Green Bond Amsterdam-Noord

Re-organize urban forest for future garden city

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MSc Landscape Architeture Thesis
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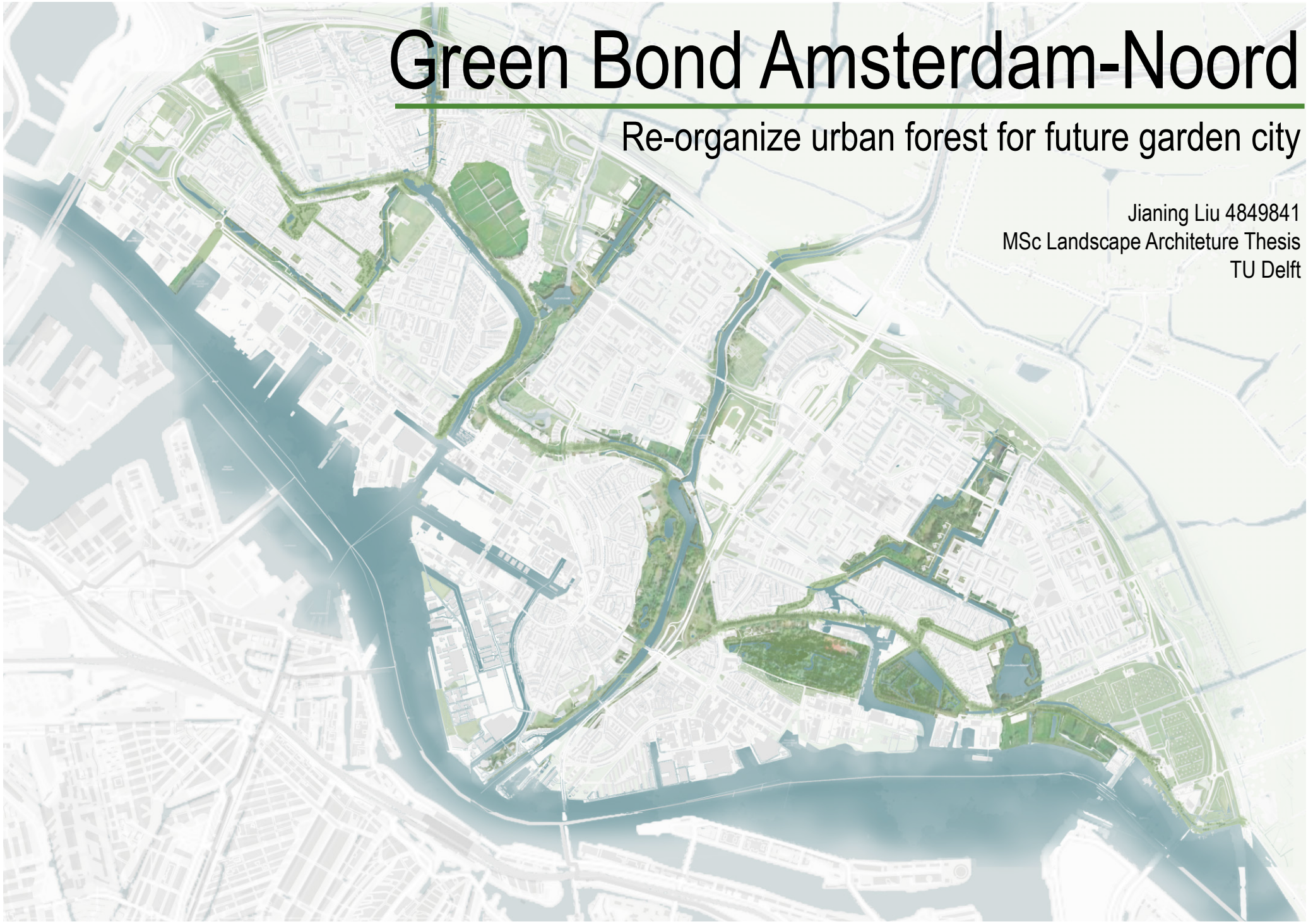

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MSc Architecture, Urbanism and Building Sciences • MSc track Landscape Architecture
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Abstract

In recent years, population ageing is becoming more and more of a challenge for cities to prepare for. Improving facilities for an all-age-friendly city can provide a healthy and supportive life for both the young and the old living in cities. One of the cities of interest in this is Amsterdam. Amsterdam has been exploring sustainable and healthy city development, such as garden city in the 1920s. In Amsterdam Noord, a central area of Amsterdam, the post-industrial IJ bank and the attached garden villages currently need renovation. Amsterdam Noord is the potential site for an all-age-friendly development.

Amsterdam Noord was built with the concept of garden city, where urban forest is used mainly as green buffer and formed entities from industrial nuisances. However, since the industry is moving out, the existing urban forest becomes barriers for connectivity and undermines the dike-polder landscape of Noord. Thus, this project takes urban forest as a key element to renovate Amsterdam Noord and aims to explore an urban forest framework for Amsterdam Noord to be all-age-friendly and to develop the Noord identity as a dike city and a garden city.

Firstly, theoretical study is executed in topics of urban identity, all-age-friendly city, and urban forest to conclude a theoretical framework of restorative and identity-narrative green network. Secondly, based on the theoretical framework, site study is executed in topics of urban fabric, site visit of the dike, and urban forest tradition. Thirdly, these studies provide site-specific strategies to build Amsterdam Noord with a restorative and identity-narrative plan, to develop the all-age-friendly-ness and its identity.

As the result, this project proposes a multi-scale plan for Amsterdam Noord. In city scale (L), Amsterdam Noord is divided into 3 zones, with different urbanization plans, to integrate into the expanding Amsterdam center as well as preserve and develop its identity. In green system scale (M), a multi-functional and restorative urban forest network is designed with the old dike as its spine, to improve connectivity within and beyond Amsterdam Noord. In green space scale (S), urban forest places are designed to offer sensorial experiences related to identity elements, as well as provide all-age-friendly space and program for Noord. The results of this project will provide a new view about how Amsterdam Noord can be developed into a future garden city, which is all-age-friendly, green, and related to its own identity as a dike city.

Keywords: Urban forest, Urban identity, Age-friendly city, Garden city, Amsterdam Noord

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Chapter 1 Introduction

Context
Problem Statement
Methodology

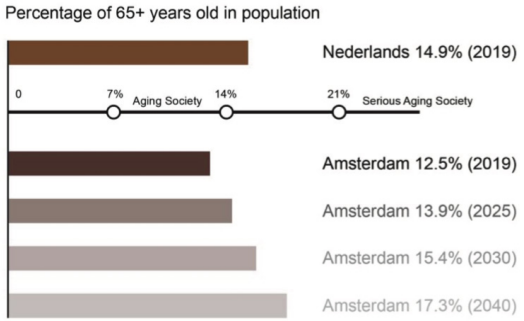
1.1 Context

"Population ageing and urbanization are two global trends that together comprise major forces shaping the 21st century."

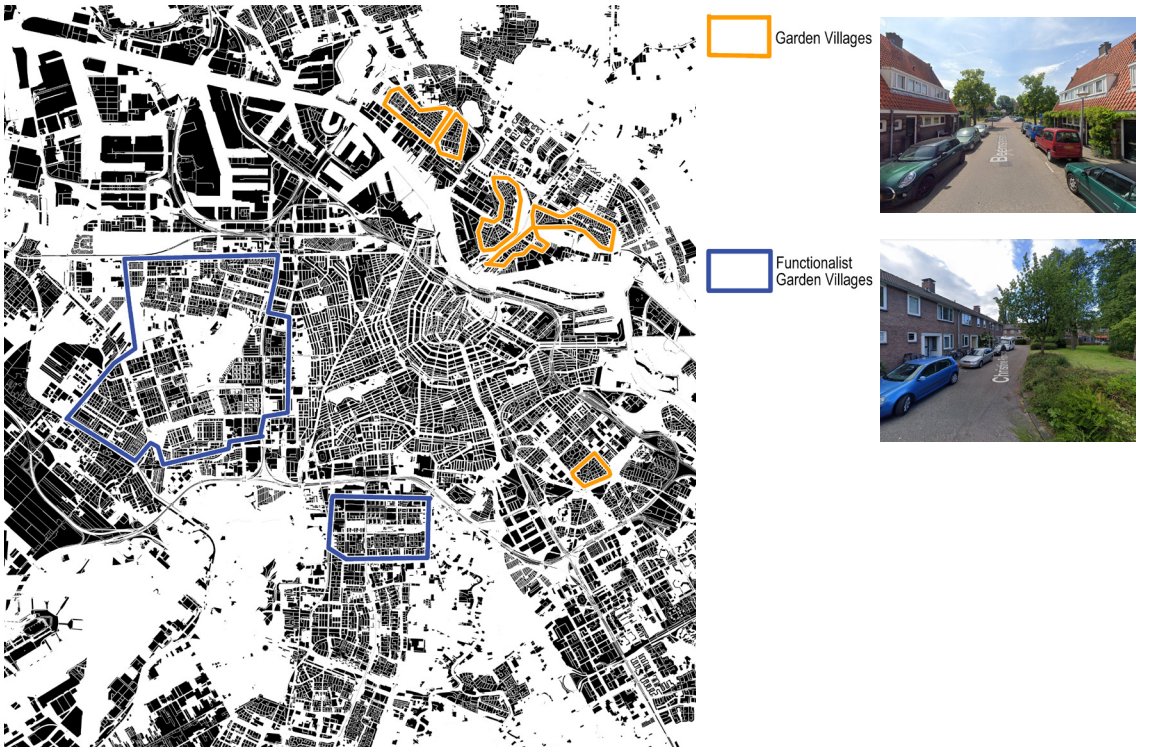
----World Health Organization, 2007

Ageing population is more and more of a challenge for cities to prepared for. It requires the city to provide a healthy and supportive environment for the aged people and the young people, who are ageing, to be able to enjoy the cultural and commercial benefit of the city.

Amsterdam, like many other capital and global cities in the world, has been struggling to host a growing number of inhabitants in a healthy and supportive way. Amsterdam has been taking new ideals and practices for healthy and sustainable city development, one of them is garden city proposed by Ebenezer Howard (1898). The practice of garden city conecpt can be traced back to early 20th century. Neighborhoods that are inspired by “garden city” concept grows around the preserved inner city. The most well-known are Tuindorp (enclosed garden village) in the 1920s mostly in Amsterdam Noord and Functional Neighborhood (open garden cities neighborhood) in the 1960s in Nieuwe West.



Data from:
http://worldpopulationreview.com/countries/netherlands-population/
Kerncijfers Amsterdam 2019 (Gemeente Amsterdam)



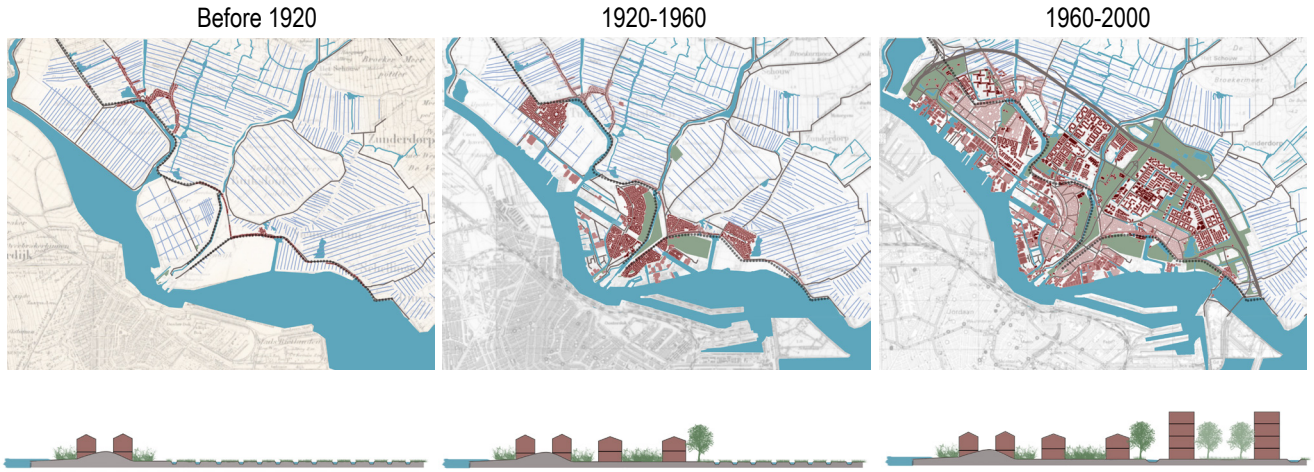
Garden villages in Amsterdam.

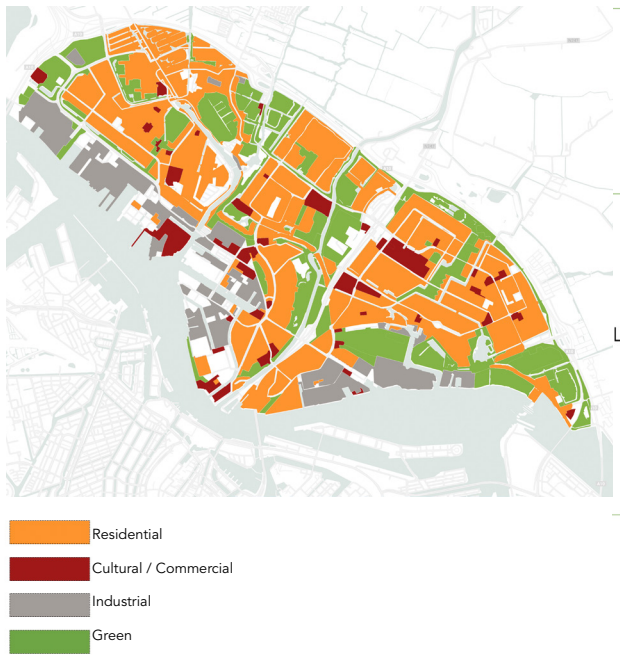
One of the garden city areas, Amsterdam Noord, has built a unique identity and is facing a challenging transformation.

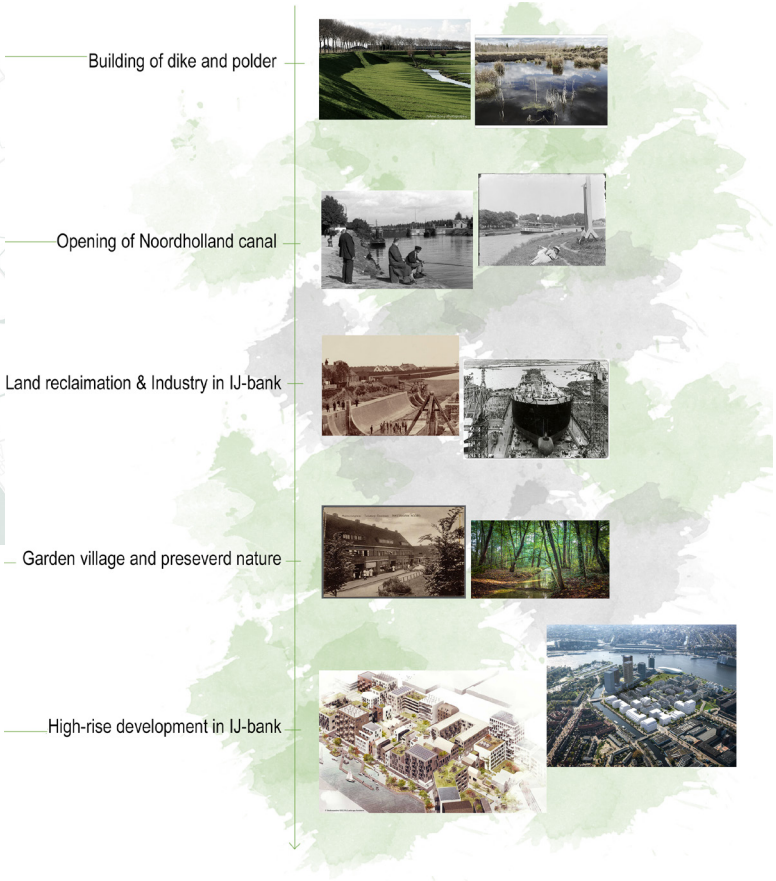
Noord had been a polder area, which centers the dike and dike villages, across IJ river from Amsterdam Centrum for centuries. In the 19th century, the IJ bank of Noord was largely developed as industrial site, with which the first generation of Tuindorp was built in 1920s to buffer the industrial nuisance and create green living environments for the workers and residents. Later on, to follow the idea of “Garden city”, more open garden city neighborhoods and green spaces, such as W.H. Vliegenbos, were built to form a green getaway from the busy city life. Amsterdam Noord becomes “the other Amsterdam” that features green and rural identity just inside the central area of Amsterdam.

Plan has been made to move the industry out of the IJ bank, and to transform the post-industrial site into a work-live mixed use area. In this way, the densely built city center is expanded to cross the IJ to build a IJ-centered Amsterdam.

The industry is moving out and Amsterdam Noord is going under densification, the “leftover” Garden City needs to be renovated to make Amsterdam Noord a future garden city, which is healthy and supportive for all ages.







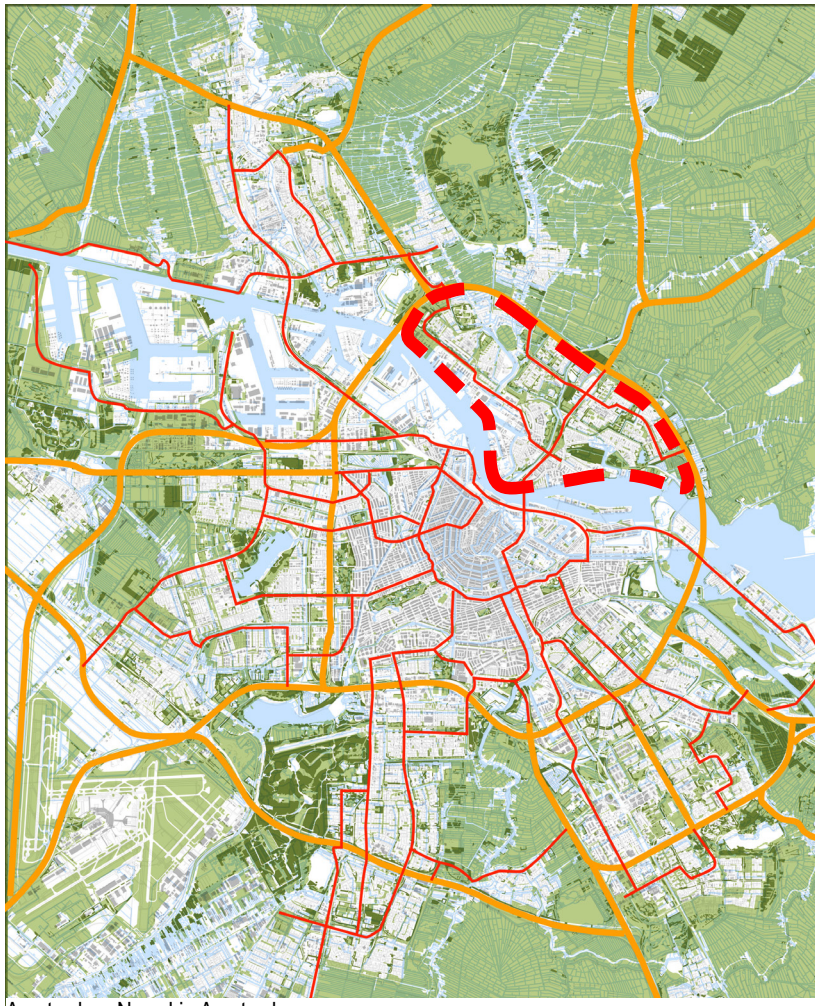
1.2 Problem statements

In Amsterdam Noord, garden city practice results in abundance of green compared to other parts of Amsterdam. However, since the garden city was built together with the industrial site, the green is mainly used as buffer to create enclosed entities from industrial nuisance. This way of using green and building a city results in:

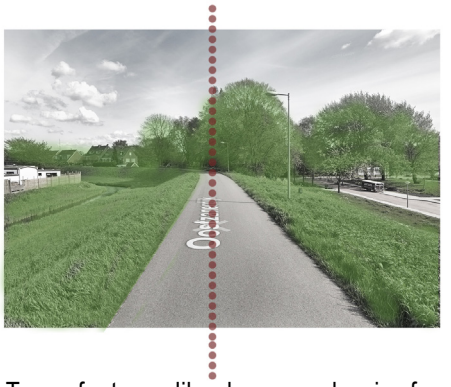
-The city being disconnected

-The topos features (the dike) being fragmented, the urban identity as a dike city being lost

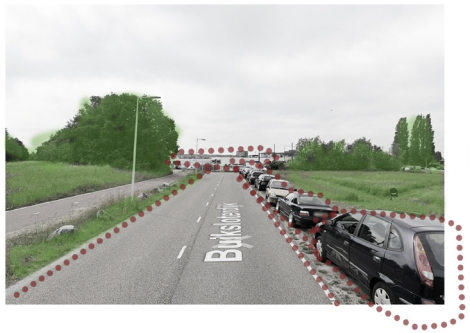
-Historical landmark, such as garden villages, being closed-off or hidden



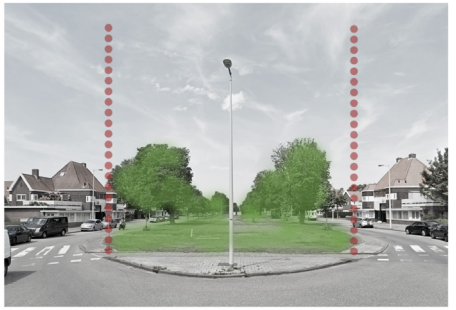
Amsterdam Noord in Amsterdam.



Topos feature, dike, becomes barrier for connectivity



Dike is fragmented as traffic infrastructure



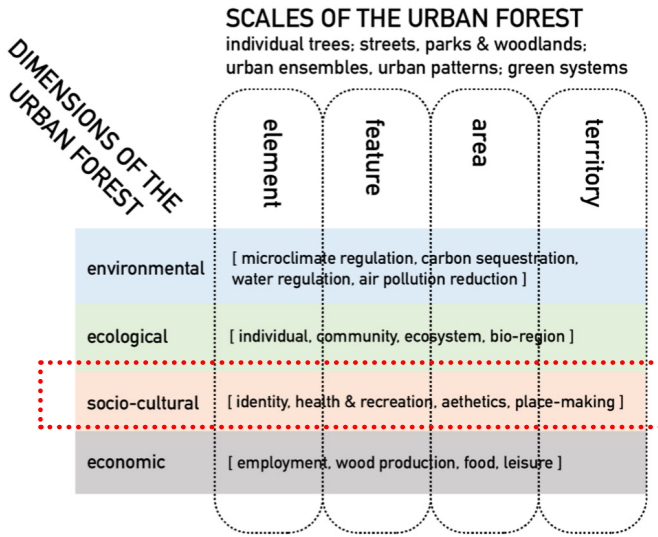
Public space in Garden villages lacking relation to the surrounding landscape

This project belongs to Flowscape studio: Urban Forest Places lab.

