

The background is a painting of a dark, stormy sea with a sandy beach in the foreground. The sky is a mix of dark blues and greys, suggesting a heavy, overcast day. The water is dark and turbulent, with whitecaps visible. The beach in the foreground is light-colored sand with some sparse, dry grass or reeds.

A Catalyst for Self-Reliance

Resilient Infrastructure As A Catalyst For Sustainable Urban Renewal In Light Of The Climate Crisis

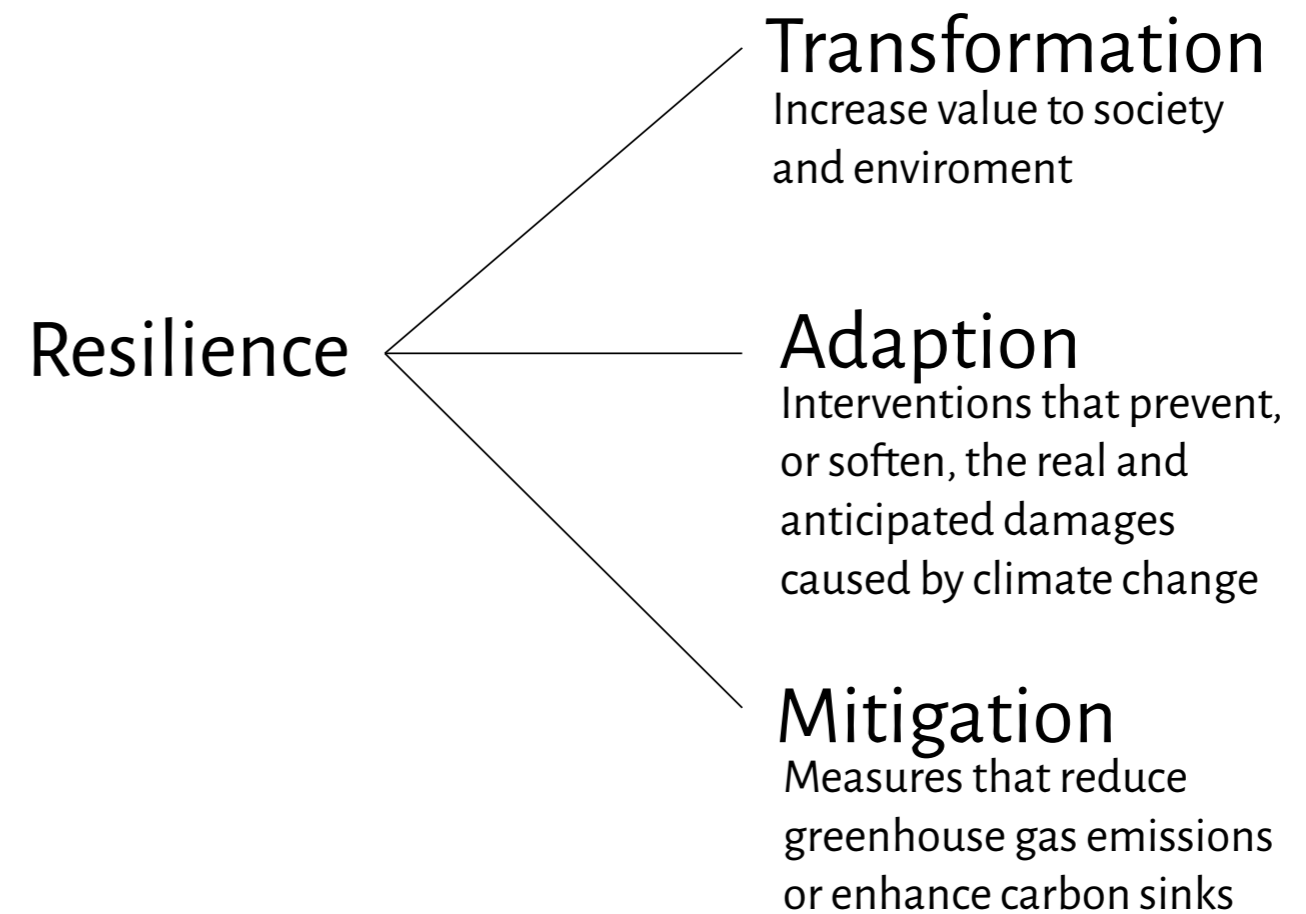
P5 presentation
By Enzo Yap - 4025180

First mentor: Dr. Fransje Hooimeijer
Second mentor: Ir. Leo van den Burg

Transitional Territories Graduation Studio 2021-2022
Department of Urbanism
Faculty of Architecture
TU Delft

