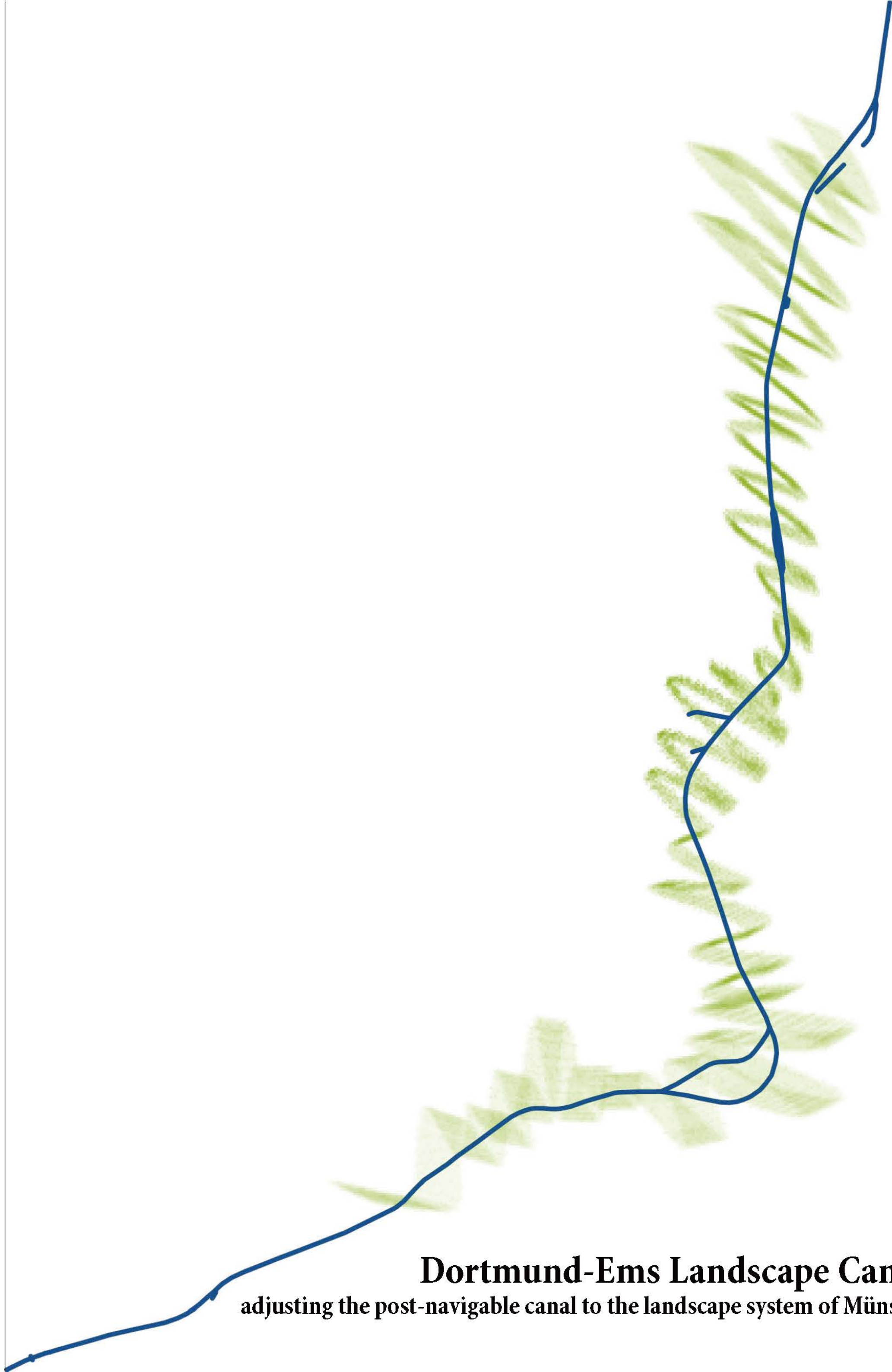

Dortmund-Ems Landscape Canal

adjusting the post-navigable canal to the landscape system of Münster

TU Delft Delft University of Technology

LANDSCAPE ARCHITECTURE

Master thesis
Dortmund-Ems Landscape Canal:
adjusting the post-navigable canal to the landscape system of Münster

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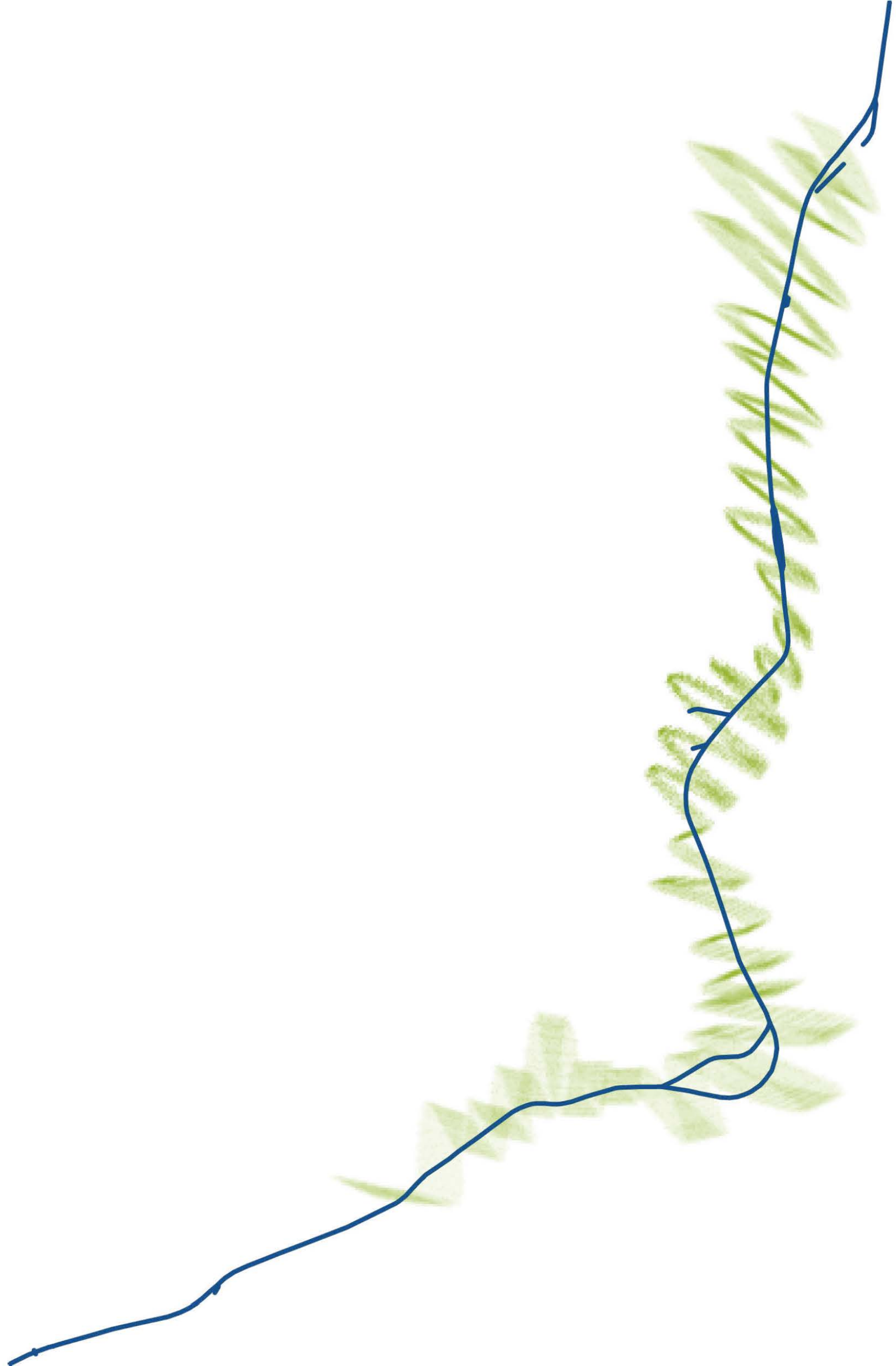
examiner: Egbert Stolk
Graduation studio: Flowscapes, Landscape Architecture, TU Delft
June 29th, 2015



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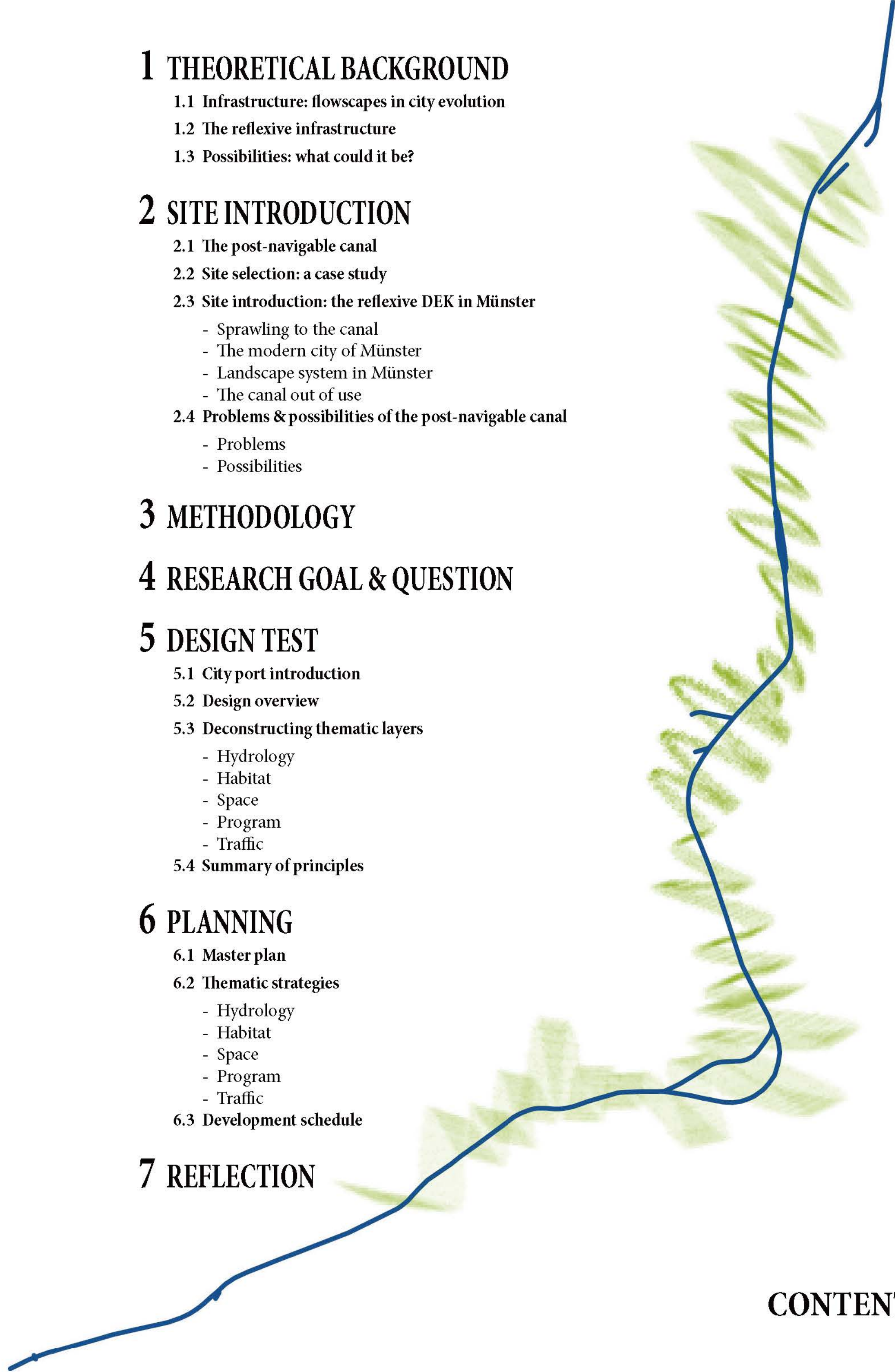
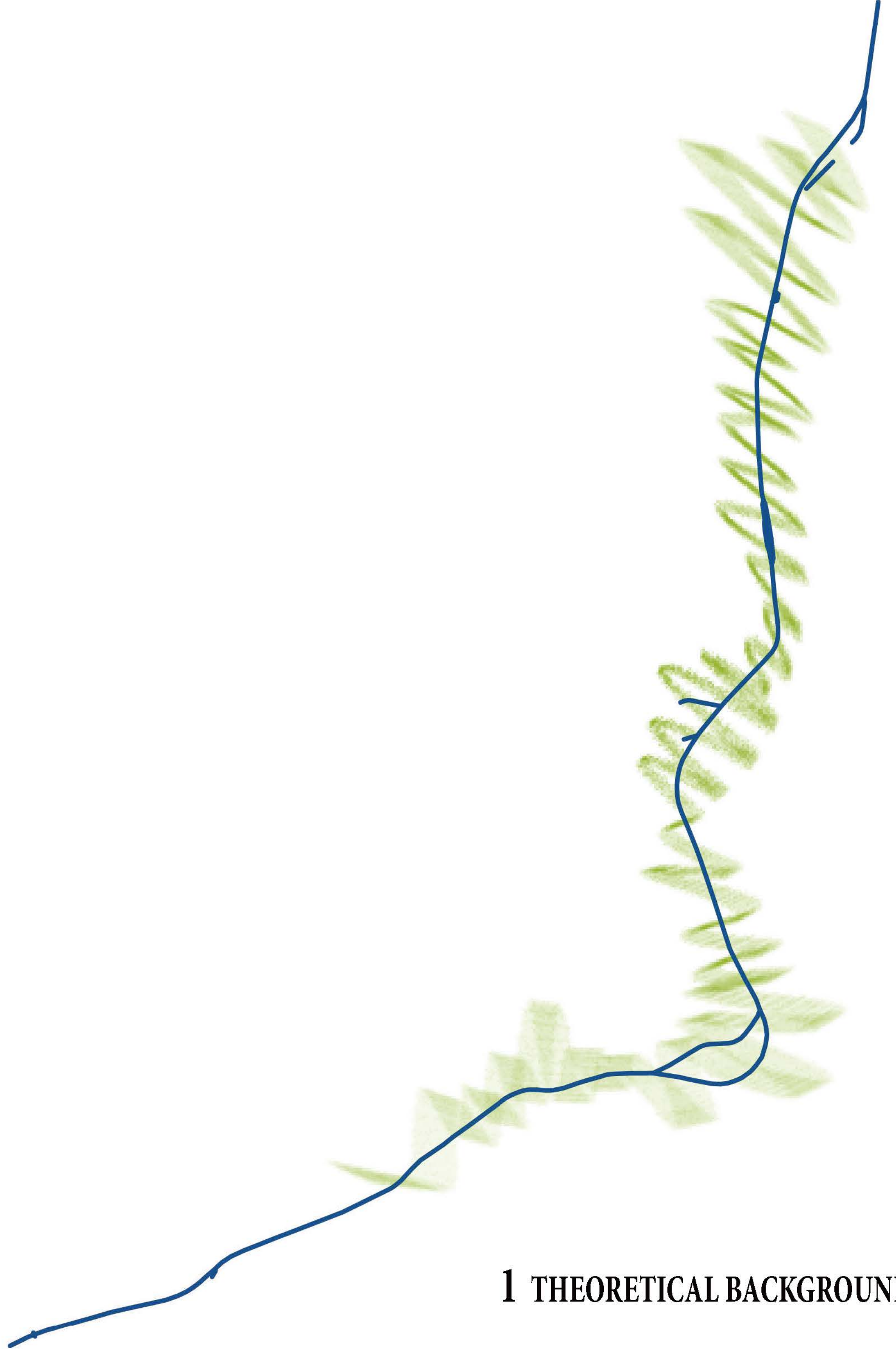




1 THEORETICAL BACKGROUND

The traditional infrastructure in modern city: highway #5 Los Angeles, California, USA, 2009 / Courtesy of Edward Burtynsky

A converting experiment of infrastructure: highline of New York

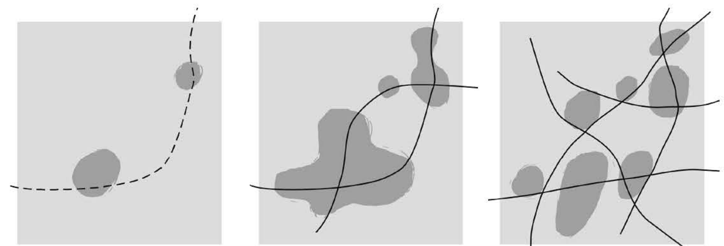
1.1 Infrastructure: flowscapes in city evolution

The modern city revolution has experienced a sprawling period and is now getting into dispersing period. So the urbanism pattern is transforming from a condensed city quickly to a sprawling one, and now to a dispersing one (multi-centered), also known as metropolitanization.

The sprawling is mainly during the industrial revolution in the nineteenth century. The division of labor in industrial society was reflected in the spatial division between work and home. Industrial production also led to a massive increase in the transport of raw materials for production and energy generation for use by machines and produced goods. This increasing need of individual and material transport led to endeavor to construct traffic infrastructure. When the modern city develops into a dispersing one, many infrastructures are abandoned or found harmful.

For example, nowadays it is commonly recognized that infrastructure over the last centuries was in service of the conquest of nature, whereby the environment was denied its natural dynamism in favor of more controlled and static systems. However, widespread insights into the potentially irreversible harm this paradigm has done to natural systems is now manifest in a growing awareness that we have to create more harmonious forms of urban landscape architecture.

The graduate studio, ***flowscapes***, explores infrastructure as a type of landscape and landscape as a type of infrastructure. The hybridization of the two concepts seeks to redefine infrastructure beyond its strictly utilitarian definition, while allowing landscape design to gain operative force in future modern city evolution processes.

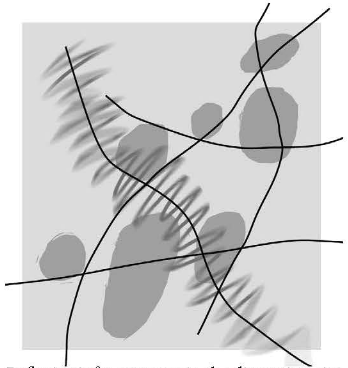


The original city | The sprawling city | The dispersing city

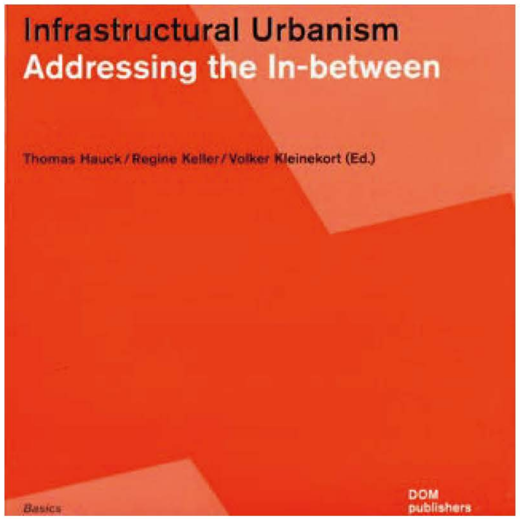
1.2 "the reflexive infrastructure"

According to Regine Keller (Infrastructural Urbanism: addressing the in-between), the current discourse on infrastructure is its "reflexivity". One presentation of reflexivity is the relevant spaces that are on longer useable, or become harmful, and consequently shut down over time. Urban infrastructure influenced, dominated and even defined these spaces as its context. Thus the reflexivity is reflected in the infrastructure and its relevant domains.

These spaces are significantly marginal in big cities. Infrastructures such as railways, highways and drainage canals have this situation more or less.



Reflexive infrastructure in the dispersing city



Hauck T., Keller R. & Kleinekort V., Infrastructural urbanism: addressing the in-between (2011). Berlin: DOM publishers.

1.3 Possibilities: what could it be?

There are four precedents to show various promising possibilities of infrastructure in modern cities:

_*Highline* in New York, used to be an old viaduct of railway. It is now a connector of people's life and emotion, providing programs for people from different ages and diffrent social groups, in different seasons.

_*Madrid Rio* in Madrid, was a national highway beside river. It is now a backbone of urban spaces, bridges enhance the connection of two sides along the route.

_*Baana* in Helsinki, was a low railway and now a lowspeed traffic route for daily commute and leisure.

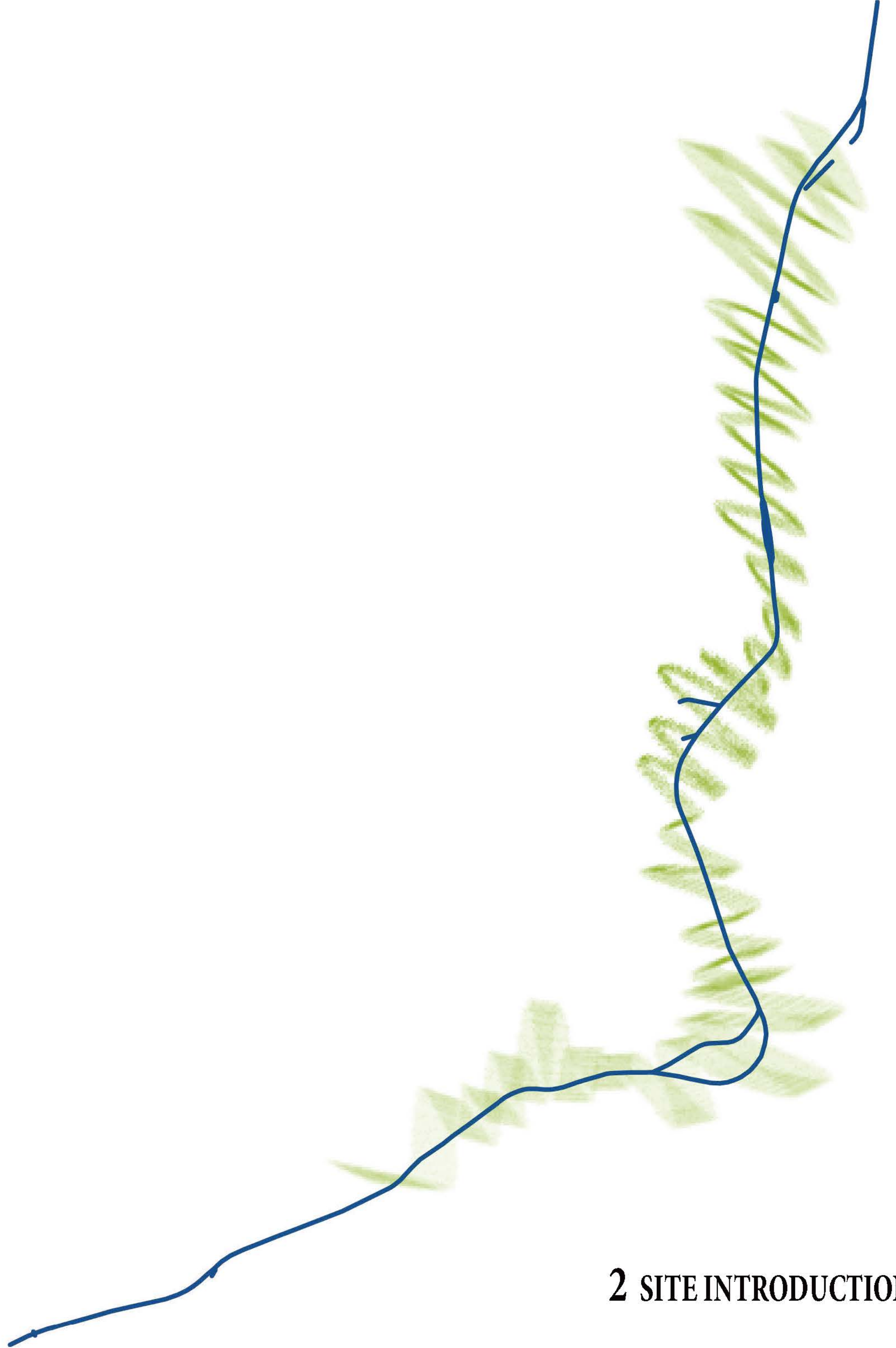
_*Bishan Park* in Singapore. There was a old concrete drainage canal, which is now a naturalized drainage stream, also acts as an ecological corridor in urban context.

Check the available activities at highline park at thehighline.org

This Helsinki's new "Low Line" (as opposed to NYC's High Line) opened on June 12, 2012. It runs through the city centre, providing a safe bicycle and pedestrian route to many points in the city. Photo via HBL.fi by Tor Wennström.

The old highway now goes underground and the riverbank is converted into new urban space in Madrid. Photo via West8.

The old Kallang River is an artificial channel to collect and drain the rainwater from nearby urban surface. After naturalized, it has the functions of rainwater purification, ecology and recreation. Photo via wikipedia.



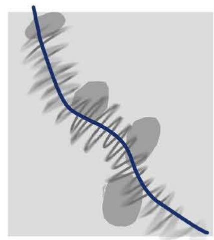
2 SITE INTRODUCTION

The swing-aqueduct carrying the Bridgewater Canal over the Manchester Ship near Manchester, England.

Rhine-Herne canal at Duisburg-Port,in Rhine-Ruhr region, Germany.

2.1 The post-navigable canal

The project is going to discuss a particular reflexive infrastructure, the post-navigable canal, which is common in modern cities. If look into some big metropolitan regions in the world, such as Manchester (England) and Rhine-Ruhr region (Germany), we can find that the navigable canals is also in the discart situation. They were built during the explosion of urban settlement in industry revolution. But as the industrial structure adjustment, the thriving railway and highway transport and other changes over time, these inner land canals have to face its decline. They used to be the artery in cities, regions and even countries. Even when their infrastructural role is written off, cast aside, they still leave visible and perceptible traces in the city, leaving problematic marginal spaces. Therefore, the infrastructure's fortune is linked with the city evolution, and vice versa.