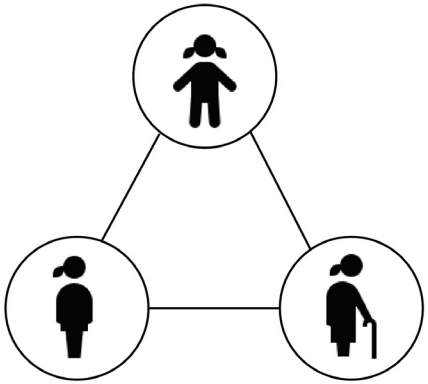
In the Urban Forest Places lab, urban forest, defined as urban green spaces with trees as its backbone, are considered as an important resource of the city. Urban forest can contribute to the sustainability of the city in many aspects, as shown in the urban forest matrix. Thus this project takes urban forest as a key element for renovating Amsterdam Noord, with focus on the socio-cultural aspect.

In the past industrial era of Amsterdam Noord, urban forest created green entities and protected people from the industrial nuisance. At the threshold of the upcoming future, urban forest should be re-organized to answer the challenge from the expanding high-dense city that threatens its rural identity, and the requirement to build an all-age-friendly city. Urban forest should form a green bond for Amsterdam Noord to be a future garden city.

This leads to the research objectives and research questions:



Urban Forest Matrix
(Source: Urban Forest Places Graduation Lab 2019-20,René van der Velde (2019))



The challenge from the expanding high-dense city that threatens its rural identity, and the requirement to build an all-age-friendly city.

Research Objectives

To explore design principles for re-organizing urban forest to promote the urban identity and all-age-friendly network for Amsterdam Noord.

To explore landscape design principles for place making, to improve the material quality that would develop the identity and provide all-age-friendly value.

Main Research Question

How can urban forest be used to develop a future sustainable garden city in dialogue with the green urban identity and Garden City tradition of Amsterdam Noord, and to promote an age-friendly city? How can this prototype for Amsterdam Noord be used as a case study to provide universal value?

Sub-question

1.What is the urban forest tradition in Amsterdam Noord?

2.What element represents the identity of Amsterdam Noord? What potential do the representative elements have to be included in the urban forest?

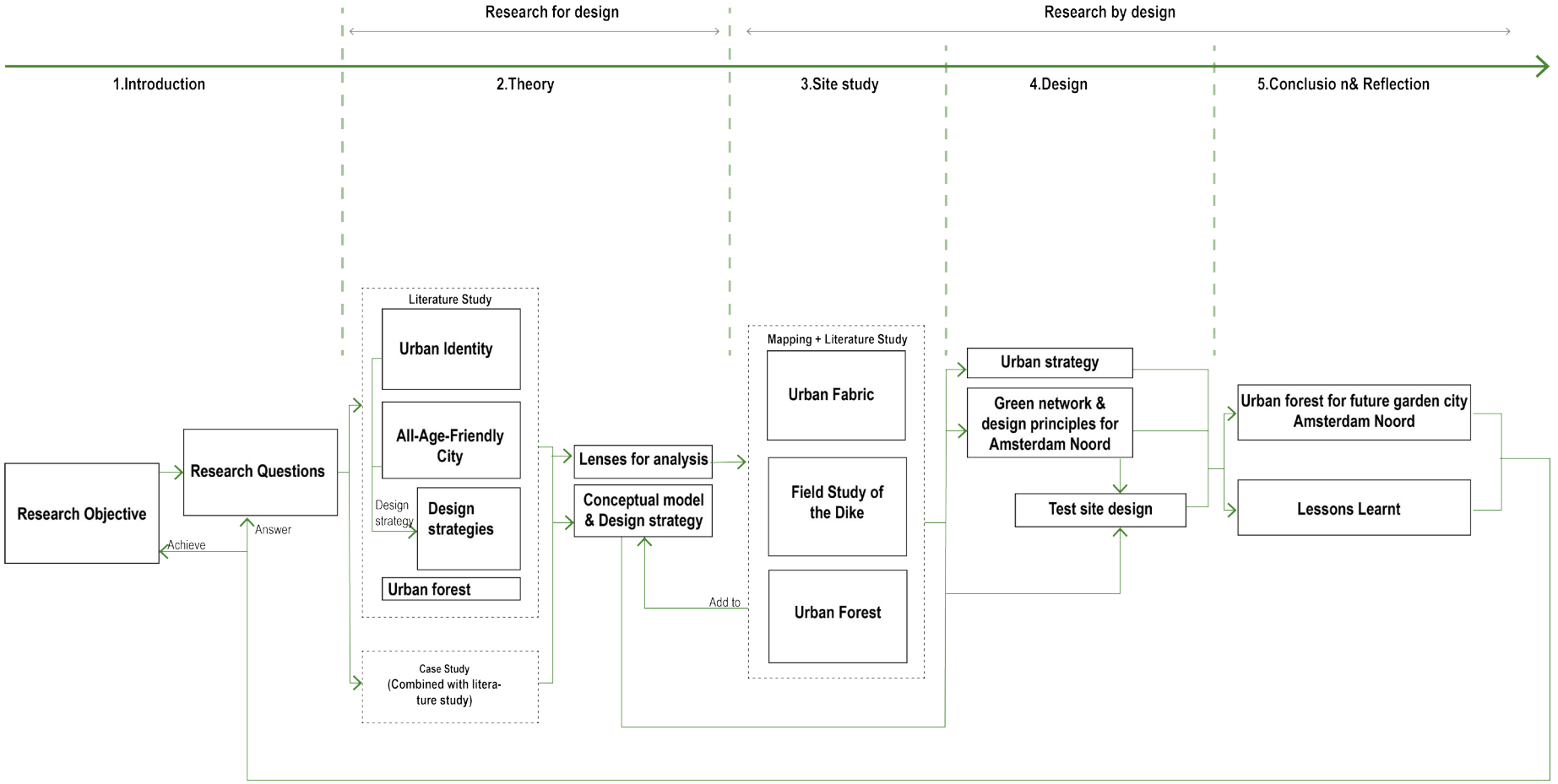
3.What defines an all-age-friendly city for Amsterdam Noord? How can urban forest contributes to it?

1.3 Methodology

This project is excuted in the combinition of "research for design" and "research by design".

Starting from the sub-research questions, "research for design" is used in theory study. With methods of literature study and case study, theoris related to urban identity, all-age-friendly city, and urban forest are studies. This study conclude a theoretical framework for this project, which contains the conceptual the conceptual model, design strategies, and lenses for analyze the site.

Secondly, "research by design" is used in site study and design. Following the lenses in the theoretical framework, Amsterdam Noord is studied in urban fabric, field study of the dike, and urban forest, with the methods of literature study, site visit, and mapping. These studies informs me the problems and potential values to build Amsterdam Noord into a future garden city. Together with the theoretical framework, especially with design strategies, site-specific intervention is designed. The intervention is designed in 3 scales: urban strategy, green network, and urban forest places. These designs answers the research question.



Chapter 2 Theory

Literature Study
- Urban Identity
- All-Age-friendly City
- Urban Forest

Theoretical Framework

2.1 Literature Study
2.1.1 Urban Identity

To build a continuous green identity for Amsterdam Noord in the modern transformation, enhancing urban identity is one of the design goals in this project. Firstly I defined what should be achieved for this goal in Amsterdam Noord and from which aspects to investigate. Secondly I explored design methods that can be used to promote city identity with urban forest.

There are many definitions related to urban identity. Considering the polder landscape and garden city tradition of Amsterdam Noord, I defined the goal for city identity in Amsterdam Noord from cultural landscape, urban characteristic and the way to perceive it.

Cultural landscape, as defined by the World Heritage Committee, is the "cultural properties [that] represent the combined works of nature and of man". It is stated that cultural landscape is the result from both natural process and human cultural process, and the landscape can be regarded as religious, artistic or cultural associations, which is, the representative of identity.

In urban characteristic, as stated by Michael Hough(1992), "Human landscapes and settlements are the consequence of culture modifying and imposing its needs on natural or wild place". In this statement, the cultivation by human to nature is mentioned, but in a very abstract description as "needs". Zalloom, Bushra & Aboutorabi, Mohsen. (2017) 's definition of City Identity explained the "needs" and its results in space, as 'the overall characteristics of its spatial and material qualities formed over time by its traditional street pattern, open spaces, architectural style, townspace and landscape representing the particular cultural landscape and urban condition'. From these definitions, city identity was given specific representative elements that can provide further investigation.

As for perception of City identity from landscape elements, it is a quality, "as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (The European Landscape Convention 2000).Thus the perception of city identity involves multi sensory experience(Wit, 2018) and subjective personal experience and memory (Hough 1992).

Based on the ideas above and the urban context of this project, urban Identity is defined, in the report, as a quality that is shown via the urban forest in different scales, that tells the natural process, cultural tradition, reflect the memory of the space. The perception of city identity via urban forestry should be achieved by sensory experience based on personal experience and memories.

This definition informs us to analyze the cultural landscape and main construction in the history of Amsterdam Noord, as well as the sensory experience they provides that may relate to historical events.

Design strategy study:

Considering the identity elements are fragmented in Amsterdam Noord, Landscape narratives will be used as a method to develop the city identity. Landscape narratives was first mentioned by Potteiger, M., & Purinton, J. (1998), and has been developed by many scholars through the years. A well-designed narrative landscape narrative can develop a silent but persistent storytelling that shape a strong image of fragmented representative elements.

To create landscape narratives, there are 3 aspects that can be worked on:

1.Physical experience

Physical experience contribute to the perception of landscape. It is divided into mainly topological and phenomenological experience. These physical experience can be achieved by variations and compositions of topos, texture, material, and other elements related to sensory experience.

2.Sequences (landscape as a drama)

The creation of sequences involves at least two scenes. The former scene sets a background, and The latter alter the setting. The perception of multiple scenes as related sequence is realized by proximity.Looking into each scene, the space, the movement, and the events together and individually, forms sequence and narrative experience.

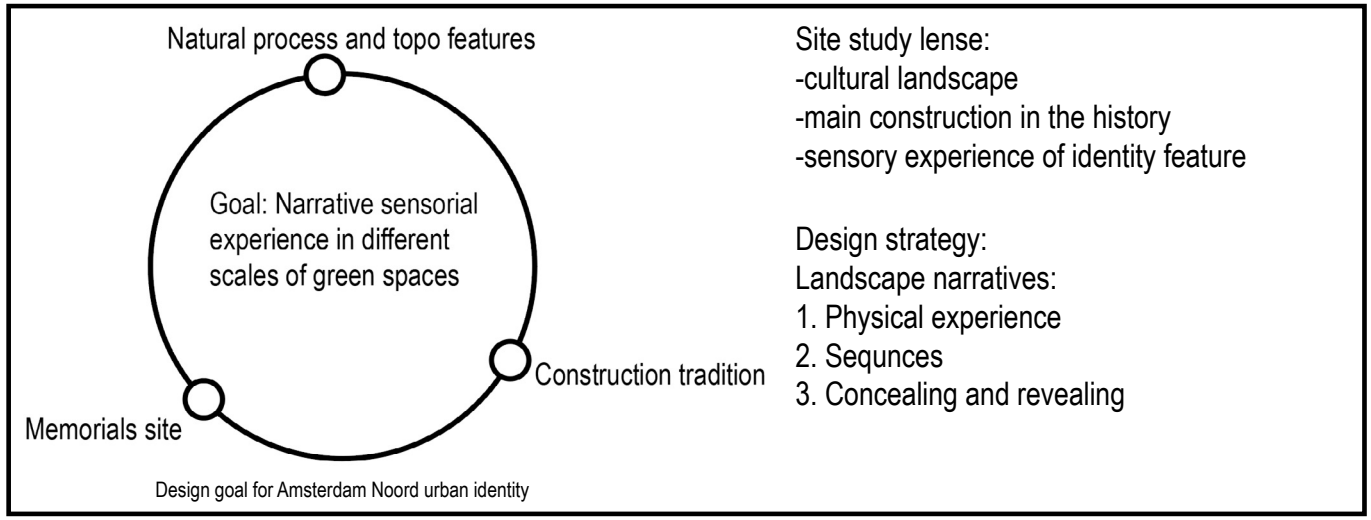
While experiencing sequences, narrative time can be fasten or slowed by manipulated landscape elements, such as plants (longer flowery period to “slow down” seasonal change), and space (going through a tunnel to create a “black out” to switch to a different scene). Routines of the sequences would also influence the narrative. Linear sequences are usually related to chronological order. Circle sequences is usually related to joint of past and future. Spiral sequences are usually metaphor for growth and evolution.

3.Concealing and Revealing

Concealing and Revealing landscape elements to/from the visitors create a sense of secret and transparency respectively. They are usually used to add more personal or emotional attachment to narrative landscape.

Secrets are used to build a suspension for personal revelation of identity, the process of exploring triggers engagement.

Transparency are used to show inviting. It is usually used to reveal how the system behind all the landscape elements works, and sometimes is also used to reveal environmental problems such as water pollution to enhance awareness



2.1.2 All-Age-Friendly City

To built a city that would support the growing aged population, all-age-friendly city is one of the design goals in this project. Firstly I defined what should be achieved in this goal for Amsterdam Noord and from which aspects to investigate. Secondly I explored design methods that can be used to promote age-friendly city with urban forest.

There are many definitions and practices related to different aspects of the idea of Age-friendly city. Considering the goal for an age-friendly city and Dutch people usually prefer age at home, I defined the goal for age friendly city in Amsterdam Noord from age-friendly intergenerational public green facilities and inclusion.

The idea of Age-friendly City was brought up by World Health Organization in 2007 as a supportive system for aging people. As a preventive methods for chronological disease, age-friendly city is also beneficial for younger generation. In Global Age-friendly Cities: A Guide by World Health Organization(2007), it is suggest that all fields should be engaged to work together for an age-friendly city within 8 topic areas mentioned: Outdoor space and buildings, Transport, Housing, Social participation, Respect and social inclusion, Social participation and work, Communication and information, and Social support and care. Directly related to urban forestry, in the outdoor space and buildings category, a non-obstacle pedestrian friendly movement network is required, outdoor spaces should also encourage people from different ages to have interaction and build connection. Considering Dutch Considering Dutch elderly people prefer to age at home instead of caring center, case study for Dutch caring landscape are done. It is concluded that Dutch way of aging requires a multi-scale system including city, neighborhood, and garden(Gezond Ontwerp, 2010). In this system, city is required to provides support in case of more diverse daily activity and better medical facility, neighborhoods act as an important elements in age caring as it promote intergenerational activity and provide entities for basic needs, age friendly gardens are preferred to be semi-enclosed space exposed to natural elements to provide restorative power form nature.

Apart from the support from the city, the inclusion of aged people should also consider its own complexity. In Netherlands, aged people are defined as 67 and above. As defined by Maurits de Hoog, Rick Vermeuien(2009), 75 years old is a dividing line for vital/serious aged group and they have different need for age care. For instance, vital aged people(between 67 and 75 years old) are more out-going and requires more cultural facilities and green public spaces, while serious aged people(75 years old and above) need more home caring services. This idea should be critiqued in that it simplified the complexity by a specific age, but it does brings the idea that elderly people are divers in lifestyle and health situation, which should all be included in an age-friendly city plan.

Based on the definition and ideas above and the specific urban context of this project, age-friendly city is defined, in the report as a supportive system through scale. It includes infrastructures from green network for movement and diverse daily activity in city scale, to restorative and intergenerational design in neighborhood/garden scale.

This definition informs us to look into the existing urban fabric and urban forestry, to investigate its slow-movement network, and to investigate the accessibility of green spaces and whether it can provide restorative value.

Design strategy study:

In the definition, accessible greenway and green spaces, exposure to restorative nature, preferred semi-enclosed spaces are mentioned as design methods.

Apart from the design methods suggested in the definition, RPM model is also included in this project to improve the restorative value in Amsterdam Noord. Based on the RPM model built by Rachel Kaplan and Stephen Kaplan in 2005, People are more reasonable when the environment supports their basic informational needs and it can provide restorative value. It requires us paying attention to improve the support in the informational needs, which are:

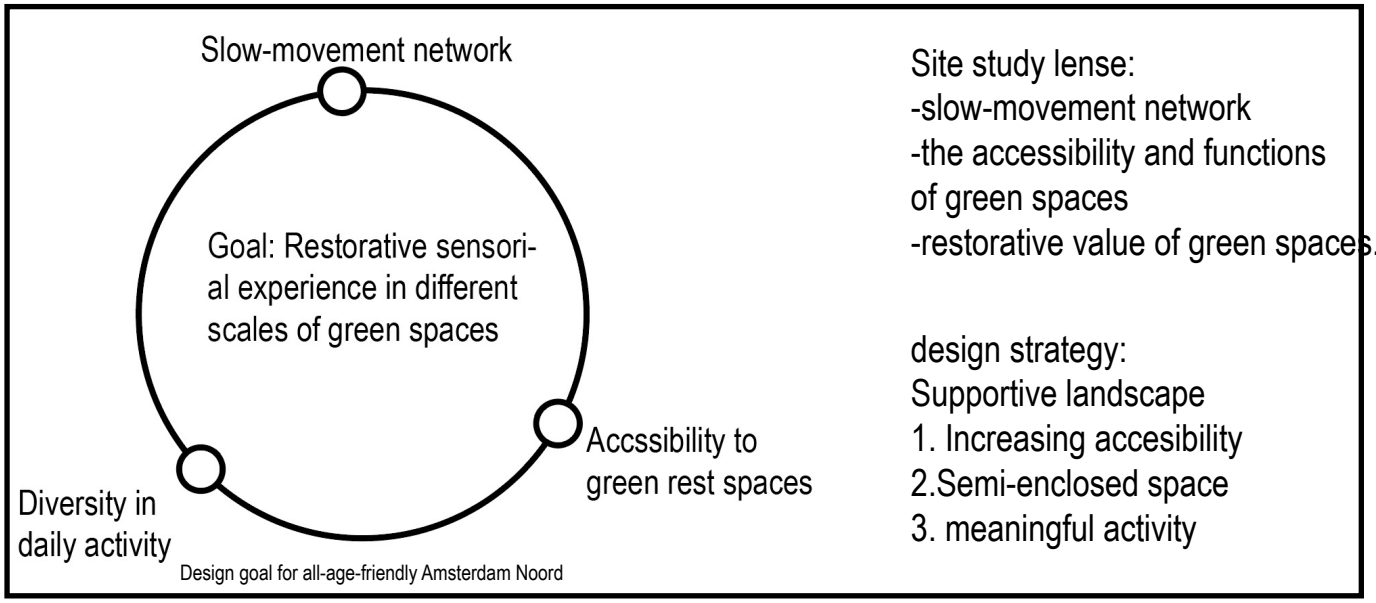
1. Exploration and understanding: to make sense of a situation and to extend knowledge

2. Restoration: maintaining the capacity to respond appropriately to the Information

3. Meaningful action: the need to participate, being an active part of the information

In addition, in the article Preference, Restoration, and Meaningful Action in the Context of Nearby Nature (Rachel Kaplan and Stephen Kaplan 2005), it's also mentioned that "nearby nature" adjacent to or within residential area usually offers positive distraction with a balance of all the elements. The nearby nature should be a focus for supportive landscape.

To support informational needs, design methods are: use visual and audio elements to keep the blance of concealing and revealing, and the clarity of orientation information and accessibility.



Design goal for all-age-friendly Amsterdam Noord

2.1.3 Urban Forest

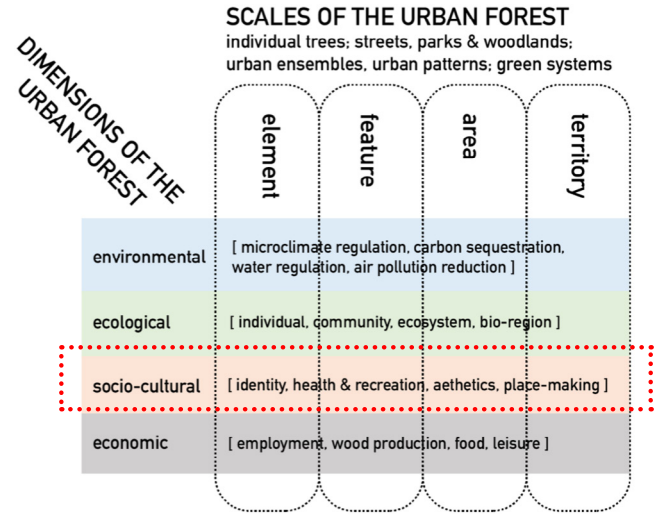
Urban forest is the key elements that will be used to renovate Amsterdam Noord. In this part, I defined the way to approach urban forest as green resources for the city.

Urban forest is widely defined as a collection of all green spaces in the city with trees as its backone. It includes any kind of woody plant vegetation growing in and around human settlements(source: Wikipedia-urban forest). As stated by Jiri Lev(2017), Urban forest plays an important role in ecology of human habitats in many ways. Aside from the beautification of the urban environment, they offer many benefits like impacting climate and the economy while providing shelter to wildlife and recreational area for city dwellers.