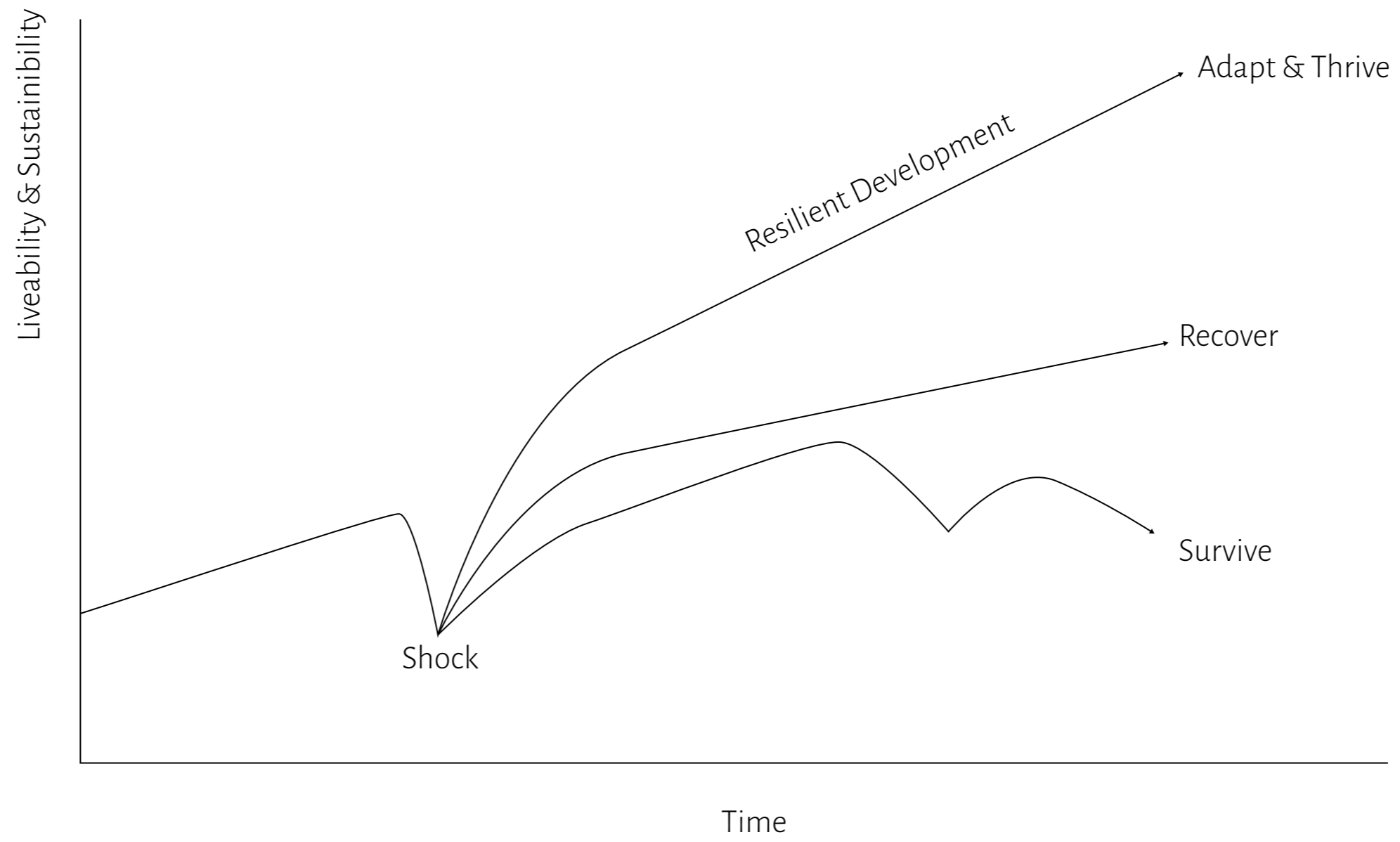
Resilient Infrastructure: Infrastructure management with the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events