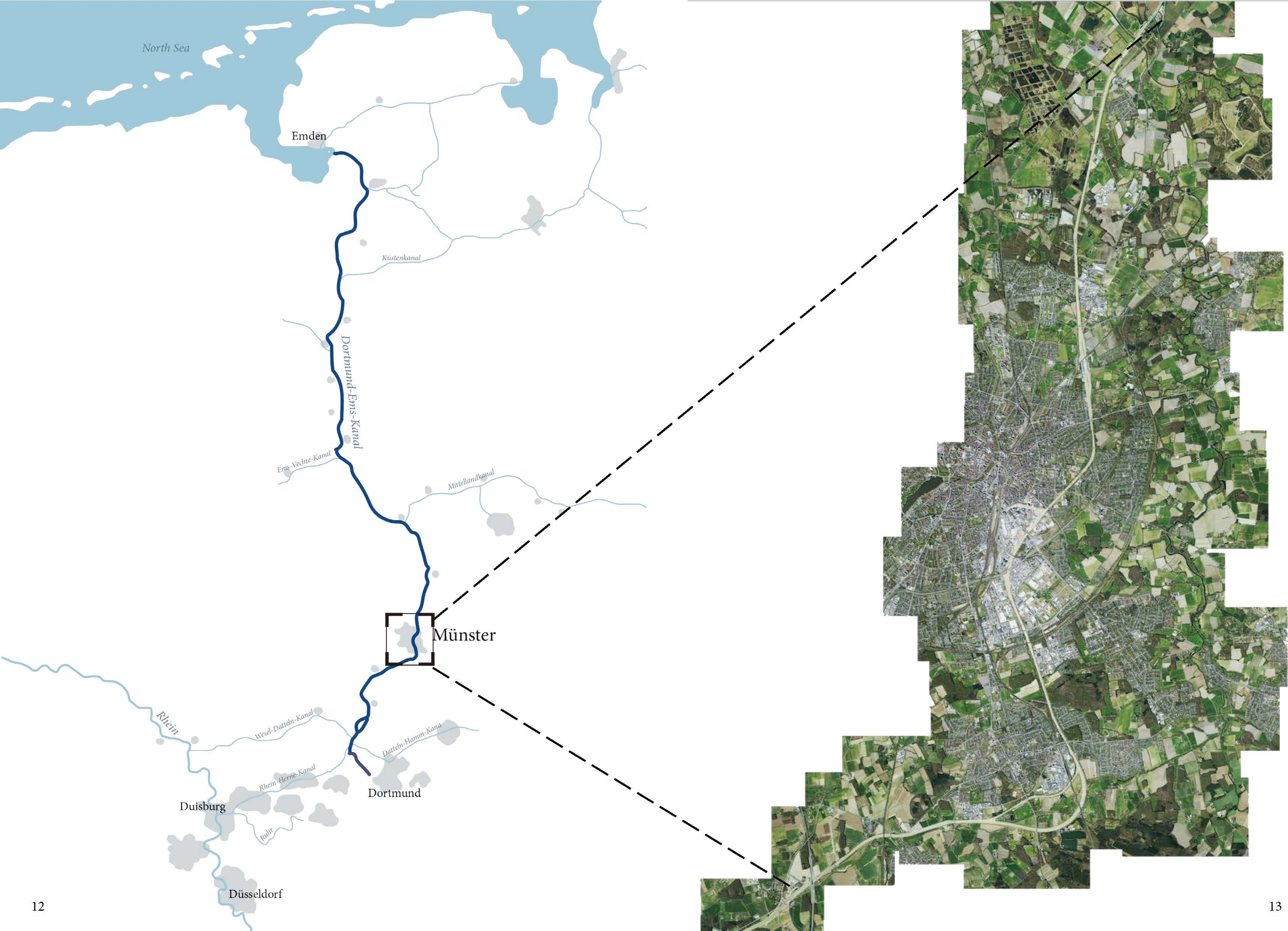
Post-navigable canal in dispersing city

2.2 Site selection: a case study

As a design-based research my graduate project is choosing *Dortmund-Ems-Kanal*'s section in *Münster, Germany*, as the design site. The canal was opened in 1899, during the prosperous time of Ruhr area. It starts from the inland port Dortmund and ends at the North Sea port Emden.

Inside *Münster,* the canal is 26.3 km long, generally 40-55m wide (at the twin lock is the widest, about 140m). There are 2 times of alternate routings, 2 locks (Zwillingsschleuse), 1 city port and 9 small docks.

Münster's development was once tightly related to the canal, while now the canal goes an opposite direction of the city's development.


North Sea
Emden
Küstenkanal
Dortmund-Ems-Kanal
Ems-Vechte-Kanal
Mittellandkanal
Münster
Rhein
Wesel-Datteln-Kanal
Datteln-Hamm-Kana
Rhein-Herne-Kanal
Ruhr
Dortmund
Duisburg
Düsseldorf

2.3 Site introduction

- Sprawling to the Canal

The timeline diagram shows a brief biography of Münster. Although the city has been a significant town since its originally official existence in the 8th century, only after the construction of the canal at the end of 19th century, the city expanded rapidly to the port on east. Nowadays it is an economic, scientific and service industry hub in the north part of North Rhine-Westphalia State.

6th century --- roots

793 --- officially existence

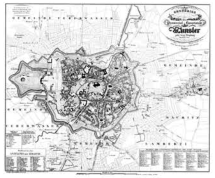
805 --- a cathedral city since "Monaterium" cloister founded

1170 --- got the town charter, a religious Christian center in Westphalia, a commercial and political hub.

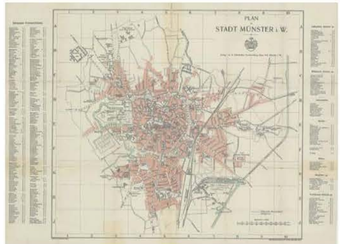
14-15th century --- an outpost of Hanseatic League.

1773 --- one of Germany's most significant university cities

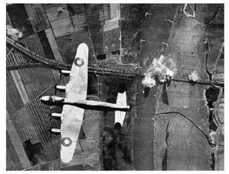
1816 --- capital of new province of Westphalia in the Kingdom of Prussia



1899 --- openning of Dortmund-Ems-Canal



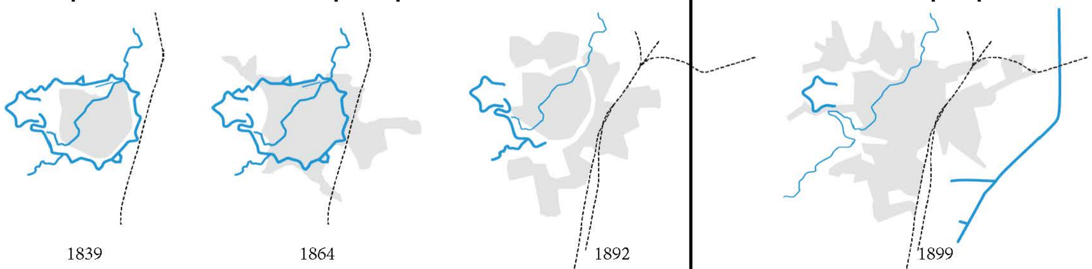
World War II --- old town bombed, the canal attacked

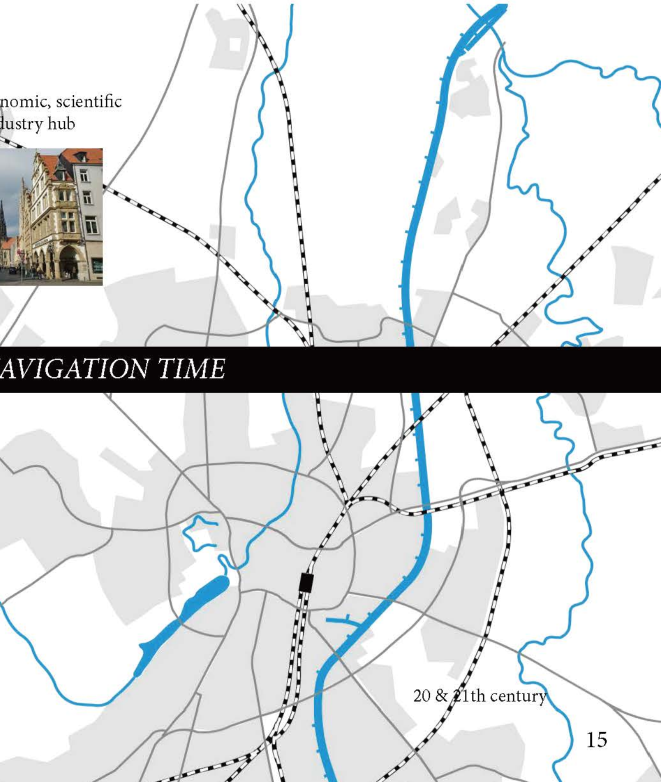


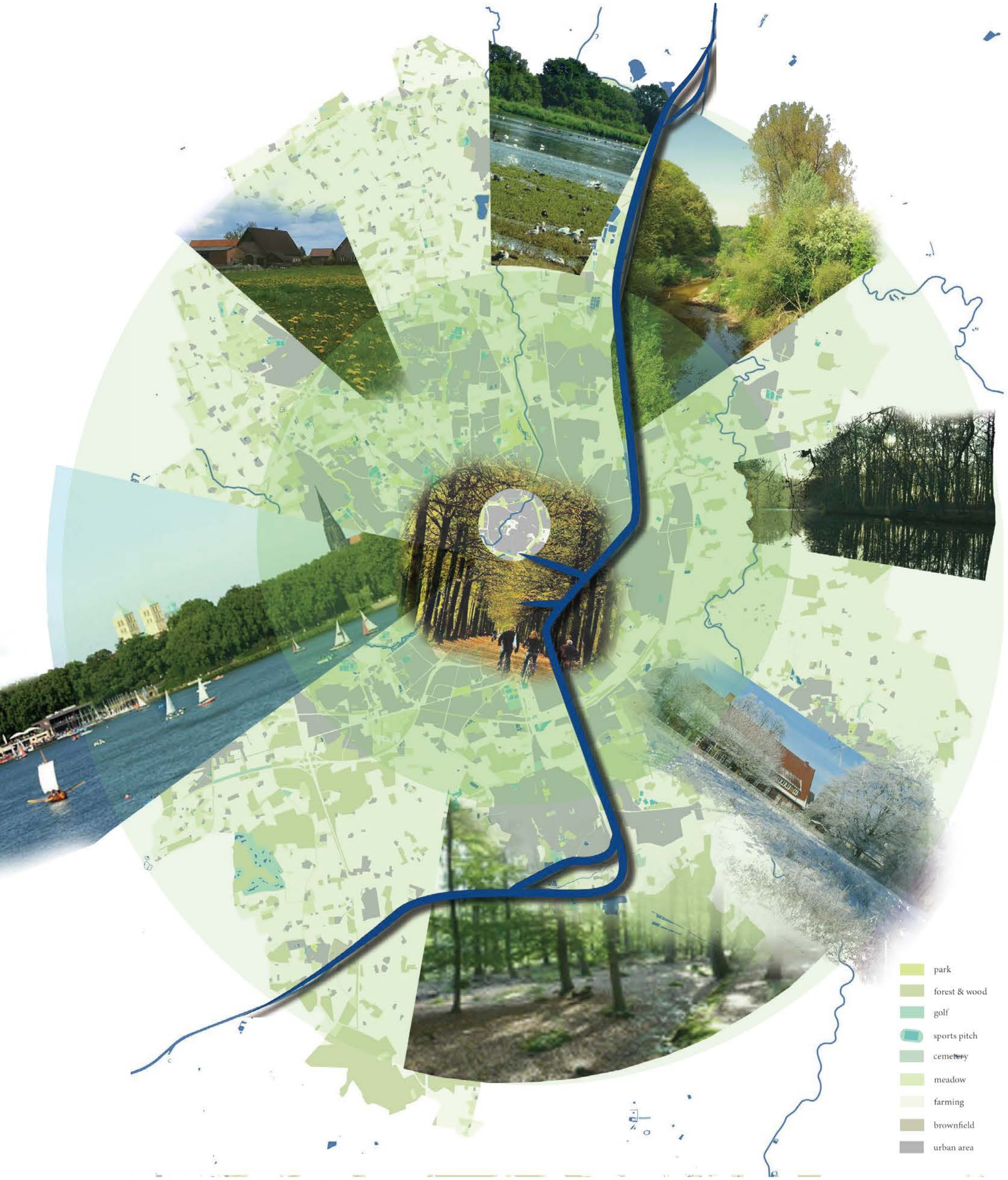
post WWII --- historical reconstruction, canal widened and new route constructed

now --- an economic, scientific and service industry hub

PRE-NAVIGATION TIME --- NAVIGATION TIME ------------------------ POST-NAVIGATION TIME





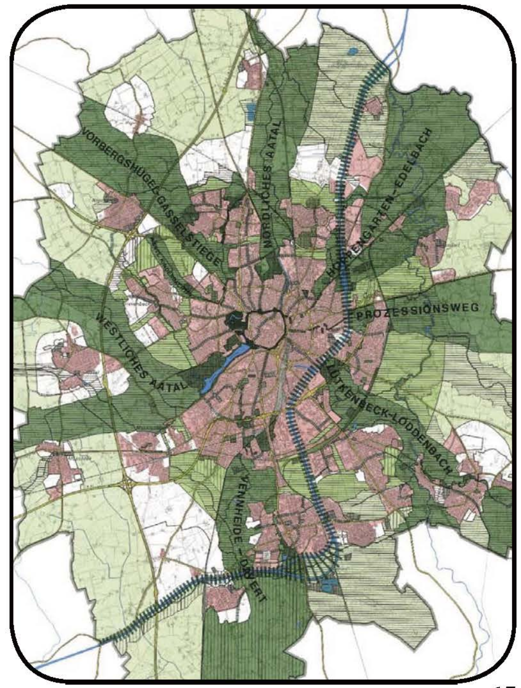


- The modern city of Münster

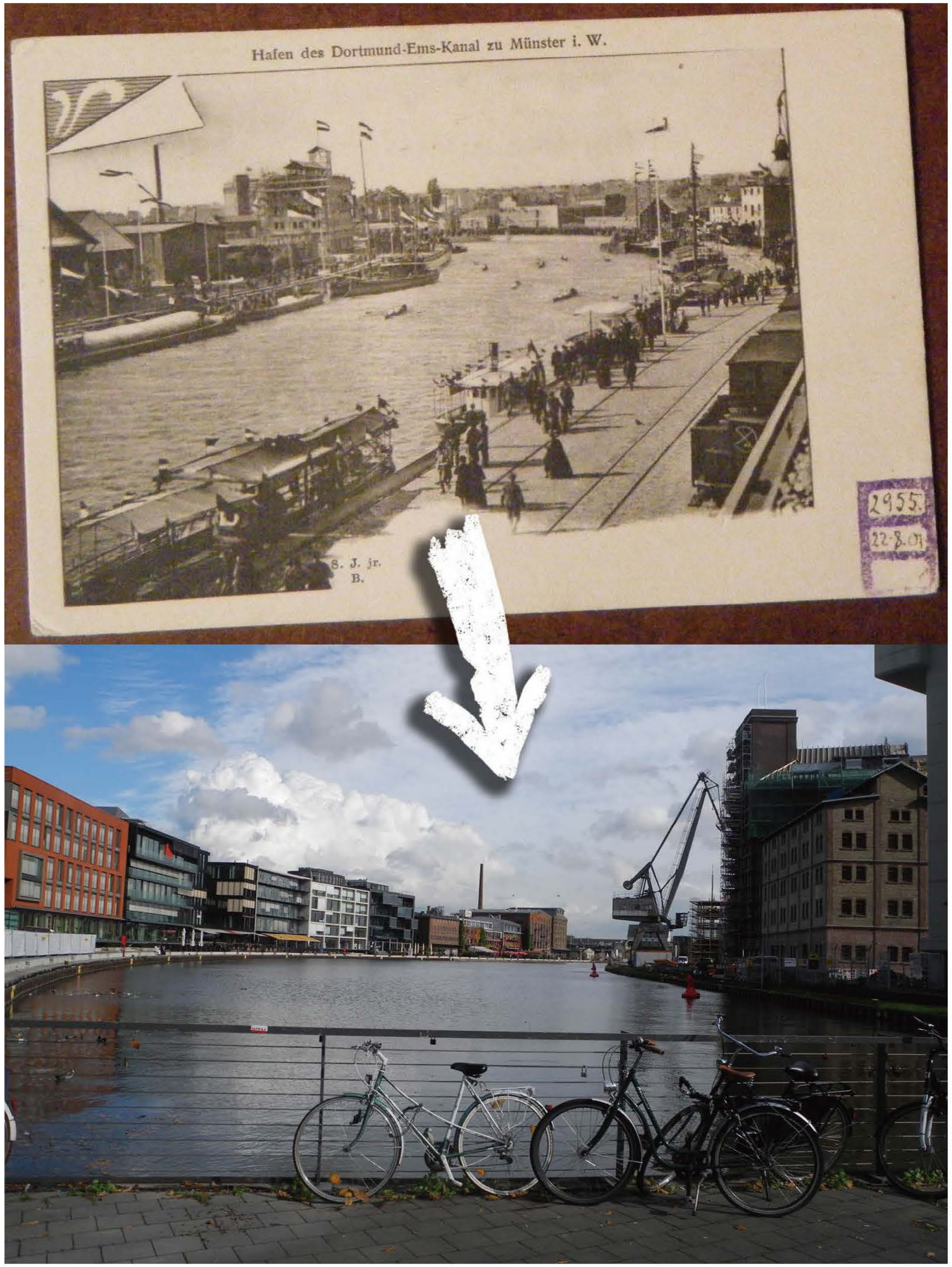
Now the Westphalian metropolis presents itself as the capital of Münsterland region, with simultaneous emphasis in economical, ecological, social and cultural objectives. Münster won *"the international awards for liveable communities 2004"* with the remarkable, comprehensive landscape system.

- Landscape system in Münster

According to the Green Space Ordinance of Münster, there is a systematic approach during the planning of green areas. The ordinance defines a green system consisting of three annular green rings and seven green corridors/wedges, which run towards the city center in a radial manner from the open countryside.

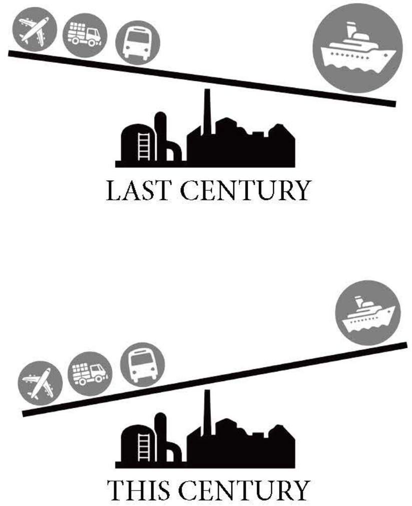


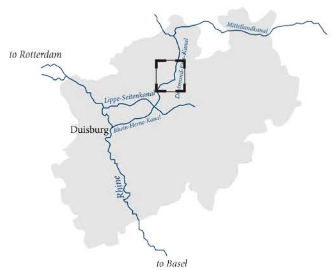
The guide plan of landscape system.
Source: Green Spaces Ordinance of Münster



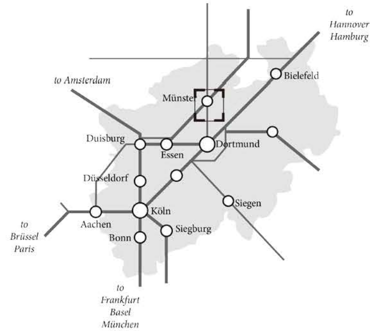
- The canal out of use

As the industrial structure adjustment, the thriving railway and highway transport and other changes over time, inner land navigation has to face its decline. As a narrow early industrial canal, Dortmund-Ems-Canal is no longer the artery in the city or region.

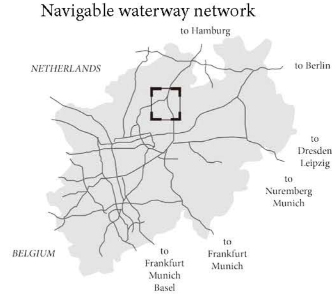




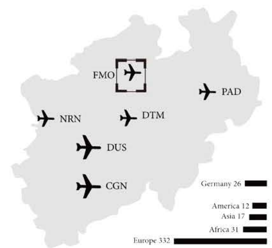
Navigable waterway network



Rail network



Road network



Airports and flight destinations

Münster's transportation connection to cities in North Rhine-Westphalia

2.4 Problems & possibilities

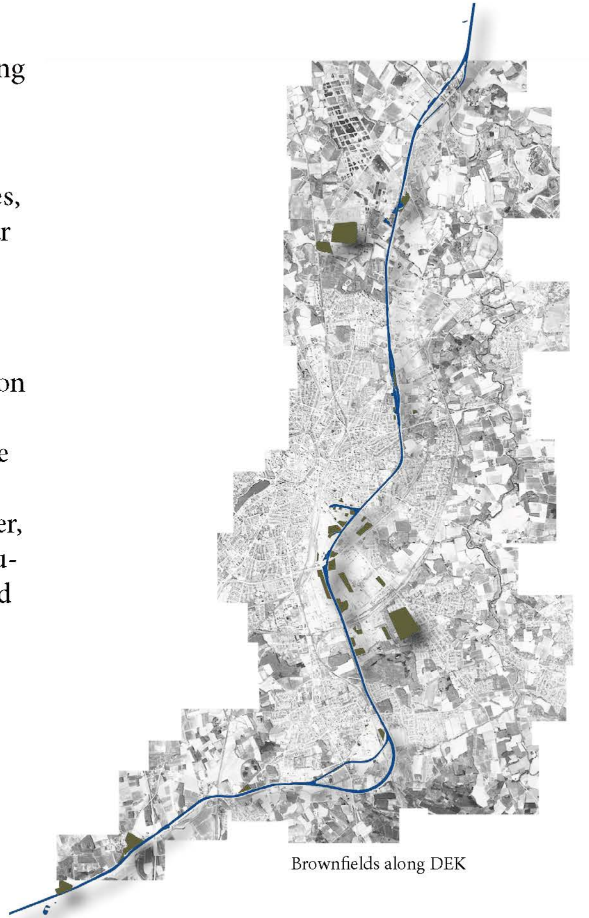
- Problems

As a past transportation infrastructure, the canal is a significant marginal space, together with its facilities (such as ports, locks, aqueducts, etc) and the surrounding industrial buildings and brownfields.

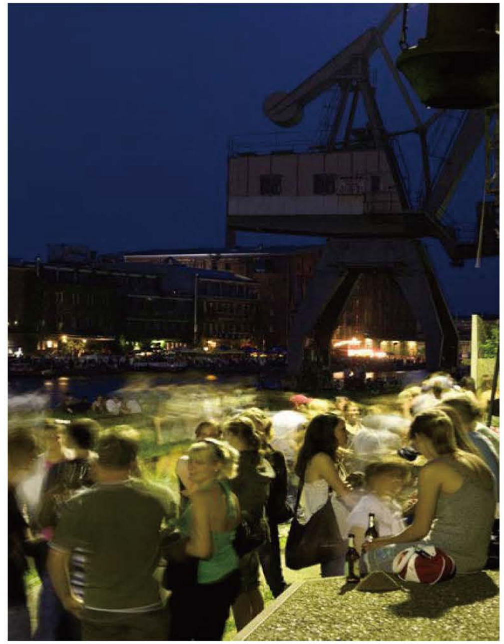
It is also a barrier of ecological system (hydrology and habitat), the urban spaces, traffic and programs because of the linear shape.

- Possibilities

Although no longer used as transportation infrastructure, the canal is promising in urban and landscape development. There are always people yachting on the water and waterbirds standing beside. Moreover, at the ciy port, many art galleries and museums, publishing houses, clubs, bars and restaurants are settled.