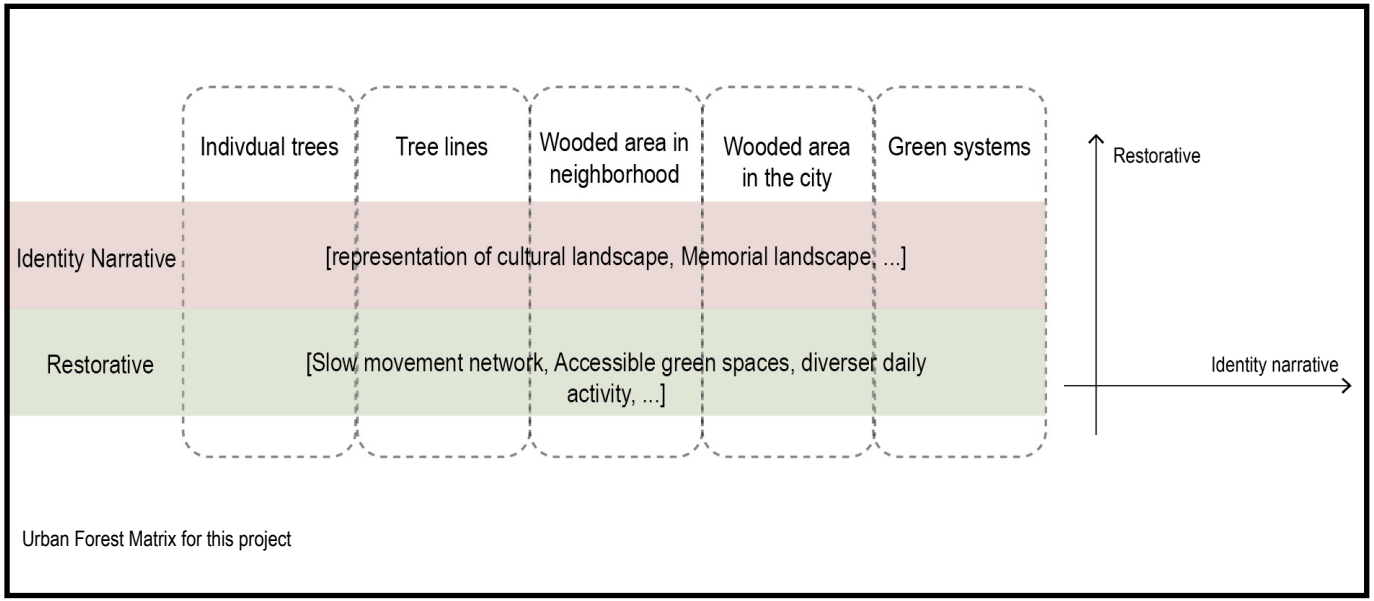
Urban forest is complicated as it contains all green elements in the city and its characteristic varies from city to city, thus a structure model is needed to approach it. Urban forest matrix is a model made by René van der Velde (2019) and it's been used in graduation projects in Urban forest places studio as a way to understand urban forest in Dutch low land city. Therefore, in this project, I took urban forest matrix as a model to understand urban forest in Amsterdam Noord.

Urban forest matrix structures green spaces in the city in different scales and dimensions. Green spaces are classified from single tree elements to tree-based city features such as greenways, to wooded areas, and to territory such as the green system of the city. All elements in the matrix works individually on city. All elements in the matrix works individually on different scales and together as a support network of the city in environmental, ecological, economical, and socio-cultural aspects.

This project takes the structure to classify green spaces into elements, features, areas, and territories, and further investigate on the socio-cultural dimensions that are related to urban identity and all age-friendly city.



Urban Forest Matrix
(Source: Urban Forest Places Graduation Lab 2019-20,René van der Velde (2019))



Urban Forest Matrix for this project

2.2 Theoretical Framework

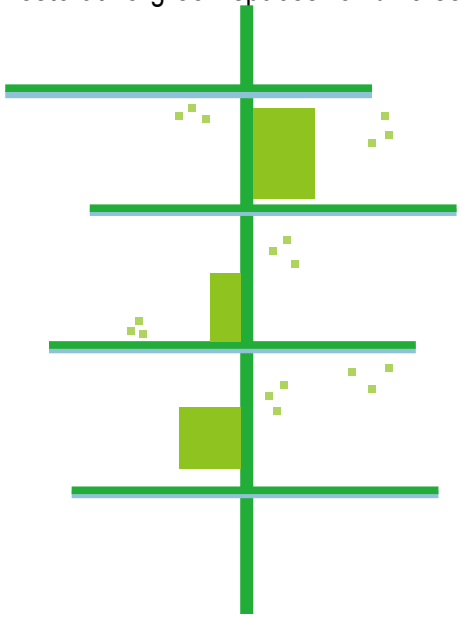
A multi-scale urban forest network theoretical framework is concluded for this project based on the theoretical background. This framework includes lenses for site analysis, conceptual model, deisgn strategies, and lenses for site study.

Conceptual model for future garden city urban forest:

In order to develop city identity and age-friendly city, a cross-region slow-movement pathway system that connects green spaces is needed. As for green spaces, it contains green paths and green nodes:

Green paths are built with the historical elements, to create a landscape narrative for the city identity, and to provide pedestrian-friendly, restorative walking experience.

Green nodes are built from the historical elements, to create a multi-sensory experience for the identity and restorative green spaces for diverse activities.

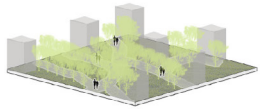


Deisgn strategies:

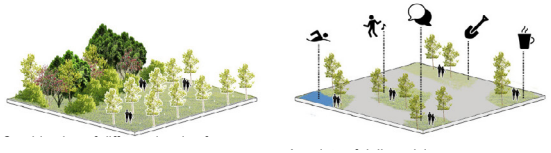
Deisgn strategies in topics of urban identity and all-age-friendly city can be re-organized in different scales.

City network scale:

- A slow-movement network with accessibiliity to green spaces

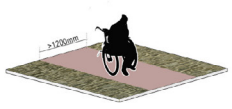


- Connection of identity representative elements that can create sequnces for identity narratives and restirative activities

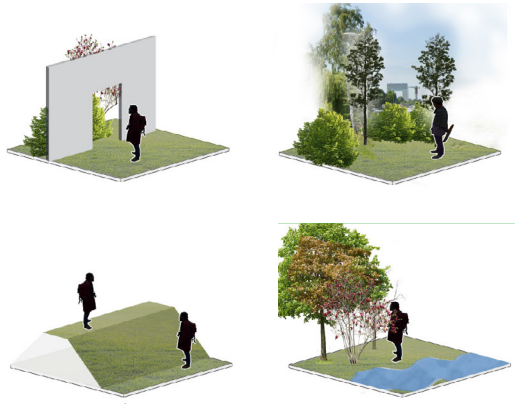


Green spaces scale:

Lines:



- Non-obstable design: smooth surface, at least 1.2m wide for pathways, use ramp instead of steps.



- Concealation of busy traffic and high-rise building
- Revealation of polder landscape and garden villages
- Sensory experience of being on a dike/waterside
- Sensory experience of seasonal change with plants

Nodes:

- Semi-enclosed space for stay and rest
- Activity to encourage intergenerational inclusion

Lenses for site analysis:

The design goals require knowledage about the city in topics of:
-cultural landscape
-main construction in the history
-sensory experience of identity feature
-slow-movement network
-the accessibility and functions of green spaces
-restorative value of green spaces.

Theses topics will be studies in the following 3 lenses:
-Urban fabric
-Filed study of the dike
-Uran forest

Urban fabric
-cultural landscape
-main construction in the history
-sensory experience of identity feature
-slow-movement network
-the accessibility and functions of green spaces
-restorative value of green spaces.

Field study of the dike
-cultural landscape
-main construction in the history
-sensory experience of identity feature
-slow-movement network
-the accessibility and functions of green spaces
-restorative value of green spaces.

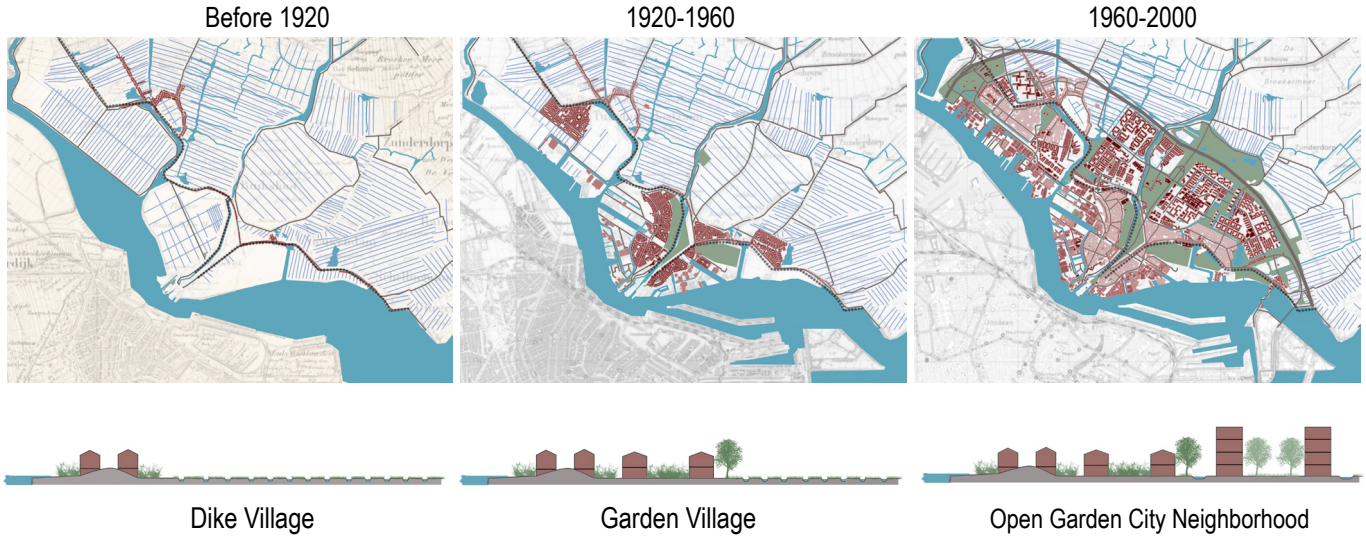
Urban forest
-cultural landscape
-main construction in the history
-sensory experience of identity feature
-slow-movement network
-the accessibility and functions of green spaces
-restorative value of green spaces.

Chapter 3 Site Sudy

Urban Fabric
Field Study of the Dike
Urban forest

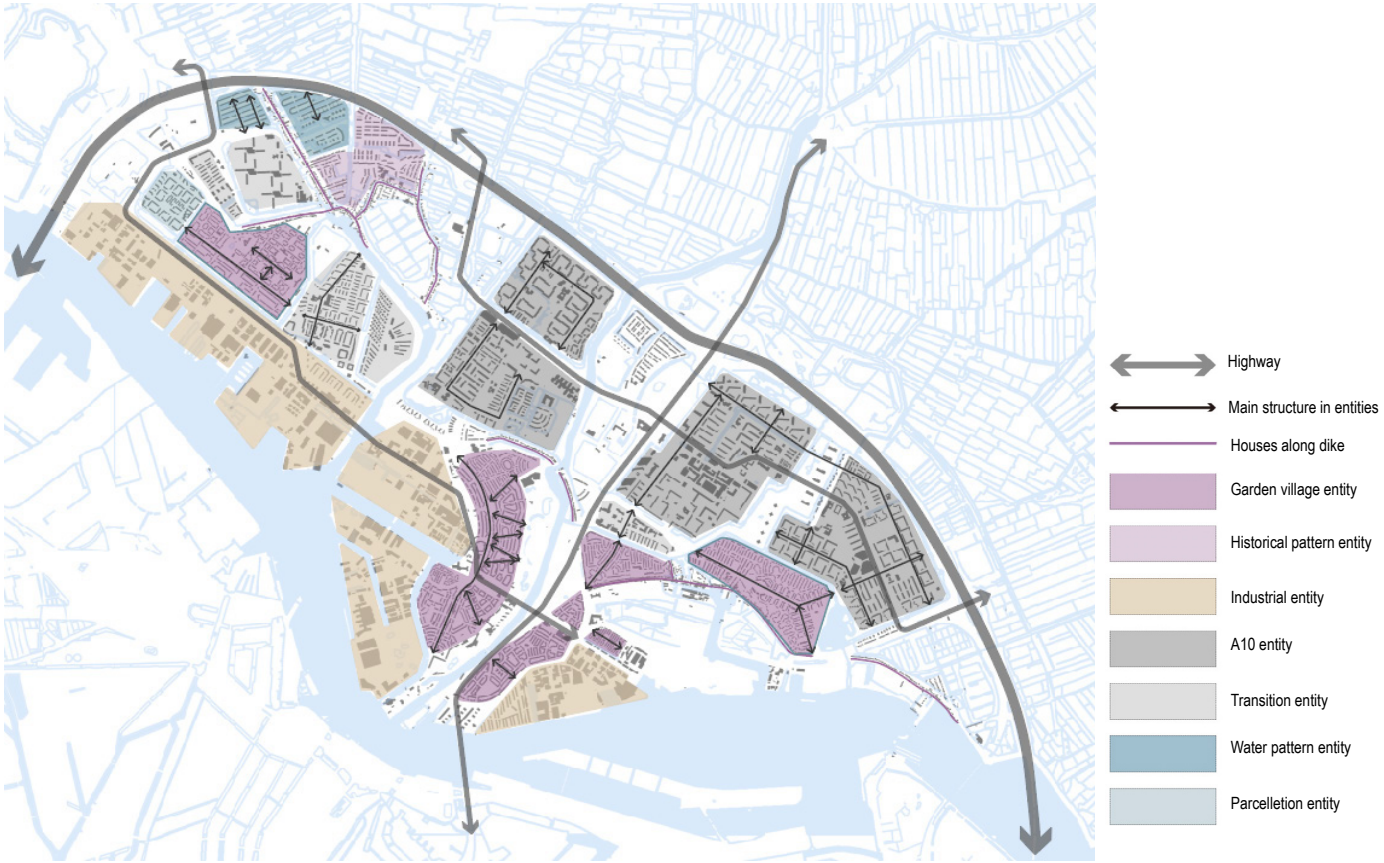
Conclusion: probelms and potential values

3.1 Urban Fabric
History and morphology



As Amsterdam Noord developed overtime, each period has its own logic for morphology.
- Dike village
- Garden village (Picturesque garden city neighborhoods) in 1920s
- open garden city neighborhood in 1960s

This results in Amsterdam Noord nowadays as a composition of many entities isolated by water and traffic infrastructure.



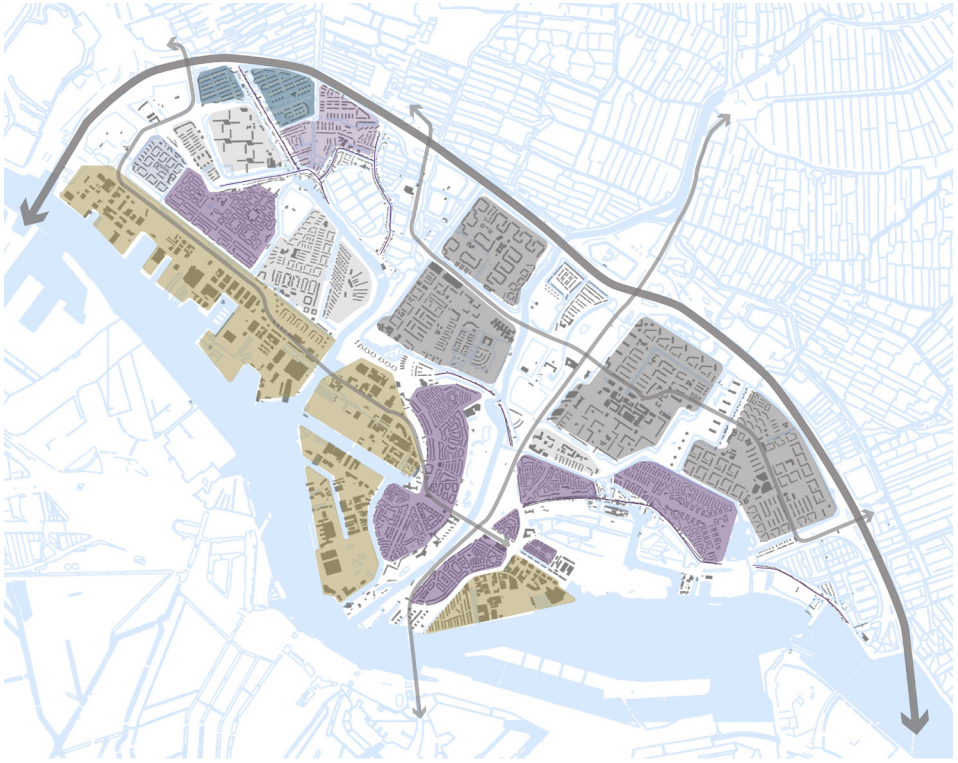
3.1 Urban Fabric

Entities and buildings

Each entities in Amsterdam Noord has its morphology and concentration of functions.

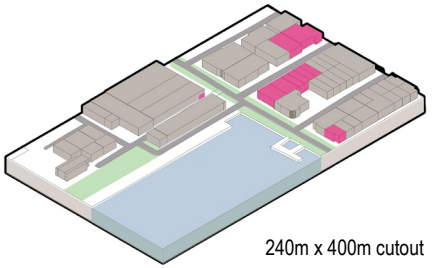
The dike, polder and garden city identity is well-preserved in the dike villages, garden villages, and polder neighborhood. They can be preserved as characteristic entities.

The industrial entities is mono-functional and in a non-human scale. It also lacks quality green spaces close by the water. The open garden city neighborhood lacks connection with the surrounding polder landscape and it is also mono-functional. These two kinds of entities can be better designed to provide restorative and narrative value.



Industrial site

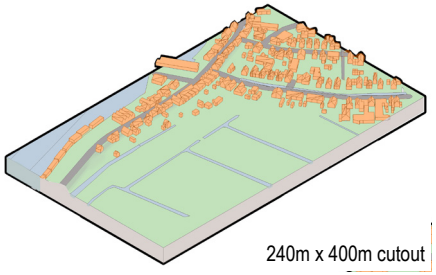
Function: industrial +commercial
Average unit size: 80m x 140m
Buildings: 2 Floors (10m) with flat roof



240m x 400m cutout

Dike villages

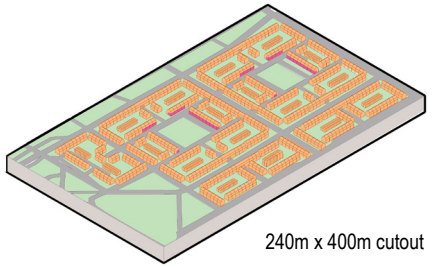
Function: residential
Average unit size: 10m x 20m
Buildings: 2-3 Floors (8-12m) with gable roof



240m x 400m cutout

Picturesque garden villages (1920s)

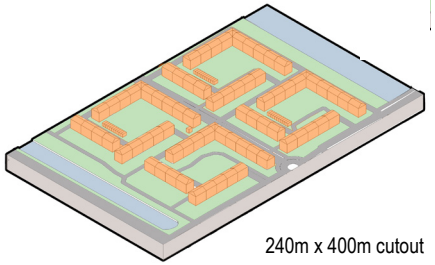
Land-use: residential +commercial
Average unit size: 50m x 50m
Buildings: 2-3 Floors (8-12m) with gable roof



240m x 400m cutout

Open garden city neighborhood(1960s)

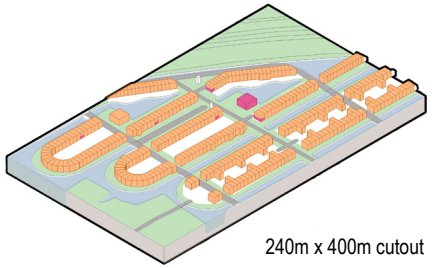
Function: residential
Average unit size: 120m x 120m
Buildings: 2-5 Floors (8-15m) with gable roof
5-12 Floors (15-50m) with flat roof



240m x 400m cutout

Polder neighborhood(1990s)

Function: residential +commercial
Average unit size: 60m x 100m
Buildings: 2 Floors (8m) with flat roof



240m x 400m cutout

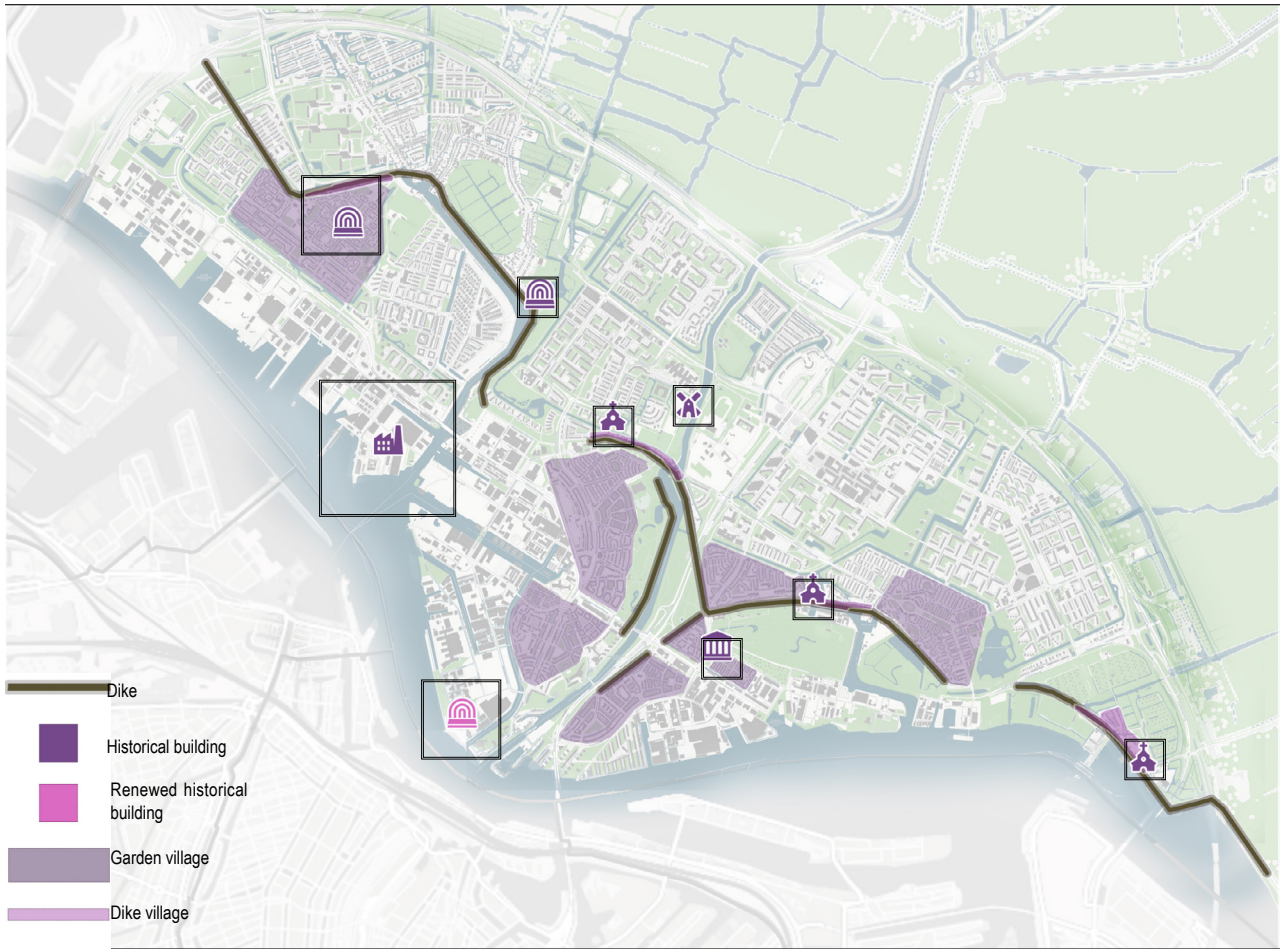
3.1 Urban Fabric
Identity and Historical Elements

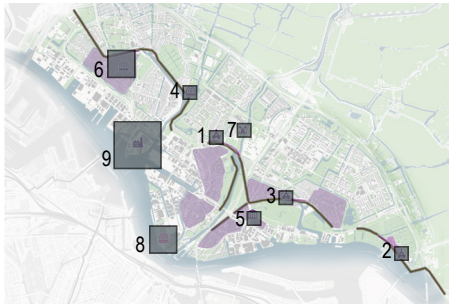
In Amsterdam Noord, the most important identity representative elements are the dike, together with the dike villages and garden villages.