- Dynamic
- Holistic
- Multiscalar
- Long Term Strategy

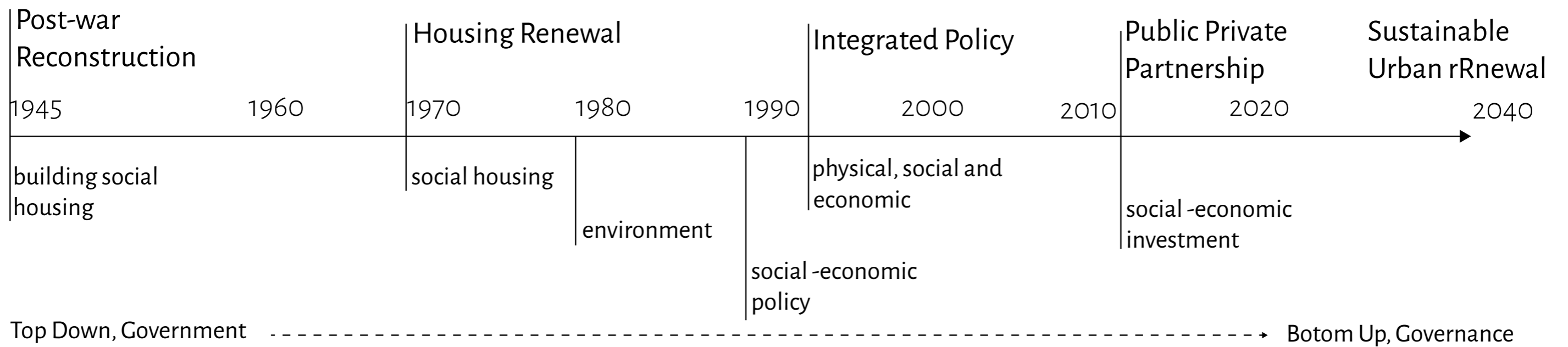


In a changing climate, more variable and with potentially more extreme events, old certainties about the protective ability of built structures are undermined.

- Omar-Dario Cardona et al. (2012)