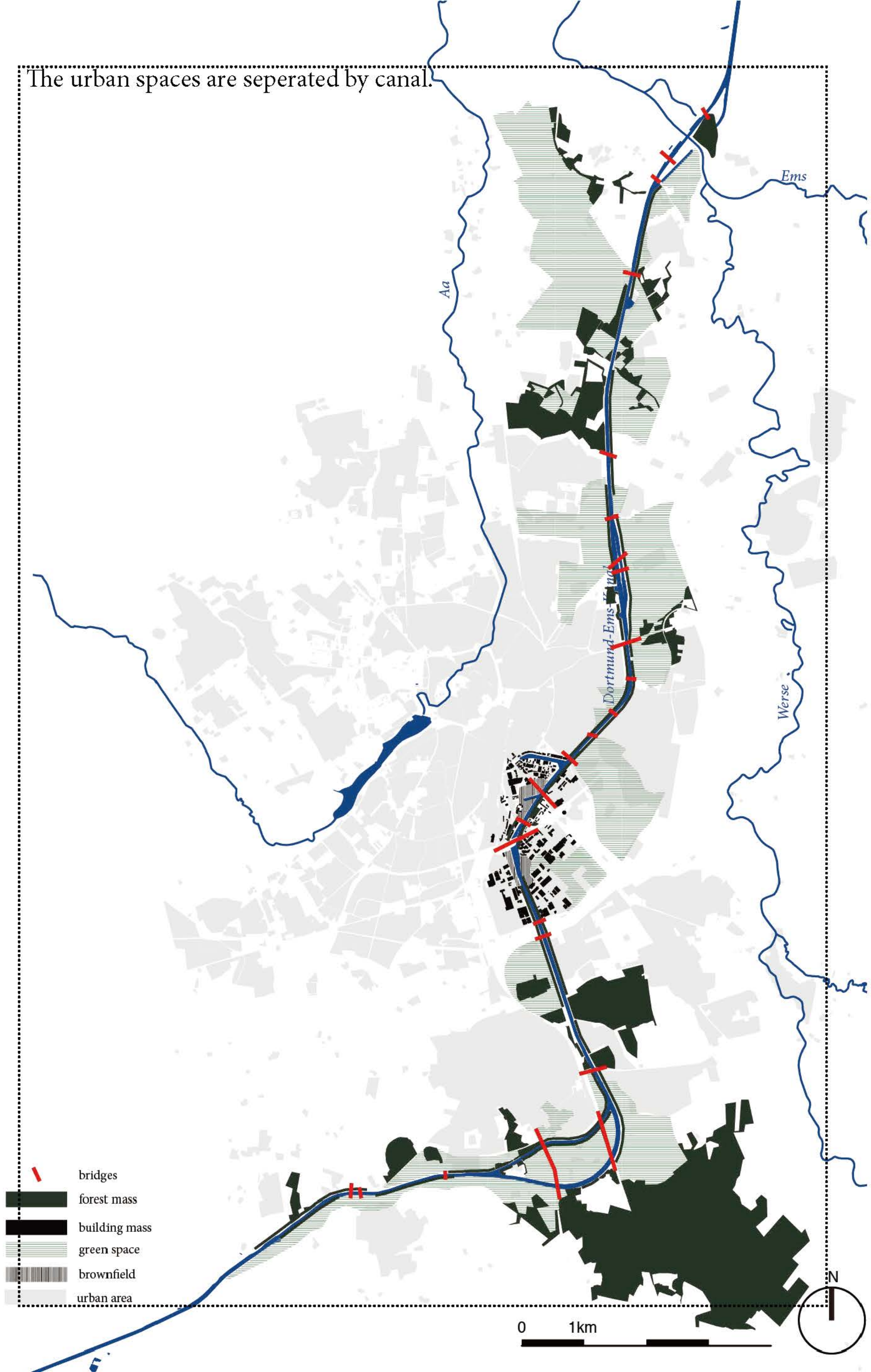
Brownfields along DEK

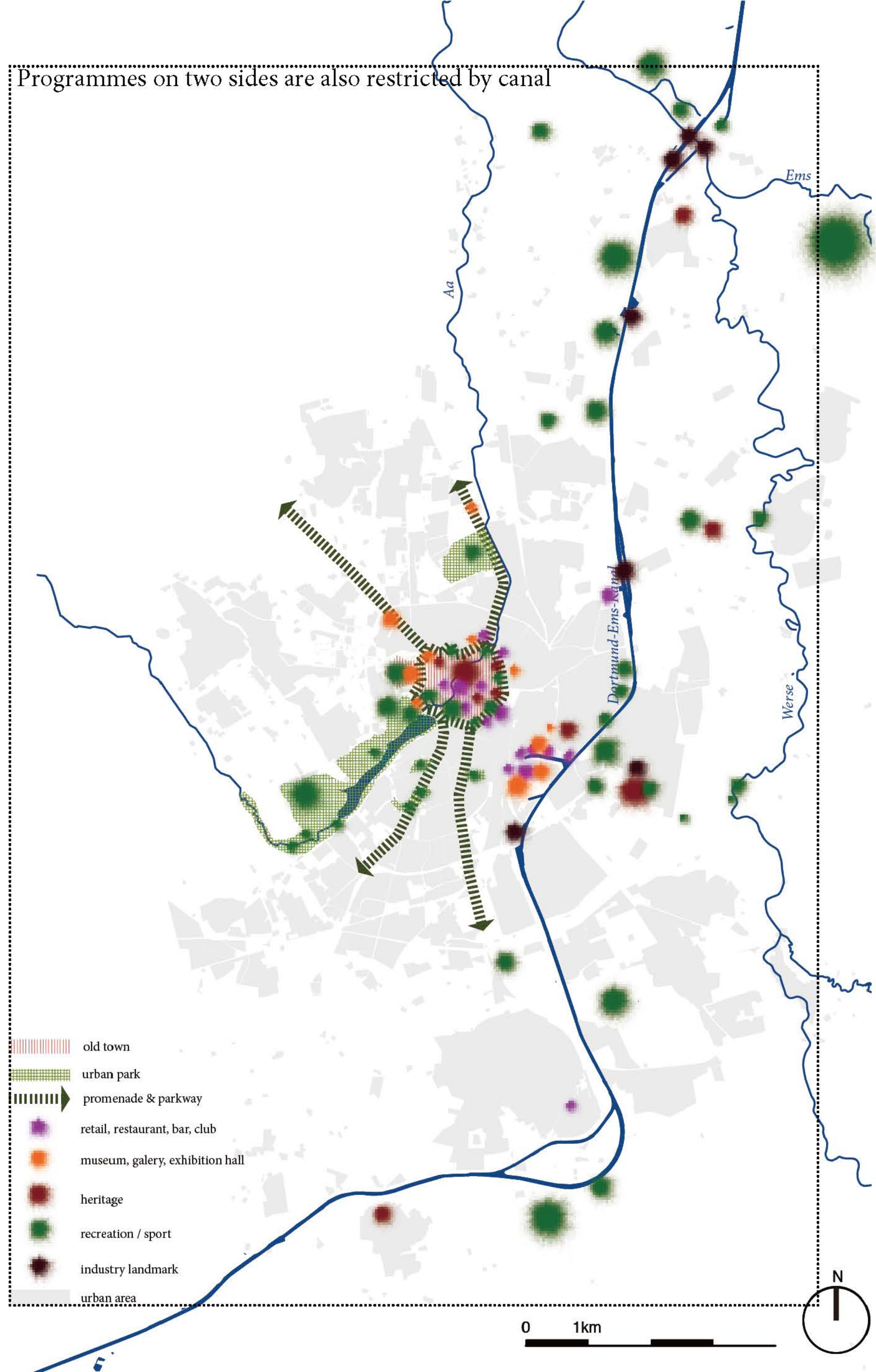


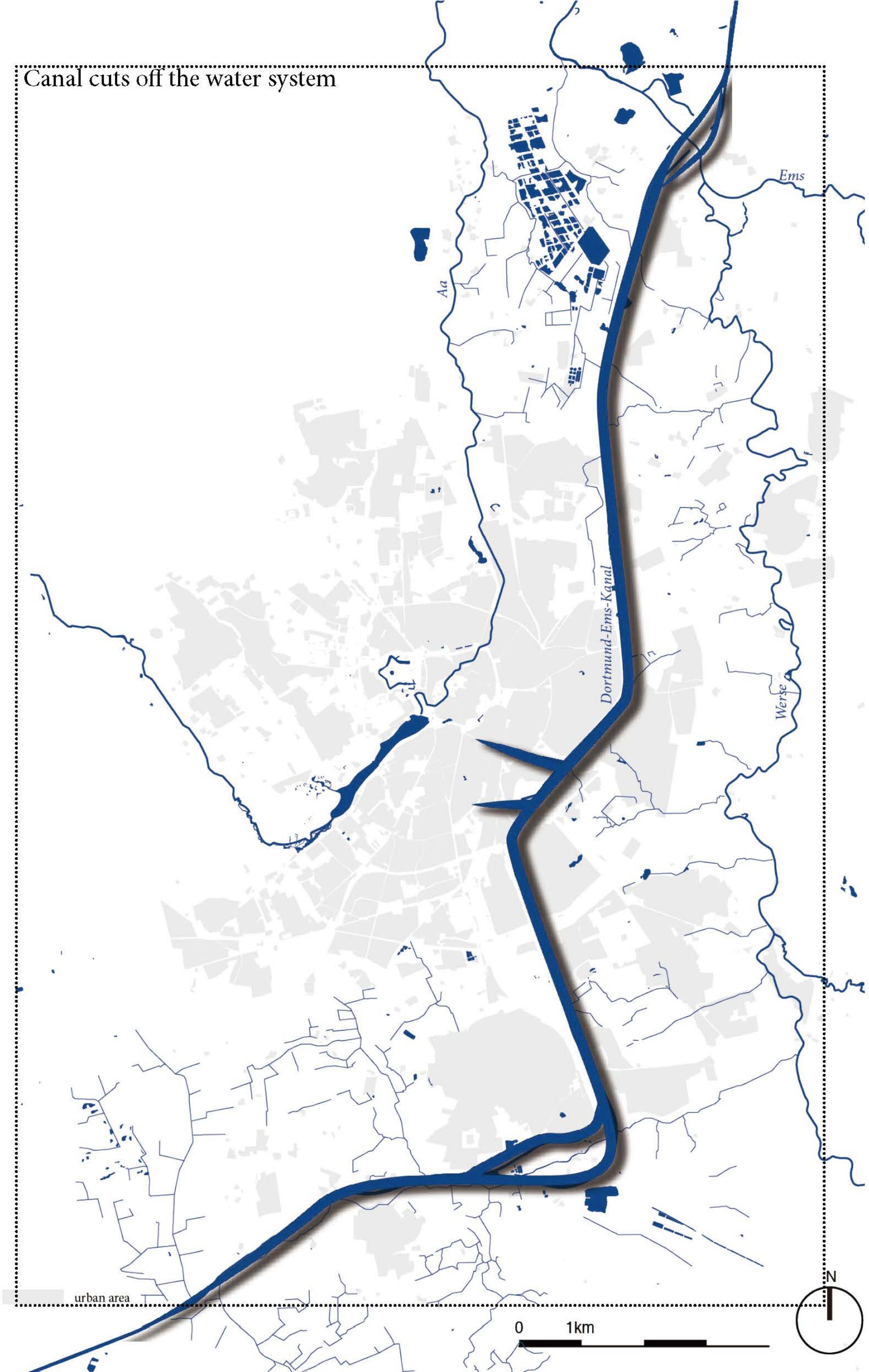
the port is the third urban frontier_

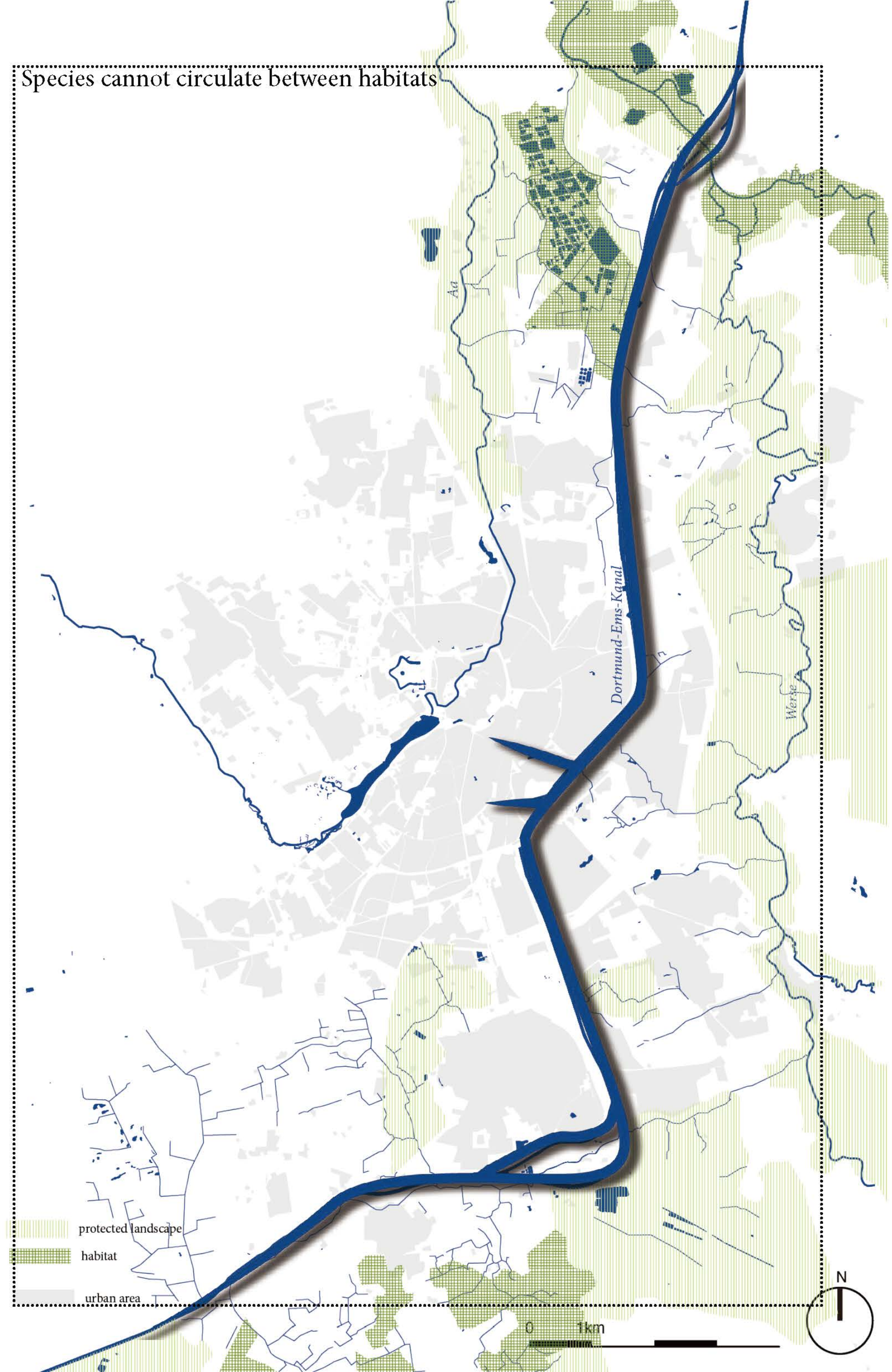
the canal is a new activity space_

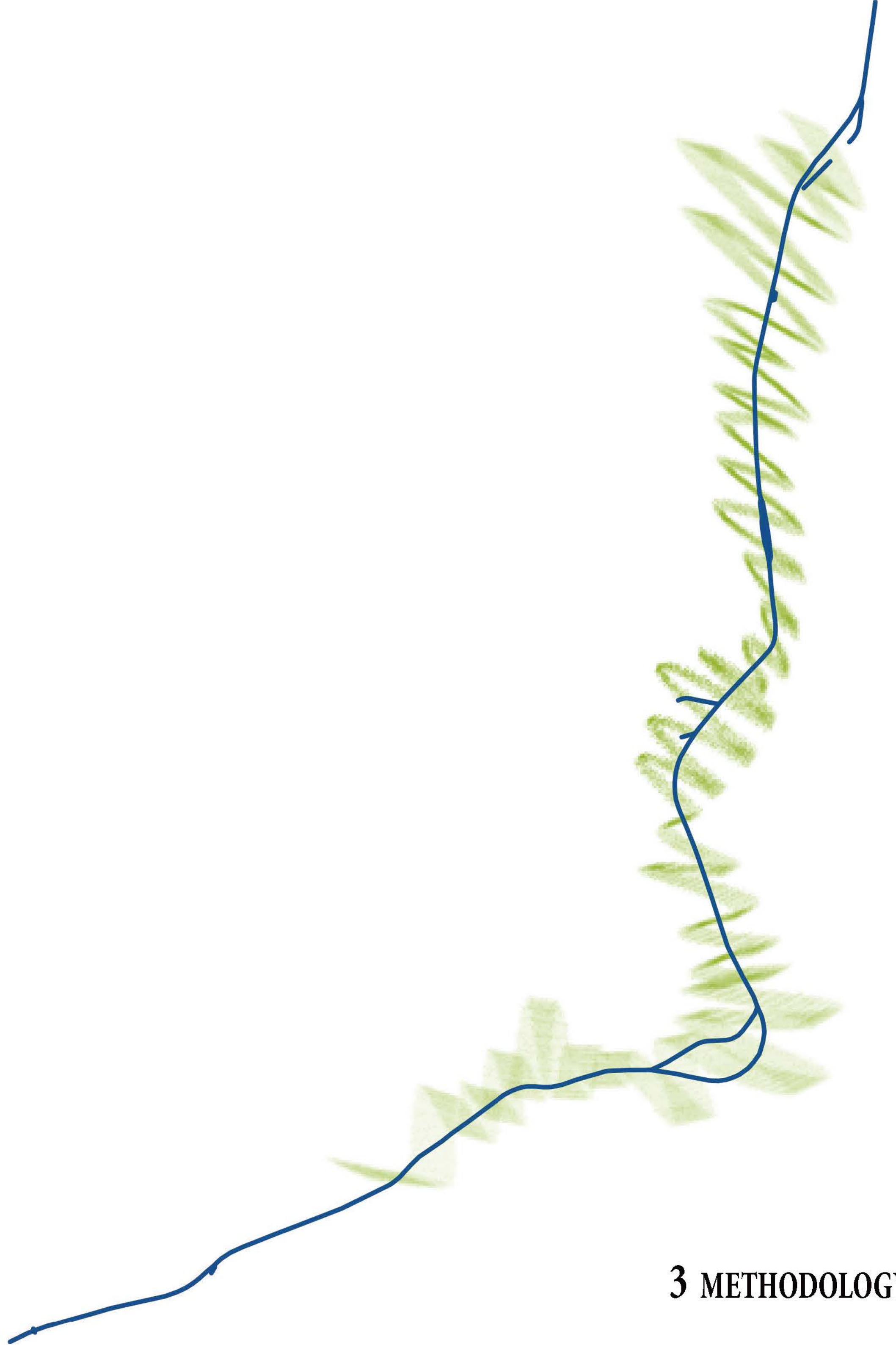
the canal is a new habitat_


The urban spaces are seperated by canal.
Aa
Ems
Dortmund-Ems-Kanal
Werse
bridges
forest mass
building mass
green space
brownfield
urban area
0
1km
N


Programmes on two sides are also restricted by canal
Aa
Ems
Dortmund-Ems-Kanal
Werse
old town
urban park
promenade & parkway
retail, restaurant, bar, club
museum, galery, exhibition hall
heritage
recreation / sport
industry landmark
urban area
0
1km
N


Canal cuts off the water system
Ems
Aa
Dortmund-Ems-Kanal
Werse
urban area
N
0
1km


Species cannot circulate between habitats
Aa
Dortmund-Ems-Kanal
Werse
protected landscape
habitat
urban area
N
0
1km



3 METHODOLOGY

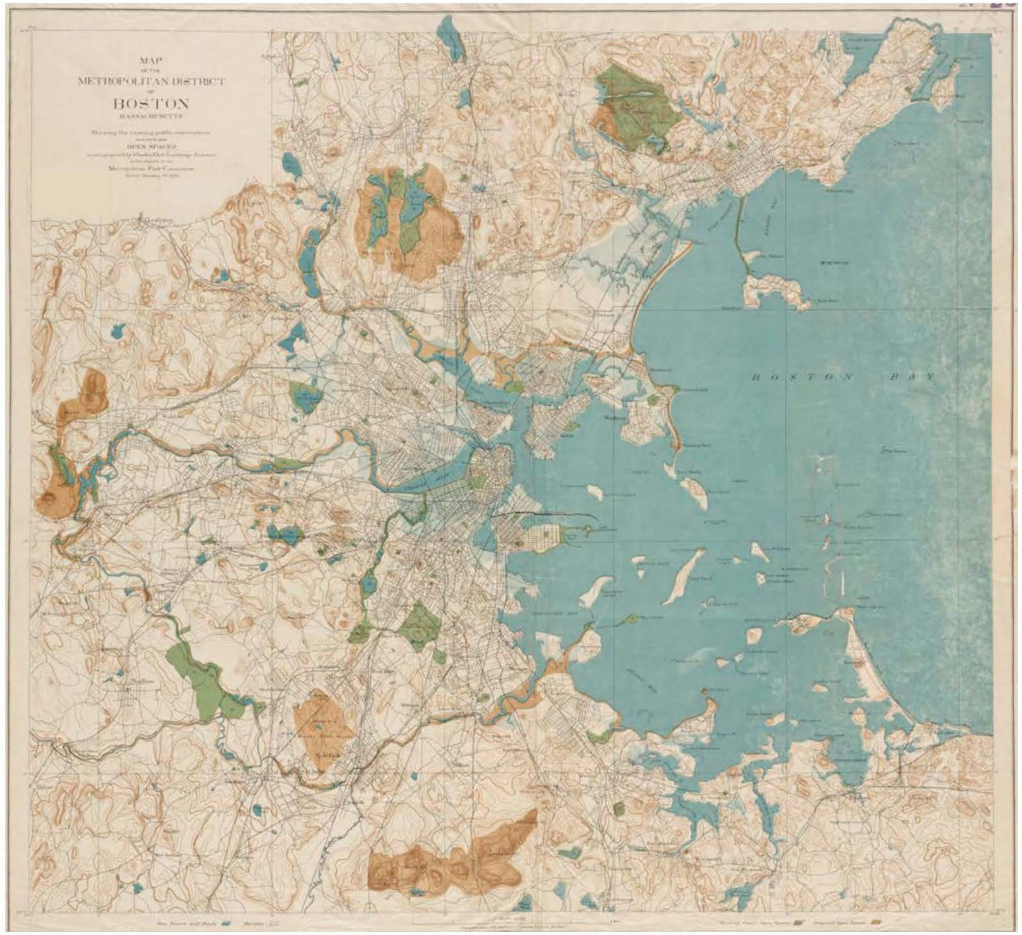
Metropolitan park system of Greater Boston

Before the turn of twentieth century, Charles Eliot and Sylvester Baxter, the pioneer of metropolitan park system, believed that as well as in the "field and tree district", landscape development could take place in low-lying places such as waterways and seacoasts. (Moga, 2009) That is because they regard these marginal spaces both problematique and opportunities.

> First of all, water has crucial influence on ecological environment of landscape. Water provides low-lying lands the possibility of creating what we now call "riparian corridors" or "greenways."
>
> Second, since twentieth century, settling development on marshland, flood plain or tidal flats has never been temperance. Factory plants and slums on the shore side face away from water and blocked public access. In Eliot and Baxter's Boston park system case, they also sought to undo what they perceived to be one of the worst cases of bad development: Revere Beach. Their proposal led to the successful redevelopment of waterways and open spaces around metropolitan Boston.
>
> Last, a creek or river it self may be polluted, and it can string industrial land, overexploited and undeveloped sites, areas of hidden or damaged scenic beauty and other leftover, unwanted or interstitial spaces. A waterway should be involved in the park framework for healthy development of metropolis.

They convert the marginal spaces (water areas, concerned as the symptoms of the growing Boston metropolis), into a vital component of the comprehensive park system. The park system is not only ***a solution*** to the problematic spaces, but also ***an opportunity*** to develop and protect the qualities of metropolitan areas.

Similarly, this graduation project is going to convert Dortmund-Ems-Canal into a crucial component of the landscape structure of Münster.



Boston park system, 1901. Diagram from Steffen Nijhuis.

Historical picture of the Revere Beach, showing the wrong kind of development in the past. Source: Journal of Planning History, by Steven T. Moga.

Now the Revere Beach is crowded in summer, with beach pavilions and other features. The federal government has designated the site a National Historic Landmark. Source: Journal of Planning History, by Steven T. Moga.

RESEARCH GOAL

The project will explore a comprehensive landscape approach with *Dortmund-Ems-Canal* in Münster. By integrating the canal into the context of Münster, I want to gain an applicable strategy to convert the ***post-navigable canal*** into a crucial component of the landscape structure in the modern city.

RESEARCH QUESTIONS

Main research question:

As the navigable function is declining, how could we find Dortmund-Ems-Kanal's new effective and positive role in Münster, as a component of the city's ***landscape system***?

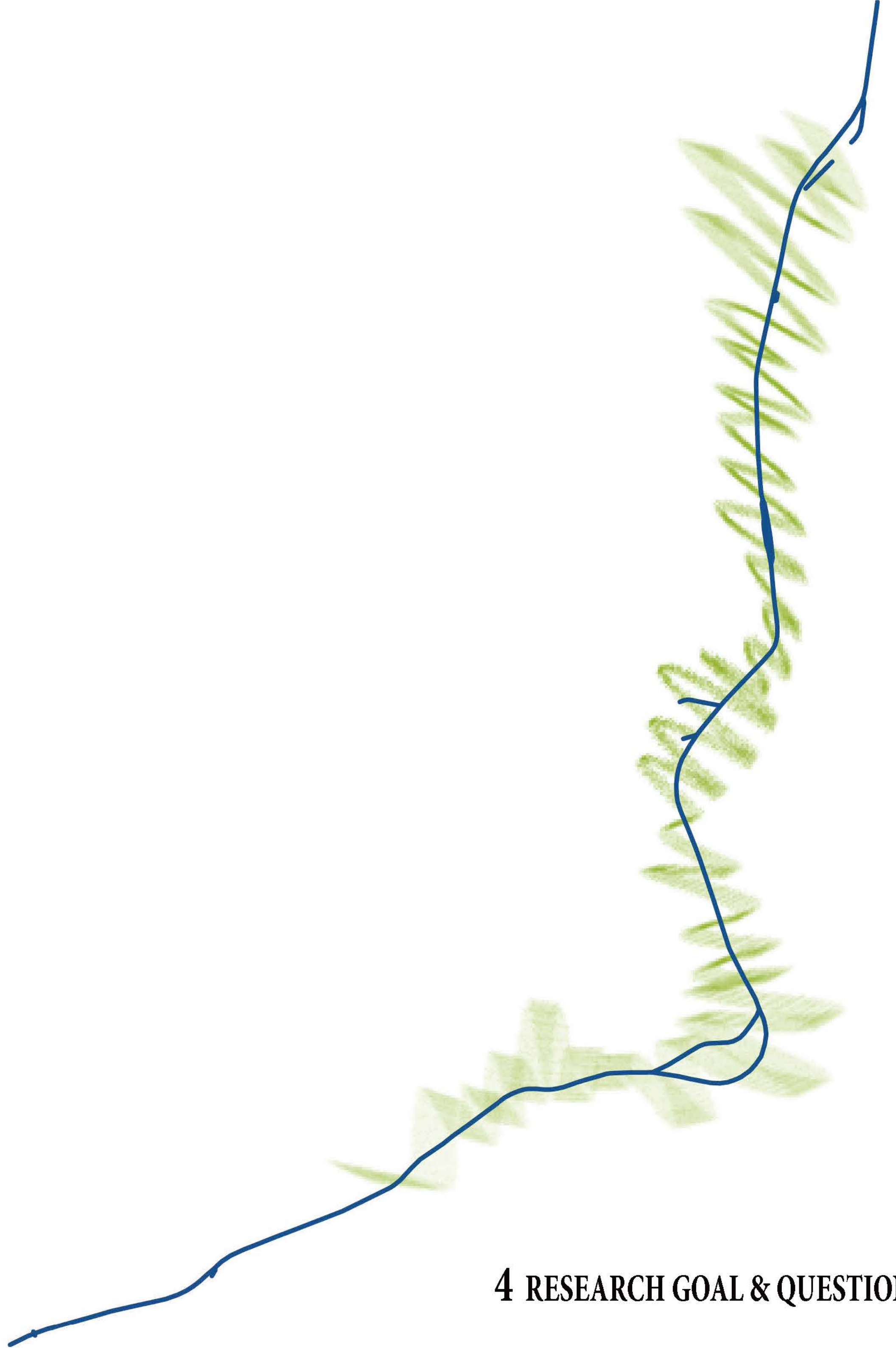
Sub research questions:

- What are the ***landscape opportunities*** between the canal and city?

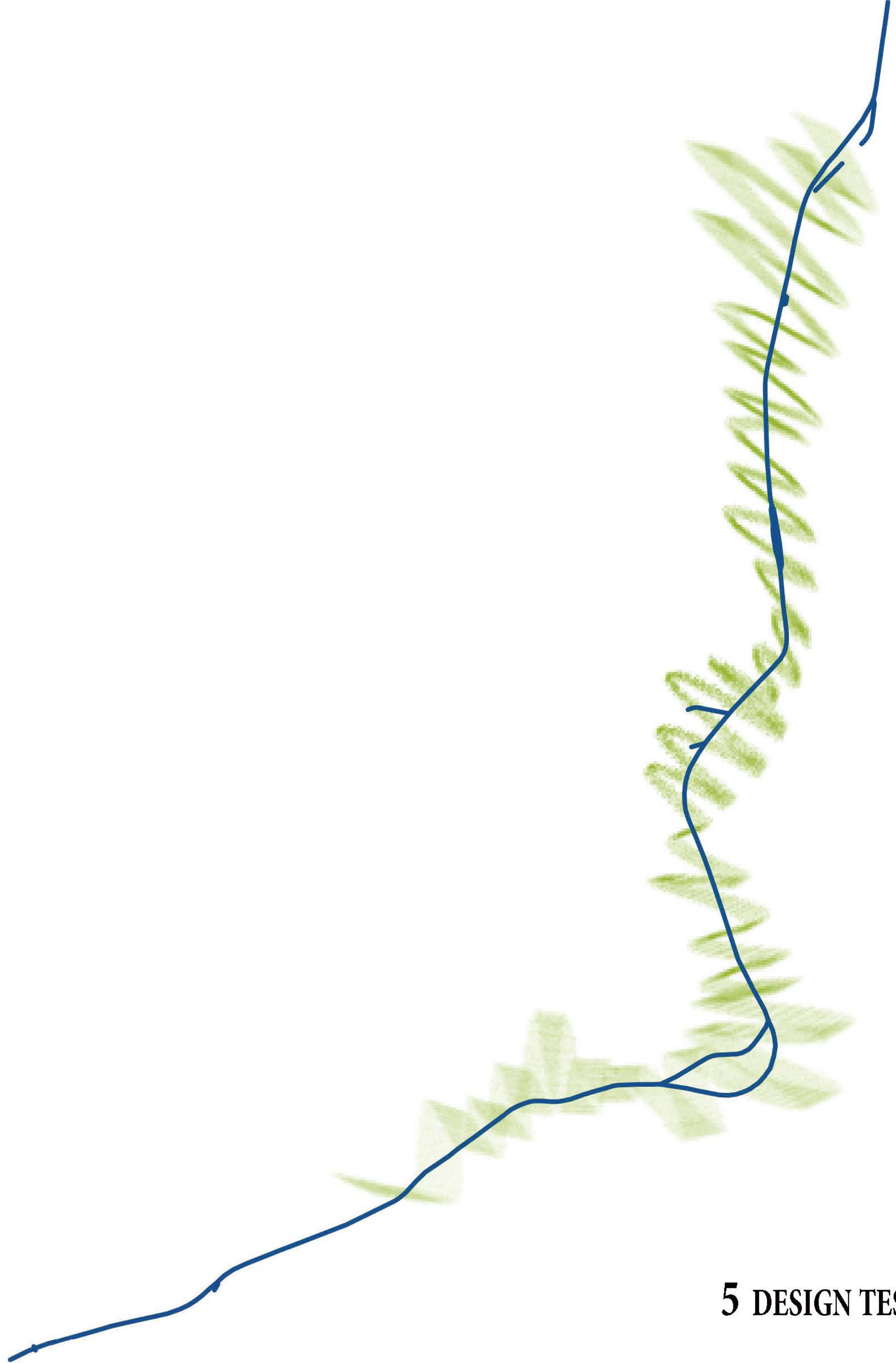
- What ***principles*** could be used?

- How to apply the principles at ***local scale*** ...

- and at ***city scale***?