Some of the historical buildings such as churches, windmill, and old warehouse are also preserved and given new functions.

From the big map, we can see most of the landmarks sit close to the dike. However, from the zoom-in maps(next page), they are hidden or enclosed from the dike by either trees or houses.

Dike is a connecting elements of other identity and historical elements. It has the potential to be developed as a centered line.





Index:

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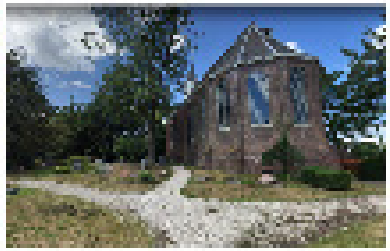
9

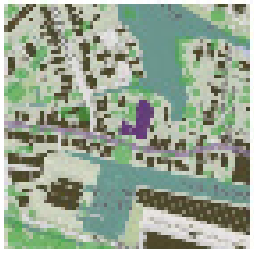
Historical buildings along the dike

Buiksloterkerk
Built in: 1609
Original Function: Church
New Function: Church, monument, concert hall

Schellingwouderkerk
Built in: 1866
Original Function: Church
New Function: Church, Dining place


Augustinuskerk
Built in: 1888
Original Function: Church
New Function: Church (locked)

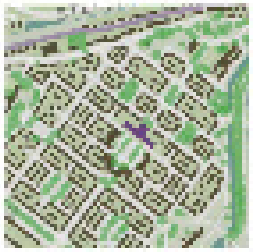



Concertgemaal
Built in: 19?? (1984)
Original Function: Power station
New Function: Concert hall, workplace


Historical buildings in Garden villages

Museum Amsterdam-Noord
Built in: 1918
Original Function: Bath house
New Function: Museum


Zonnehuis
Built in: 1932
Original Function: Community center
New Function: Cultural center




Historical uildings at waterfront

Krijtmolen d'Admiraal
Built in: 1792 (1992)
Original Function: Grinding limestone to chalk and from tuff to trass
New Function: Monument, event place for renting


Eye Film Museum/A'DAM Lookout
Built in: 1930(2011)
Original Function: -
New Function: Entertainment


NDSM
Built in: 1900
Original Function: Factory
New Function: Events space

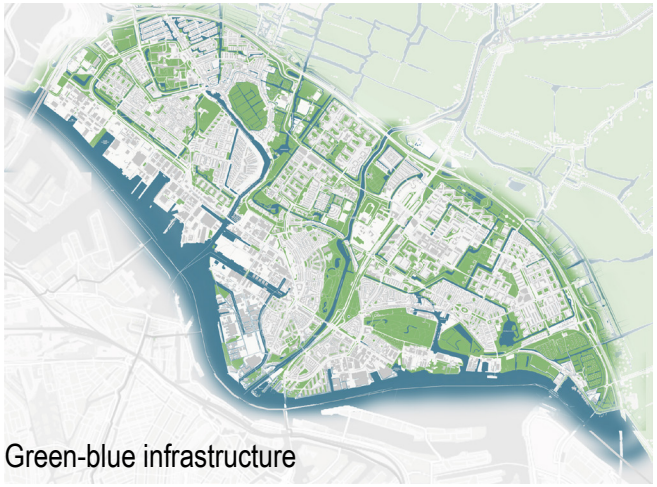

3.1 Urban Fabric
Green and Blue Infrastructure

Amsterdam Noord features abundance of green and water bodies.

The public green amenities are built between the residential entities. Parks, allotment gardens, sportsfields, preserved polders, and cemetery together provide natural experiences and daily activities for citizens in Amsterdam Noord.

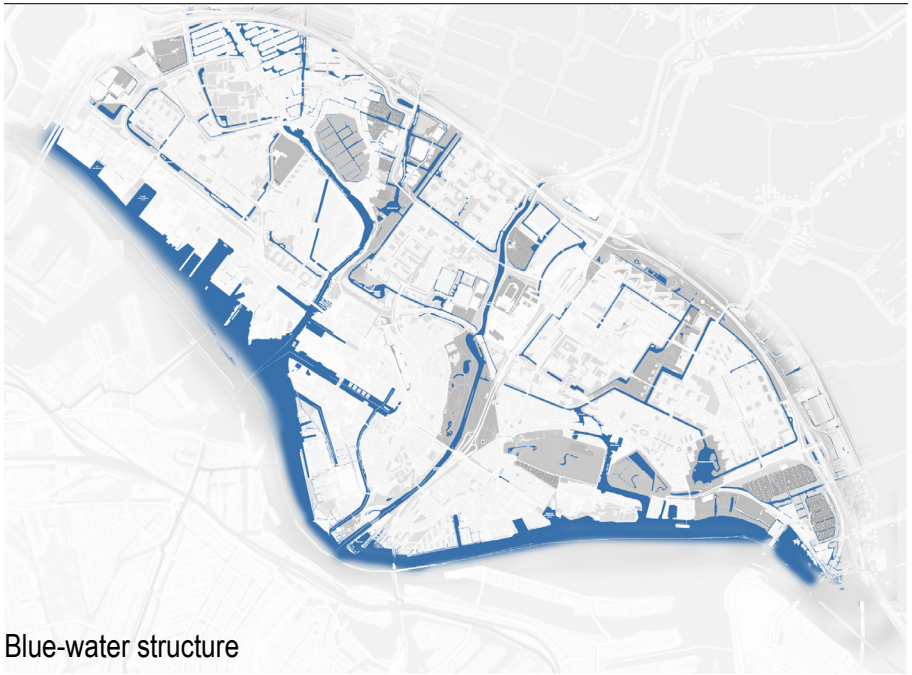
In refigurarion the polder for urbanization, water bodies are made running around and between the entities.

Thus, the area bewteen entities is a less developed natural area. This can also be concluded in the sections of waterlines(next page), where most waterside spaces are green and car-free.



Green-blue infrastructure

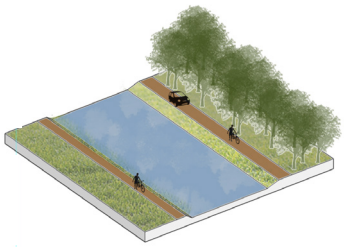
Green- public green amenities



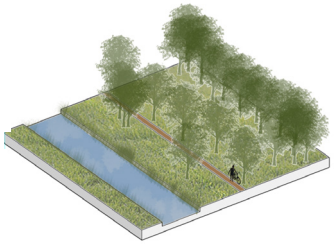
Blue-water structure

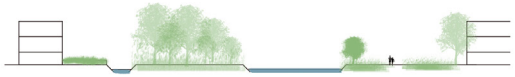
-IJ
-Noordhollandcanal
-Waterways
-Water body around entities
-Polders

2 typologies of waterlines
-waterside road (5-5') with car roads



-waterside lane (1-1', 2-2', 3-3', 4-4', 6-6', 7-7') with bike-only lanes




Section 1-1'

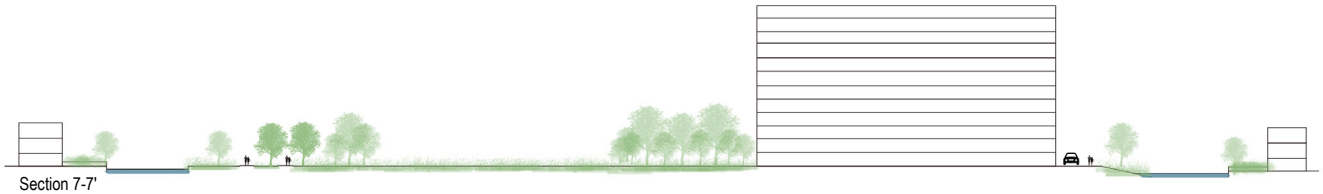

Section 2-2'


Section 3-3'


Section 4-4'


Section 5-5'

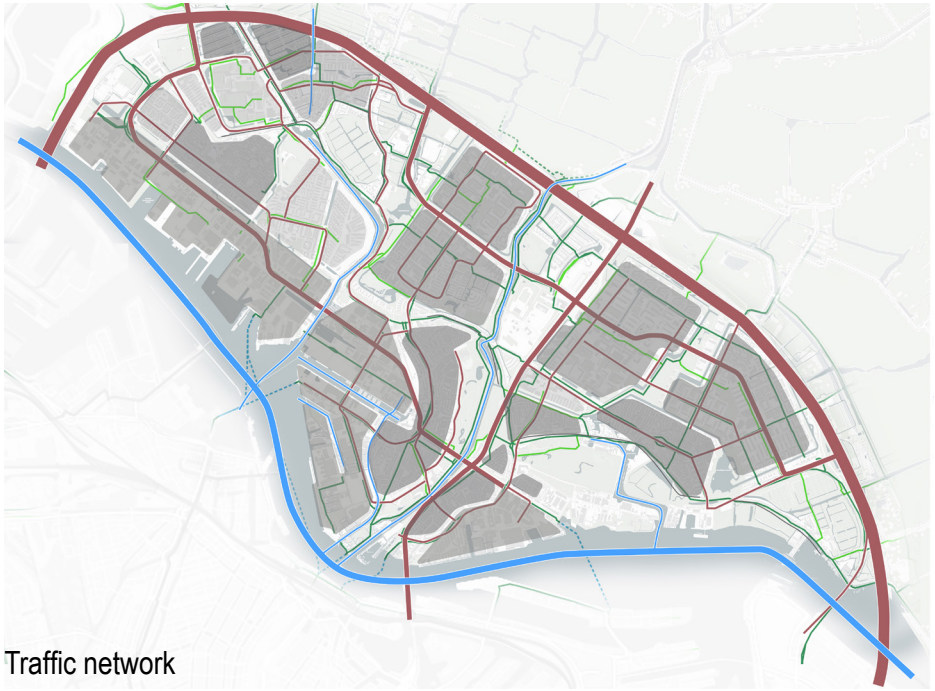

Section 6-6'


Section 7-7'

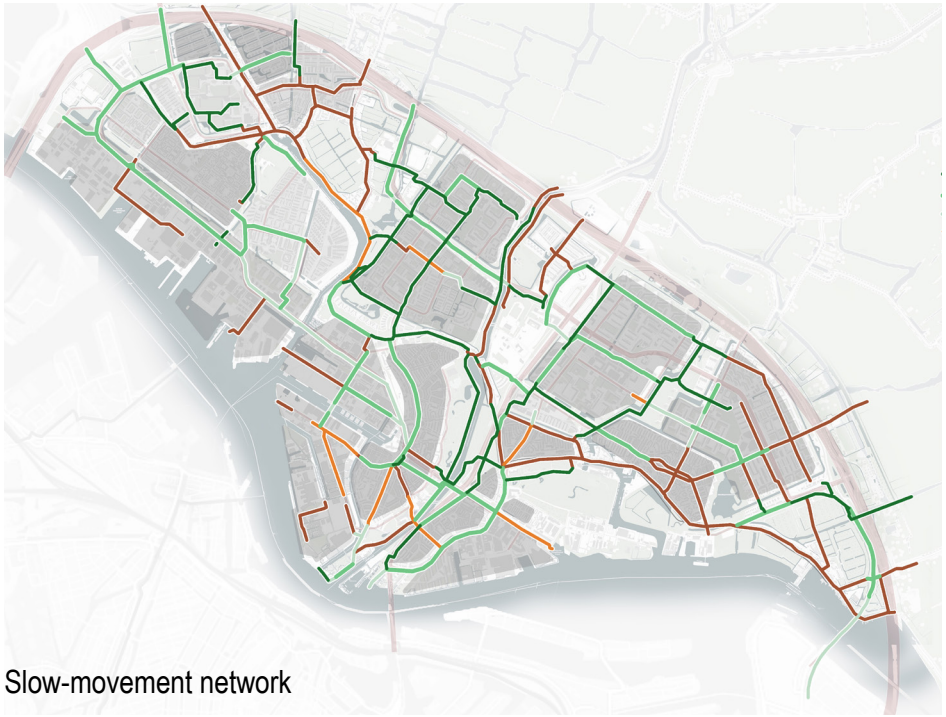
3.1 Urban Fabric Connectivity

In Amsterdam Noord, bike lanes* are mostly built with car roads. If we take bike-only lanes and green bike lanes(which use trees to separate bike lanes from car traffic) as restorative slow-movement network, this network is not complete.

*:here bike lanes are also used for other slow-movement including wheechair, pedestrian.



Traffic network



Slow-movement network

The existing slow-movement network can't connect all monuments

Also, because the network is not complete, the existing slow-movement network connect green amenities to the entities, but not cross entities.

Existing slow movement-network + Identity and historical elements

Existing slow movement-network + Public green amenities

Conclusion of Urban Fabric

Problems:
1. DIsconnected cross-entity slow movement network
2. Open garden city neighborhood and indutrail entities need renovation

Potential values:
1. Dikes and waterlines have the potential as restorative connecting elements
2. Dike villages, picturesque garden villages, polder neighborhood still preserve the dike city identity.

Problems

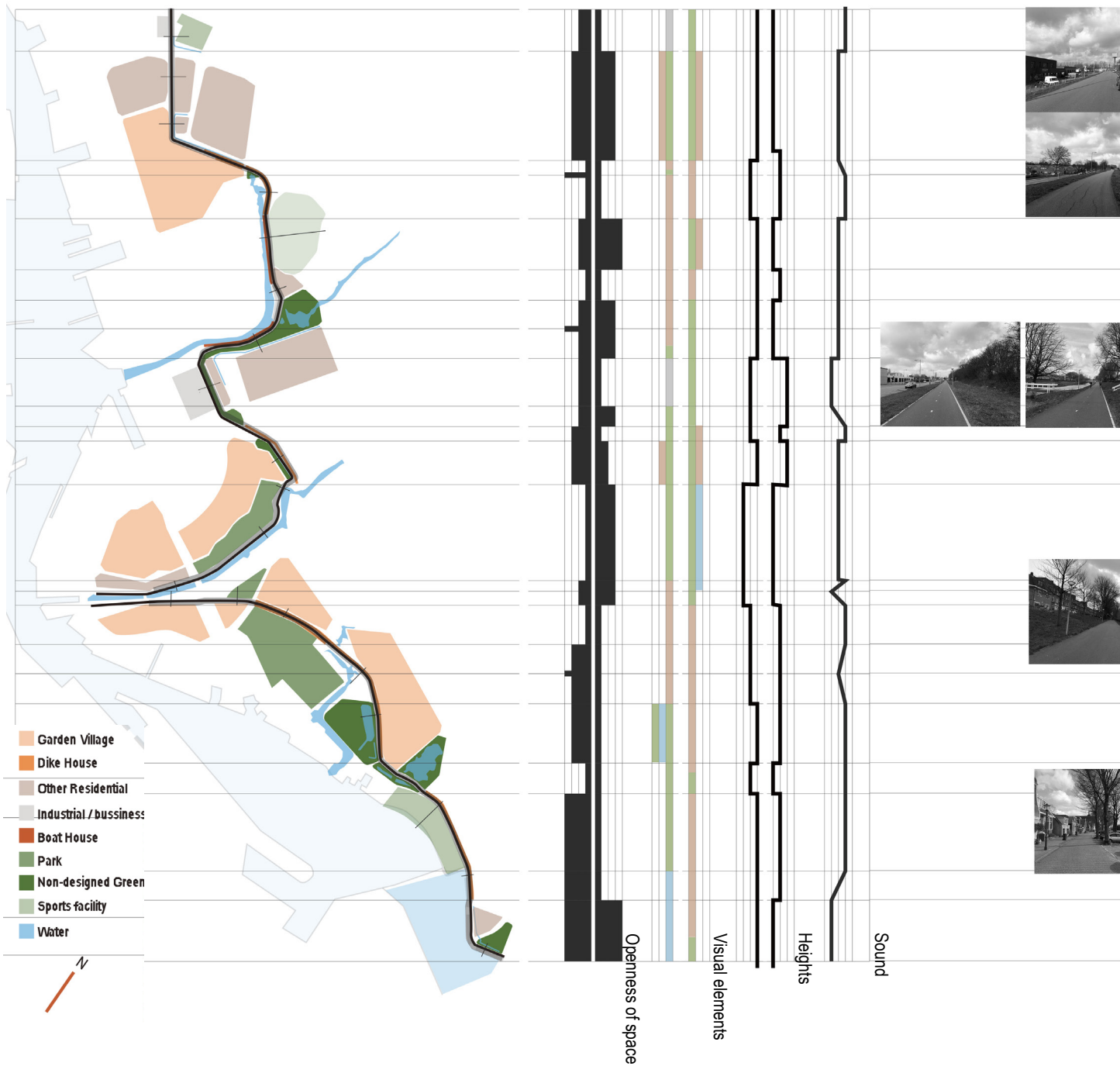
Potential value

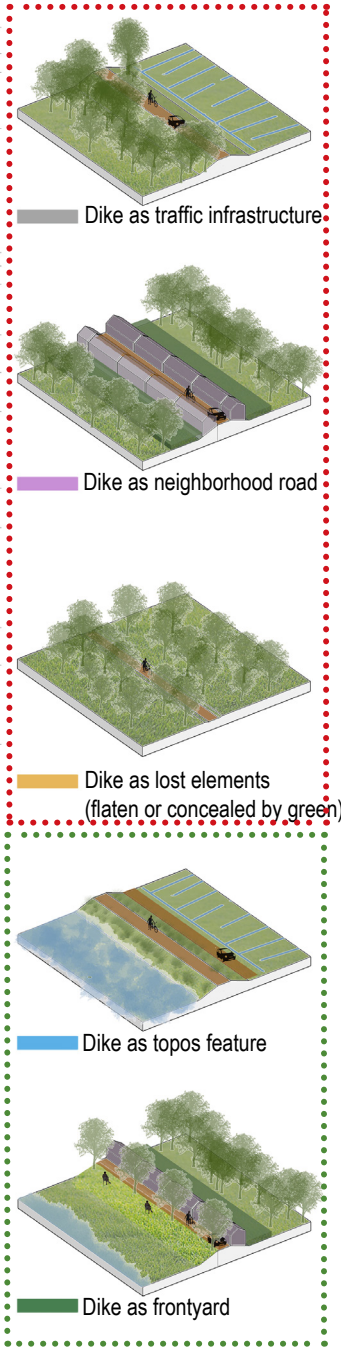
3.2 Field Study of the Dike
On dike experience

The dike goes through the potential area and is away from busy car traffic. Going though the dike, the expeience varies in openess of space, visual elements, height, and sound. It composes a interesting sequnces of topos and cultural features of Noord(the identity).

After centuries of urbanization, the dike, as a old topo features, has is fragmented function and sensory expierences.
The dike can be described with 5 typologies:
1.Dike as traffic infrastructure
2. Dike as neighborhood road
3. Dike as lost elements(flaten or concealed by green)
4. Dike as topos feature
5. Dike as front yard

The last 2 typology has still characteristic sensory experience as a dike and restorative green spaces with them, while in the 1,2,3 typology, the sensory expierence is lost and it's used as a infrastructure with little restorative value.

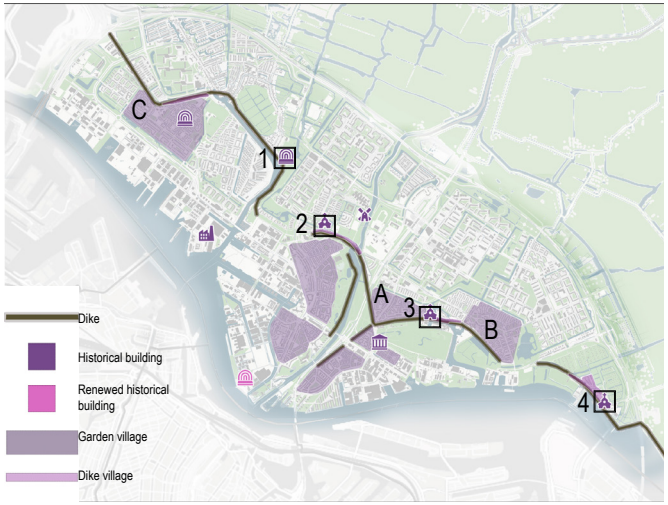



Dike as traffic infrastructure
Dike as neighborhood road
Dike as lost elements
(flaten or concealed by green)
Dike as topos feature
Dike as frontyard

3.2 Field Study of the Dike
Dike and identity elements

Historical buildings and garden villages are close to, but hindden from the dike.