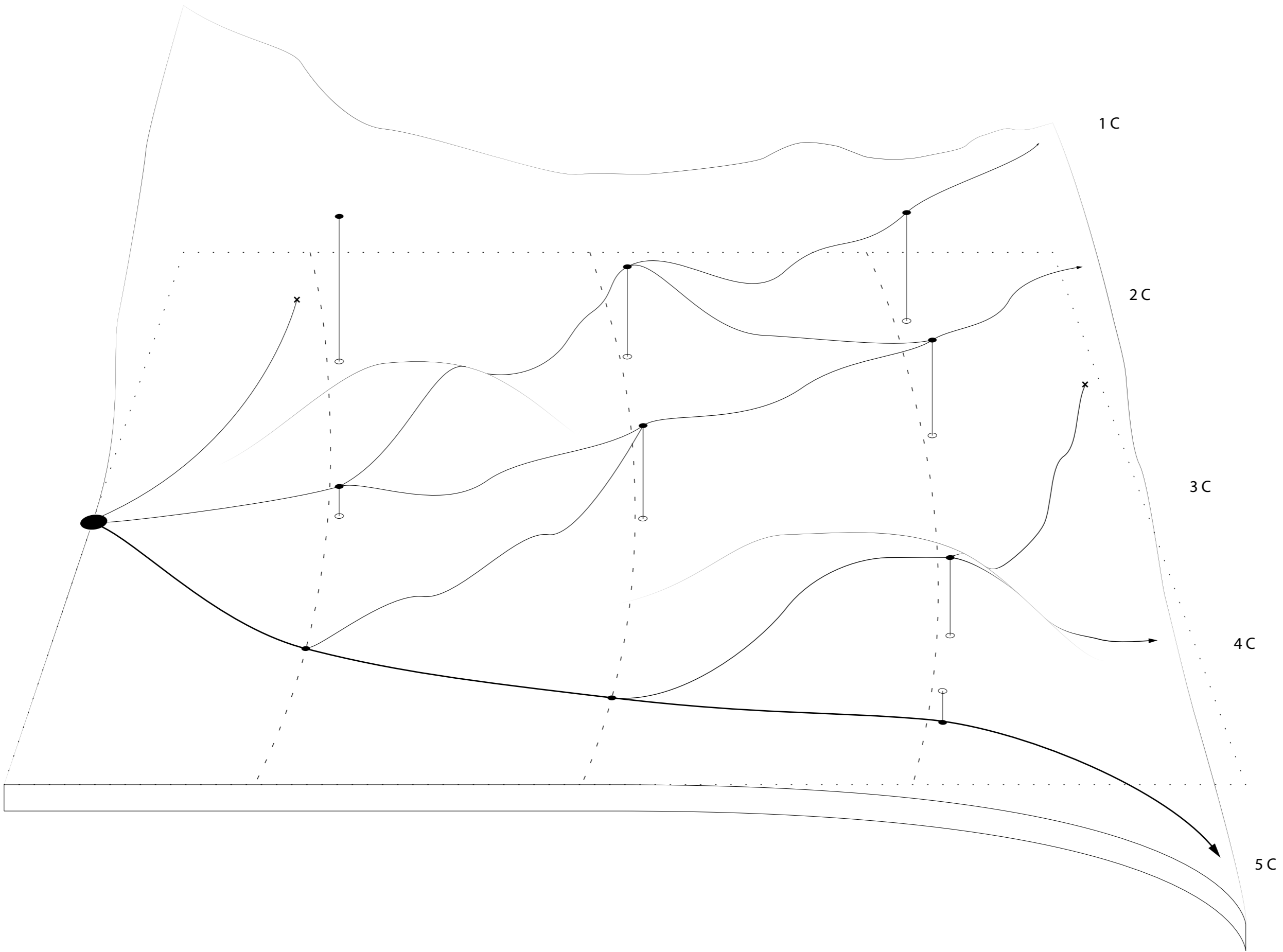


Resilient Infrastructure: Infrastructure management with the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events





Sustainable Urban Renewal: Urban development that can empower and give agency to local communities to absorb, recover from, and more successfully adapt to adverse events



