the vision for all of the Scheggen

Applying the design principles derived from this project to other places in the city to test and elaborate them



**Thank you for listening!**



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