These identity elements have their own characteristicsm, site-specific green nodes can be made to emphasis the elements

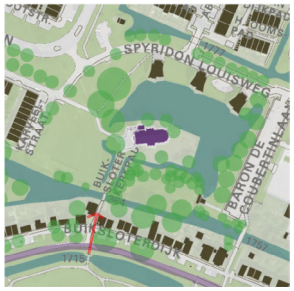


Historical buildings

view from the dike

1. Concertgemaal
Built in: 19?? (1984)
Original Function: Power station
New Function: Concert hall, workplace

2. Buiksloterkerk
Built in: 1609
Original Function: Church
New Function: Church, monument, concert hall



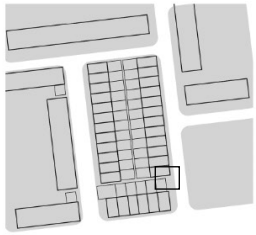
3. Augustinuskerk
Built in: 1888
Original Function: Church
New Function: Church (locked)

4. Schellingwouderkerk
Built in: 1866
Original Function: Church
New Function: Church, Dining place

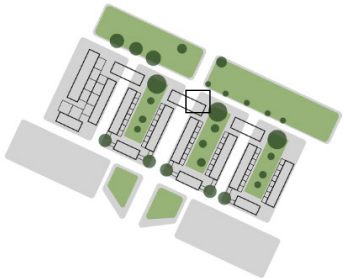
Garden villages

Border map | Green map | Neighborhood structure map | Typical block

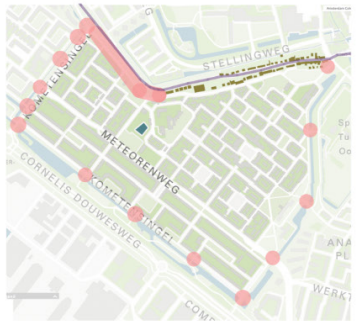
A. Tuindorp Buiksloot

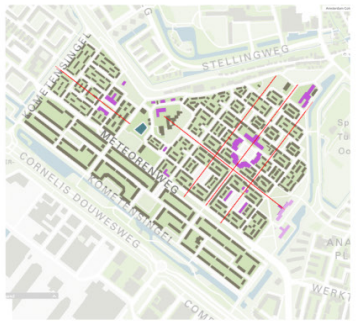


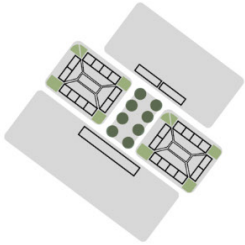
B. Tuindorp Nieuwedam



C. Tuindorp Oostzaan







Dike
Dike villages
Entrance

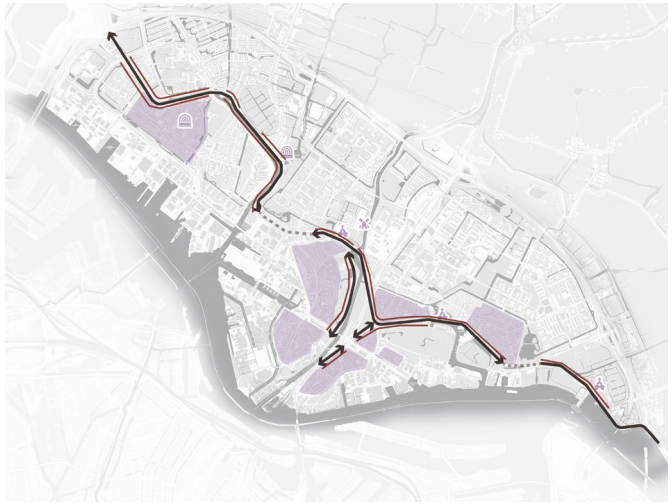
Courtyard
Square / Playground
Other green
Trees

Buildings
Historical buildings
Symmetric line

Conclusion of Field Study of the Dike

Problems:
1. Lost sensorial experience of dike.
2. Important historical elements are concealed and disconnected in lanscape.

Potential values:
1.The dike itself provides rich sensorial experience.
2.New green spaces can be made to link historical elements to the dike.



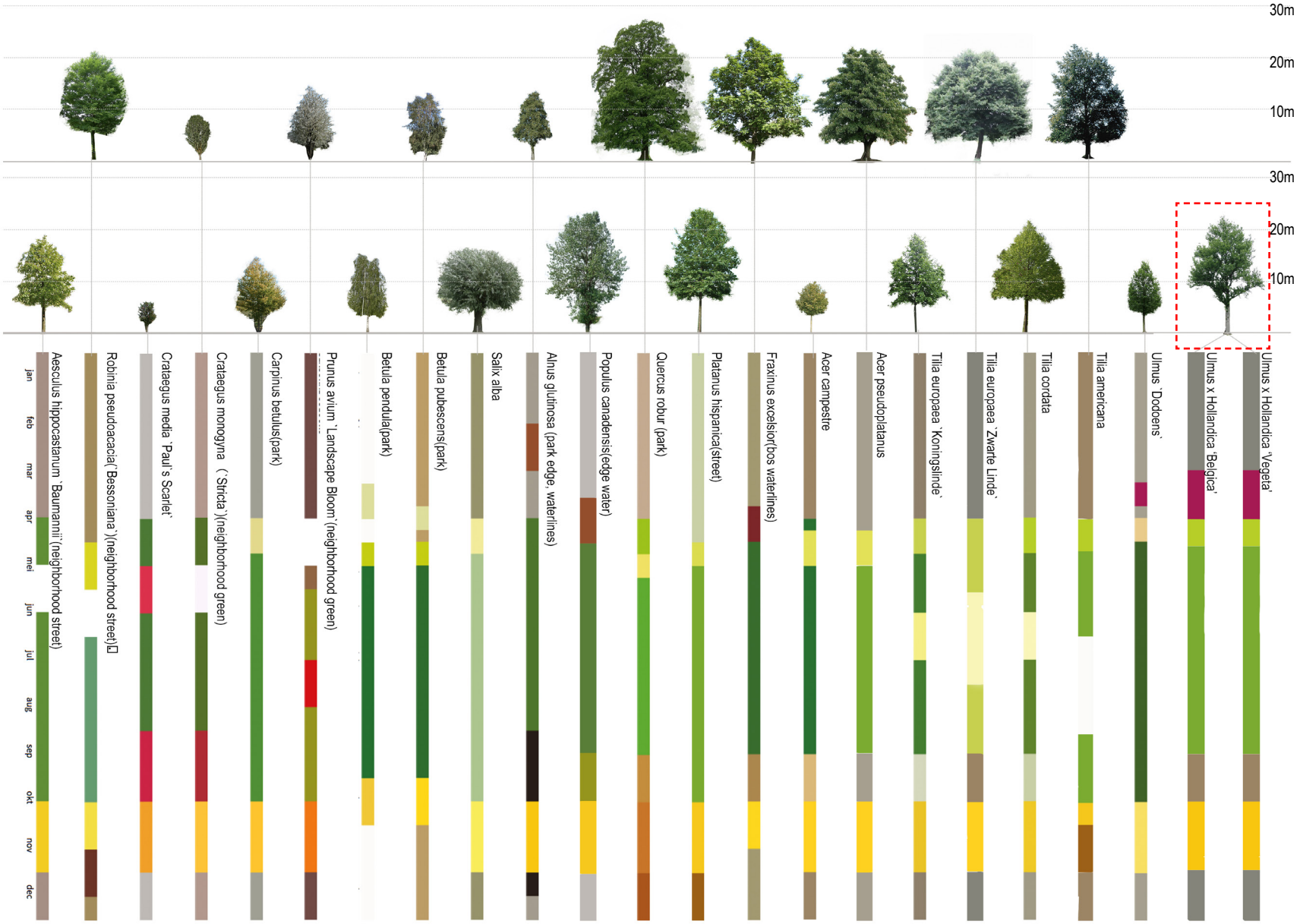
Problems

Potential value

3.3 Urban forest
Elements: commonly used species

The commonly trees in Amsterdam Noord are deciduous trees, which has a rich seasonal change through out the years.

The mostly used tree is *Ulmus hollandica*. This is also the most used tree in the whole, Amsterdam because it suits well with the salty water and soil condition. In Amsterdam Noord,*Ulmus hollandica* is also seen as monument trees along the old canal structures, thus it is the representative tree of the dike identity.(Source: Stiller, L., & Blankers, E. (2011). Het Amsterdamse Bomenboek).



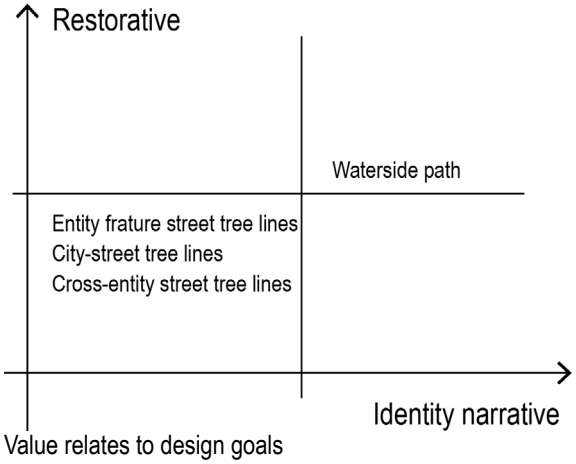
Size and seasonal change (color) of mostly used trees in Amsterdam Noord (souece: Gemeente Amsterdam, Ebben)

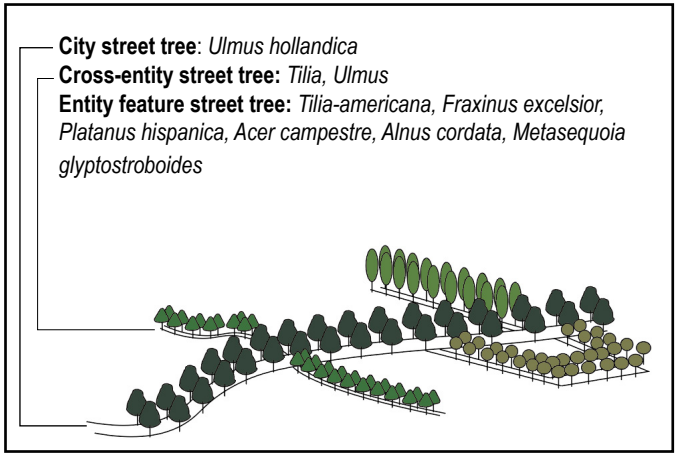
3.3 Urban forest
Features: single-species tree lines

A single-species tree line can create a strong sense of place and identity, thus is a important identity representative elements.

Apart from 2 watersiden path, the single-species tree lines in Amsterdam Noord are mostly used along car roads as street tree lines. There is a species language in hierachy of 3 streets: City street tree lines (which is planted along city street, usually *Ulmus Hollandica*), cross-entity street tree lines (which is planted along main street that cross entities,usually *Ulmus* and *Tilia*) and entity feature tree.

Landscape features such as dikes and most waterside features can not be recognized in this network.





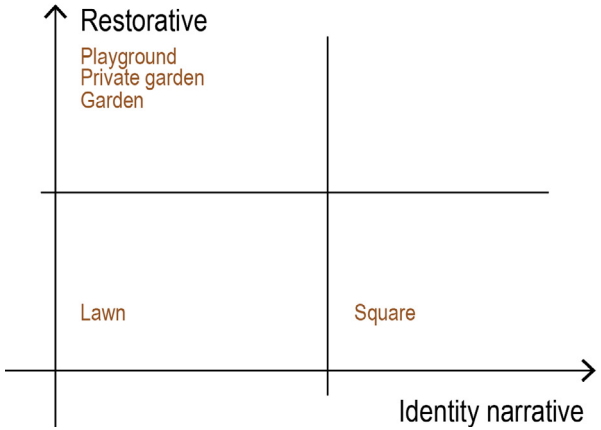
Species language in street tree lines.

3.3 Urban forest
Areas: single-species tree lines

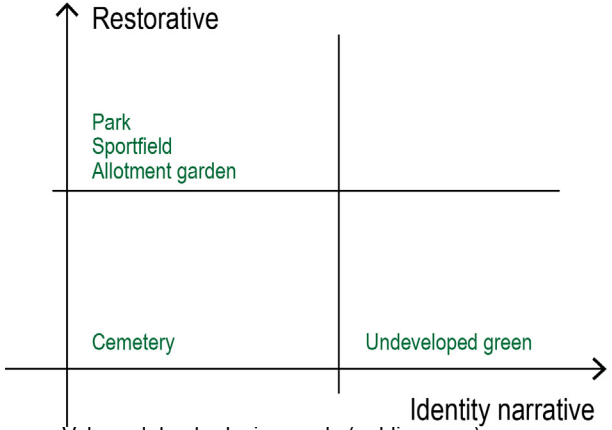
Neighborhood green and public green areas in the city are most functional oriented, such as playgrounds and sportfields.

Only a few has an enclosed space that can provide restorative value, such as gardens and city parks.

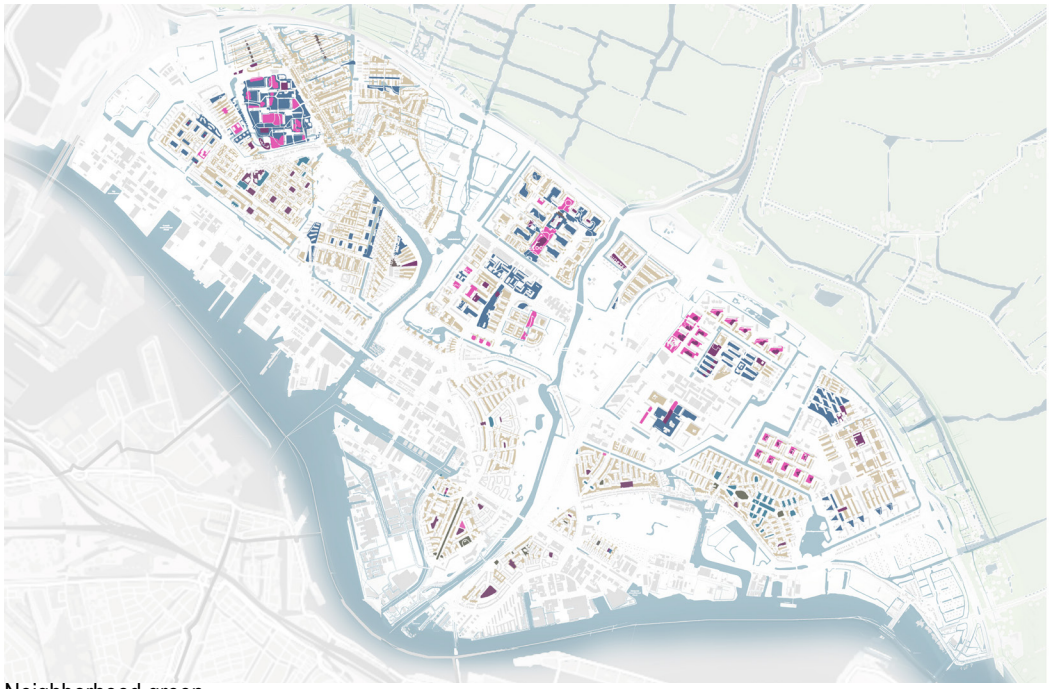
Only in 3 public areas can the green urban identity be seen in the landscape, such as a preserved polder and preserved forest.



Value relates to design goals (neighborhood green)



Value relates to design goals (public green)



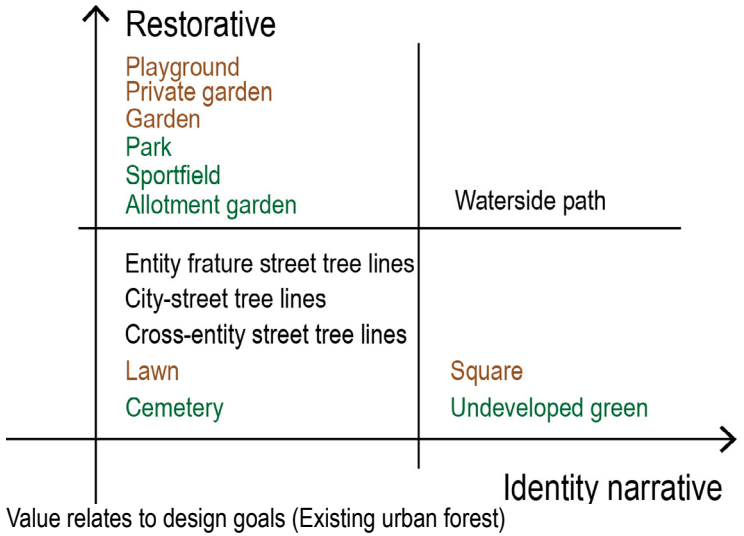
Neighborhood green

Public green

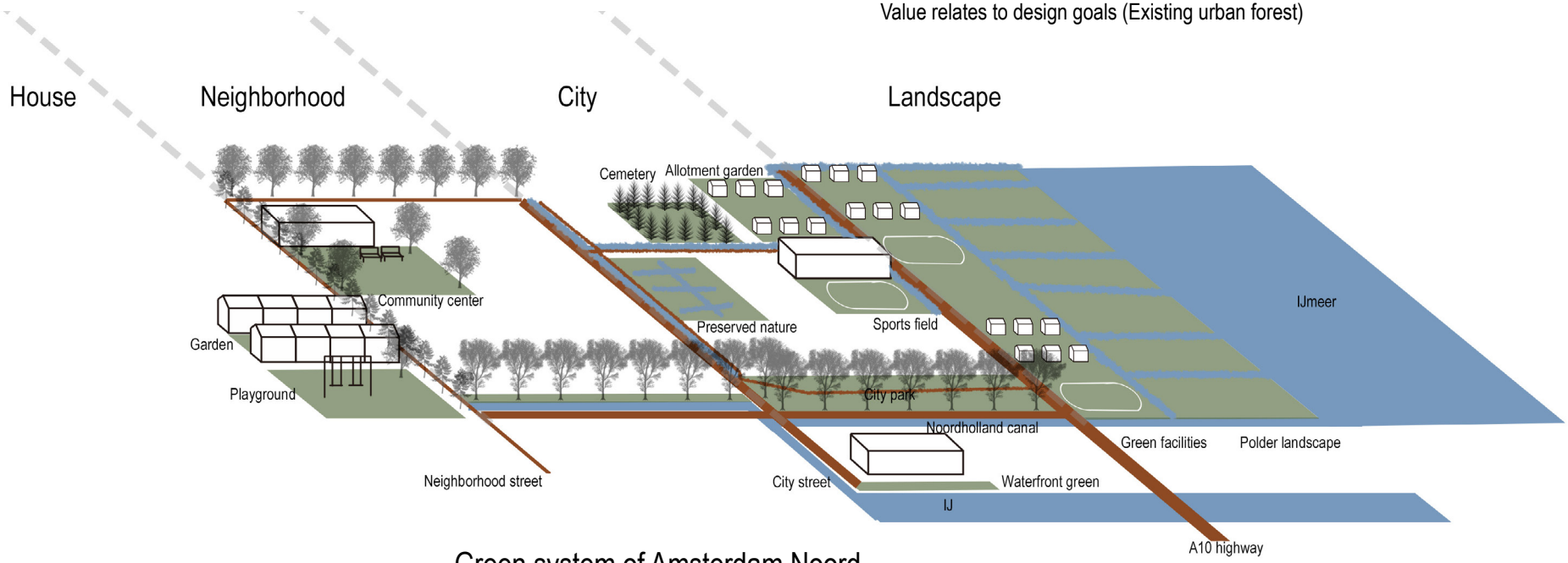
Conclusion of Urban Forest

Problem:
The existing tree features are mostly function-oriented. Identity elements such as dike is seldomly recognized in the existing tree features and areas.

Potential values:
1.*Ulmus hollandica is recognized as a simbol tree for dike identity*
2.Tree lines and green areas in the city already provide high restorative value.



Value relates to design goals (Existing urban forest)



Green system of Amsterdam Noord

3.4 Conclusion: probelms and potential values

Site study gives problems in Amsterdam Noord, and potential values that can help it become a future garden city:

Conclusion of Urban Fabric

Problems:
1. DIsconnected cross-entity slow movement network
2. Open garden city neighborhood and indutrail entities need renovation

Potential values:
1. Dikes and waterlines have the potential as restorative connecting elements
2. Dike villages, picturesque garden villages, polder neighborhood still preserve the dike city identity.

Conclusion of Field Study of the Dike

Problems:
1. Lost sensorial experience of dike.
2. Important historical elements are concealed and disconnected in lanscape.

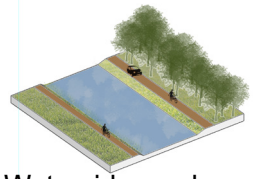
Potential values:
1.The dike itself provides rich sensorial experience.
2.New green spaces can be made to link historical elements to the dike.

Conclusion of Urban Forest

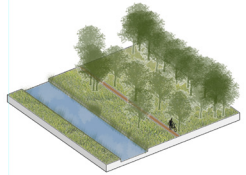
Problem:
The existing tree features are mostly function-oriented. Identity elements such as dike is seldomly recognized in the existing tree features and areas.

Potential values:
1.*Ulmus hollandica is recognized as a simbol tree for dike identity*
2.Tree lines and green areas in the city already provide high restorative value.

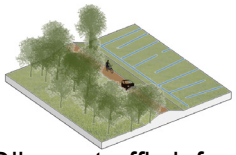
Potenrial values for design:
City network scale: Dike and waterlines has the potential for slow-movement network,
Green spaces scale: New green spaces can be build where dike meets historical elements or waterlines, into new green spaces with high identity narrative and restorative value.