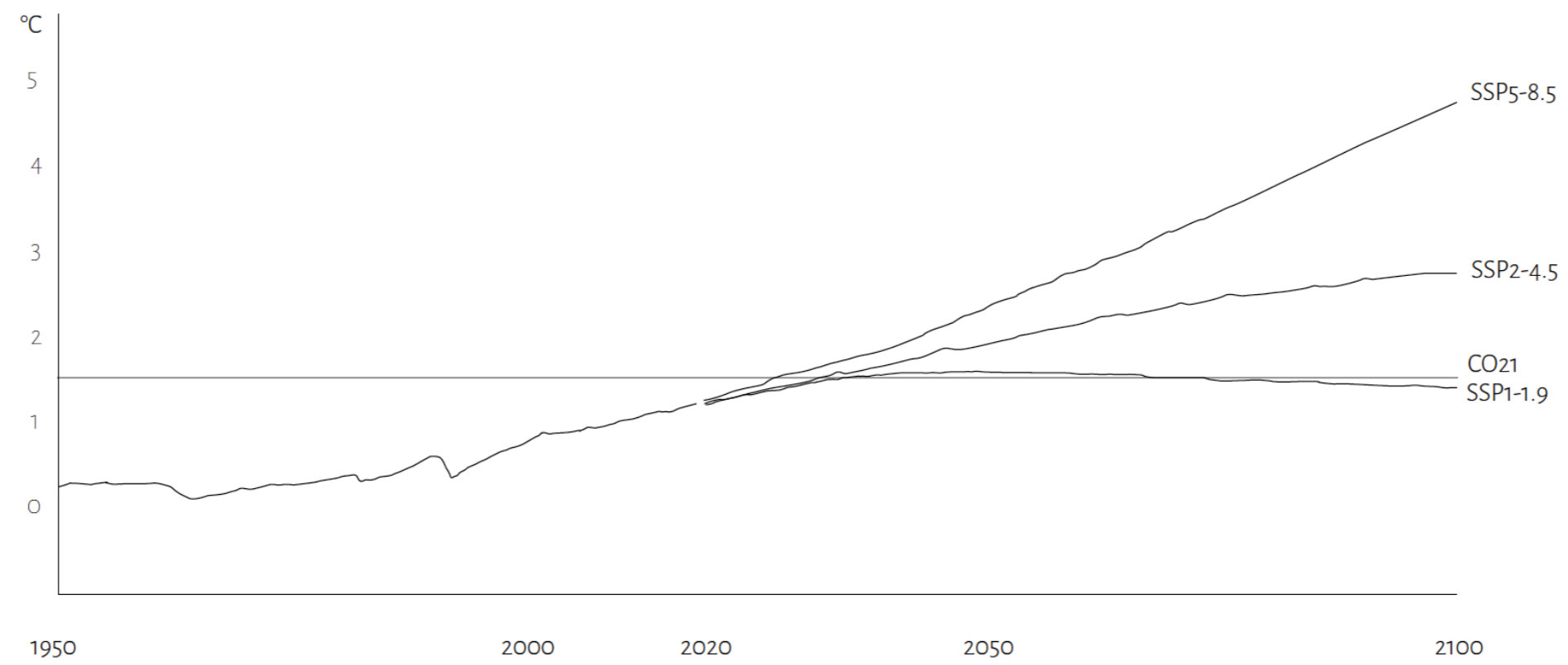
NEEDED INFRASTRUCTURE INVESTMENT ——— NEEDED INVESTMENT INTO NEIGHBOURHOODS

For climate adaptation and mitigation
For improvement of efficiency
For reduction of costs

For addressing socio-economic inequality
For improving community resilience
For improving individual agency

SYNERGISING INVESTMENTS AS A CATALYST

Problematization



Problematization

“In relation to extreme events, global risk assessments show that social losses – as well as economic losses as a proportion of livelihood or GDP – are disproportionately concentrated in poorer communities and households.”

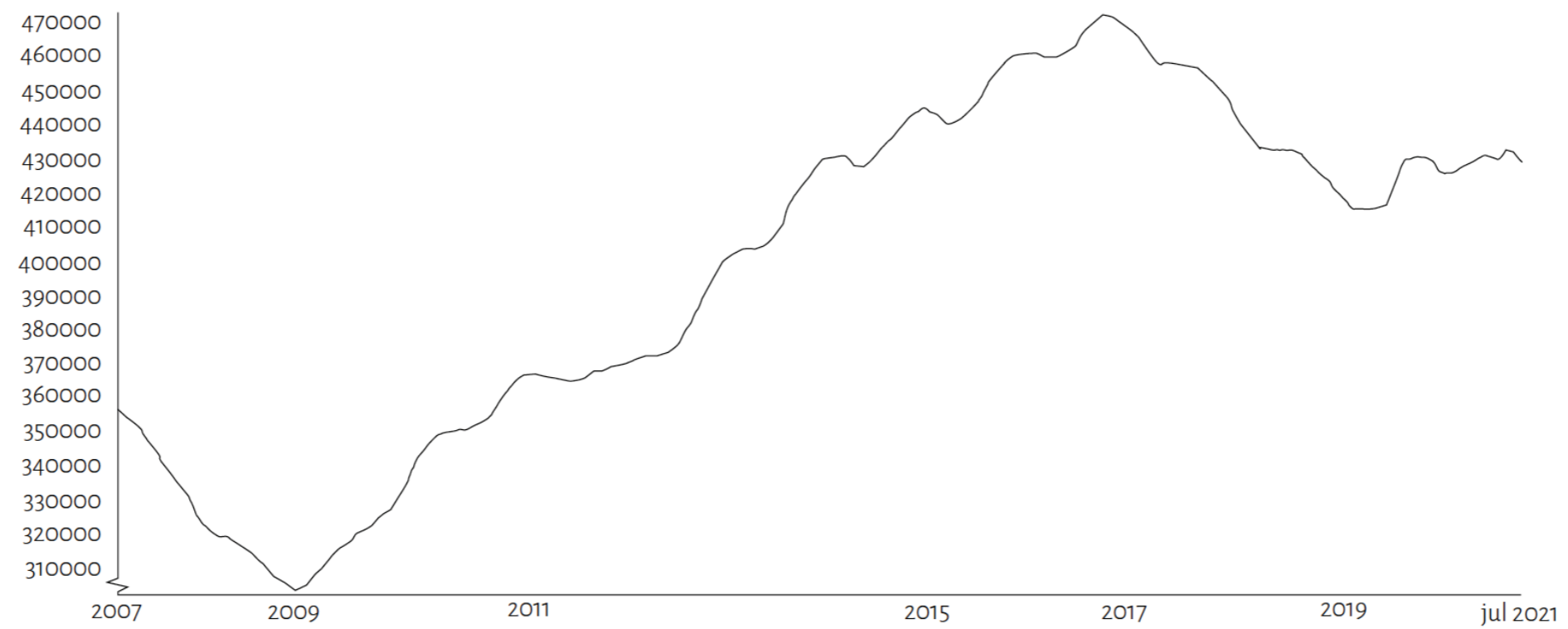
- Christopher Field et al. (2012)