4 RESEARCH GOAL & QUESTION



5 DESIGN TEST

5.1 City port introduction

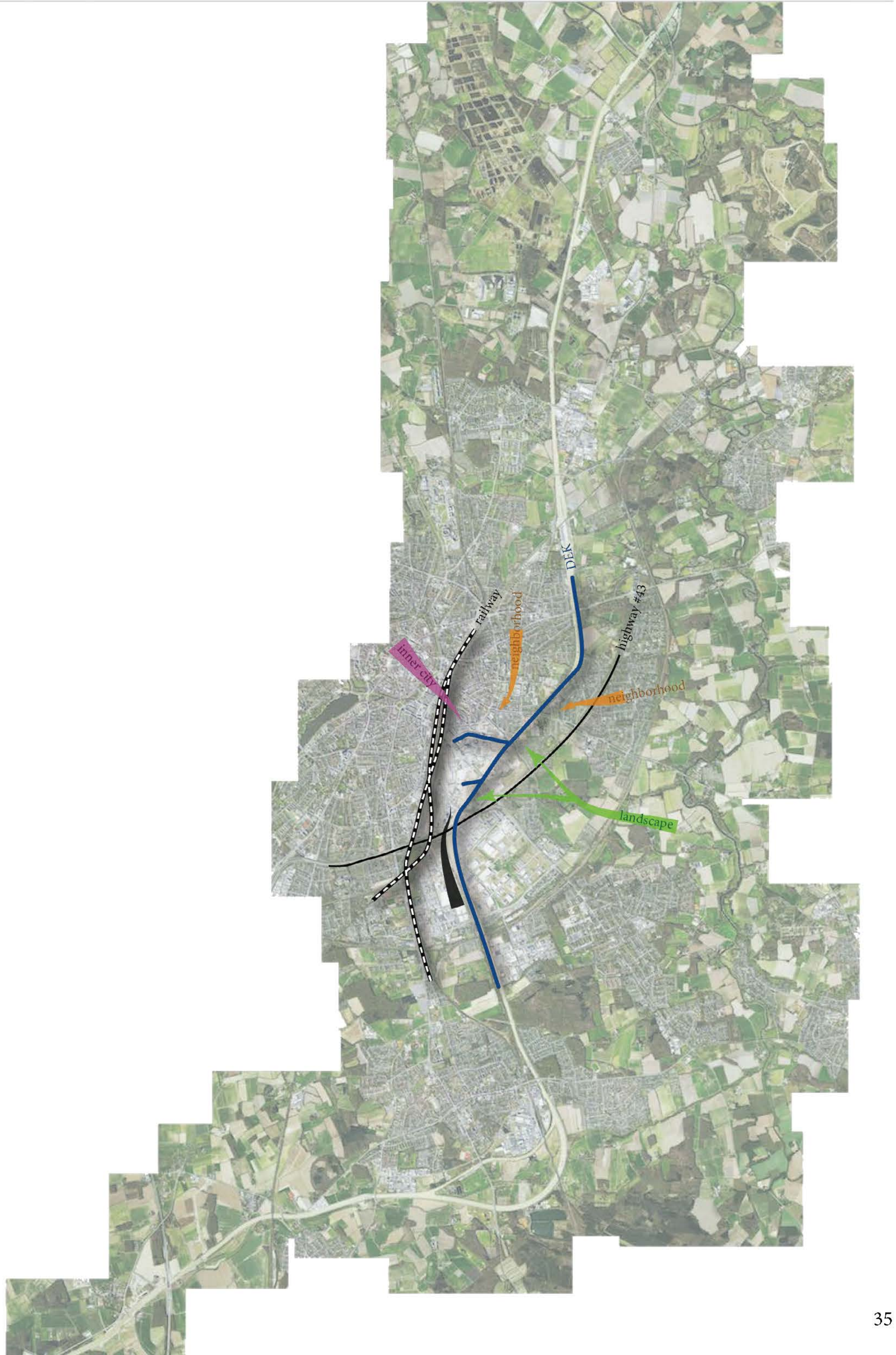
To get a grip on the canal's problems and possible solutions, I firstly do a design test at a crucial spot of the canal, the city port of Münster. It is the conflict junction of history and present, city and landscape, and the canal's problems and potentials.

From the view of external, there are types of landuses bordering here: industrial land, neighborhood, woods, suburban gardens, agricultural land, etc. On the other side of the central railway station is the old town of Münster. The port is also the conjunction point of infrastructural lines, canal, railway and highway, which cut the place into segments.

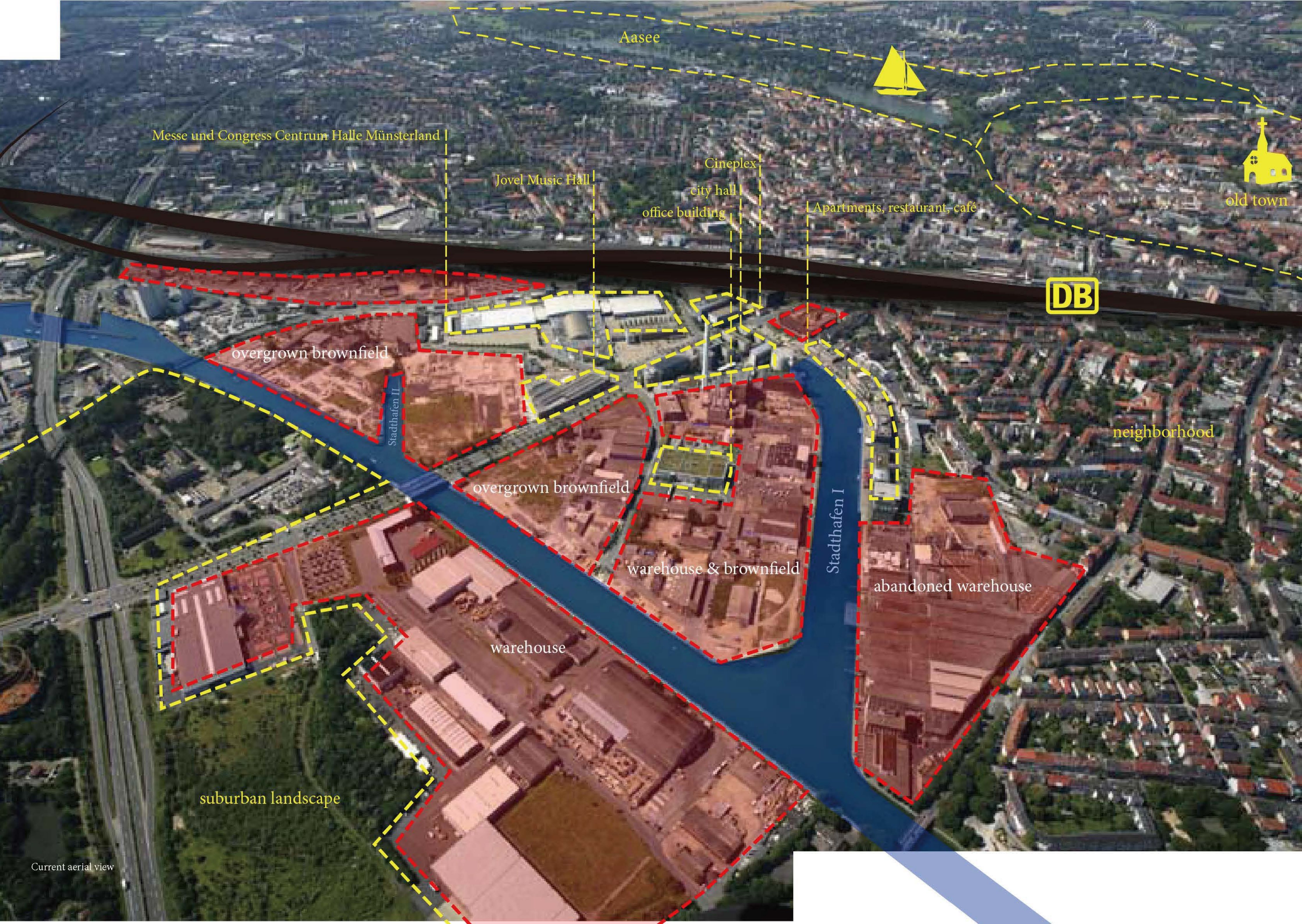
From internal view, the flowing two images show the history and present of city port.

_ The port in 1902: a freight and industry center

_ The port at present: As the canal out of use, and the port used to be the center, there are many discard warehouses and big patches of brownfields around the city port I & II. In the buildings some cultural and business activities (studios, clubs, galleries, museums and publishing houses) are settled. There are property developments here, such as apartment buildings, cinema, and a congress center.



The city port in 1902



Current aerial view

Future aerial view

5.2 Design overview

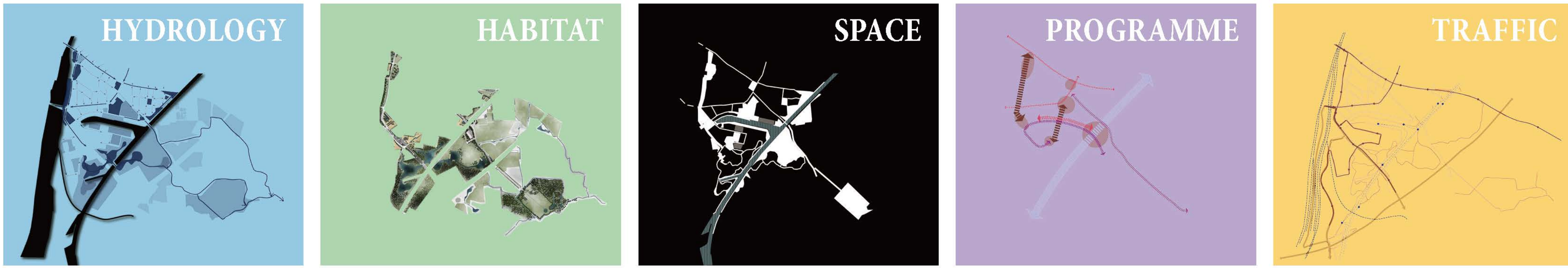
To restore an order out of the chaos, the design defines a landscape structure, solving the canal's problems and developing the potentials.

Commercial treets, parkways and country lanes are connecting the canal to the urban and landscape areas. Around the port is a new urban frontier of Münster. There are art warehouse, clubs, shopping mall, bars and restaurants, office and apartment buildings. There are spaces such as parks, event squares, wetland park and castle. The remained business and industry is restricted near the cross of highway and railway.


1 railway station
2 art warehouse
3 cinema
4 congress center
5 city hall
6 shopping mall
7 tourist center of wetland park
8 music house
9 sports club
10 apartment building
11 office building
12 industrial building
13 glasshouse
14 cathedual
15 castle hotel
16 telecommunicate tower
17 water tank
18 street park
19 water square
20 port square
21 festival square
22 arcade
23 playground
24 sports field
25 suburban allotment gardens
26 nersury
27 wetland park
28 woods
29 parking lot
30 trampoline bridge
0 100m
N

5.3 Deconstructing thematic layers

In this part, the design will be deconstructed into five thematic layers, to discuss the canal's problems and potentials, explore the principles and apply them locally at the port. The five layers are: Hydrology, habitat, mass & space, program and traffic.



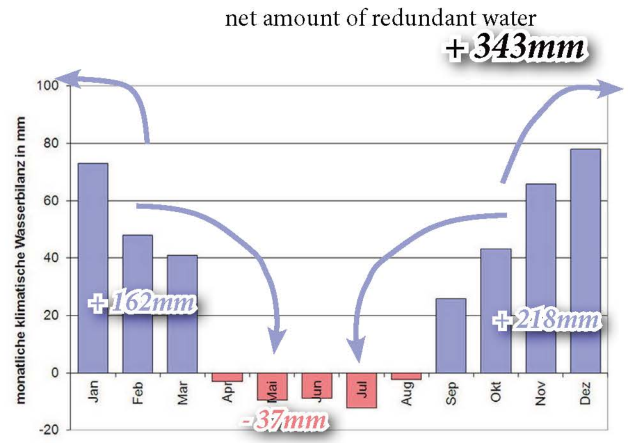
HYDROLOGY

A rainwater discharge network

_ A rain laden city

A well-known saying in Münster is “Entweder es regnet oder es läuten die Glocken. Und wenn beides zusammen fällt, dann ist Sonntag” (“Either it rains or the church bells ring. And if both occur at the same time, it’s Sunday.”).

The perception of Münster as a rain-laden city isn’t caused by the absolute amount of rainfall but by the above-average number of rainy days with relatively small amounts of rainfall. The highest daily rainfall was registered on July 28, 2014: the State Environment Agency registered at one of its stations 292 l / m² during seven hours. From the map of soil capability of water, the city could not lade the water locally. The record rainfall in 2014 led to severe flooding throughout the city and the nearby Greven.



Annual fluctuation of monthly climatic water balance as a field agent for NRW for the period 1981-2010. Blue bars represent water to be discharged and red bars to be supplied (Data source: dwd.de).

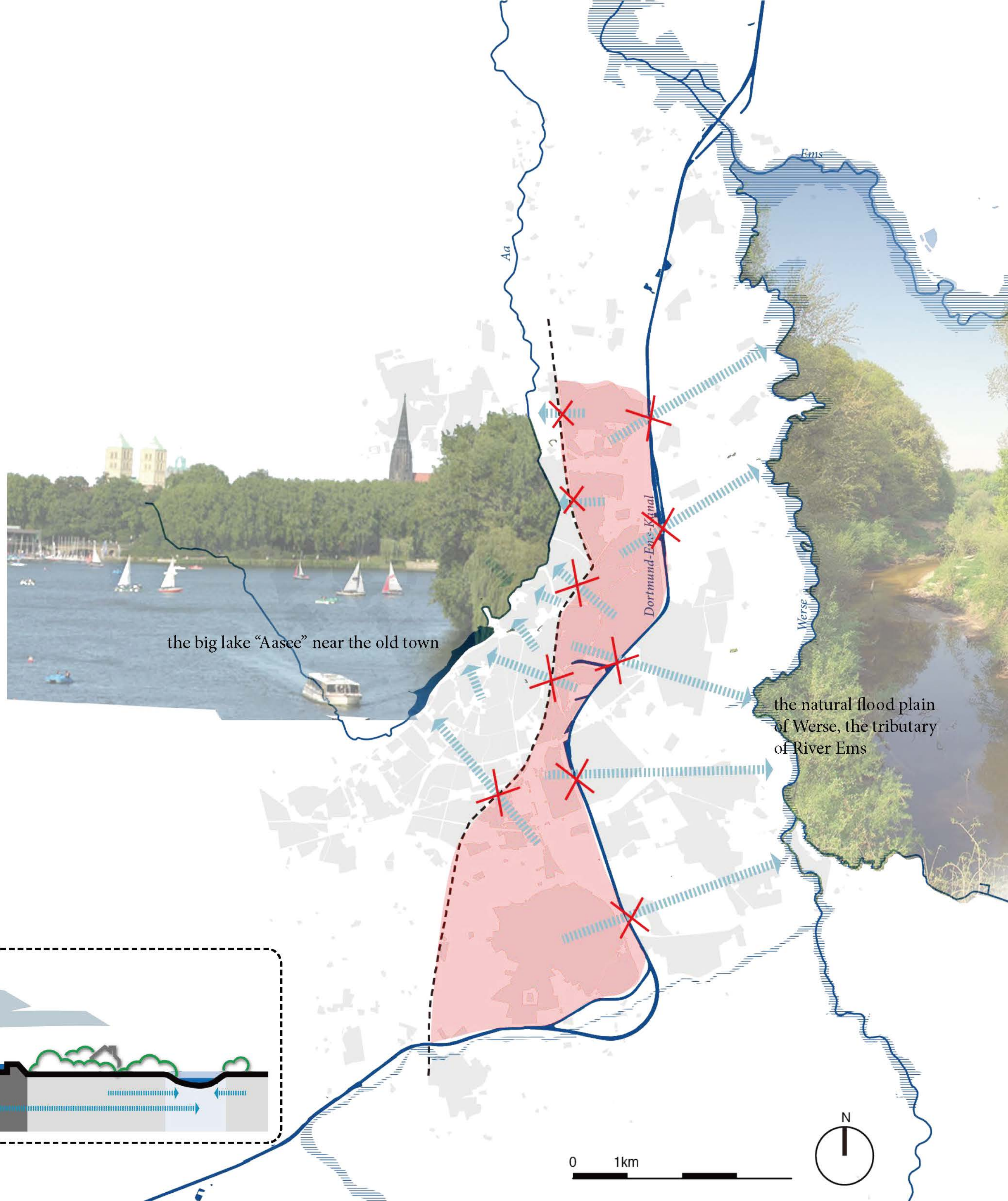
Streets around St.-Paulus-Dom were flooded in 1946, photo from Municipal Archives Münster.

_ The three main waterways

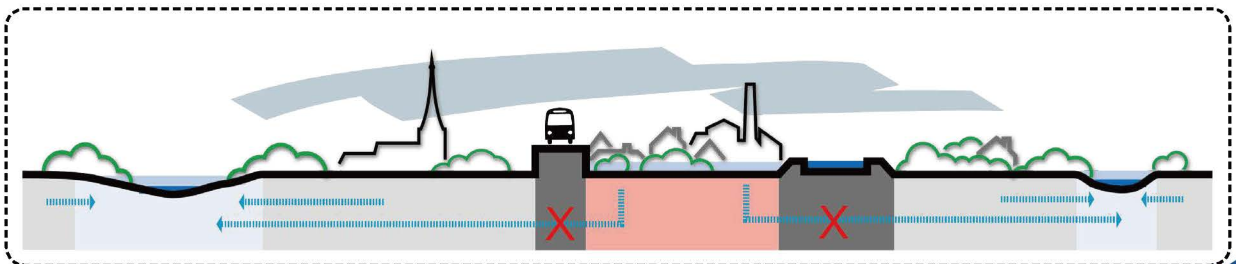
One of the city's three water bodies, brook Münstersche Aa in the west was deepened and widened near the inner town to accept the redundant rain water. Werse goes through the east natural and rural area and on north joins Ems. Around the stream and its tributaries there is linear riparian floodplain. Last, the artificial canal is seperated with the natural water system.

_ Problem

Together with the railway going through north and south, the canal is preventing the rainwater flow to either the Aasee on the west or the riparian floodplain on the east. Between the two infrastructures the urban area is like a basin, and the port zone is the bottleneck.

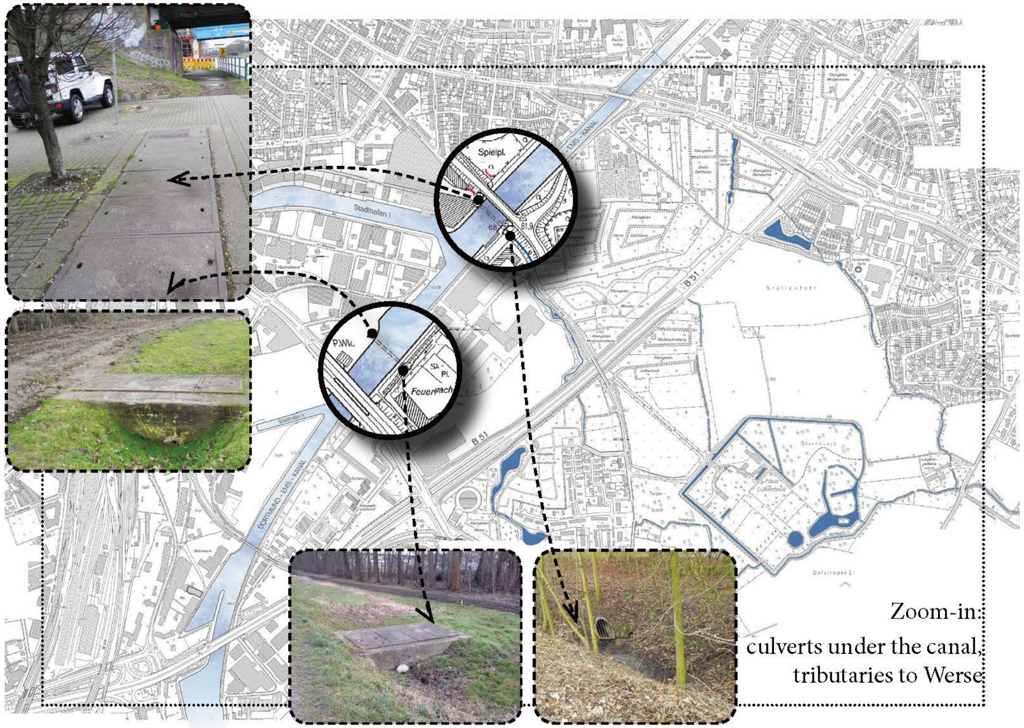


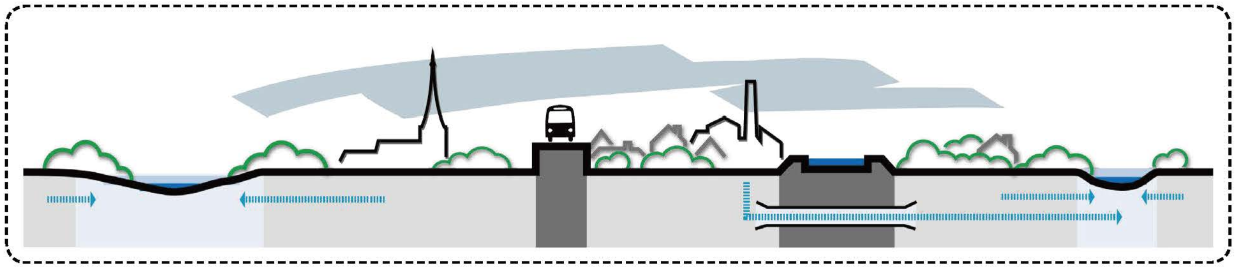
The port area in the ever biggest thunderstorm on July 28, 2014.

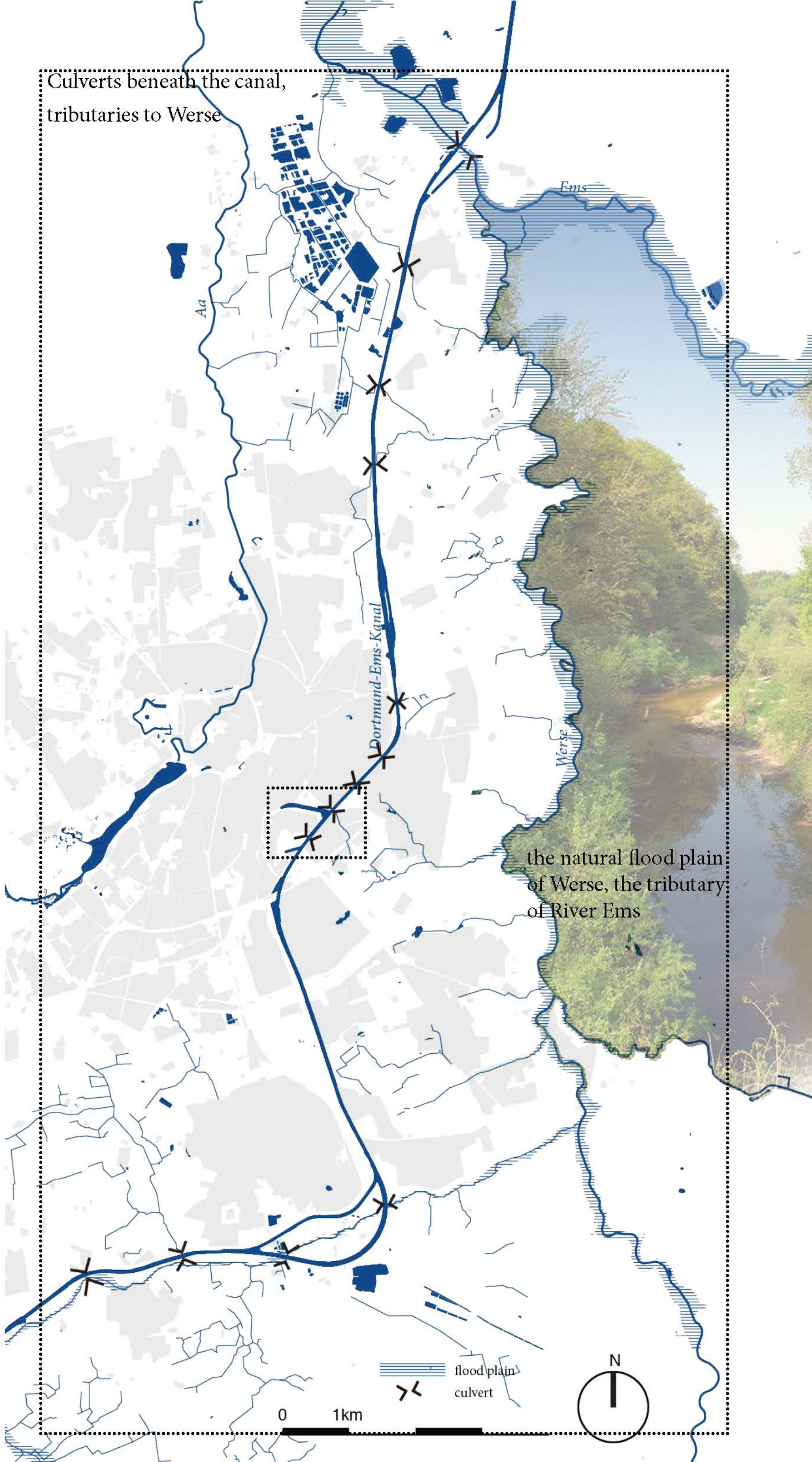


_ Opportunity

The culvert beneath the canal is intending to connect the urban drainage system with the natural streams. Obviously it is an opportunity to discharge surface water from urban to natural system.





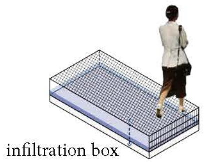


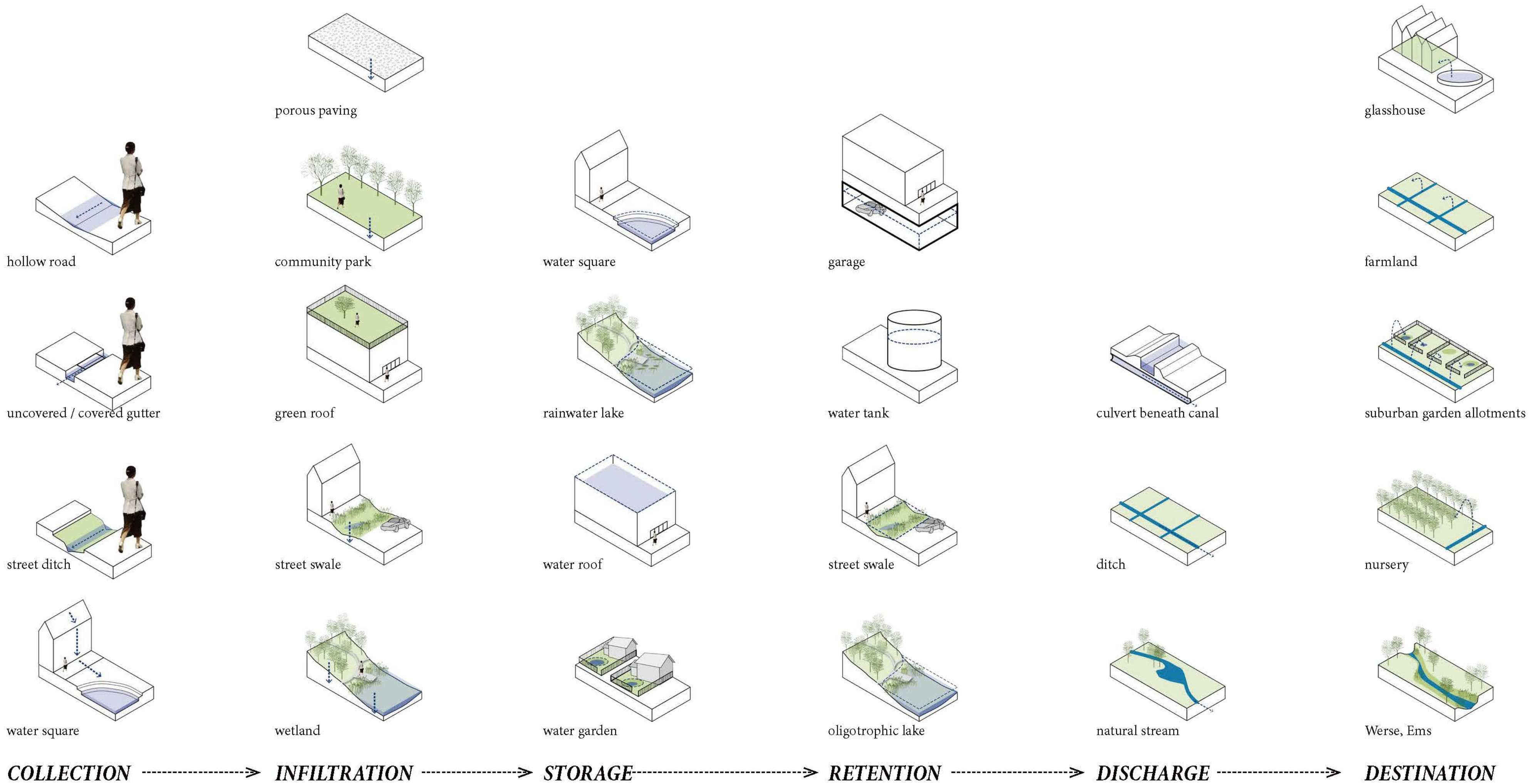
_ Principles

To collect surface water,
to let the water infiltrate locally as much as possible,
to store proper amount of water for dry season,
to leave retention spaces in case of a thunderstorm,
to discharge redundant rainwater from city,
to let the water get to landscape.