Waterside road

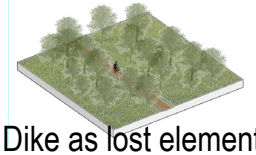


Waterside path



Dike as traffic infrastructure

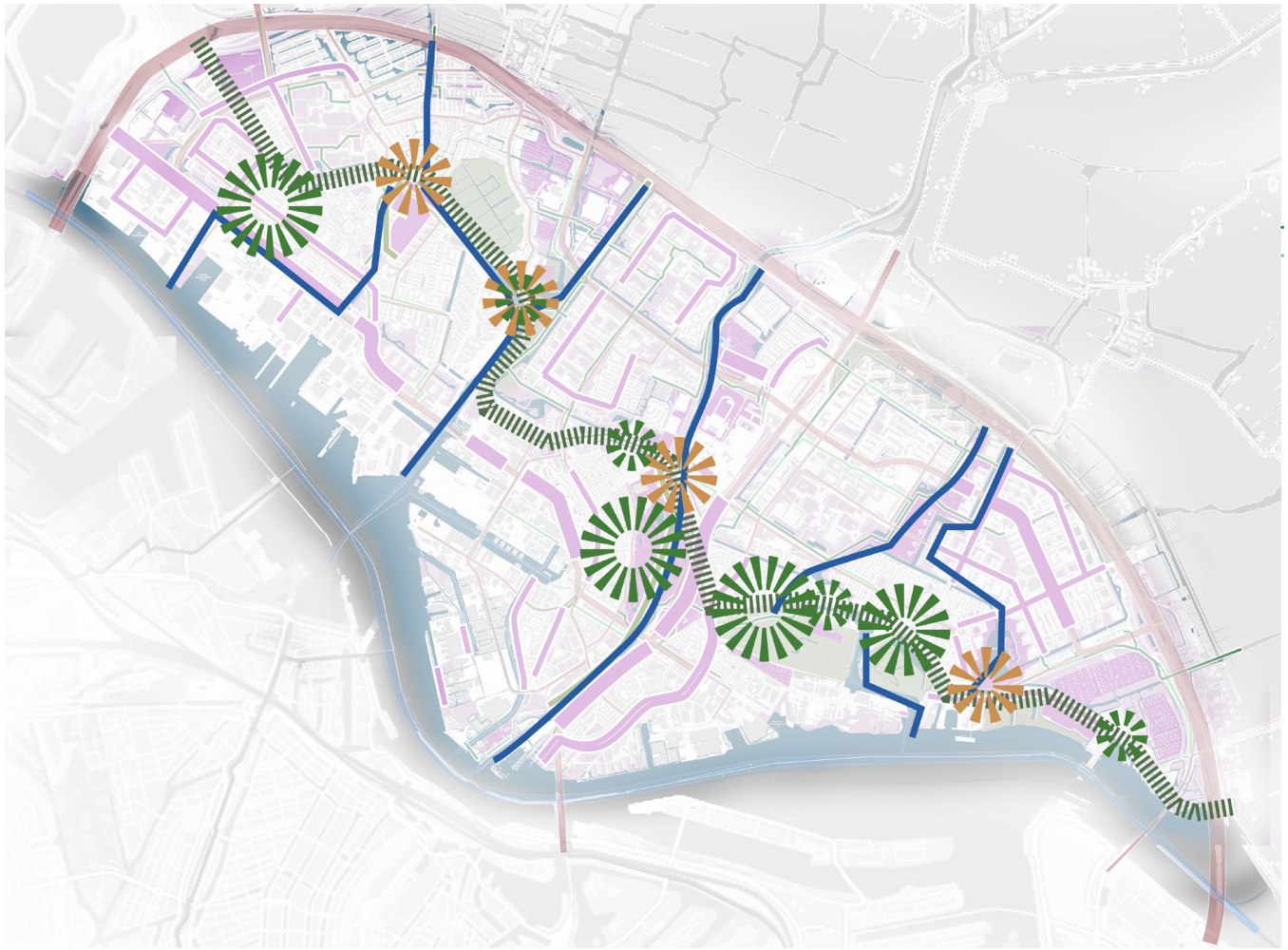
Dike as neighborhood road



Dike as lost elements

Dike + Crossing

Dike + Historical elements

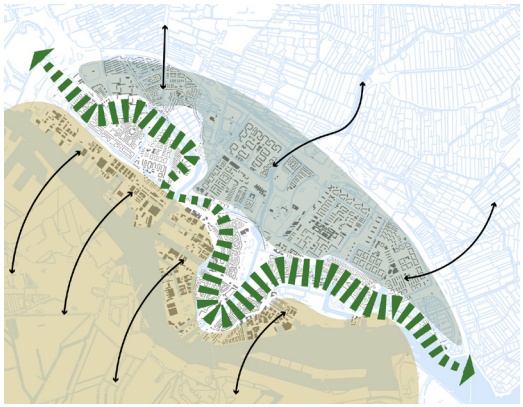


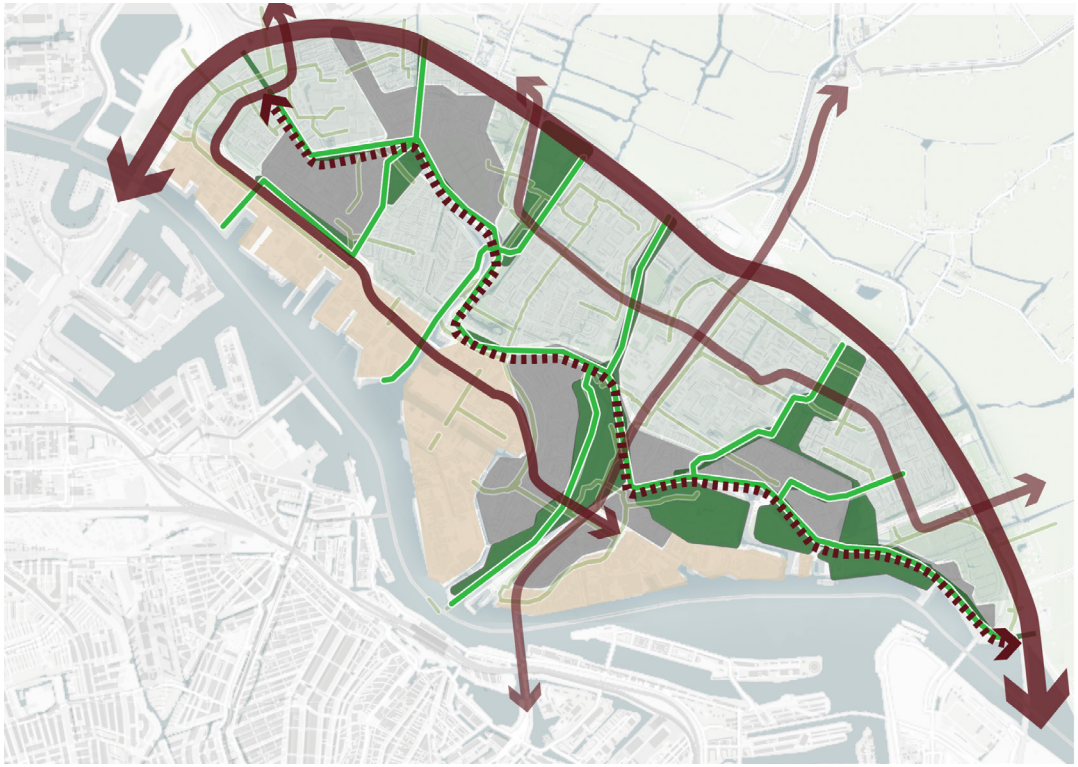
Chapter 4 Design

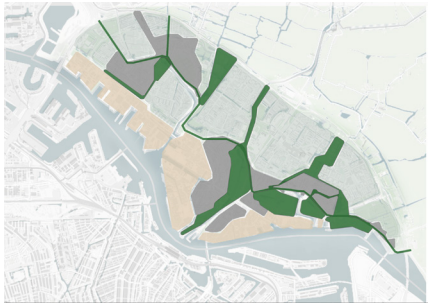
L: Urban Strategy
M: Green Bond Amsterdam-Noord
S: Identity narrative and restorative place making

Amsterdam Noord is given new structure in my project.

The proposed green network and preserved historical area forms a belt to stop Amsterdam from over-expansion, it divided as well as connected the transformed IJ bank(high density) which is included into center Amsterdam, and the Noord suburb neighborhood(low density) in the back.

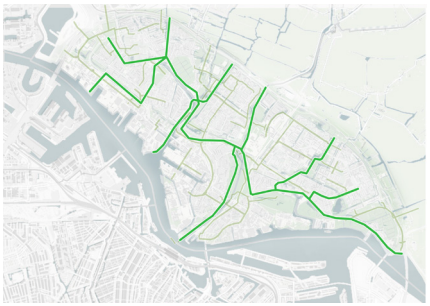




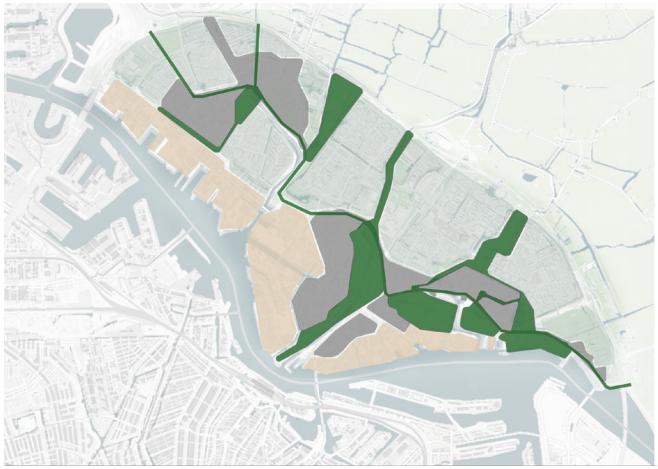


Urban design

Major car traffic



Slow-movement network

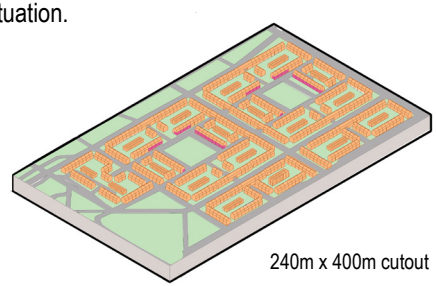


Green bond Amsterdam-Noord

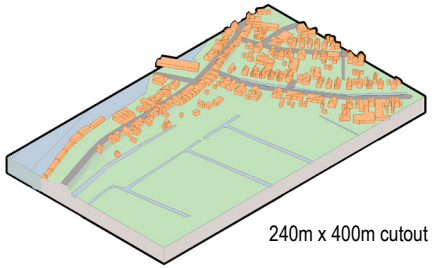
This is the proposed green network.

Preserved historical area

This area consists of dike villages and garden villages, buildings in this area should be maintained or rebuilt the same as the existing situation.



240m x 400m cutout



240m x 400m cutout

Transformed IJ bank (high density)

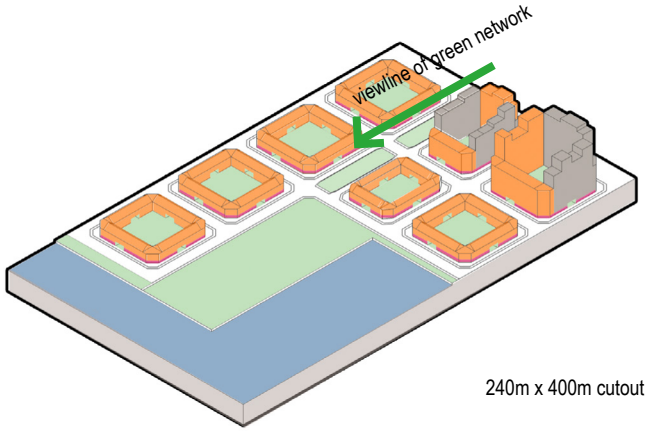
This area adopts the courtyard form refering to the south bank of IJ, to built a multi-function new IJ bank in the north.

Lower units are used where is closer to IJ while higher units are used in the back. Lower units are also used along the viewline of the green network. In this way, IJ-bank skyline becomes a dynamic curve and has more layers, visual connection to the green can also be created.

Function: residential
office
commercial (ground floor)

Average unit size: 60m x 60m

Buildings: 3 Floors (12m) with gable roof
5-12 Floors (15-50m) with flat roof



240m x 400m cutout

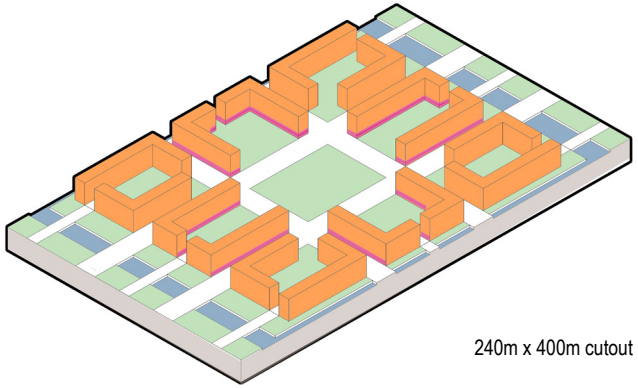
Noord suburb neighborhood (low density)

This area is built refering to garden villages that have a common green center as a amenity center. Meanwhile, the scale is large and more openings are added to improve the connectivity and lower the density. The neighborhood has also a stronger relationship with the surrounding polders by bridges and waterside public spaces.

Function: residential
Commercial(ground floor around central green)

Average unit size: 60m x 80m

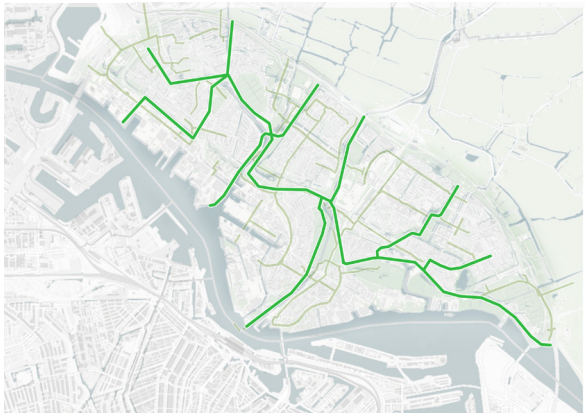
Buildings: 5 Floors (20m) with flat roof

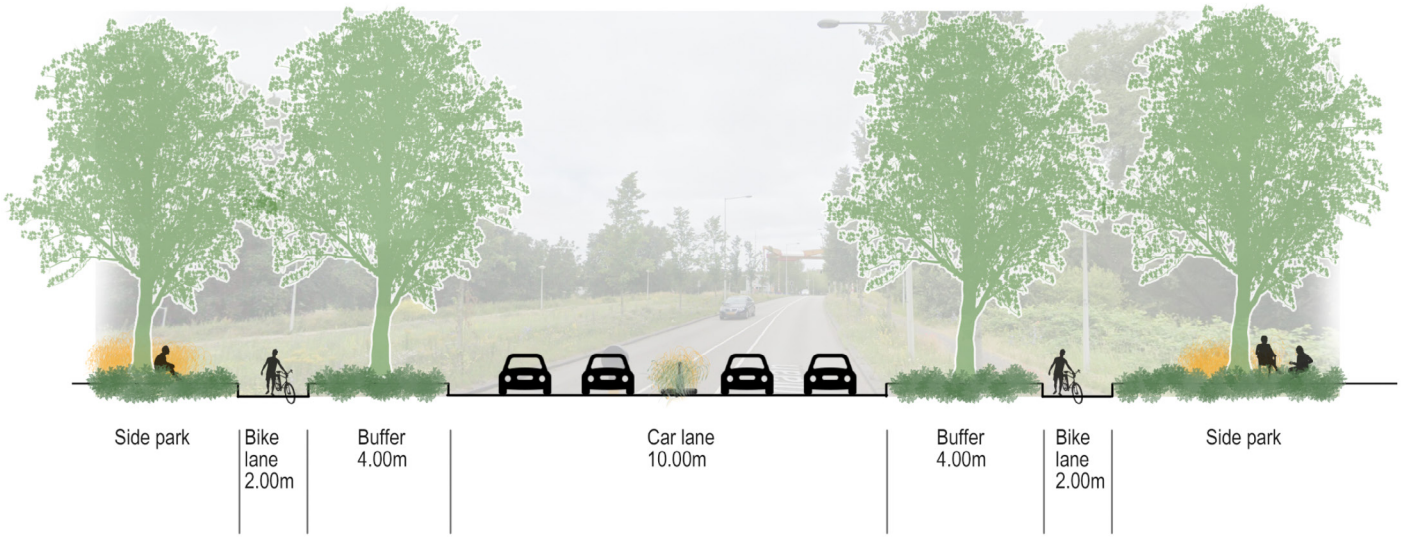


240m x 400m cutout

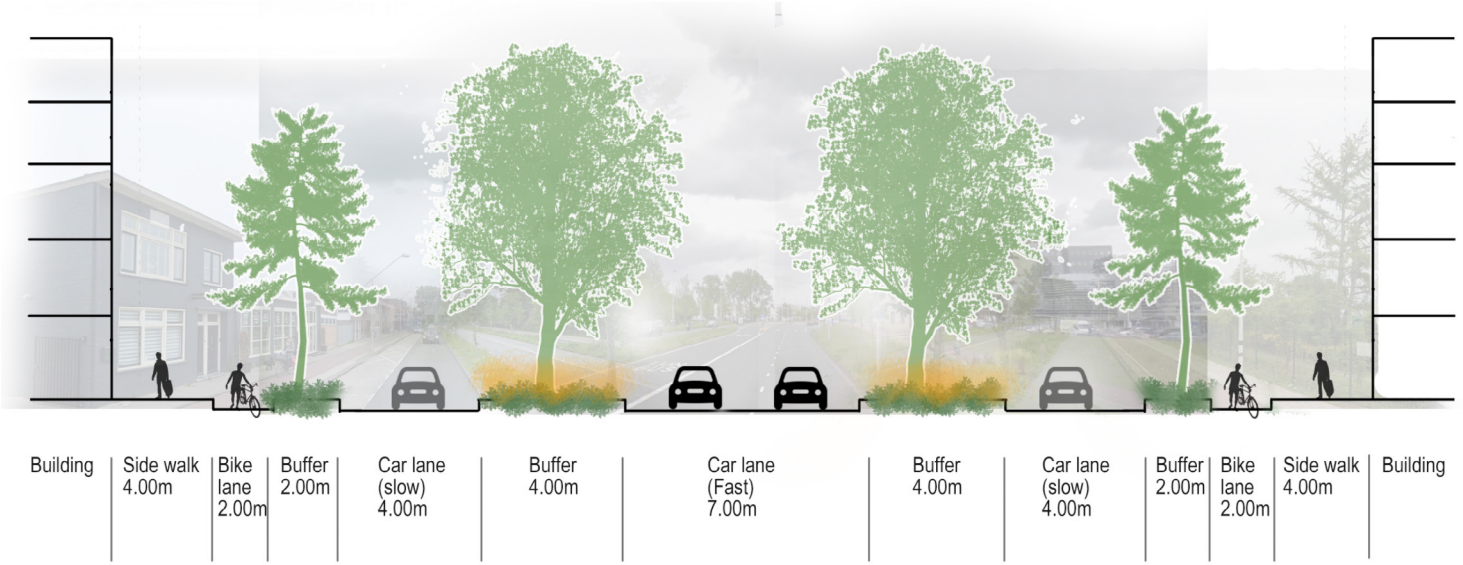
The proposed streets are more integrated with green spaces, in order to provide a restorative exprience for people travels in all kinds of vehicles.

(Interventions related to the dike will be mentioned in the next part.)





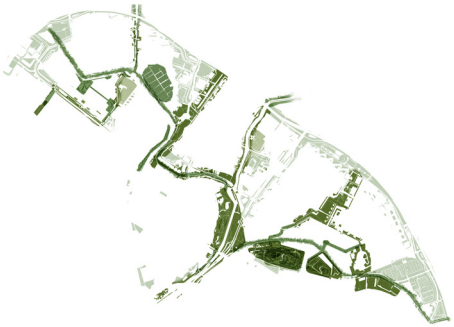
Proposed street in Noord suburb neighborhood (low density)

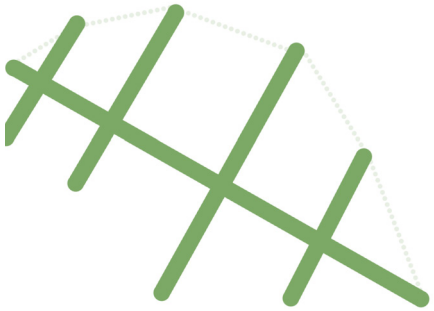


Proposed street in transformed IJ bank (high density)

4.1 M: Green network
Masterplan

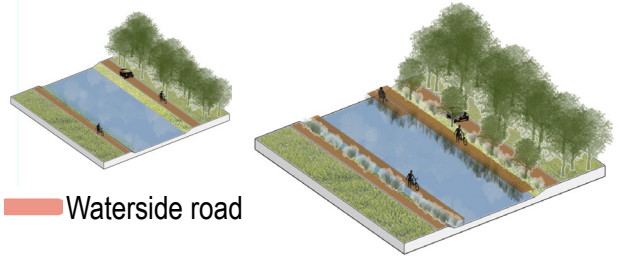
A green slow-movement network built with the dike and waterside green paths. Nodes along the network are designed to provide urban identity representative and restorative experience.

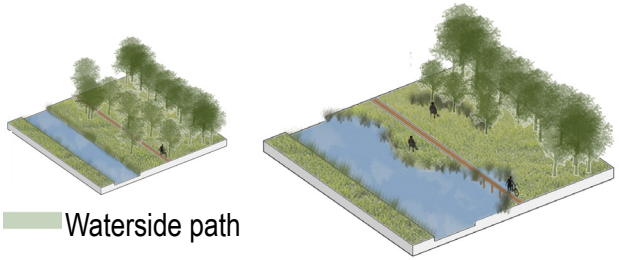




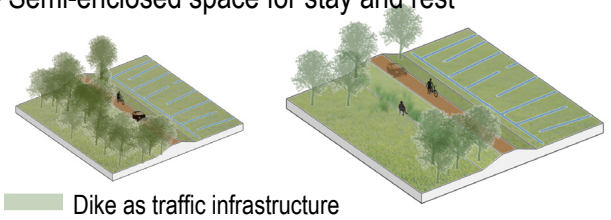
Design Strategies

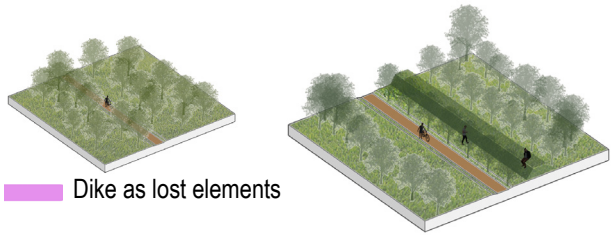
Waterside lines
-Non-obstable design: smooth surface, at least 1.2m wide for pathways, use ramp instead of steps.
- Concealation of busy traffic and high-rise building
- Sensory experience of being on a waterside
- Sensory experience of seasonal change with plants
- Semi-enclosed space for stay and rest



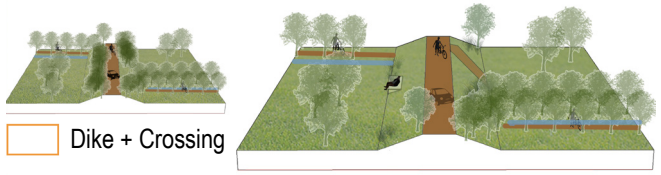


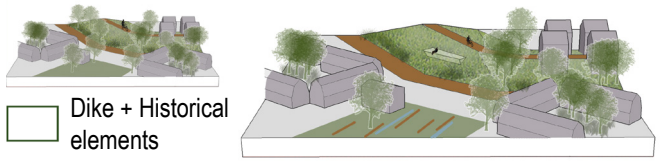
Dike lines:
- Non-obstable design: smooth surface, at least 1.2m wide for pathways, use ramp instead of steps.
- Concealation of car traffic
- Sensory experience of seasonal change with plants
- Semi-enclosed space for stay and rest





Dike nodes:
- Non-obstable design: smooth surface, at least 1.2m wide for pathways, use ramp instead of steps.
- Revealation of the dike
- Sensory experience of being on a dike
- Sensory experience of seasonal change with plants
- Semi-enclosed space for stay and rest

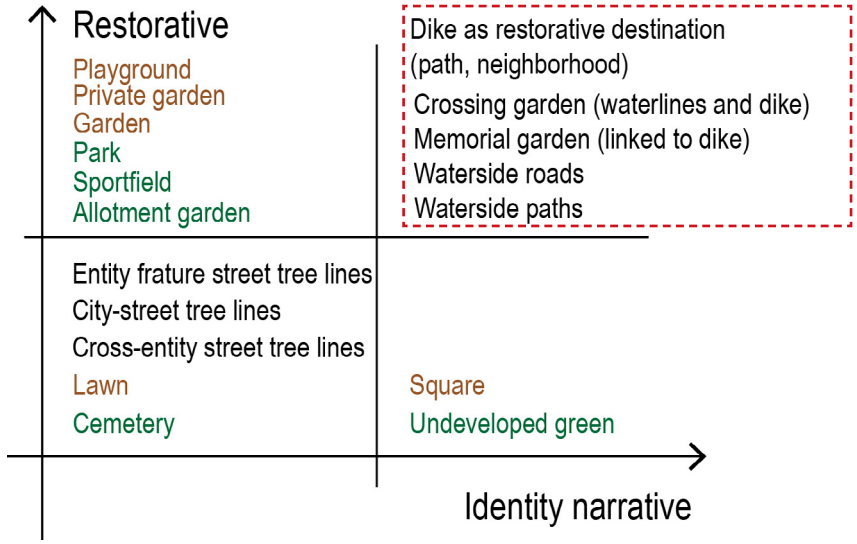


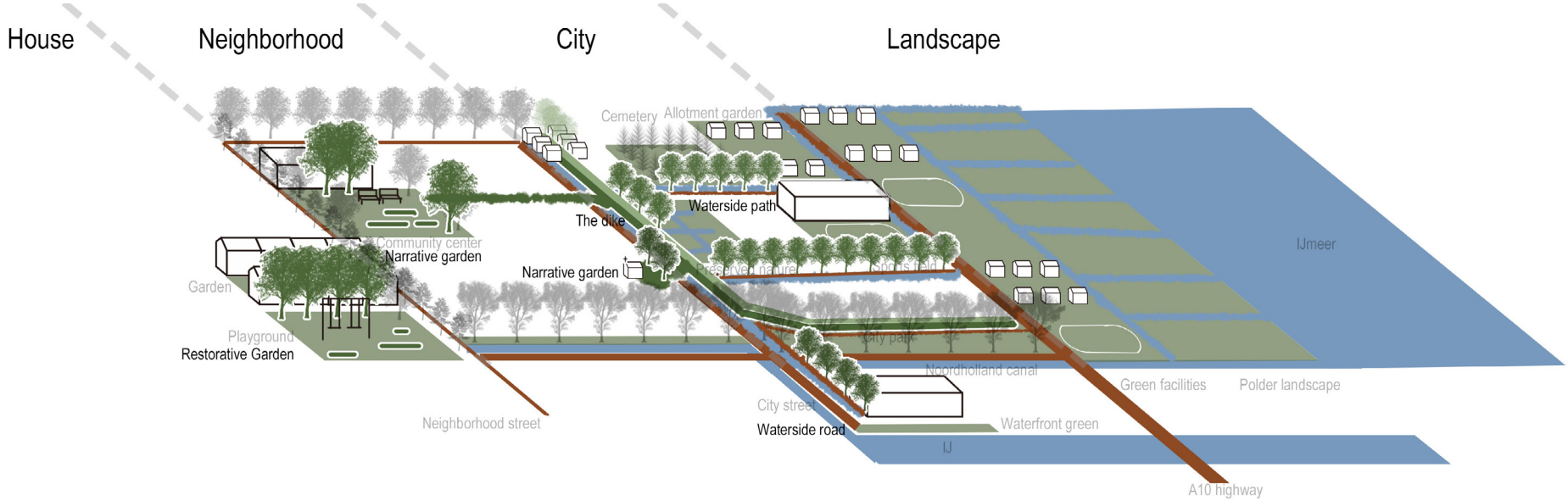


Proposed urban forest system

The dike and waterside are reorganized as central feature lines for Amsterdam Noord urban forest. They connect the city with a slow movement network with green nodes.