Problematization

Gini coefficient on income in NL: 0.29
Gini coefficient on income in Rotterdam: 0.29

Gini coefficient on wealth in NL: 0,79
Gini coefficient on wealth in Rotterdam: 0,89

People with social welfare benefits in the NL

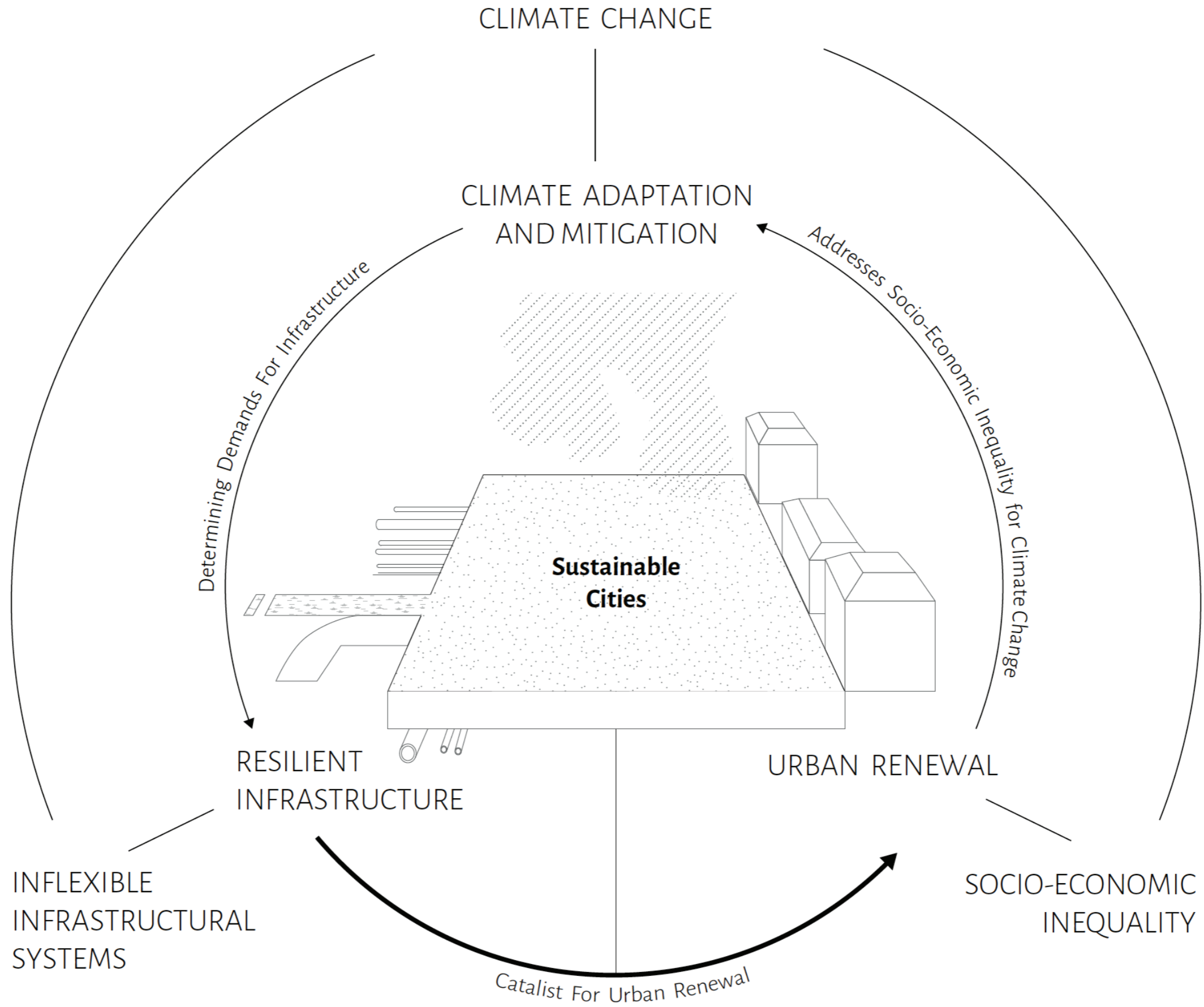


Ethical Starting Point