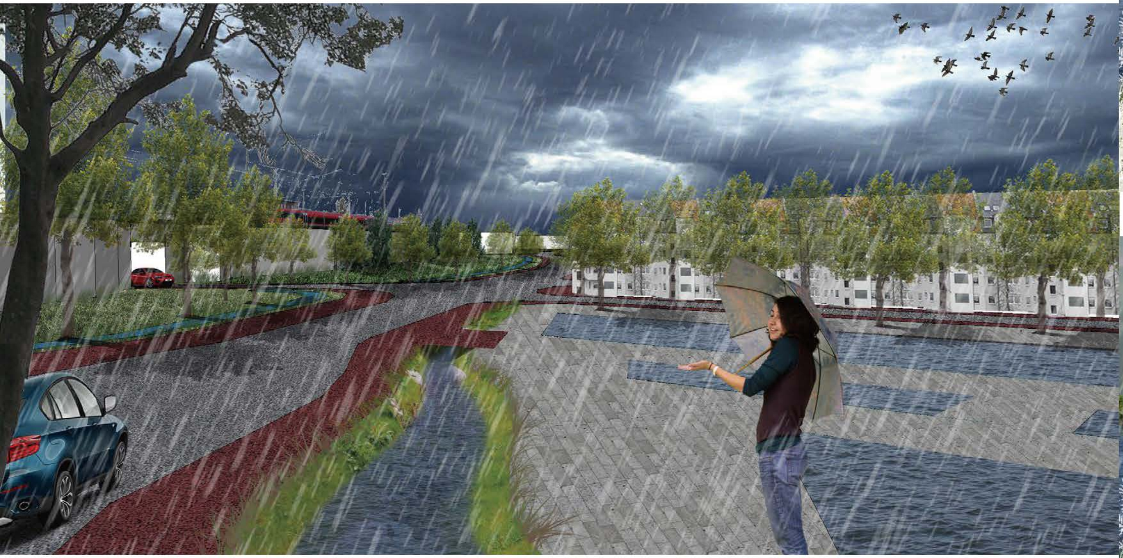
_ Application

To design a climatic water discharge process of above steps





Parkway, swale, water square in dry season.



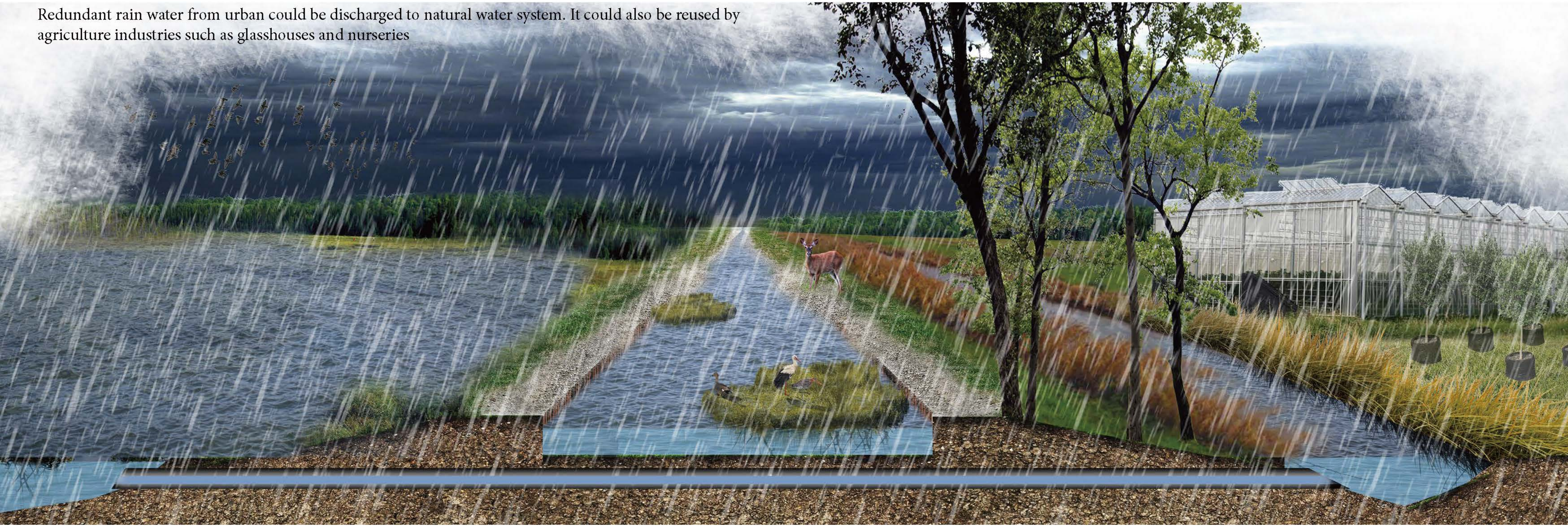
Parkway, swale, water square can store the seasonal rainwater. And the water can also infiltrate through soft surface.

The wetland in dry season.

The rainwater lakes could store seasonal rainwater.

Some other oligotropgic lakes (seprated with rainwater lakes in normal time), could also contain the redundant rainwater if there is a thunderstorm.

Redundant rain water from urban could be discharged to natural water system. It could also be reused by agriculture industries such as glasshouses and nurseries




collection
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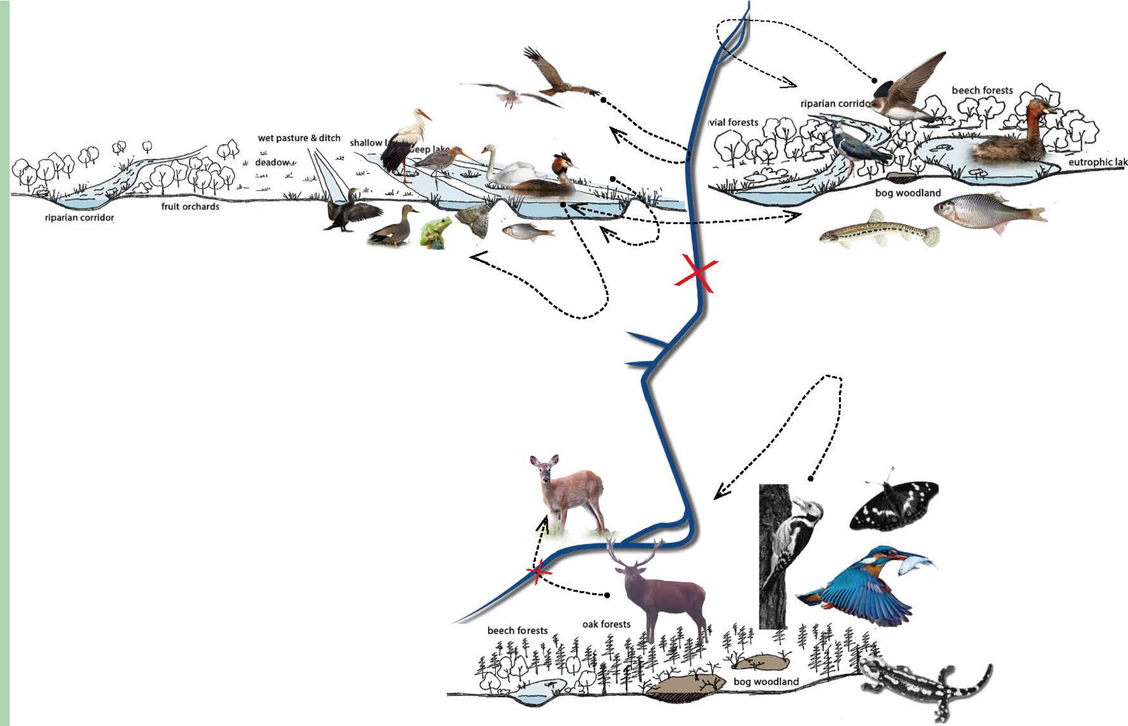
HABITAT

A crucial section of natural habitat circuitry



_ Low circuitry between existing habitats

There are three main habitats along DEK: the Ems riparian, Rieselfelder (a water bird sanctuary) and Davert (oak-hornbeam forests, acidophilous oak woods & Luzulo-Fagetum beech forest). Because the artificial canal is almost cutting off all the natural water system on two sides, the circuitry along and across it is limited.

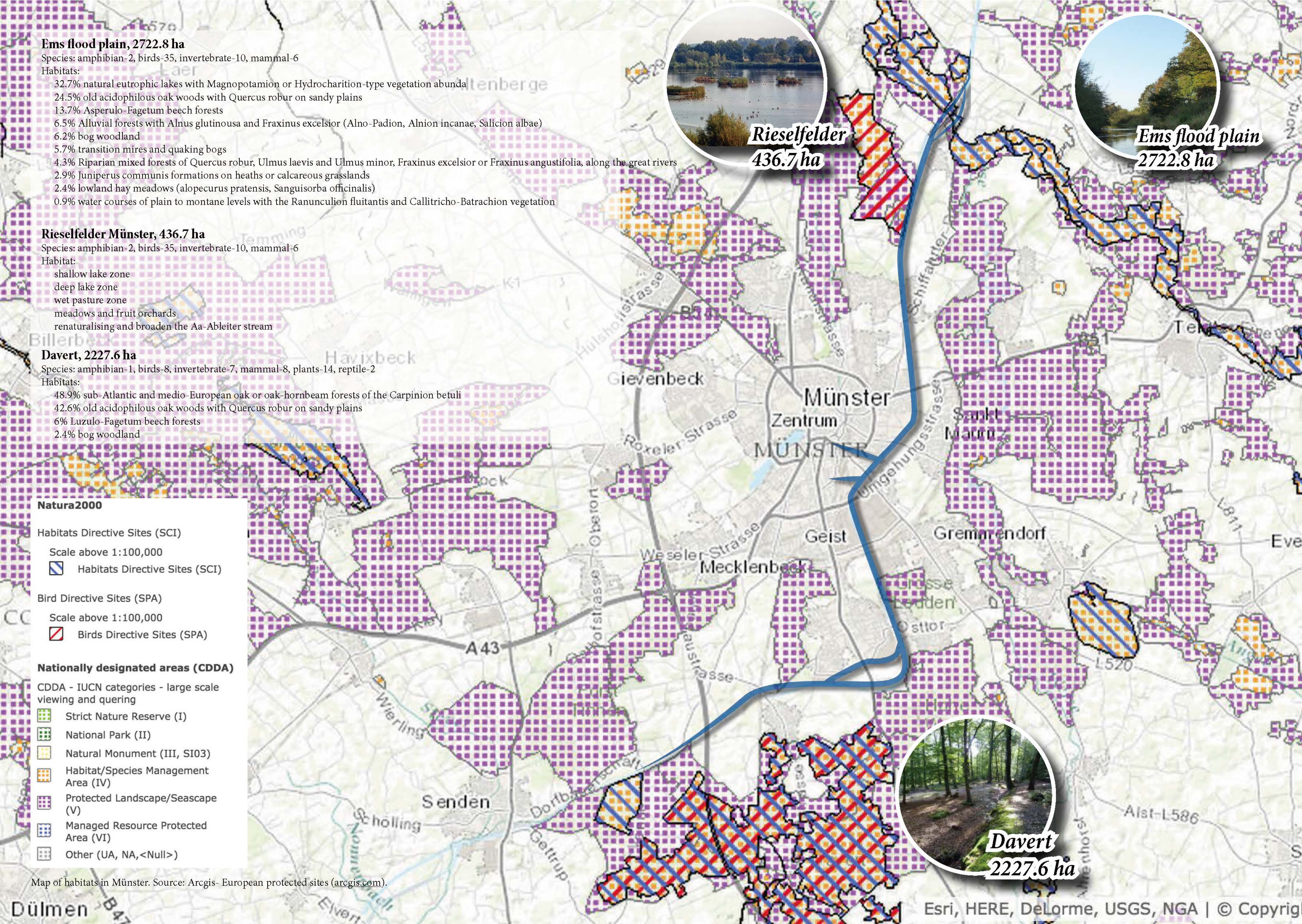
For example, Roeselfelder, the remarkable sanctuary of waterbirds, is totally seperated from the riparian corridor on the east. The Ems riparian has weak point when crossing the canal.


DEK goes over Ems by the new and old aqueduct.

Ems flood plain, 2722.8 ha
Species: amphibian-2, birds-35, invertebrate-10, mammal-6
Habitats:
- 32.7% natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation abunda
- 24.5% old acidophilous oak woods with Quercus robur on sandy plains
- 13.7% Asperulo-Fagetum beech forests
- 6.5% Alluvial forests with Alnus glutinousa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)
- 6.2% bog woodland
- 5.7% transition mires and quaking bogs
- 4.3% Riparian mixed forests of Quercus robur, Ulmus laevis and Ulmus minor, Fraxinus excelsior or Fraxinus angustifolia, along the great rivers
- 2.9% Juniperus communis formations on heaths or calcareous grasslands
- 2.4% lowland hay meadows (alopecurus pratensis, Sanguisorba officinalis)
- 0.9% water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation

Rieselfelder Münster, 436.7 ha
Species: amphibian-2, birds-35, invertebrate-10, mammal-6
Habitat:
- shallow lake zone
- deep lake zone
- wet pasture zone
- meadows and fruit orchards
- renaturalising and broaden the Aa-Ableiter stream

Davert, 2227.6 ha
Species: amphibian-1, birds-8, invertebrate-7, mammal-8, plants-14, reptile-2
Habitats:
- 48.9% sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli
- 42.6% old acidophilous oak woods with Quercus robur on sandy plains
- 6% Luzulo-Fagetum beech forests
- 2.4% bog woodland

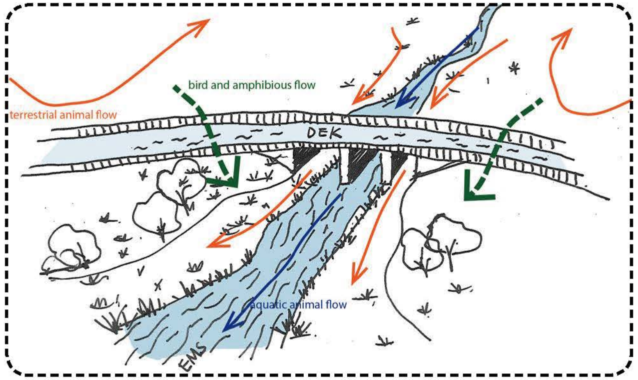


Map of habitats in Münster. Source: Arcgis- European protected sites (arcgis.com).

_ Opportunities

As the third main waterway of Münster, the canal has the potential to become a habitat corridor for the protected species, such as birds, fishes and mammals.

The culverts beneath the canal could also developed as fauna passage (for aquatic and terrestrial animals), to improve the ecological circuitry across canal.



A intentional drawing for fauna passage under the infrastructure. Reference: Landscape ecology principles in landscape architecture and land-use planning. Redrawn by author.

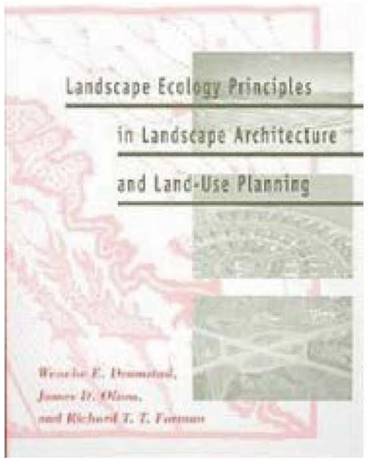
The canal is a new habitat. Photo by author

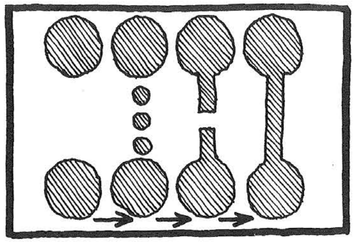
Culverts go beneath the canal. Image from bingmap

_ Habitat steppingstones

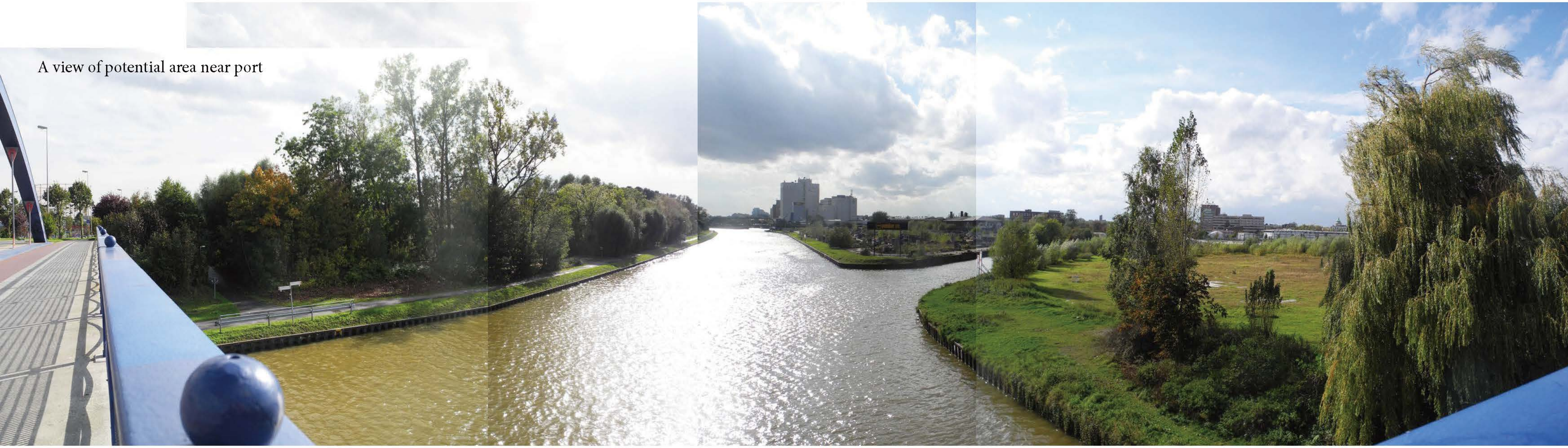
According to Froman, a row of steppingstones (small patches) is intermediate in connectivity between a corridor and no corridor, and hence intermediate in providing for movement of interior species between patches. To convert the canal into a eco-corridor between north & south, habitat stepping stones are necessary.

At the port's city side, there is big area of overgrown fields; on the other side are a patch of woods, auburban gardens, nurseries and so on. So it is a potential point as a habitat steppingstone.





Stepping stone connectivity. Source: Landscape ecology principles in landscape architecture and land-use planning.



A view of potential area near port

A perspective collage of future habitat steppingstone

_ Principles

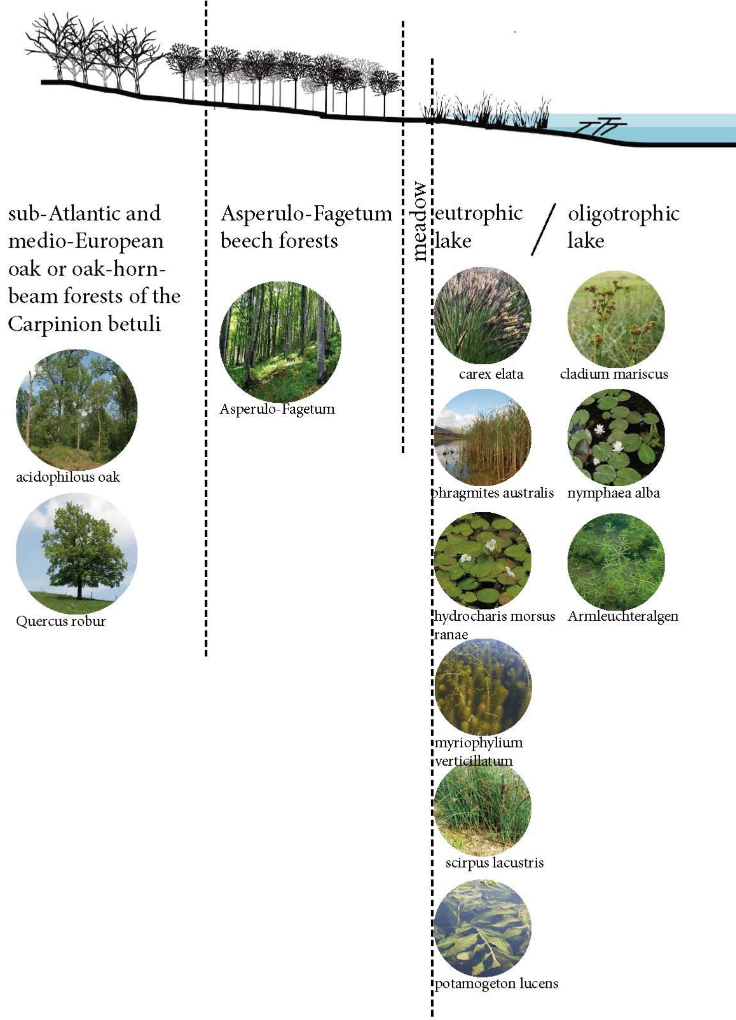
The first principle is to diversify habitat. The intentional living environments are:

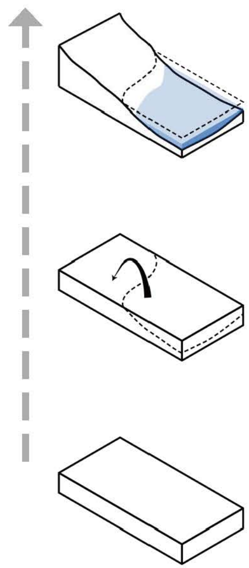
- Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli
- Asperulo-Fagetum beech forests
- Meadow
- Eutrophic lake
- Oligotrophic lake
- Floating wetland

The other principle is to connect habitats seperated by canal:

- Fauna exist for big mammals
- Culvert for aquatic animals, small and medium-sized mammals

Different fauna passages. Source: Wildlife and traffic.

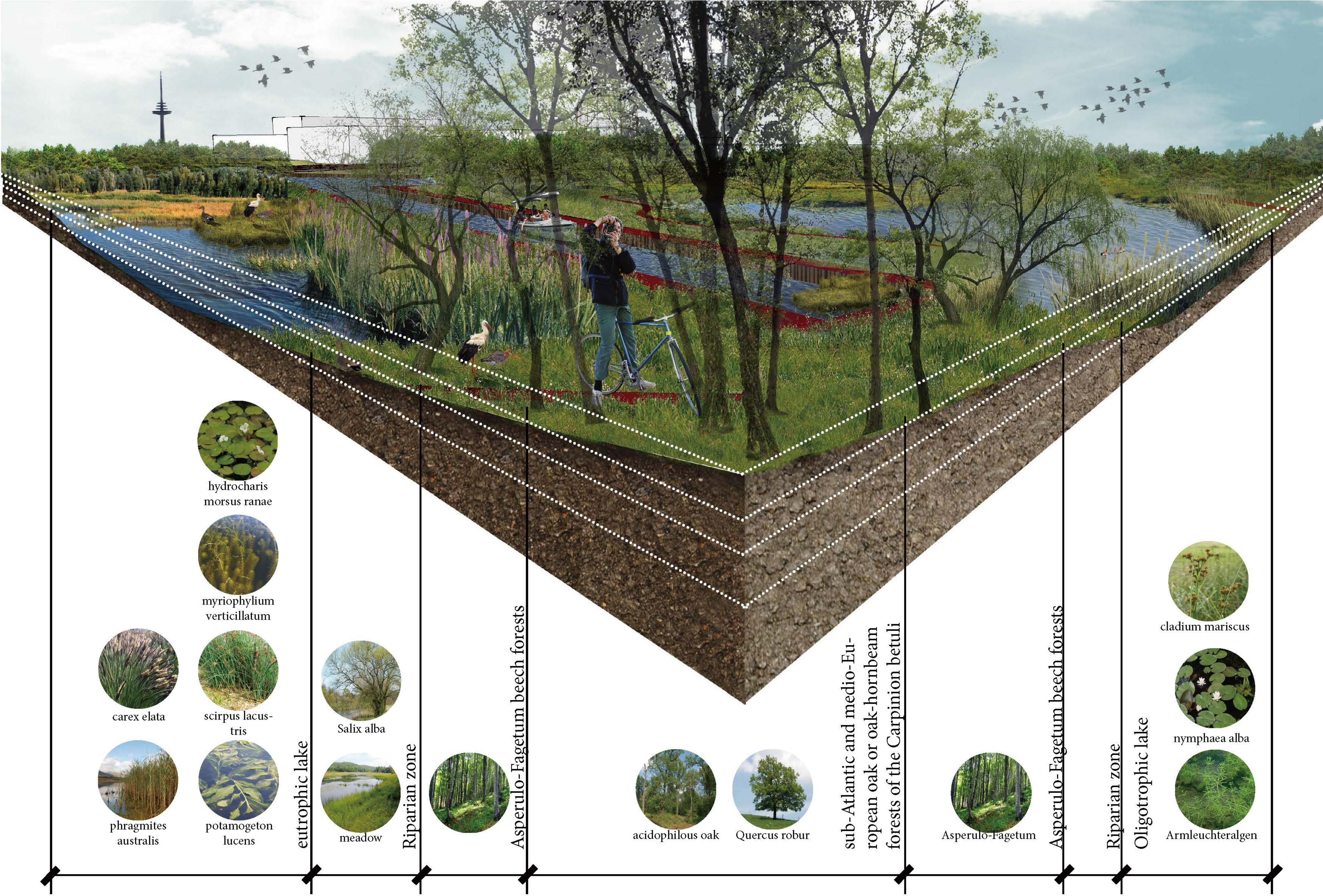




_ Application

At the port there is flat landform now. By cutting the soil from one place and filling it in other, to create topography of various eco-environments. There would be upland, lowland, coast and water zone. On the upland will be oak woods, on the lowland beech forests, along the coast hydrophilic plants and at lowest eutrophic and oligotrophic lakes. The floating wetland is a particular type to naturalize the canal as far as possible.

To restore the connection of habitats on the two sides, there are fauna exists beside canal, and also tunnels under it.