The dike becomes the spine of this network. New green lines and nodes are designed to provide sense of identity and restirative values.

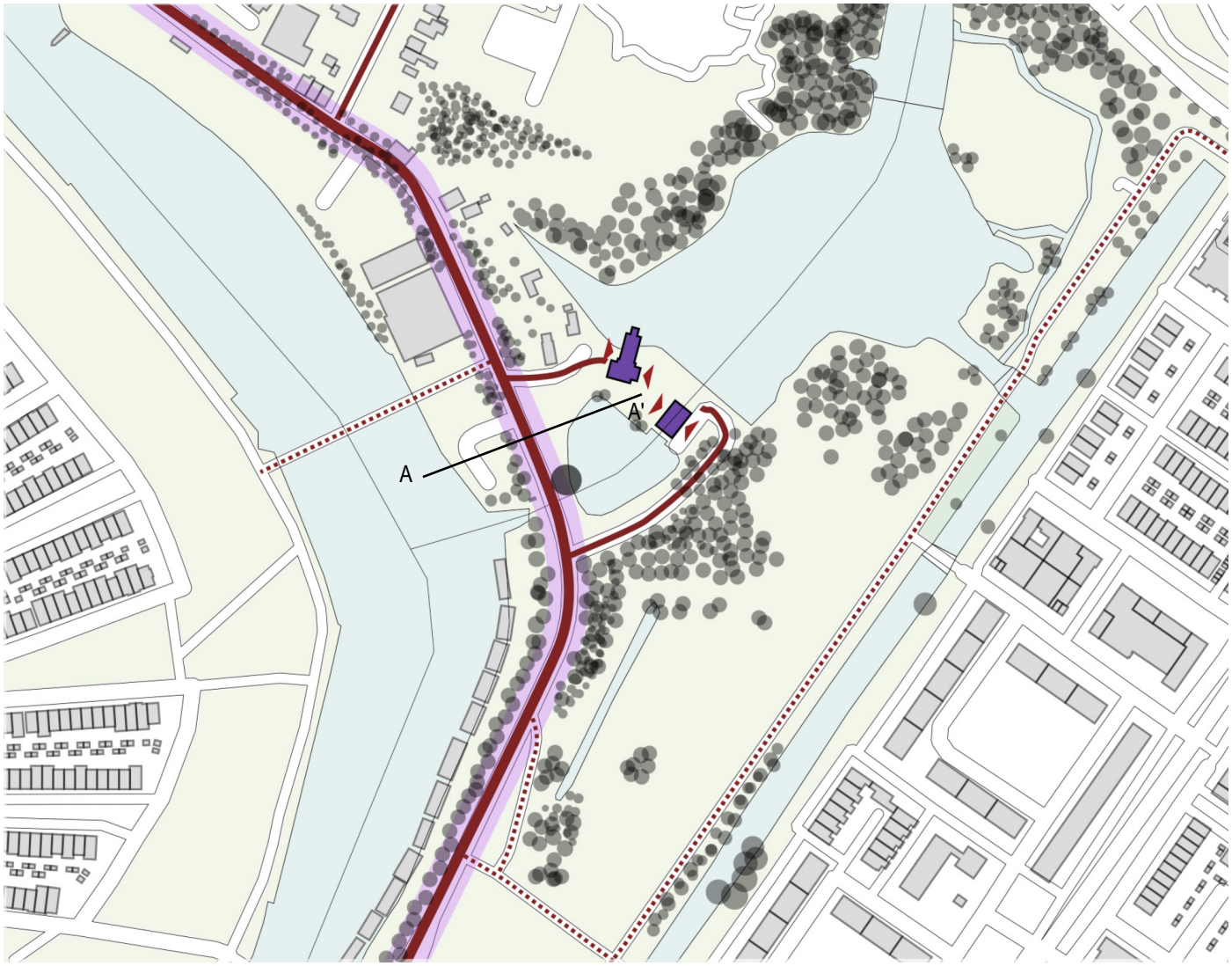




The dike as a activity and identity narrative spine

4.1 S: Urban Forest Place
Test site 1: Dike + Concertgemaal

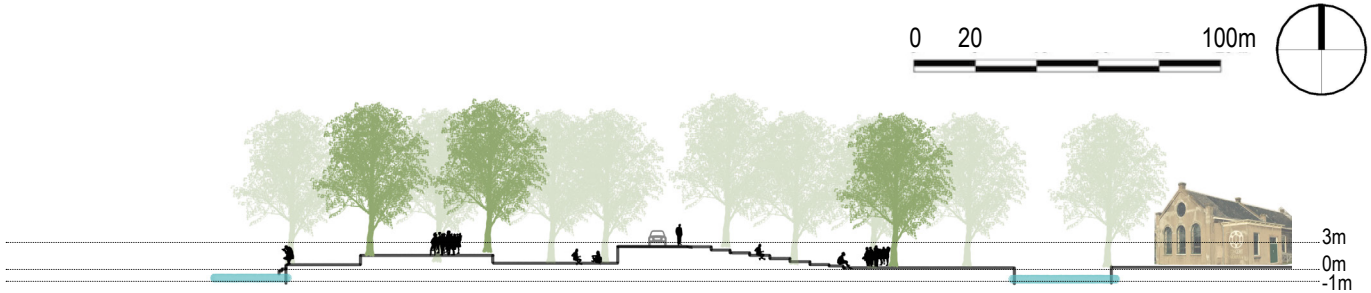
Diagnosis:
1. Dike as traffic infrastructure: Car traffic is not separate from the bike lane; undeveloped water front area(hidden by trees)
2. Disconnection in landscape to Concertgemaal(hidden by trees)
3. Waterside path missing the node



For typologies of:
- waterside path
- dike as traffic infrastructure
- dike+crossing
- dike+ historical elements

The design interventions are:
- Car traffic is limited by speed <30 km/h
- New connection of lines, with tree lines as guidance
- Waterfront urban forest
- Outdoor theater space connecting dike to Concertgemaal
- Along the waterside path, garden, which uses the size of garden city community green spaces, is made as resting spot.
- Original plantations around the polder is kept to keep the original eco system and biodiversity

The trees in the waterside forest forms frames for views across the water. From the dike, the bridge, the across neighborhood, and the water can be seen respectively.



Section A-A'(after)

Circulation and main program

1 The dike

2 Sunken space

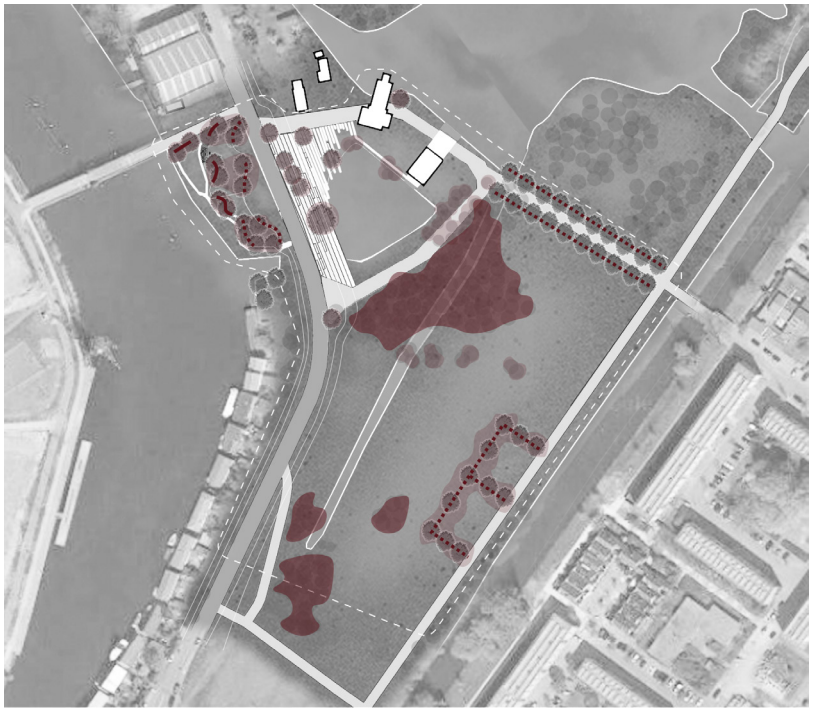
3 Slope terrace

4 Waterfront terrace

5 Ourdoor theater

6 Waterside garden

Plantation scheme



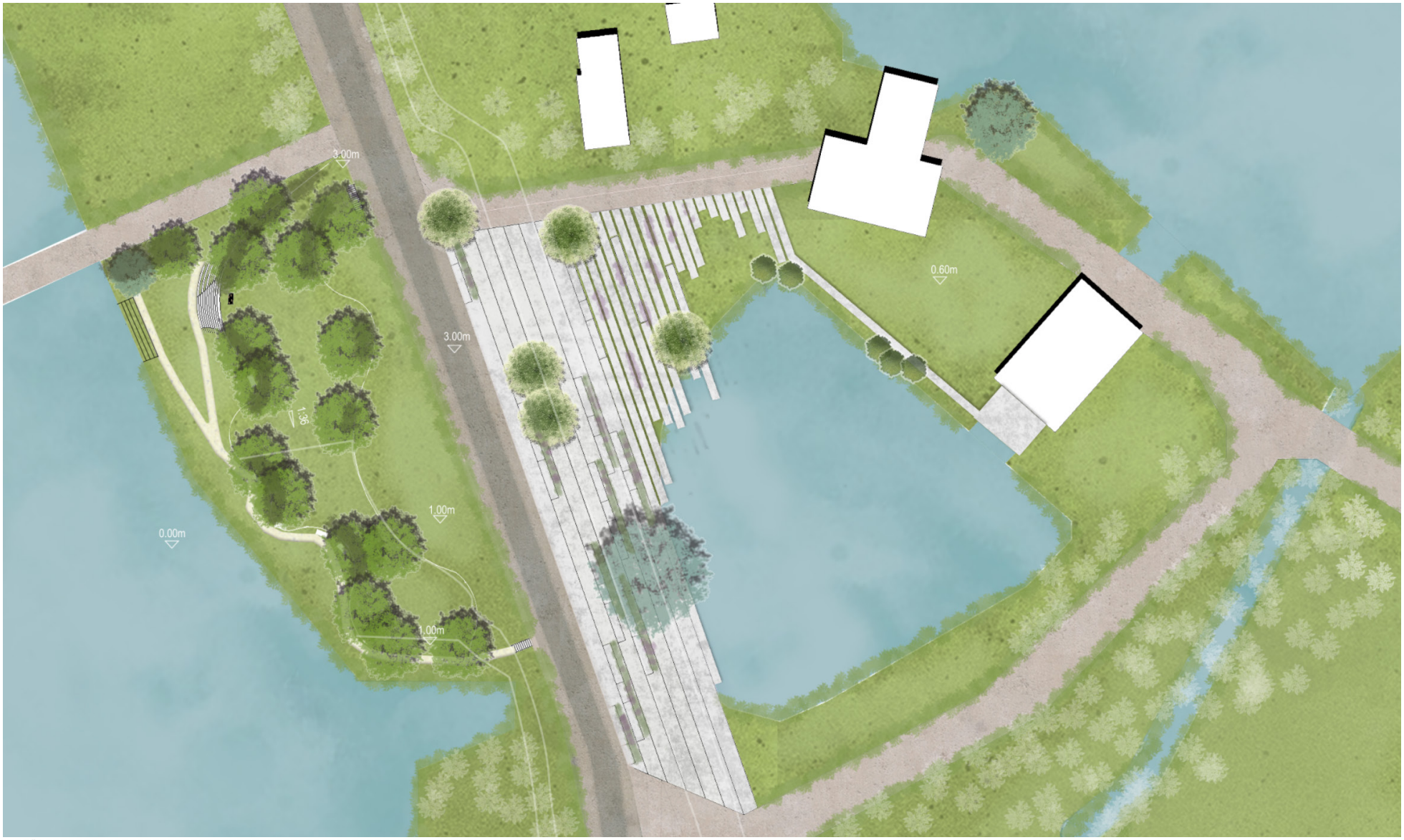
Frame

Wall

Room:
activity space underneath trees

Block:
inaccessible forest

Detailed plan



Ulmus hollandica

Salix alba

Aesculus hippocastanum

Buxus sempervirens

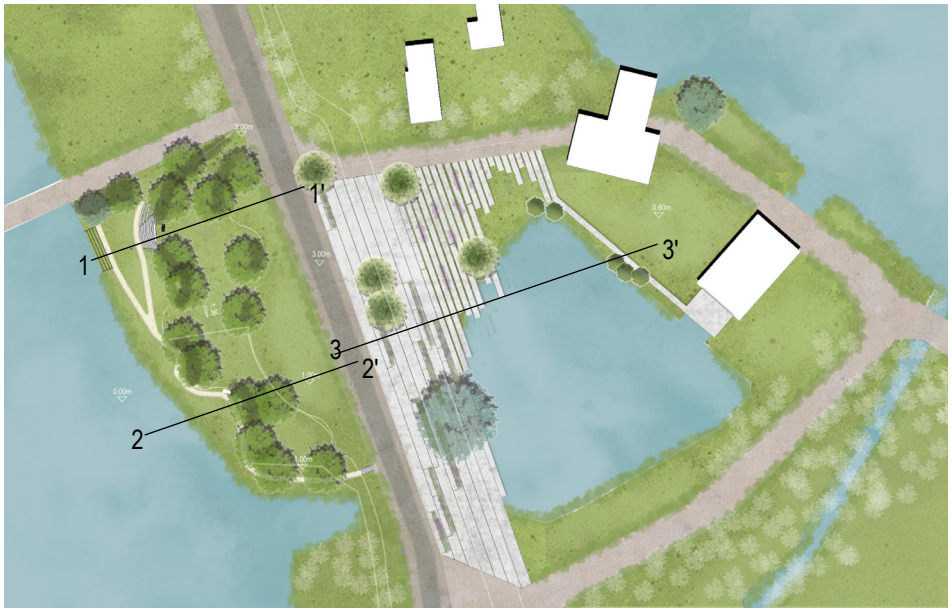
Muhlenbergia capillaris

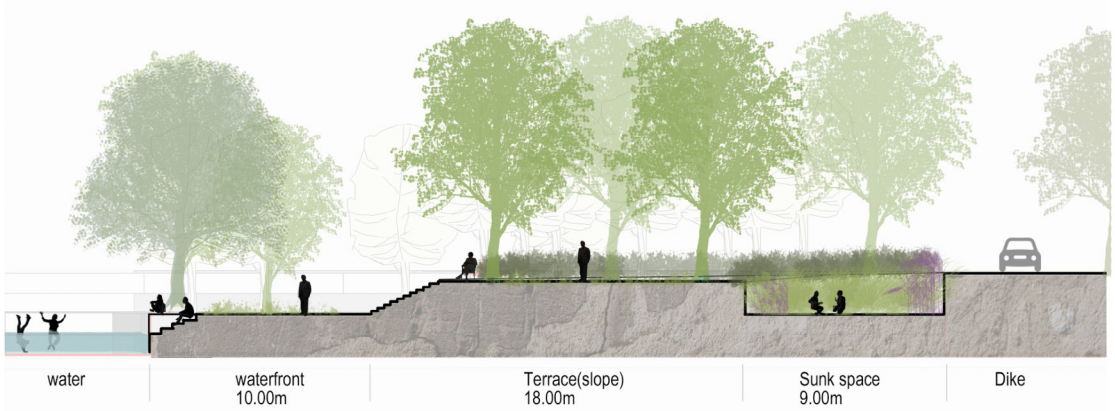
Asphalt

Smooth concrete

0 10 50m

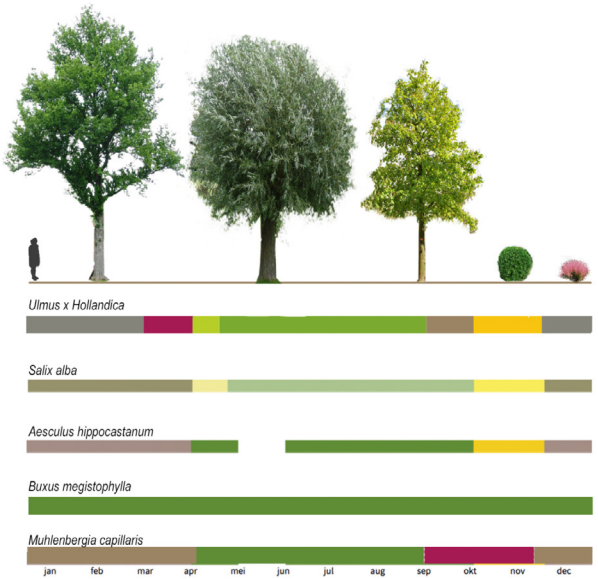
Sections



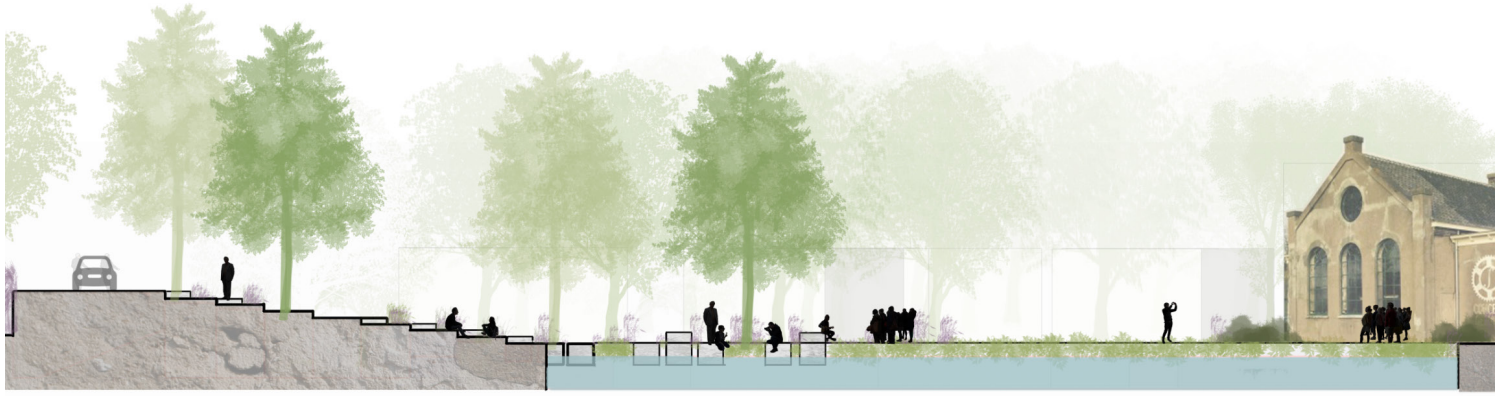


Section 1-1'

Section 2-2'