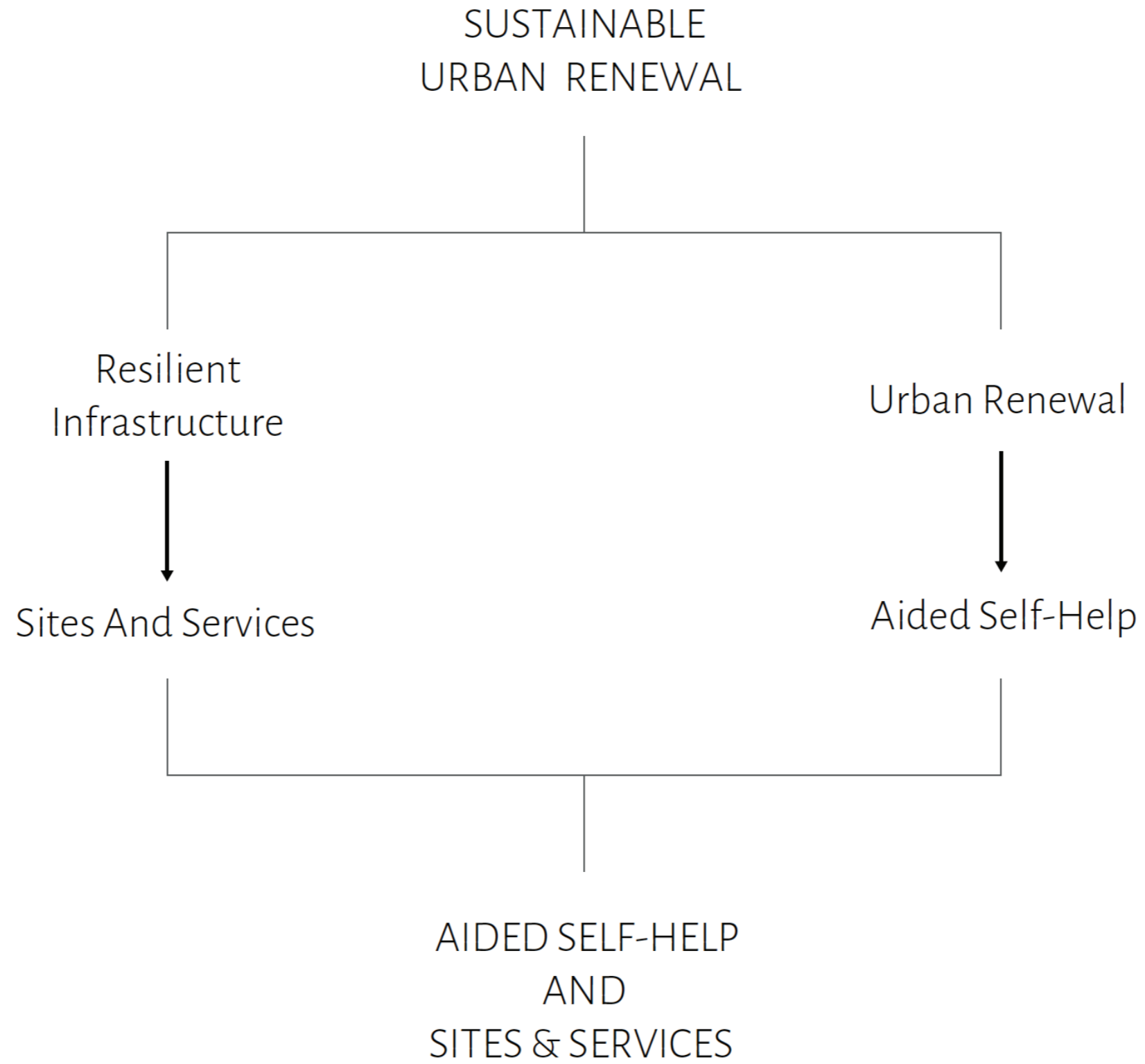
“The changes to our relationship with nature and one another that are required to respond to the climate crisis humanely should not be viewed as grim penance, but rather as a kind of gift — a catalyst to transform broken economic and cultural priorities and to heal long festering historical wounds.”