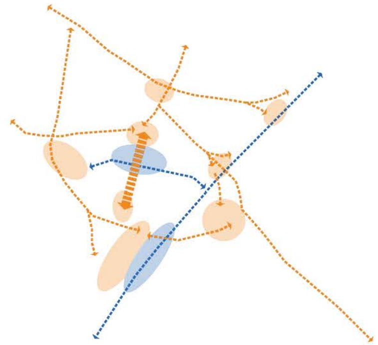

hydrocharis morsus ranae
myriophylium verticillatum
carex elata
scirpus lacus-tris
phragmites australis
potamogeton lucens
eutrophic lake
Salix alba
meadow
Riparian zone
Asperulo-Fagetum beech forests
acidophilous oak
Quercus robur
sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli
Asperulo-Fagetum
Asperulo-Fagetum beech forests
Riparian zone
Oligotrophic lake
cladium mariscus
nymphaea alba
Armleuchteralgen

The wildlife passage and mammal exit.

1. rainwater (eutrophic) lake
2. oligotrophic
3. culvert passage
4. mammal exit
5. tunnel for aquatic and territorial animals

SPACE

Serial urban-canal-landscape spaces

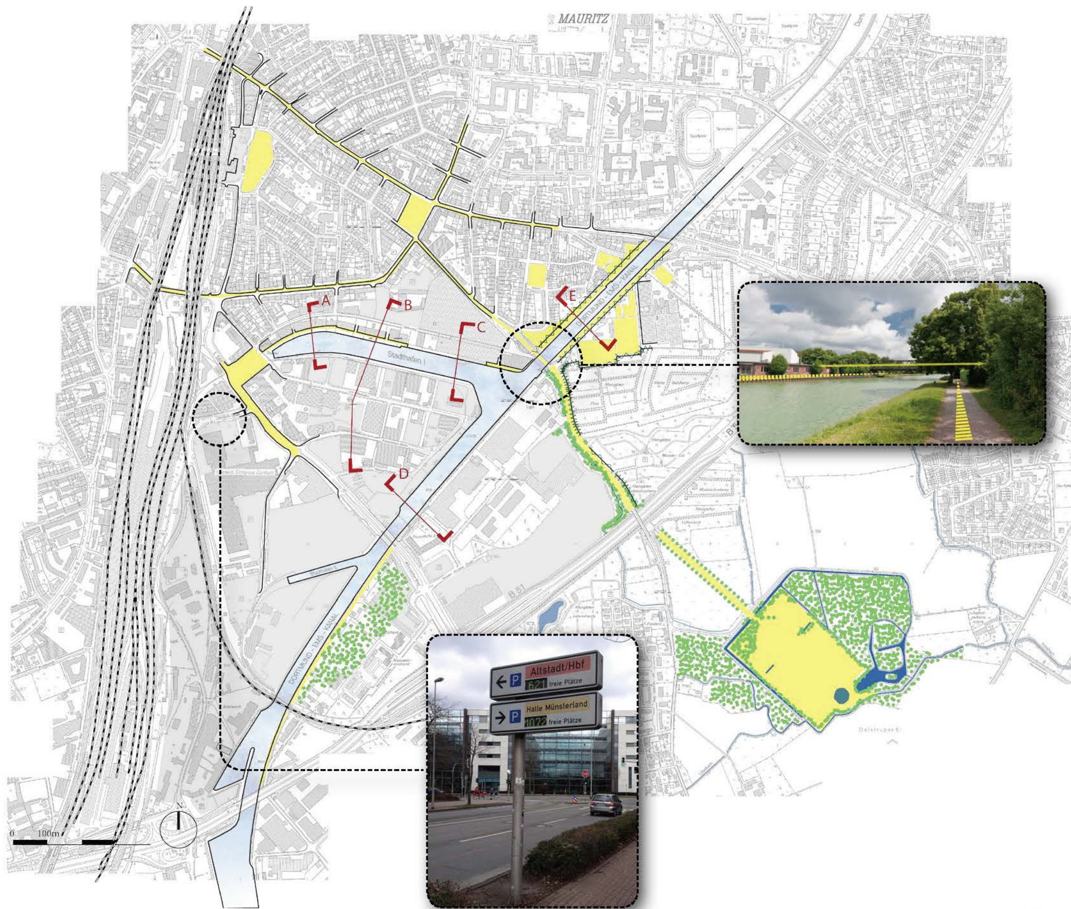


_ The canal is a barrier

The canal could be seen as a barrier through the city. From the space permeability map, we can find that the urban space is going away and over the canal.

_ The canal is the city backyard

Meanwhile, the relevant spaces of canal are isolated and fragmented. Patches of empty lands are temporarily used as parking lots but never sufficiently ocuppied. In the canal sections (Page 42) there are few public spaces.



_ There are spaces in, on and beside the canal.

_ Principles

In order to overcome the barrier and convert the backyard, there are two spatial principles:

To extend the urban & rural spaces to canal.

Path: Street, parkway, arcade, country lane

Node: Park, square, important building, traffic node, landmark

To define and connect the urban space & canal space.

To remove fences, bushes and dense tree rows;

to add canal exit to the nearby green spaces, such as ramps, stairs;

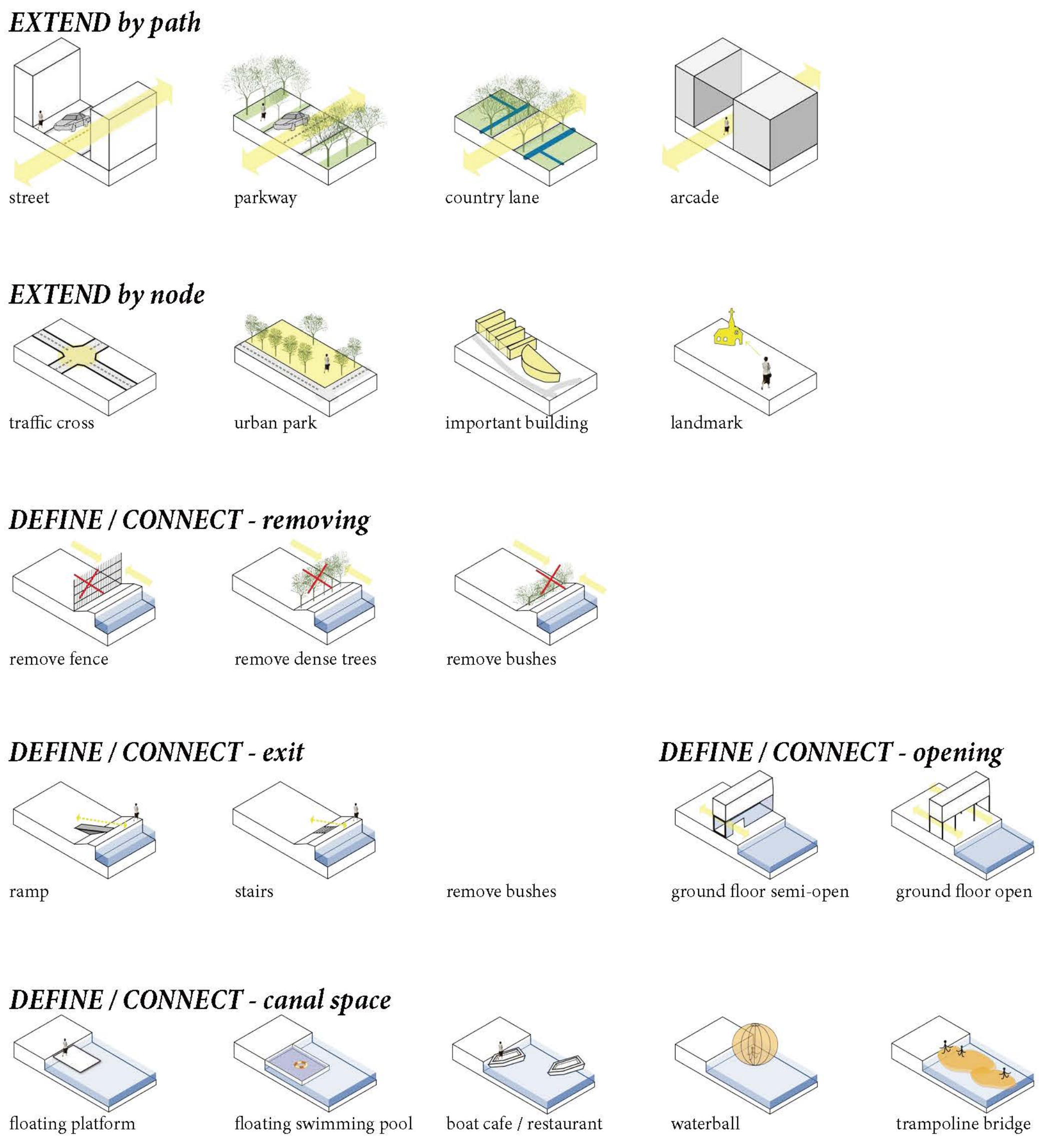
to open/ semi-open the ground floor of buildings: gallery, shop, café, arcade, etc.

(Floating) platform, boat café/restaurant, trampoline bridge, water ball, floating swimming pool

_ Application

Firstly the paths compose a spatial network, extending the city and landscape to the canal. At the junction of paths are nodes, implying important urban spaces.

Then the canal space is opened to surrounding spaces. The canal could be easily accessed from urban spaces such as parks, playgrounds, squares, etc. And canal spaces are developed beside, on and in the water.



Parkways from central railway station and street square lead people to the port.

The existing bush fence seprates canal and urban space.

New canal space is integrated with urban community park.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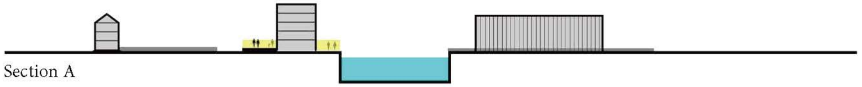
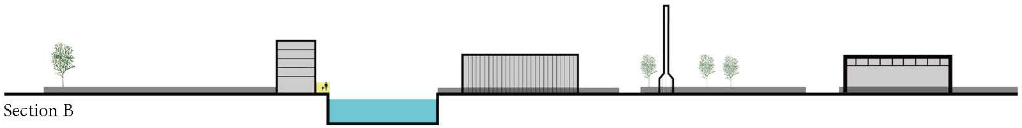

Section A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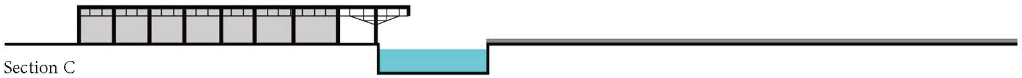
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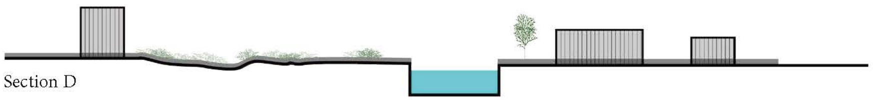
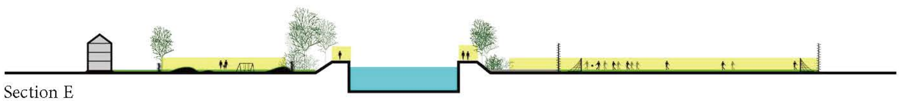
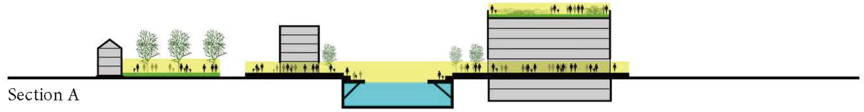

Section D


Section E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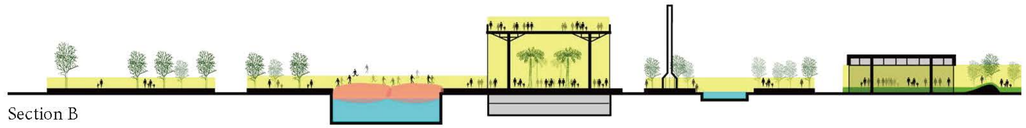
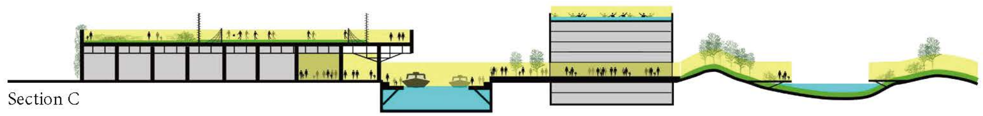
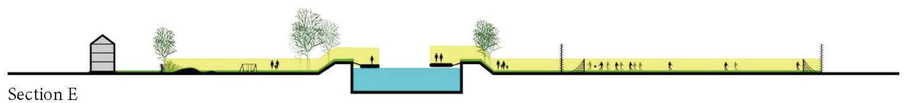

Section B


Section C


Section D


Section E

PROGRAMME

A multi-used urban center

_ The three urban frontiers

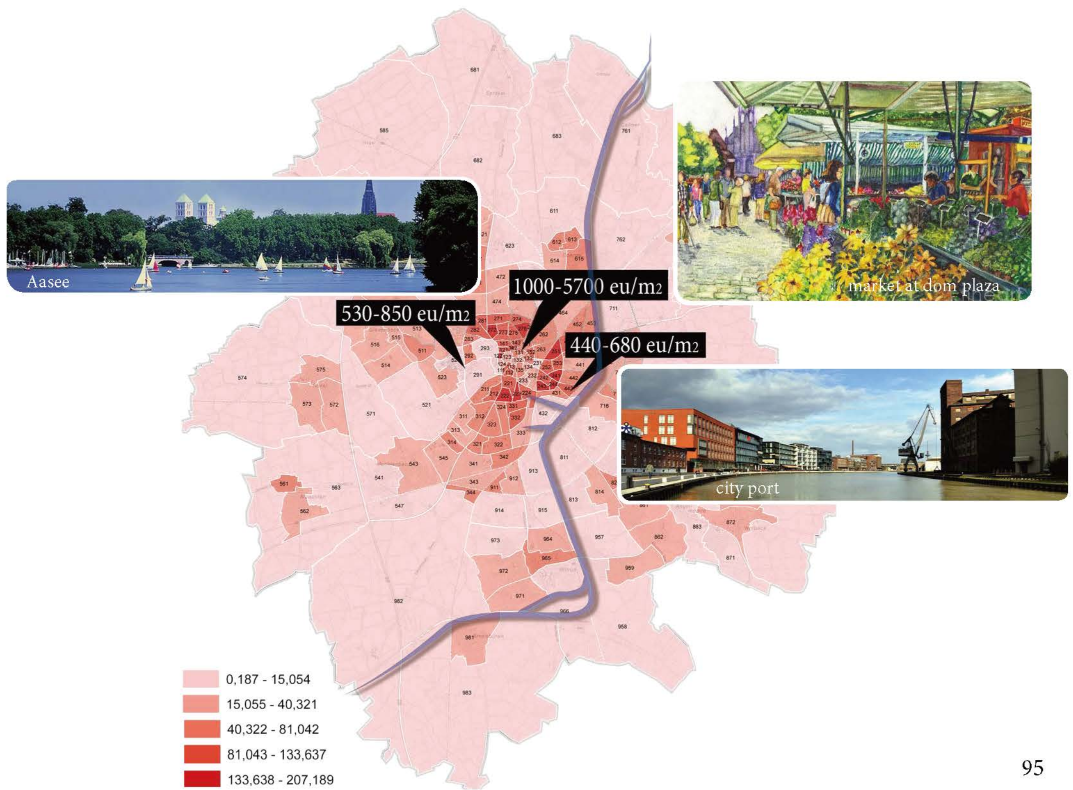
When studying the urban activity map (following page), we can find activities form three urban frontiers. They are the old town, the Aasee, and the port area.

The ***old town*** is now a heritage with many catheduals, houses and fortresses, attracting tourists during the year. It is also the center of citizen's daily shopping and living life. So there is a conflict of people's daily life and tourism. The old town is too crowded.

The lake ***Aasee*** is the best recreation destination for local people in holidays. Besides the lake, there are parks, parkways, zoo, yachting clubs and so on.

The ***port area*** is gradually becoming the city's third urban frontier. Cultural activities take place in some discard industry buildings. New buildings are constructed here, such as cinema, hotel, apartmentbuildings and a congress center. The new city hall is also beside the port.

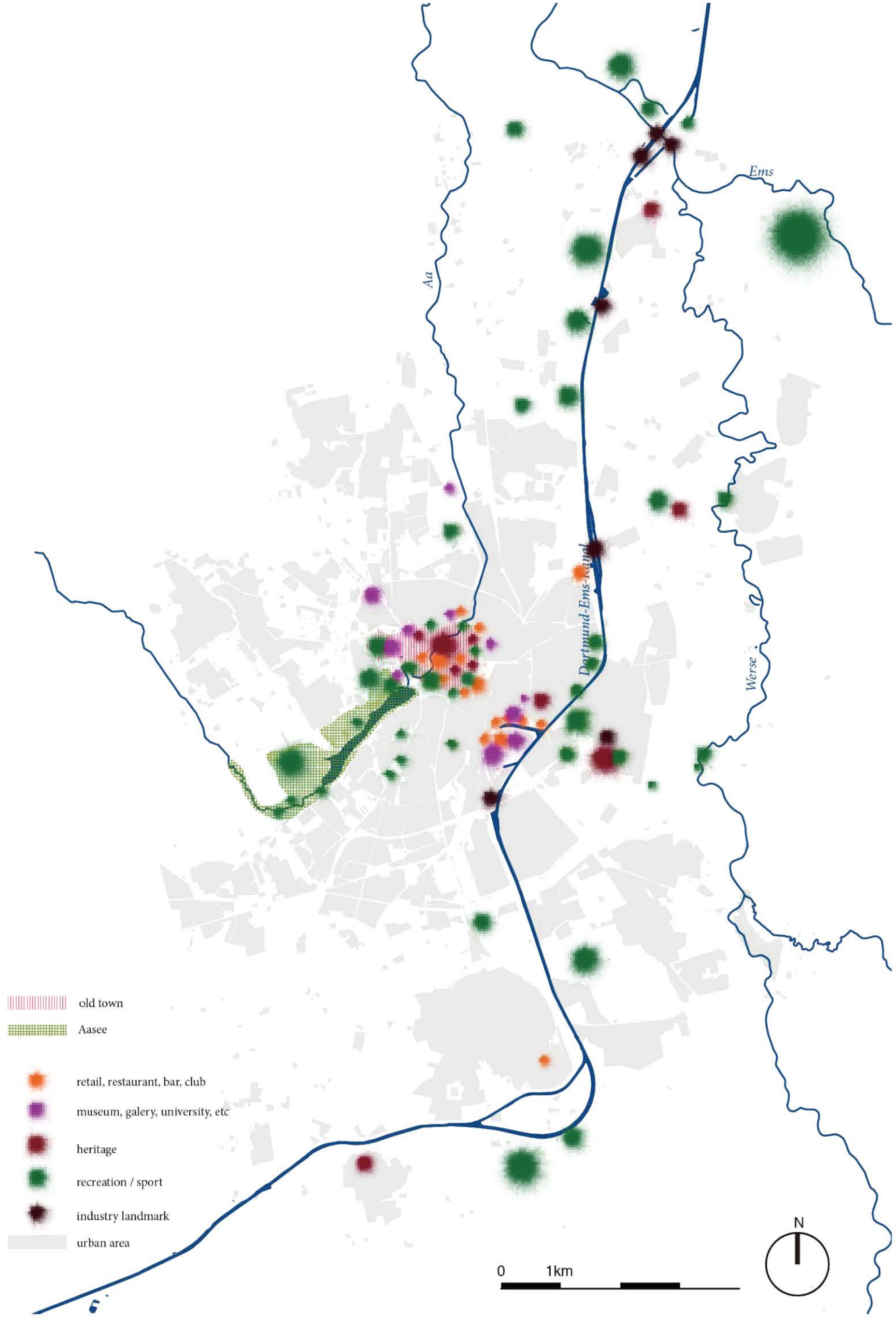
However, the development situations are unbalanced between the three sites. The situation is proved by the population density map. The difference of each area's property price also tells the unbalance.




"OVERWHELMED"


"FINE"


...... ?????


Ems
Aa
Dortmund-Ems-Kanal
Werse
old town
Aasee
retail, restaurant, bar, club
museum, galery, university, etc
heritage
recreation / sport
industry landmark
urban area
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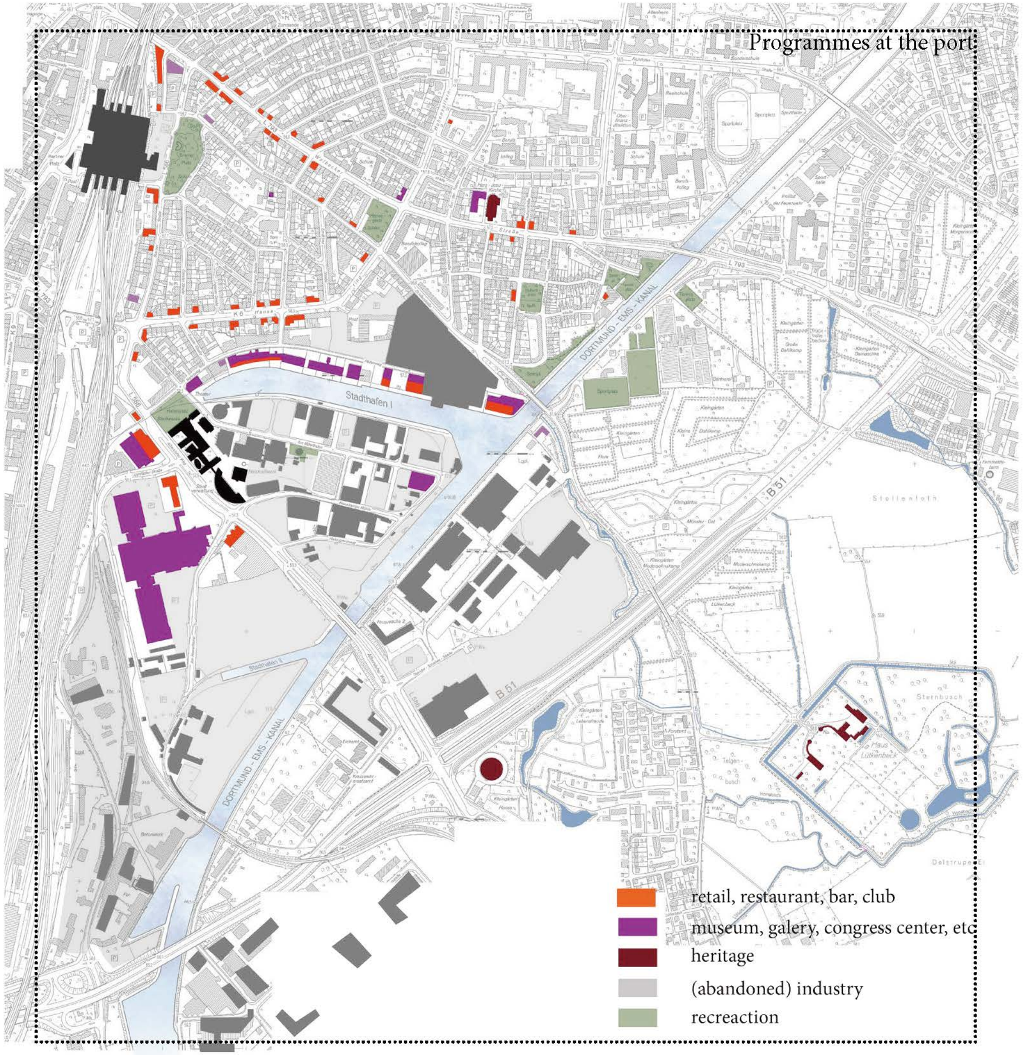
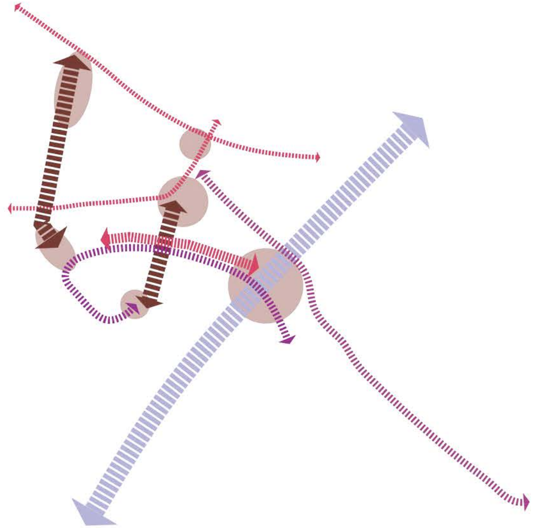


_ Local analysis of city port

Because the cultural activities take place in cheap discard industry buildings, they are fragmented and mixed with industrial activities in the map.

Other program in this area is mainly neighborhood retail shops.

This area also lacks of outdoor activities.



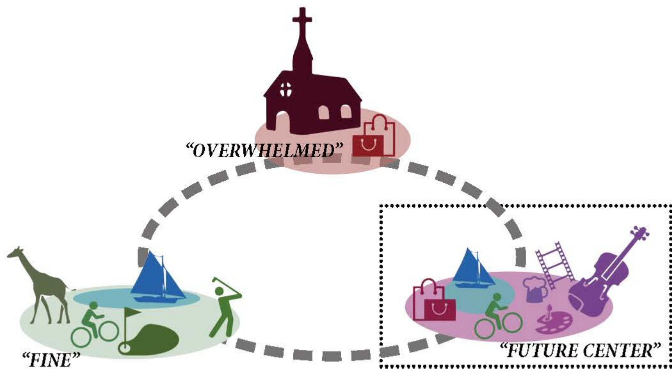
_ Principles

The port's objective is becoming the future center of citizens' modern life. There are principles need to follow:

Cultural potential is promoted.
Commercial program is also developed at the port, to distract the load of old town.
Recreation programs are also necessary to increase the area's competitiveness in the whole city's development.
Business & industry programs are constricted in particular place.

_ Application

The program corridors integrate the port into the citizen's social life.



The port would be citizen's new destination of shopping, culture and recreation programmes.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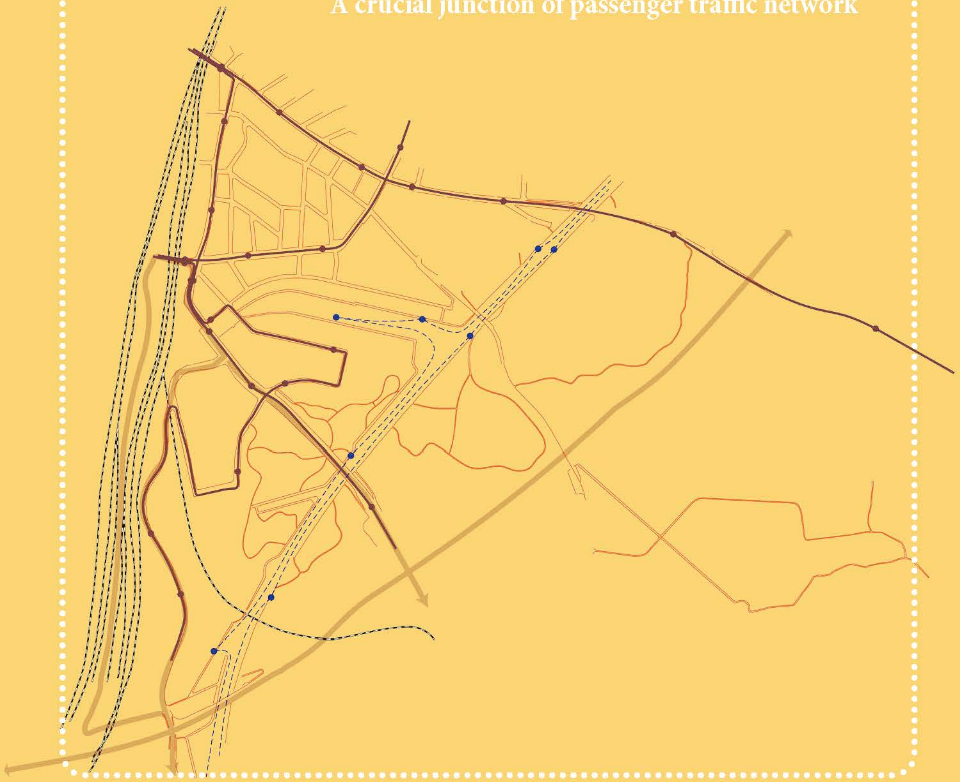
TRAFFIC

A crucial junction of passenger traffic network



_ The port is no longer the logistics center

Because of the industrial structure adjustment, the thriving railway and highway transport and other changes over time, the narrow early industrial canal, Dortmund-Ems-Canal is no longer in use. As a consquence, rather than the city port, the present logistic center is at the crossing junction of the railway and highway #43 (here is the load and unload railway station of cargoes).