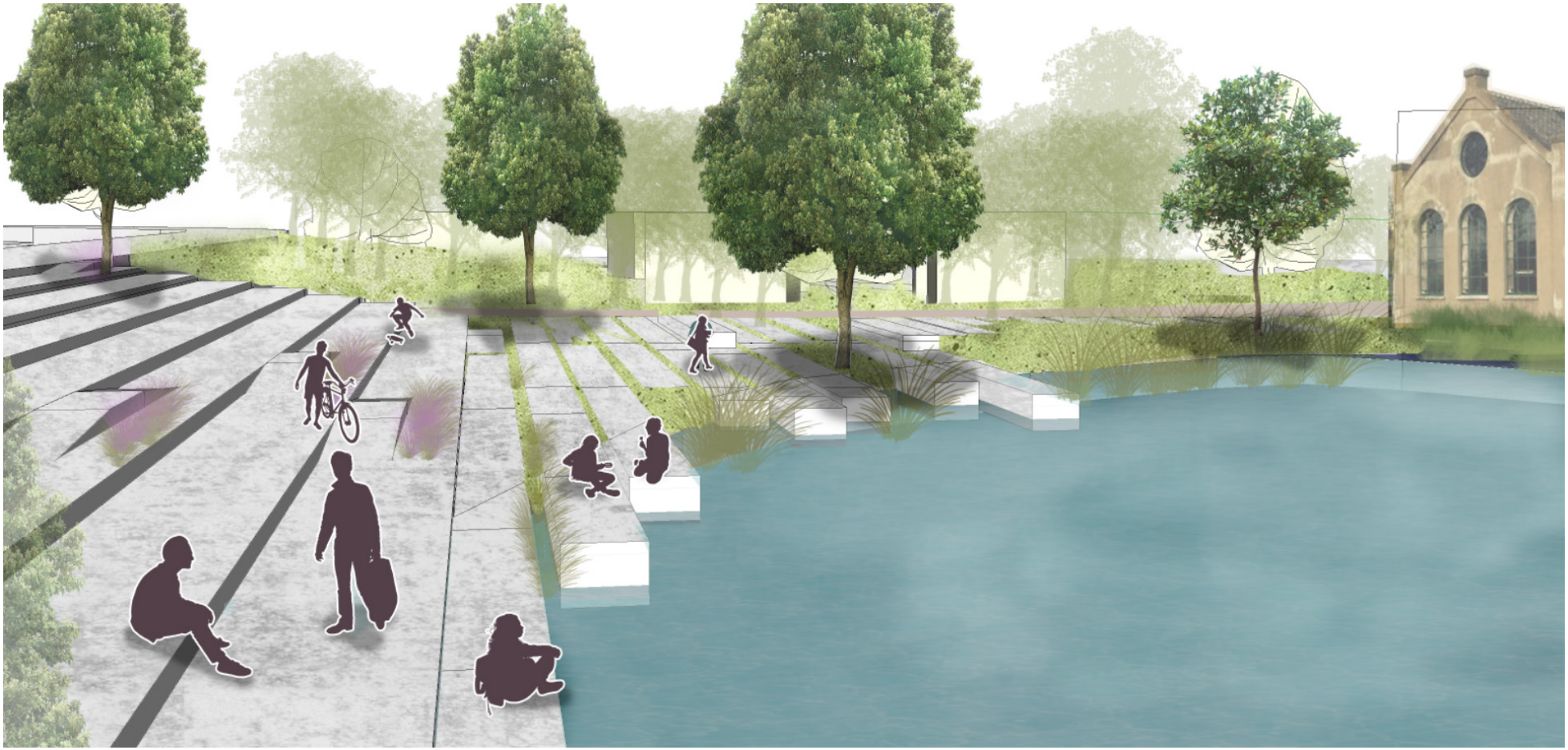


Secasonal color change of trees



Section 3-3'

Waterfront terrace

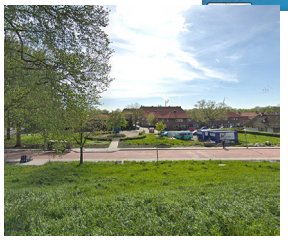


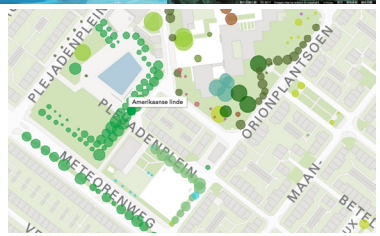
Open theater

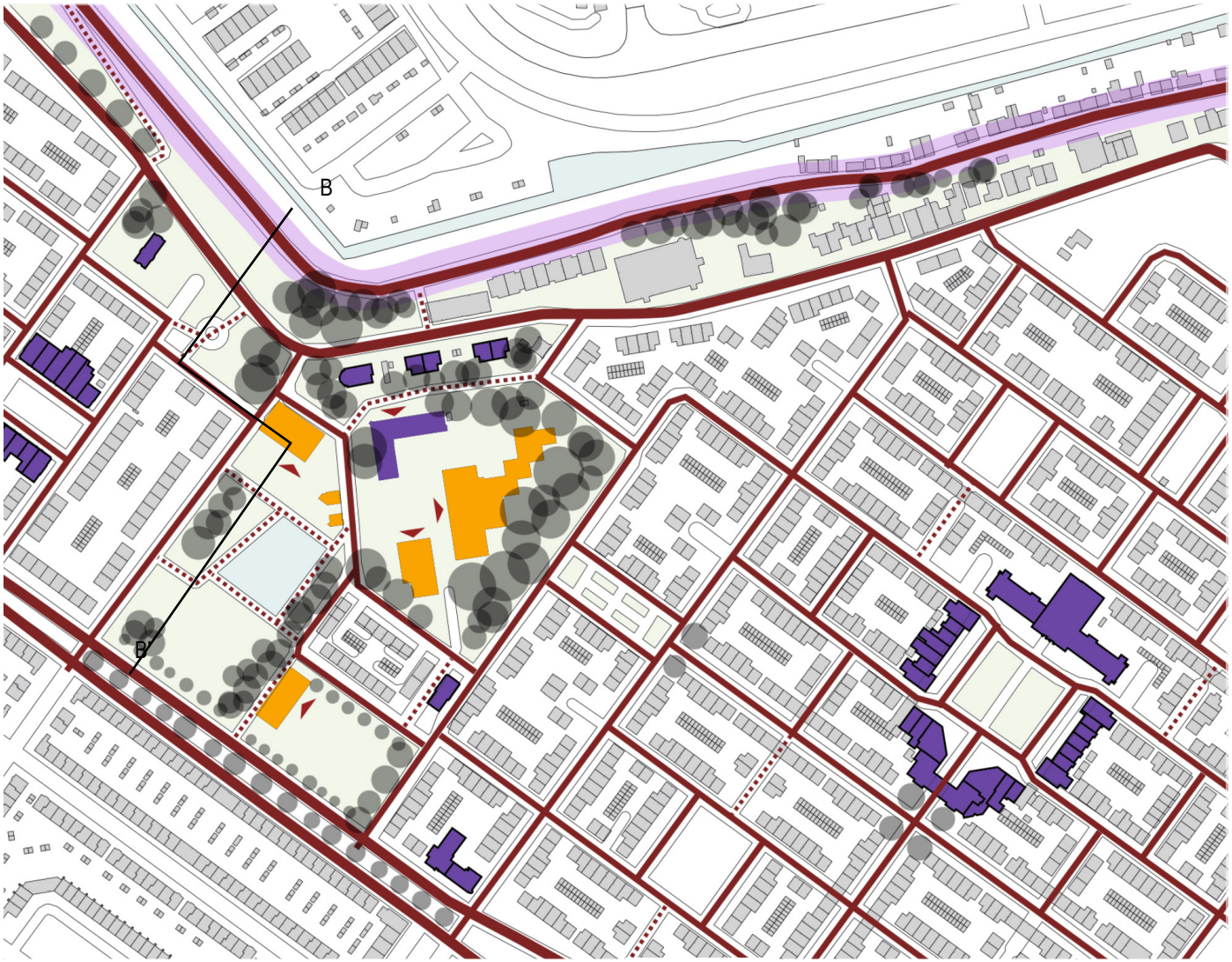
4.1 S: Urban Forest Place
Test site 2: Dike + Tuindorp Oostzaan

Diagnosis:
Dike and Garden village:
1.Disconnection in landscape

Public space in Garden Village:
1. Single tree species, lack of variiety in plants
2. Simming pool as important public space, but only used in summer
3. Entrance of public service buildings are hard to find



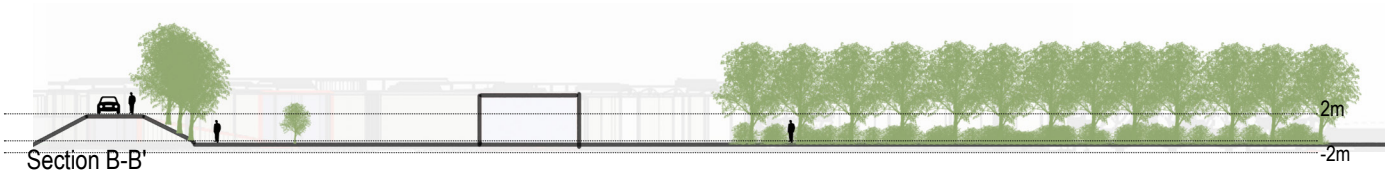




0 20 100m

Car road
Pedestrain/bike path
The dike

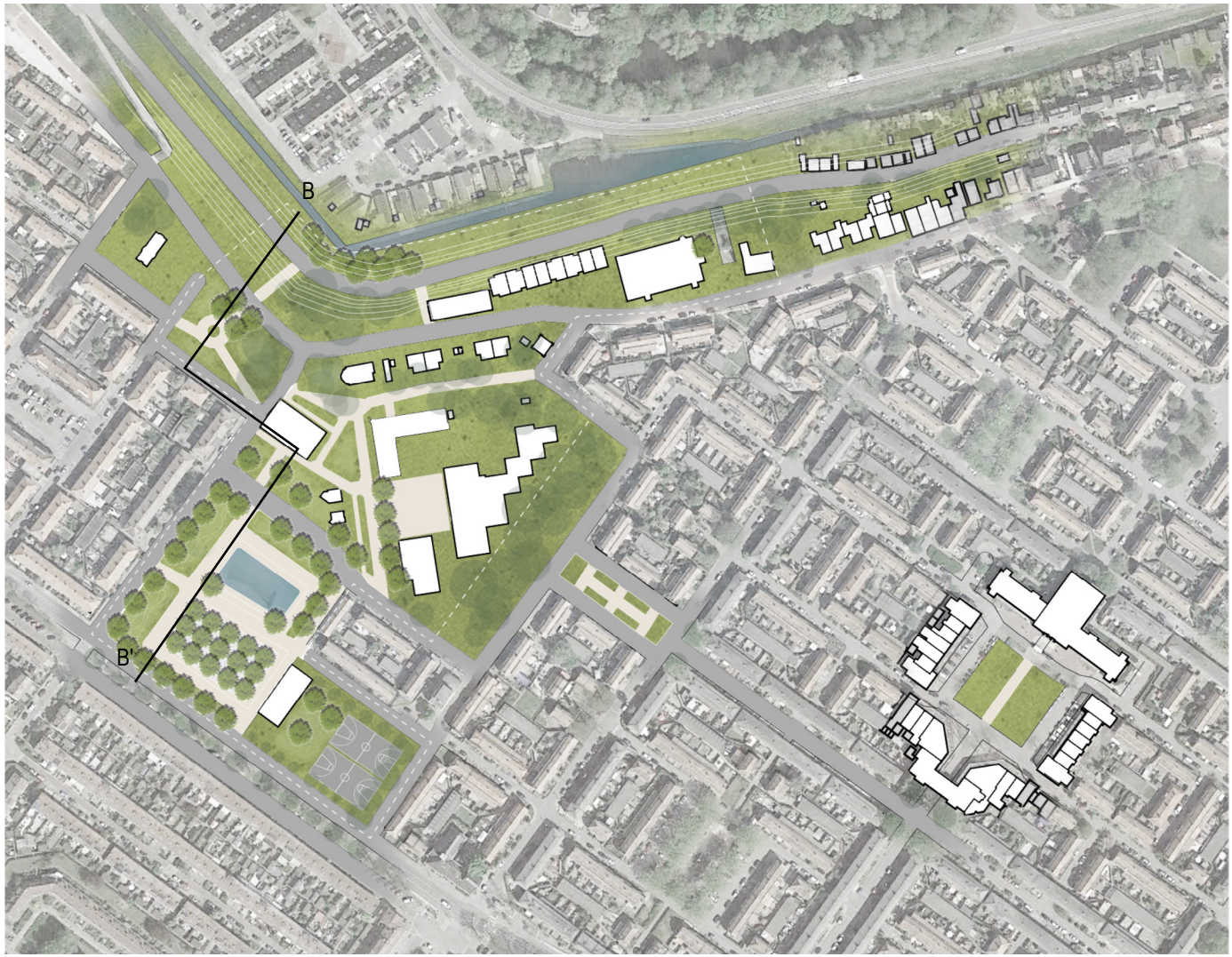
Entrance to building
Historical building
Public service building
Existing tree



Section B-B'

Design intervention:
Dike and Garden village:
1.Connect the dike to the front garden

Public space in Garden Village:
2. Build square that connects all entrances of Public service buildings
3. Multi-functional centural green with more sub-space(water pond, semi-enclosed lawn, shaded squarem cafe) that has more functions through the years and more diverse plants. The size of the su-space is the same as the typical neighborhood plants.



Section B-B'(after)

Circulation and main program

1 Descending filed from the dike

2 Neighborhood frontgarden

3 Public central green spaces

4 Square of public service buildings

5 Public Garden

6 Zonneplein

Plantation scheme

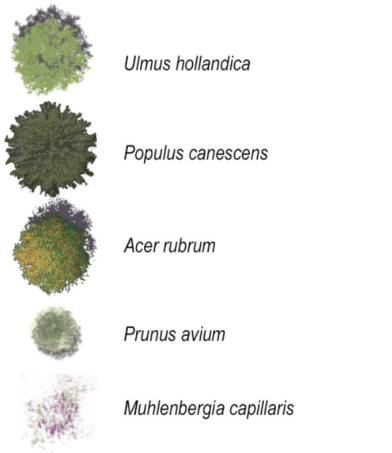
Frame

Wall

Room:
activity space underneath trees

Block:
inaccessible forest

Detailed plan 1: dike and garden village



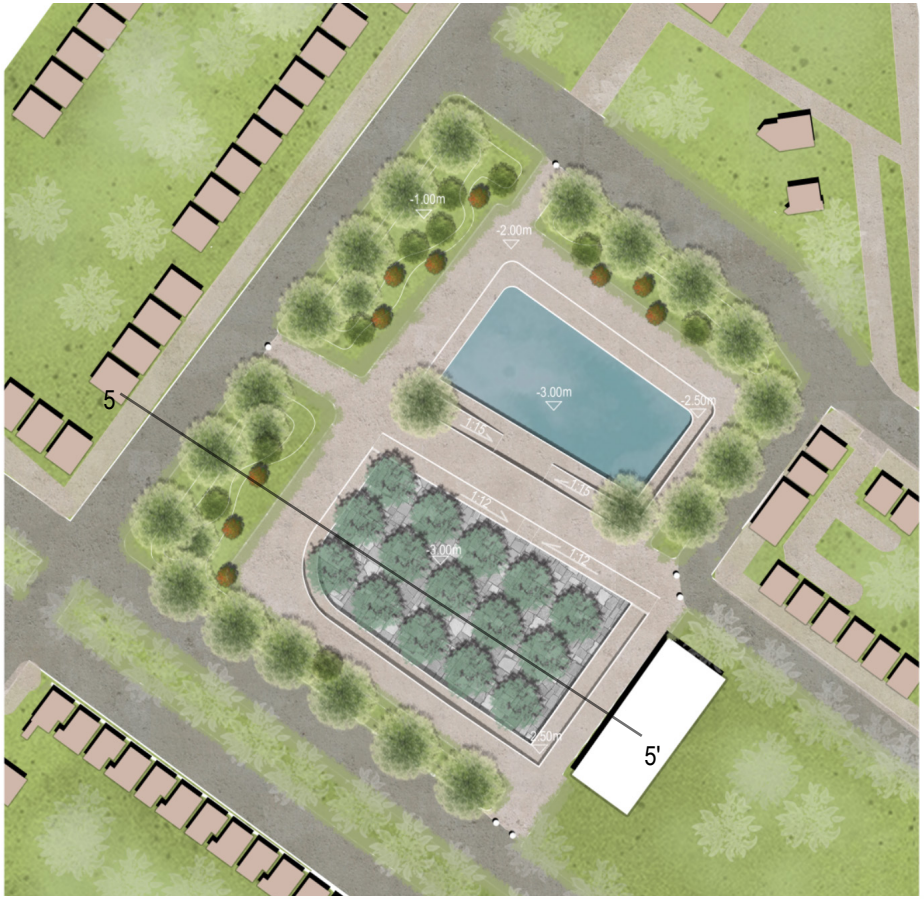
Secasonal color change of trees

House	Sidewalk +parking 6.00m	Neighborhood road 4.00m	Neighborhood front garden 32.00m	Neighborhood main road 9.00m	Descending field 25.00m	Dike road 8.00m

Section 4-4'

View from the garden to the dike

Detailed plan 1: public green spaces



Tilia americana

Robinia pseudoacacia `Bessoniana`

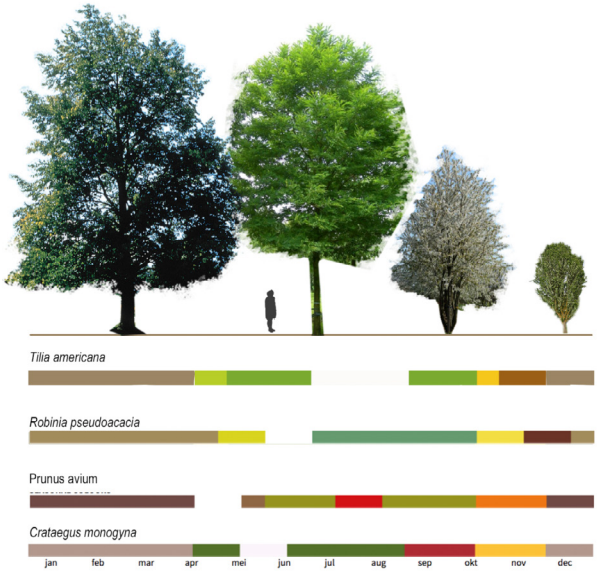
Prunus Avium

Crataegus monogyna

Brick

Brick(irregular)

0 10 50m



Secasonal color change of trees

House
Section 5-5'

Sidewalk +parking 6.00m

Neighborhood road 6.00m

Green fence 7.00m, 1.00m e.

Sitting lawn 10.00m, 1.00m e.

Path 6.00m

Sunken square 4.00m+46.00m+4.00m -2.50m -3.00m -2.50m

Path 4.50m

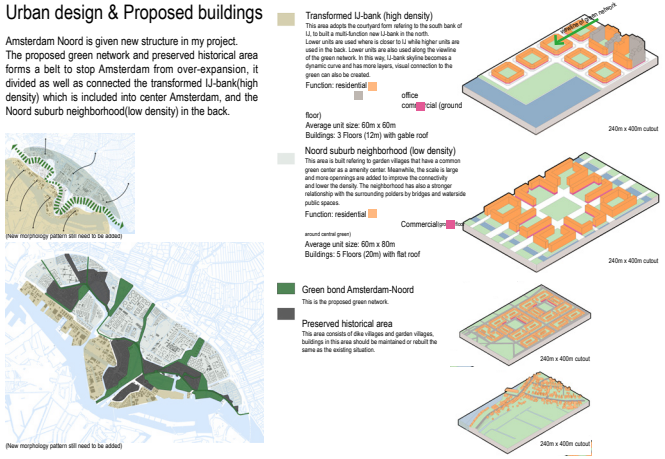
Cafe

Sunken Square

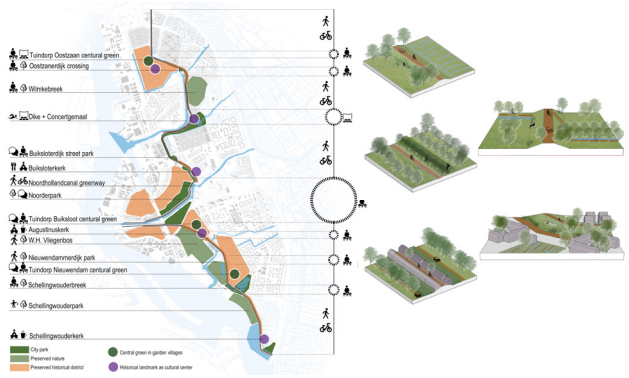
Chapter 5 Conclusion & Reflection

In this project, urban forest is used and re-organized for future garden city in 3 scales:

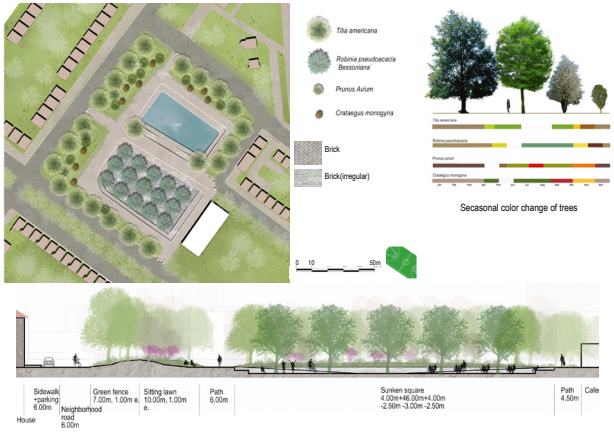
-L-City scale: the urban strategy. The “left over” garden villages together with the dike form a natural boundary between the densely built city center crossing the IJ and the low density suburb area. On the southern side of the boundary, the IJ-bank can be densely built with more open green spaces, especially waterside green spaces. It forms a green IJ-centered city center for Amsterdam. On the northern side of the boundary, the open garden city neighborhood can be built with central green spaces as community center as well as gren spaces that has more connection to the surrounding polder.



-M-Green system scale: the green bond. With interventions following the site-specific principles, the dike together with the garden villages and green spaces form an accessible close-by nature network. It takes the dike as its spine to organize green spaces that provide identity narrative sequence and diverse restorative activities.



-S-urban forest place scale: the identity narrative and restorative landscape. With the material manifesto related to the topos, the material, and specific tree species, design strategies are applied on test site to provide sensorial experience that is identity narrative and restorative.



The combination and interaction of the 3 scales together re-organized urban forest in Amsterdam Noord to form a future garden city, that is all-age-friendly and in dialogue with its green urban identity.

Lessons learnt:

1.Post-industrial Renovation in Systematic View

My project is initiated by the renovation of a post-industrial area, and landed in the urban forest attached to it. This taught me that a city develops as a system, the transformation in one place also affects the surrounding area and the system connected to it.

2.Research & design

For the methodology of this research, I used ”research for design” and “research by design” to organize different parts of this research. “Research for design” is used in theory study to form an ideal concept of “urban forest for future garden city”. Secondly, “research by design” is used in site study and design to define the potential and possible intervention for Amsterdam to be a future garden city with its urban forest. From the design results, design principles are concluded for other similar cases.

This methodology has its strong and weak sides.The strong side of the methodology is that it follows a continuous logic of “general concept - specific intervention - general conclusion”. It is easier to organize the research. The weak side of this methodology is that it separates the literature study and site study into two parts in chronological order. It brings limits to the understanding of the site in the earlier stage of the research, and thus to the literature study. For instance, for the waterside path design, more climate ready research could be done, but I didn’t realize that until I've finished my theoretical framework. This methodology should be improved to be more flexible in structures.

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