Locally the existing industry and routing are too many and dispersed. Although close to the central station, this area's passenger traffic is problematic. The existing bicycle path is fragmented, and not permeable enough. The existing busline is also not permeable.

_ The future hub of passenger traffic

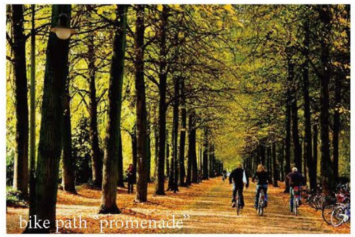
To integrated into the city's traffic network, the post-industrial area has to develop passenger traffic network. And there are three opportunities that promise it becoming the future hub of passenger traffic:

The port is next to the central railway station.

Münster is developing its "bicycle capital" designation. So there are bicycle pathes, the most famous one called "promenade" around the old town. There are also bike renting and parking stations around (biggest at the railway station).

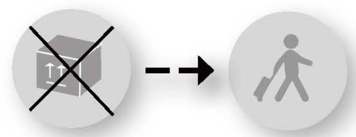
There is a short waterbus routing on the lake of Aasee for tourism and recreation. It could be applied on the canal.

bike renting & parking near railway station

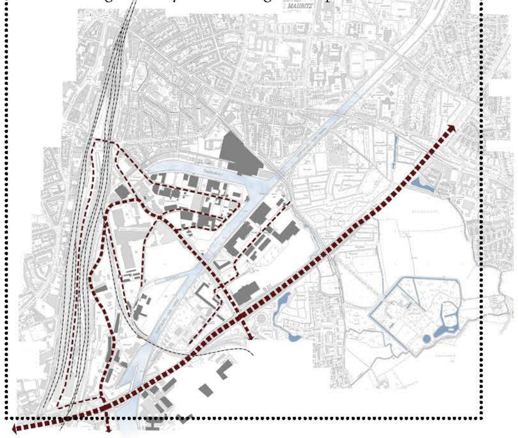


bike path "promenade"

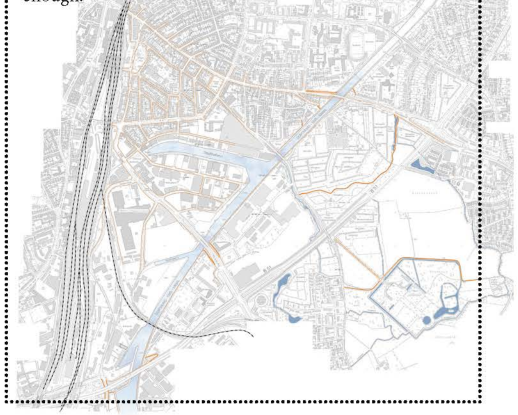
waterbus on Aasee



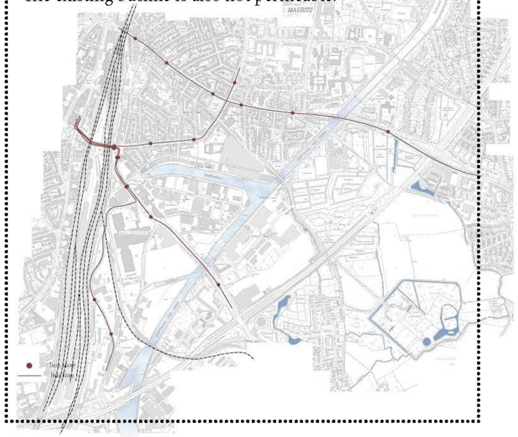
The existing industry and routing are dispersed.

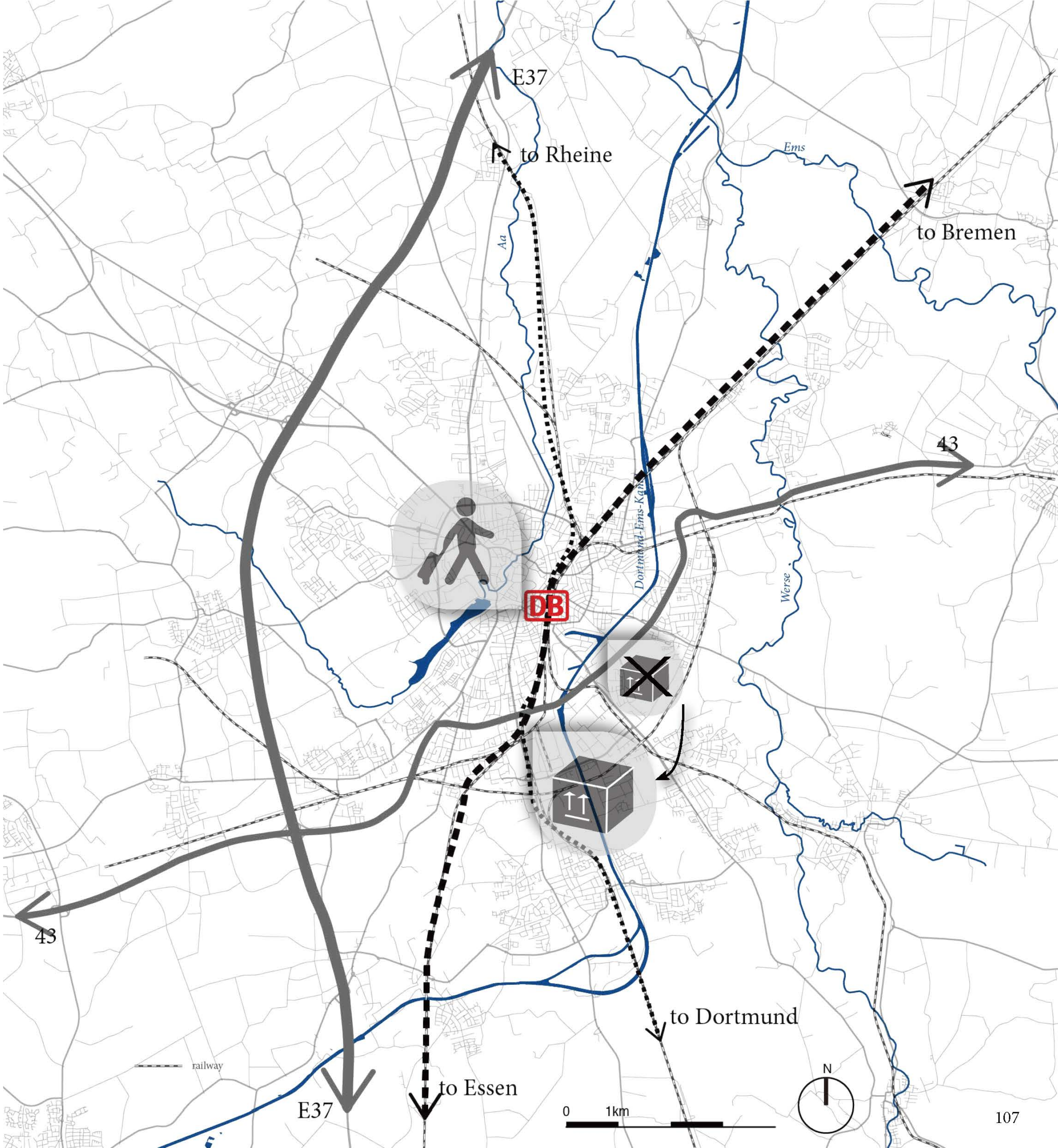


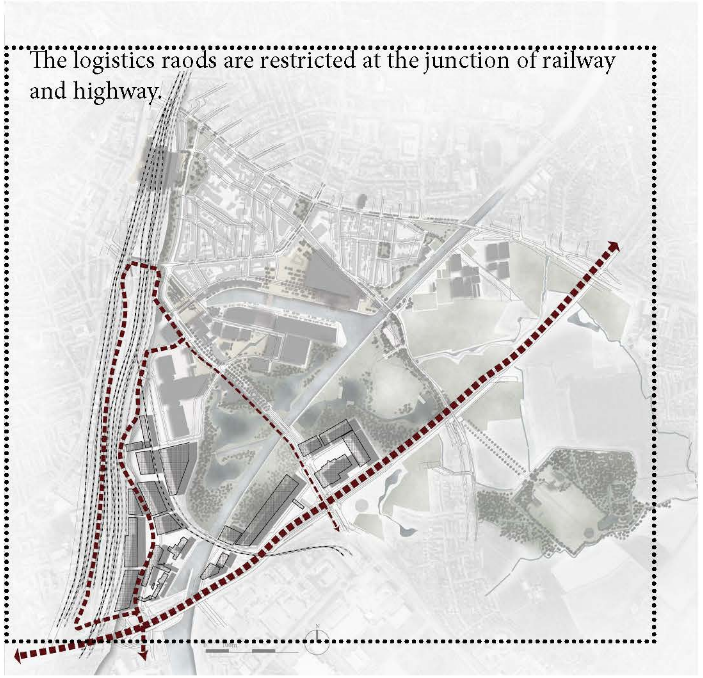
The existing bicycle path is fragmented, and not permeable enough.

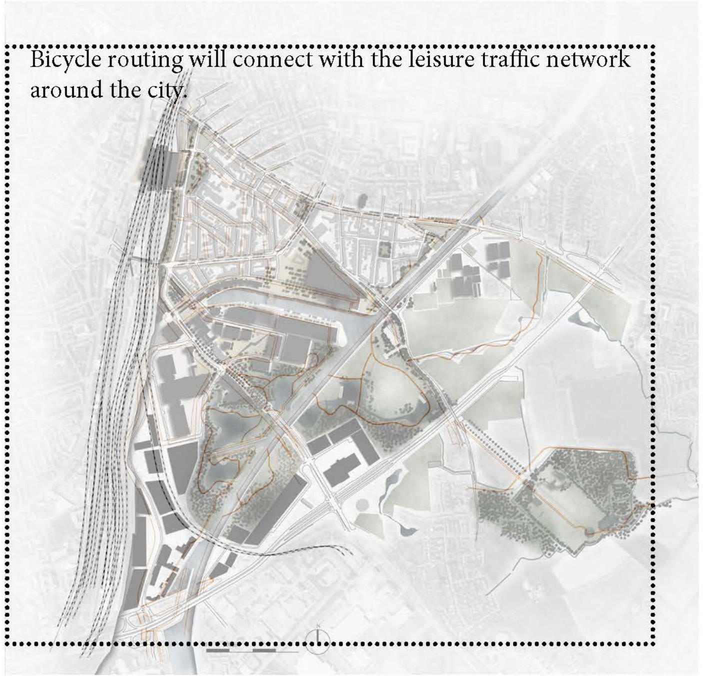


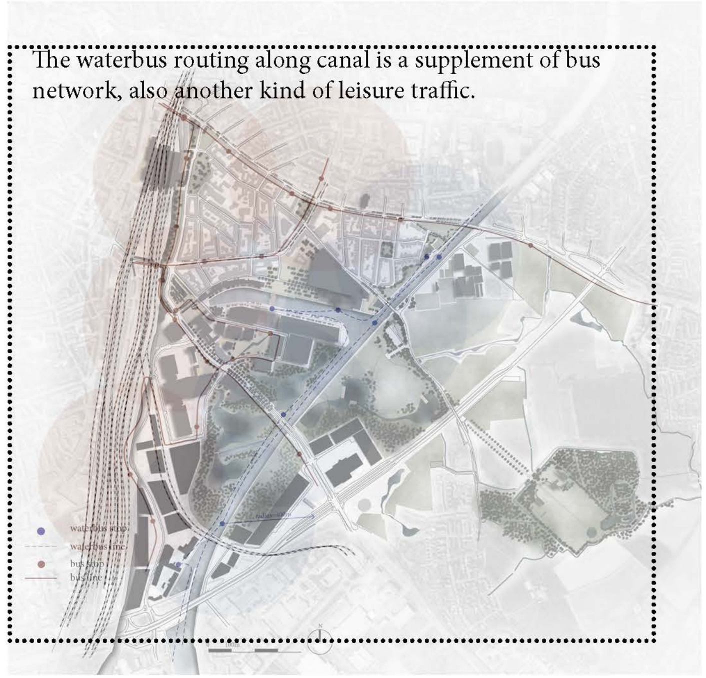
The existing busline is also not permeable.











_ Principles

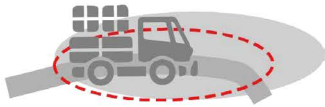
To decrease the freight transport;
to complete the bicycle path;
to add waterbus as a means of public traffic.

_ Application

The logistics roads are restricted at the junction of railway and highway.

Bicycle routing will connect with the bicycle path network around the city (map in next charpter).

The waterbus routing along canal is a supplement of bus network, also another kind of leisure traffic.

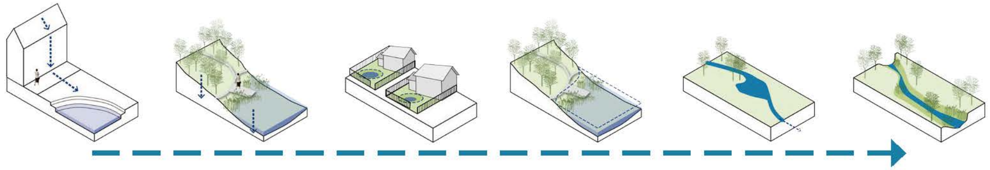



bicycle path
waterbus stop
waterbus line
bus stop
bus line
0 100m
0 100m
N

5.4 Summary of principles

_ Hydrology principles

To collect surface water,
to let the water infiltrate locally as much as possible,
to store proper amount of water for dry season,
to leave retention spaces in case of a thunderstorm,
to discharge redundant rainwater from city,
to let the water get to landscape.



_ Habitat principles

The first principle is to diversify habitat. The intentional living environments are:

Sub-Atlantic and medio-European oak or oak-horn- beam forests of the Carpinion betuli
Asperulo-Fagetum beech forests
Meadow
Eutrophic lake
Oligotrophic lake
Floating wetland

The other principle is to connect habitats seperated by canal:

Fauna exist for big mammals
Culvert for aquatic animals, small and medium-sized mammals

_ Space principles

In order to overcome the barrier and convert the backyard, there are two spatial principles:

To extend the urban & rural spaces to canal.

Path: Street, parkway, arcade, country lane

Node: Park, square, important building, traffic node, landmark

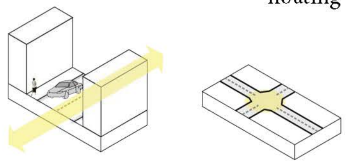
To define and connect the urban space & canal space.

To remove fences, bushes and dense tree rows;

to add canal exit to the nearby green spaces, such as ramps, stairs;

to open/ semi-open the ground floor of buildings: gallery, shop, café, arcade, etc.

(Floating) platform, boat café/restaurant, trampoline bridge, water ball, floating swimming pool



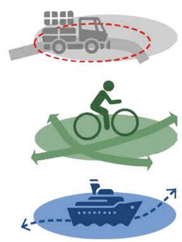
_ Programme principles

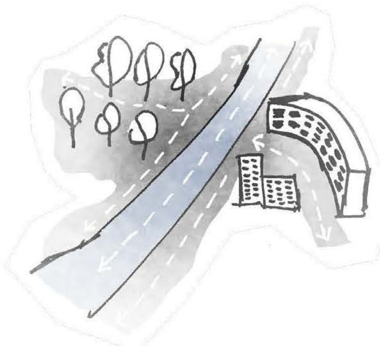
The port's objective is becoming the future center of citizens' modern life. There are principles need to follow:

Cultural potential is promoted.
Commercial program is also developed at the port, to dis-tract the load of old town.
Recreation programs are also necessary to increase the area's competitiveness in the whole city's development.
Business & industry programs are constricted in particular place.

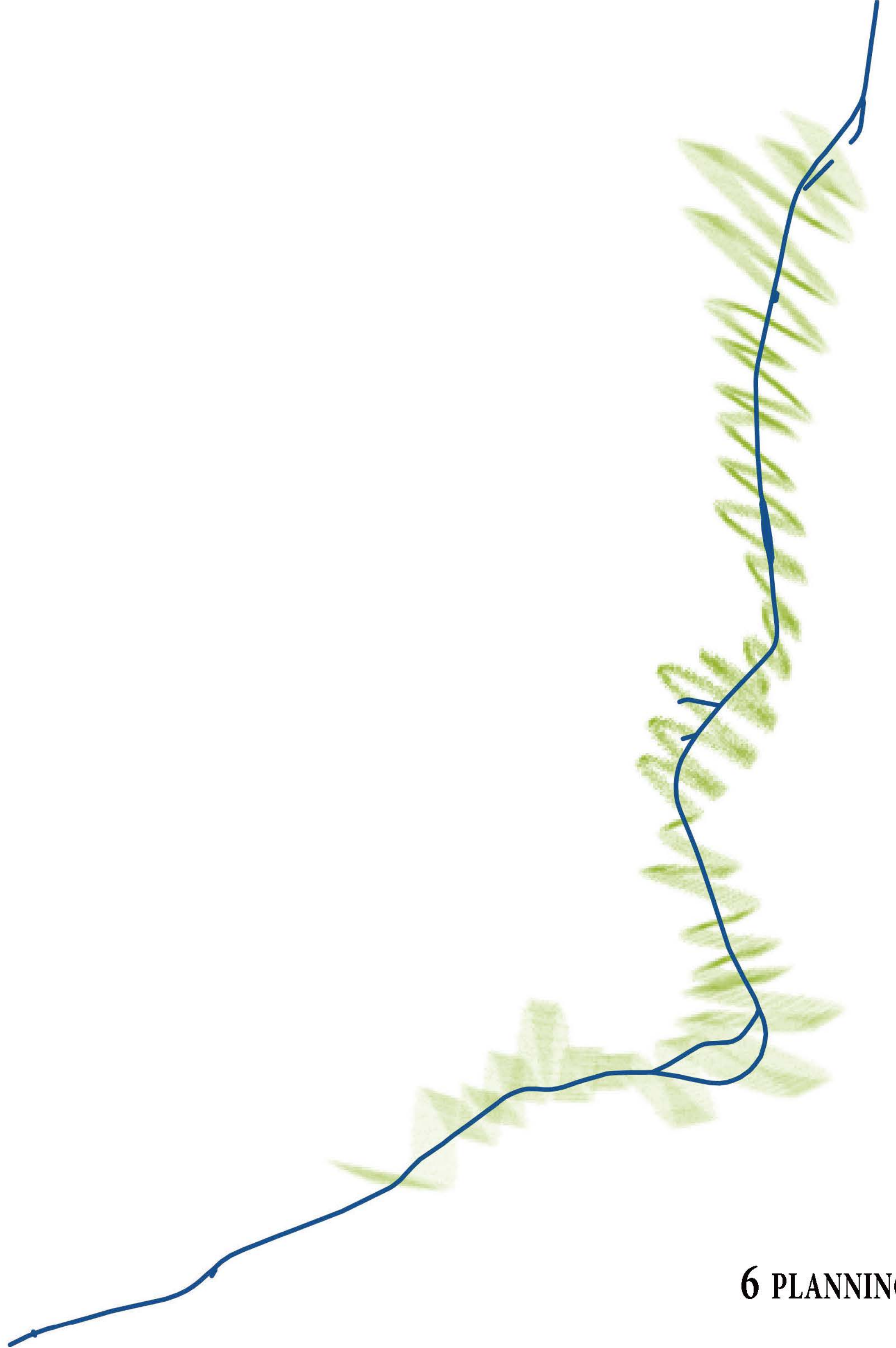
_ Traffic principles

To decrease the freight transport;
to complete the bicycle path;
to add waterbus as a means of public traffic.



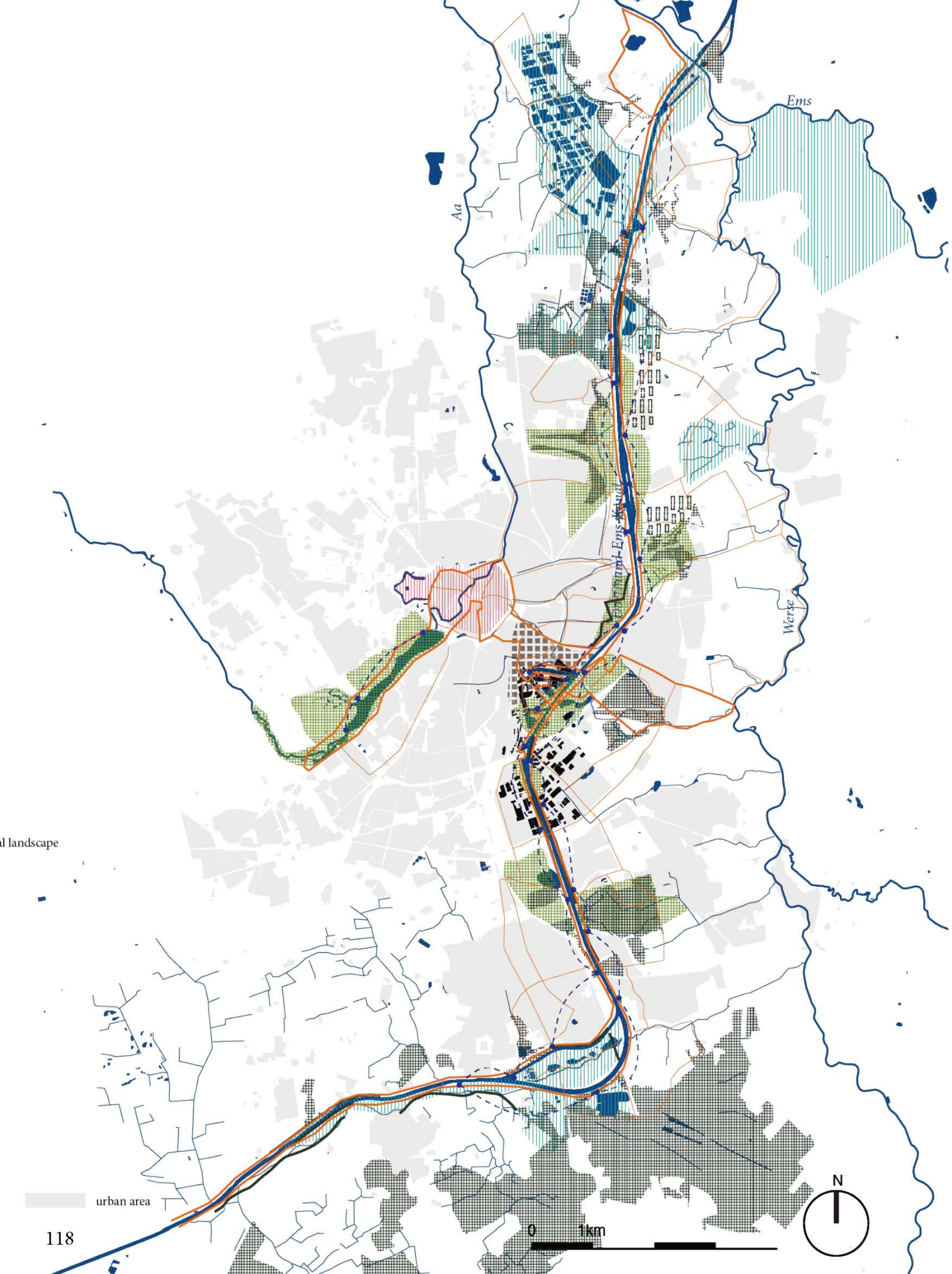



CAFE

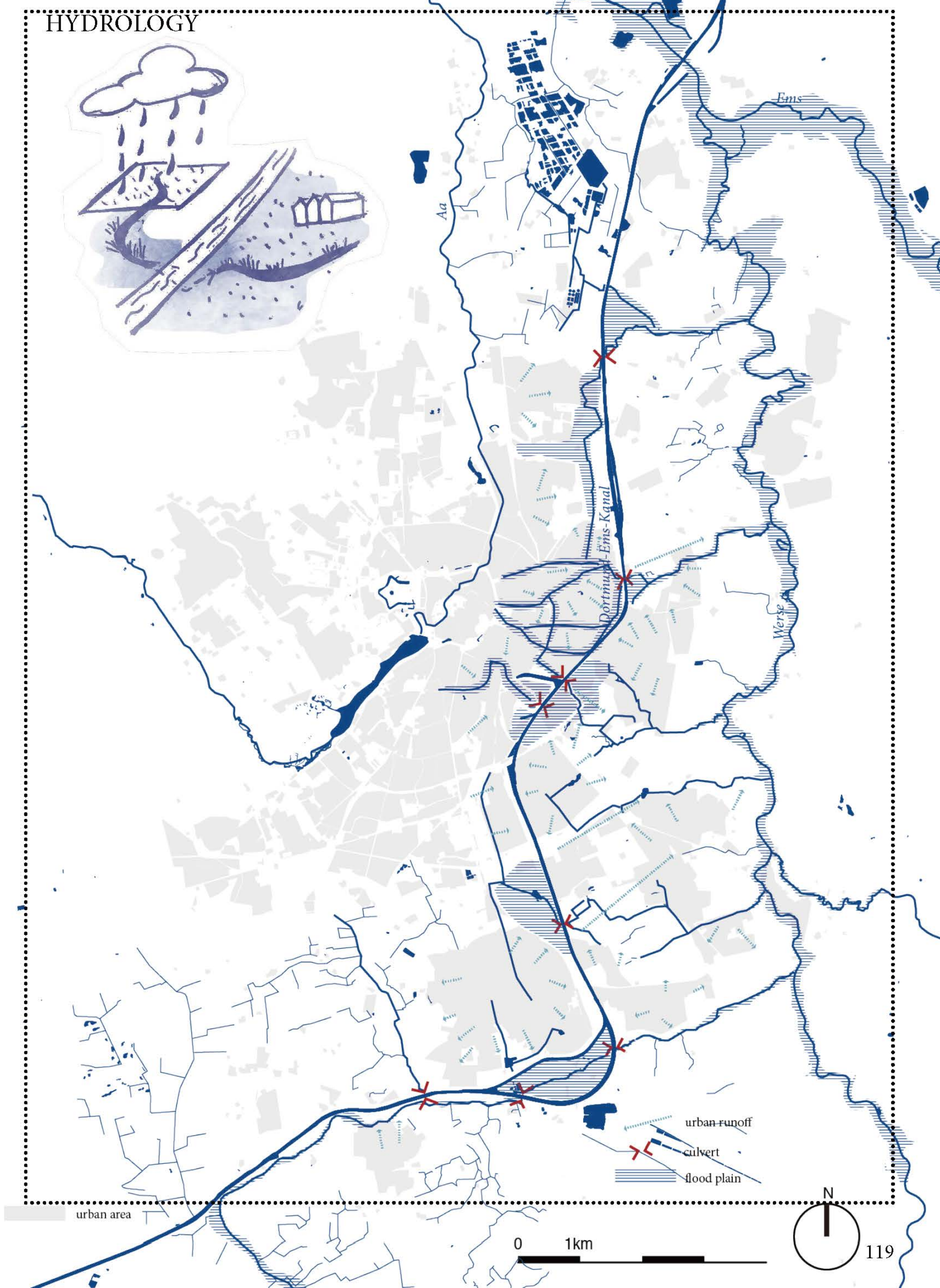


6 PLANNING

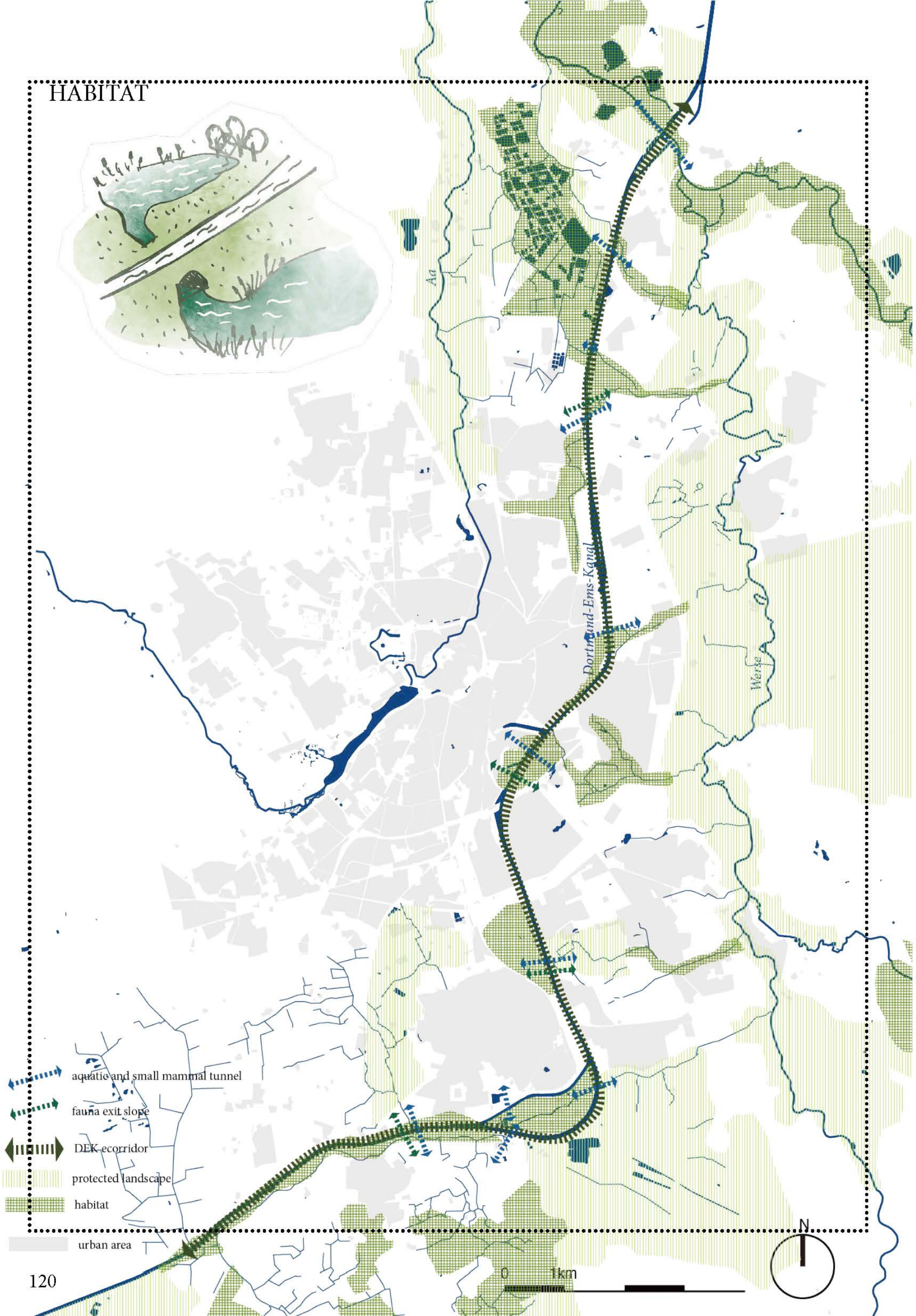
6.1 Master plan



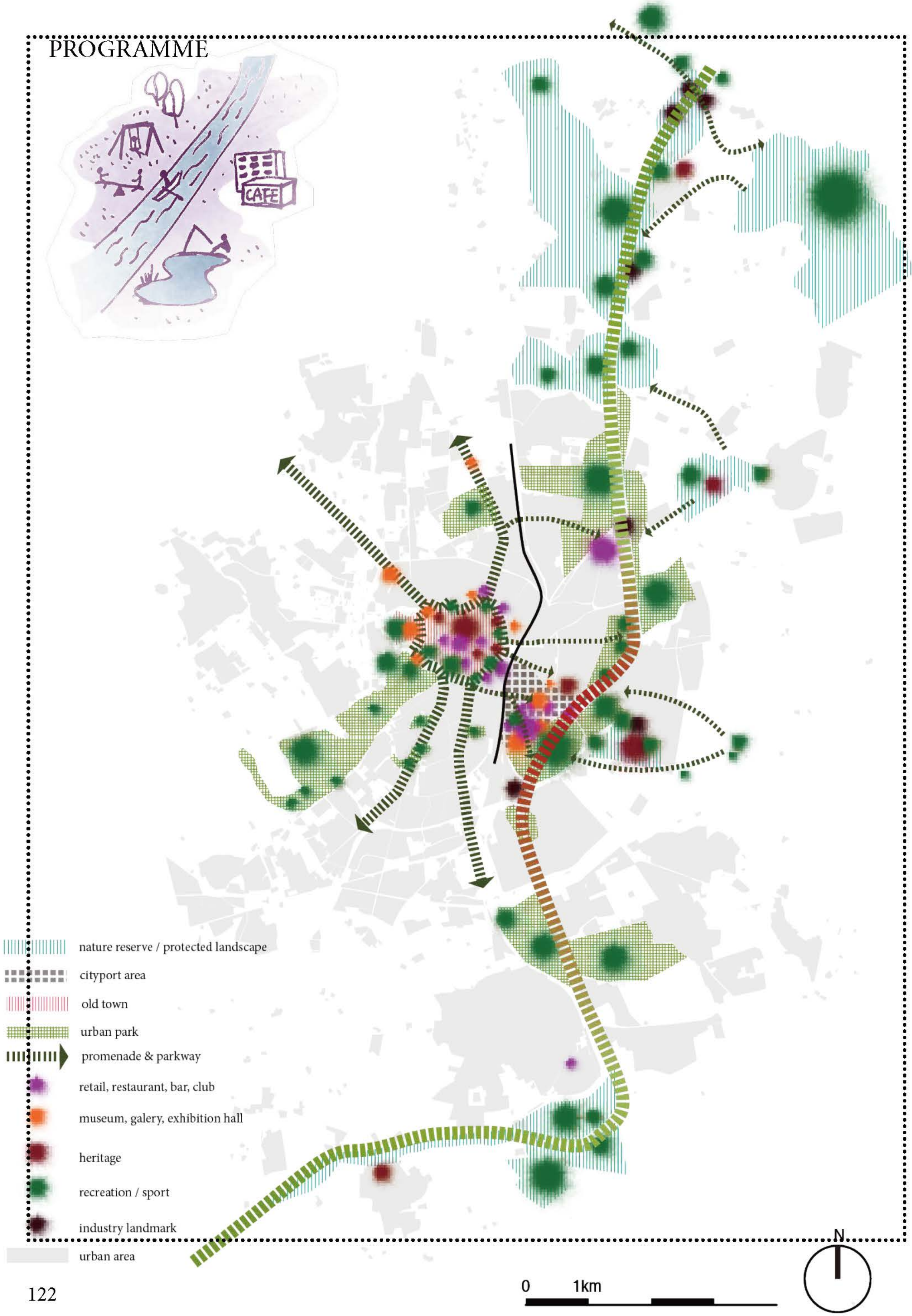
6.2 Thematic strategies

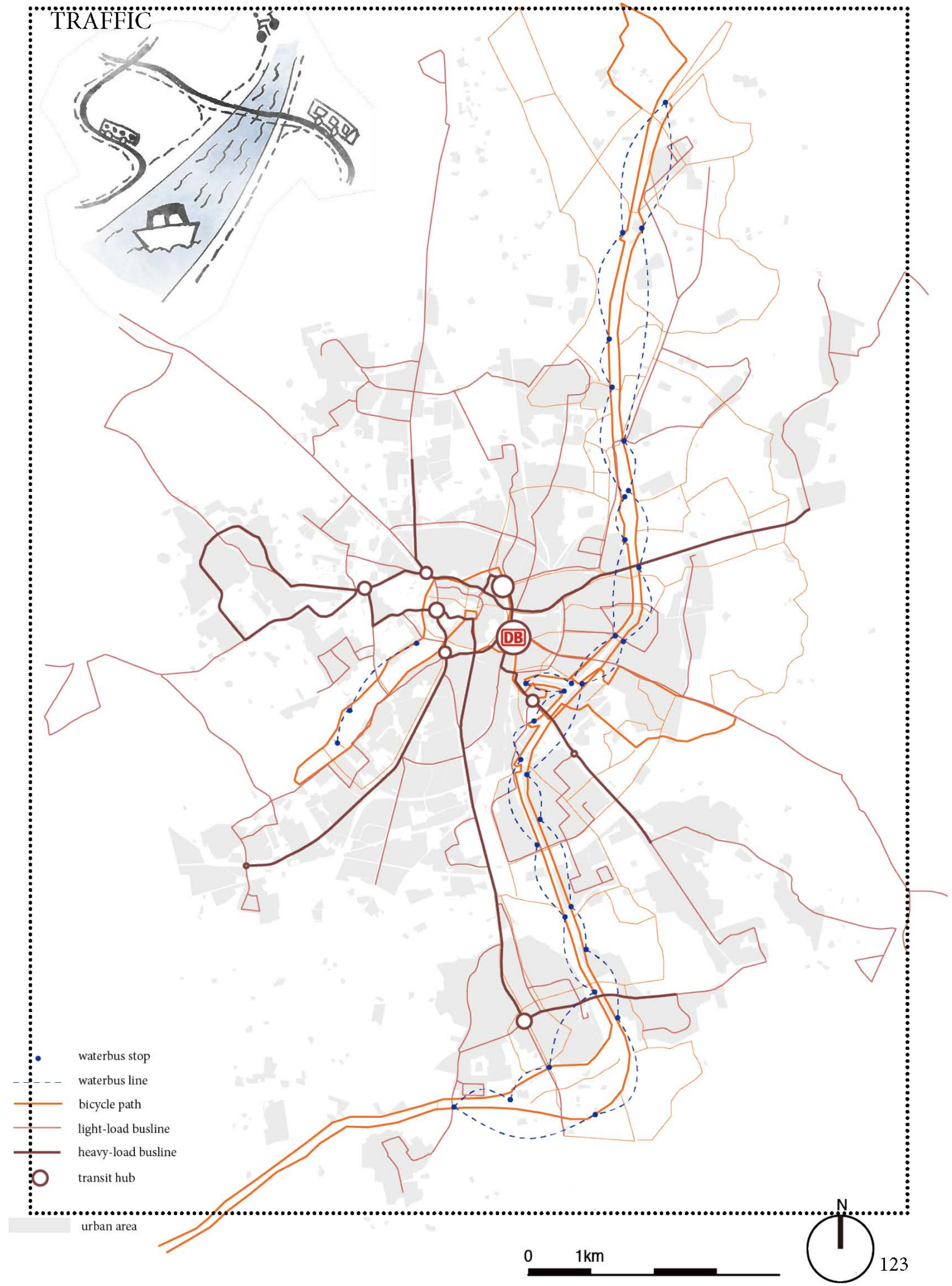


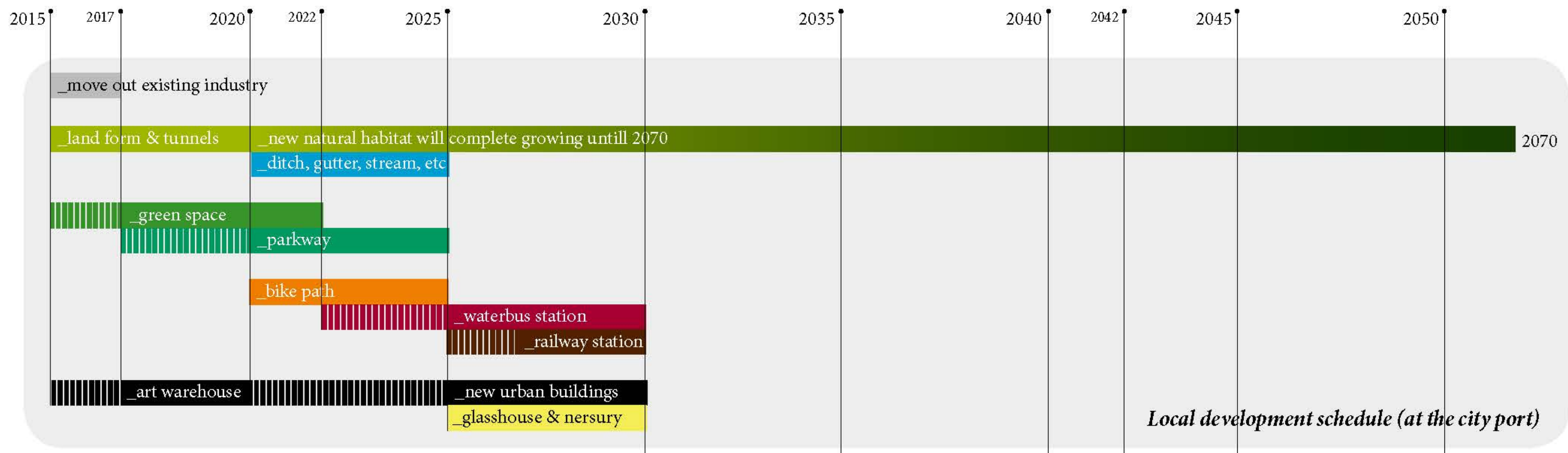
HABITAT

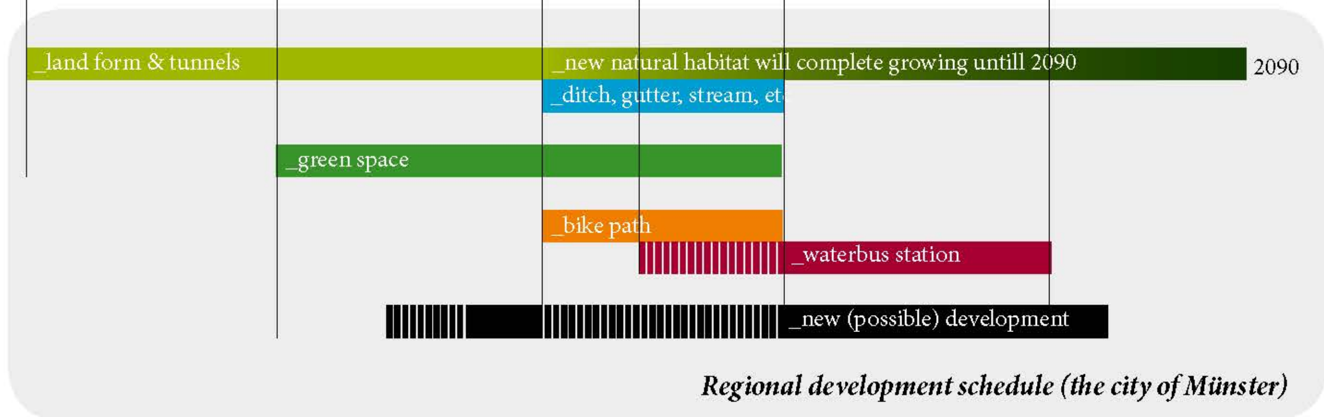


SPACE


PROGRAMME
CAFE
nature reserve / protected landscape
cityport area
old town
urban park
promenade & parkway
retail, restaurant, bar, club
museum, galery, exhibition hall
heritage
recreation / sport
industry landmark
urban area
0
1km
N


TRAFFIC
DB
waterbus stop
waterbus line
bicycle path
light-load busline
heavy-load busline
transit hub
urban area
0
1km
N

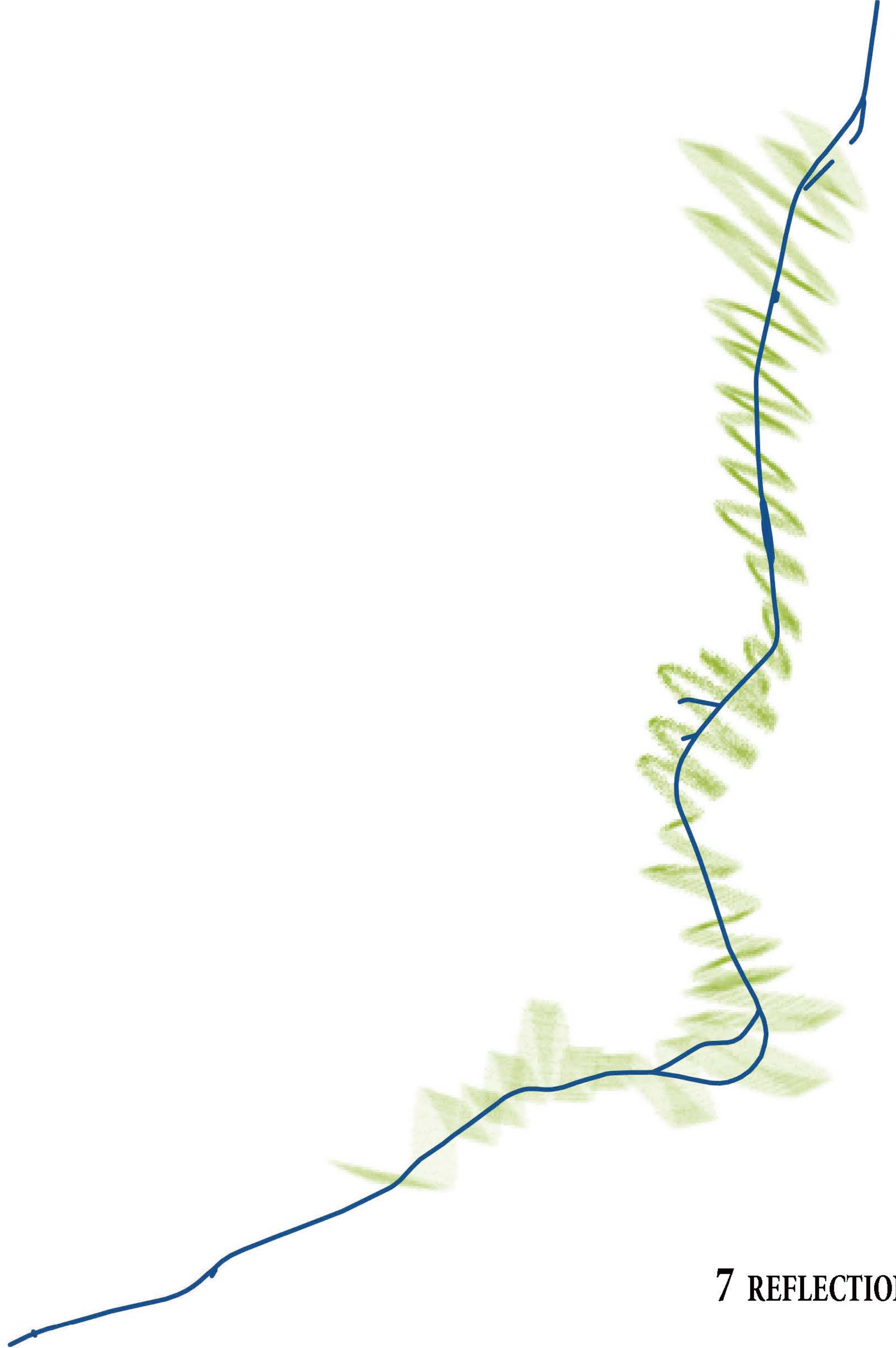




6.3 Development schedule

The city port development is the initial development phase, since it is crucial along the canal. The procedure basicly follows four steps: landscape base -- green space -- traffic -- new urban development. The construction of land form and tunnels under canal is initial because after this the new habitat will take 50 years to grow completely. The existing industrial land is moved out, while concept and design of the urban green spaces will be dicussed. Next the parks, squares and parkways could be built. While designing and building the parkways, the bike path could be considered together. As the warehouse will be remained as art studios and gallery, it will be developed early to earn money, with other outdoor programmes. Last, the other traffic facilities and new urban development are designed and constructed.

The second pahse is to expand the development in the region of whole city. The design and construction also follows four steps of "landscape base -- green space -- traffic -- new urban development".



7 REFLECTION

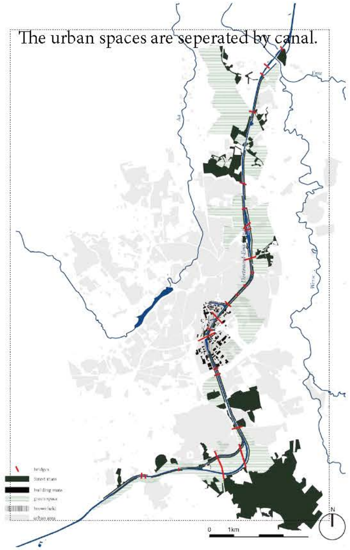
Reflection: “the reflexivity of early infrastructure”

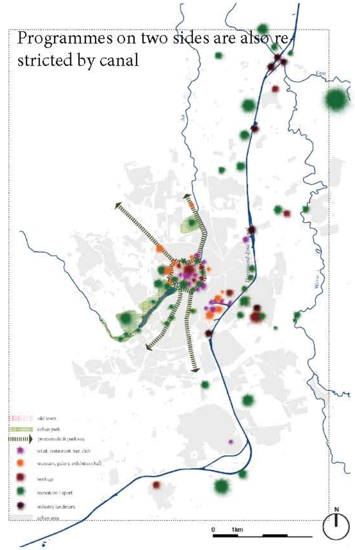
As early infrastructural works - such as interlocal traffic and transportation networks, military defence systems, and dikes - are gradually cast aside, their reflexivity also emerge. My project is a design-based research for a particular early industrial infrastructure, post navigable canal. The discarded freght works presents its reflexivity in my whole process of analysis, design and research.

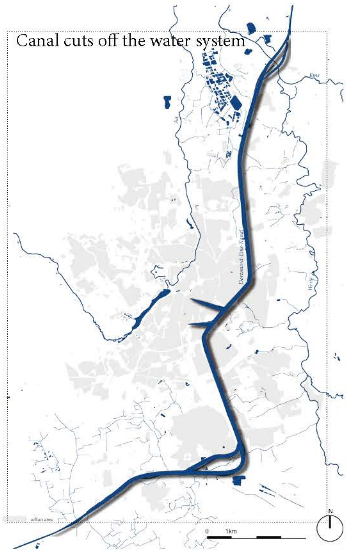
_ Problems & potential

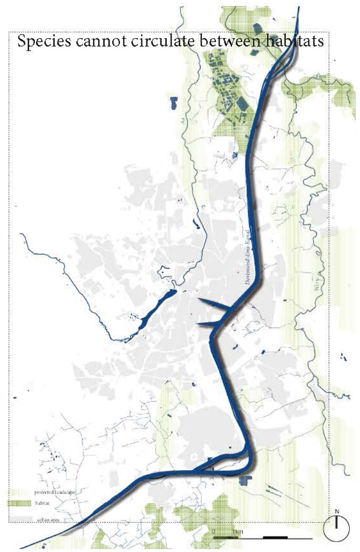
As a past early industrial infrastructure, the post-navigable canal is significantly marginal space in modern city. My case of Dortmund-Ems canal divides the problematique into two parts. First, old industrial lands and buildings are decreasing, and freight facilities (such as ports, locks, aqueducts, etc) are also abandoned. Second, these artificial or canalized waterway is also abrupt trace on the maps of ecology, urban spaces and so on.

Meanwhile, the discard canal is also promising in urban and landscape development. The canal space is suitable for water leisure and aquatic species. Art galleries, clubs and bars also gradually settle in the left-over warehouses. This will help extend the canal to the city.









Possibilities of the canal

Brownfields along DEK

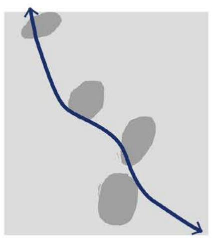
_ The canal & city

As an overview, the navigation canal and city's relationship evolves throughout time.

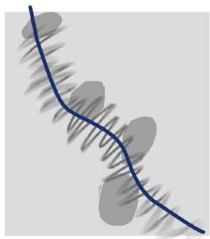
Right after the construction around Industrial Revolution, the navigable canal is inland freight infrastructure. It is a type of fundamental facility for carrying vessels transporting goods between cities.

At the turn of 21th century, there are more and more early industrial canals losing the original function because of industrial structure adjustment and the thriving railway and highway transport. The left over canal is now a visible structure on the city map, which is problematic to the surrounding urban areas.

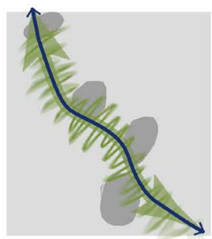
My project explores the post-navigable canal's possibility as a landscape infrastructure in modern city. ***No matter at local or regional scale, an operative landscape structure could be developed on the base of the canal trace. And the structure works in various thematic layers, while the canal is playing a complex role with no neglecting.***



Past: canal as infrastructure



Now: canal as structure



Opportunity: canal as landscape infrastructure

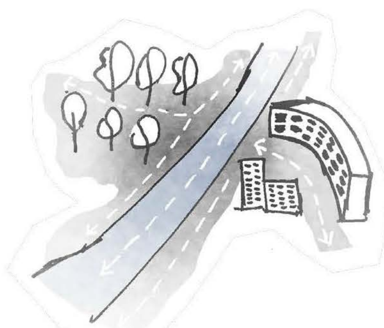
_ The canal's complex roles in multiple layers

To gain comprehensive understanding and solution of the reflexive canal, my project tries to converts it in multiple layers: hydrology, habitat, space, program and traffic. Consequently the discard canal becomes a component of a landscape structure, while it plays complex roles in these multiple layers:

The canal could address a possitive effect in the layer of space, programme and traffic. Urban public spaces could be created along the canal. Then the canal space would become vital waterfront space, where water recreation and other programs could take place. Here a discard canal is a backbone of urban public space rather than a barrier or a gap.

Sometimes it is not practical to convert the canal into a positive role. For example, as an artificial freight waterway, the canal has no possibility to be totally naturalized and connected with the natual water system. In the case of Dortmund-Ems canal, the embankment is higher than the surrounding area. It cuts off the water flow between the two sides. But to tear down the whole canal is also not realistic. So the wise solution is to reconnect water flow though the culvert and tunnels beneath it. (In other cases the solution may be lock, or aqueduct.) In this layer of hydrology, the canal's negativity is only eliminated.

What's more, in habitat layer, the canal could be both positive and negative. On one hand, by creating natural habitats along it, the canal could be an eco-corridor to link the existing habitats. On the other hand, as the artificial waterway cuts off the natural system and it will be huge and expensive work to naturalize it, fauna passages (tunnels, culverts and exit slopes) manage to overcome the ecology barrier.



_ Conclusion

Early infrastructures could cause problems while provide potentials. No matter inter-local transportation networks, military defence systems, or dikes, they keep the structural traces from the interlocal or separate origin. And the existing linear, curve, or loop shape is convenient to transform into crucial landscape intervetion in cities (or a component of landscape system). Landscape architecture intervention is also necessary to gain comprehensive proposal for the infrastructures' problems and potentials, from spacial, social and ecological view.

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