- Naomi Klein (2014)

Conceptual Framework



Aided Self-Help and Sites & Services Model



Aided Self-Help and Sites & Services Model

“Because aided self-help, including the sites & services scheme, is a combination of two urban development processes - the conventional urban development and informal urban development - it is useful as a model for achieving the goal of an inclusive city, and for integrating housing for the urban poor.”

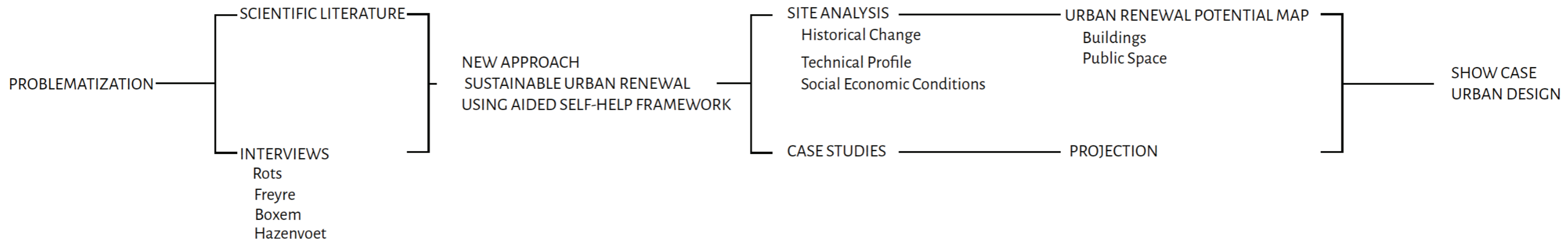
- Simone Rots (2021)

How can the resilient infrastructure for climate change mitigation and adaptation be used as a catalyst for urban renewal?

How can climate change mitigation and adaptation be integrated in and enhance the spatial aspects of sustainable urban renewal?

Which strategies can be developed wherein resilient infrastructures are spatially accommodating and supporting climate change mitigation and adaptation?

How can investments into resilient infrastructure act as a catalyst for sustainable urban renewal?





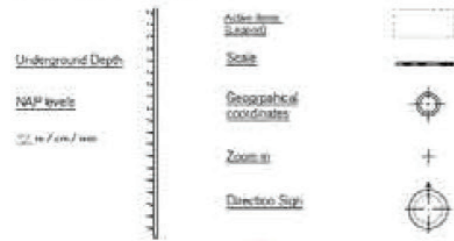


Technical Profile

Bospolder & Tussendijken

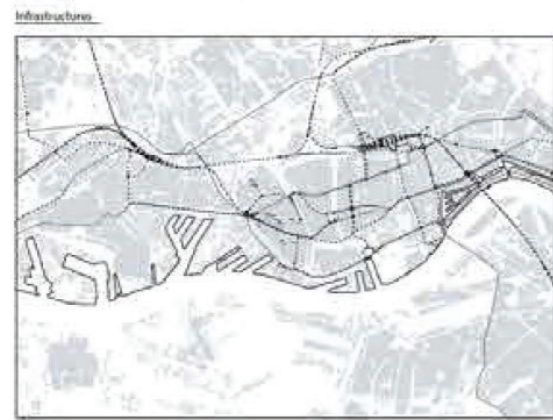
Authors:
Enzo Yap

Cartographic indication

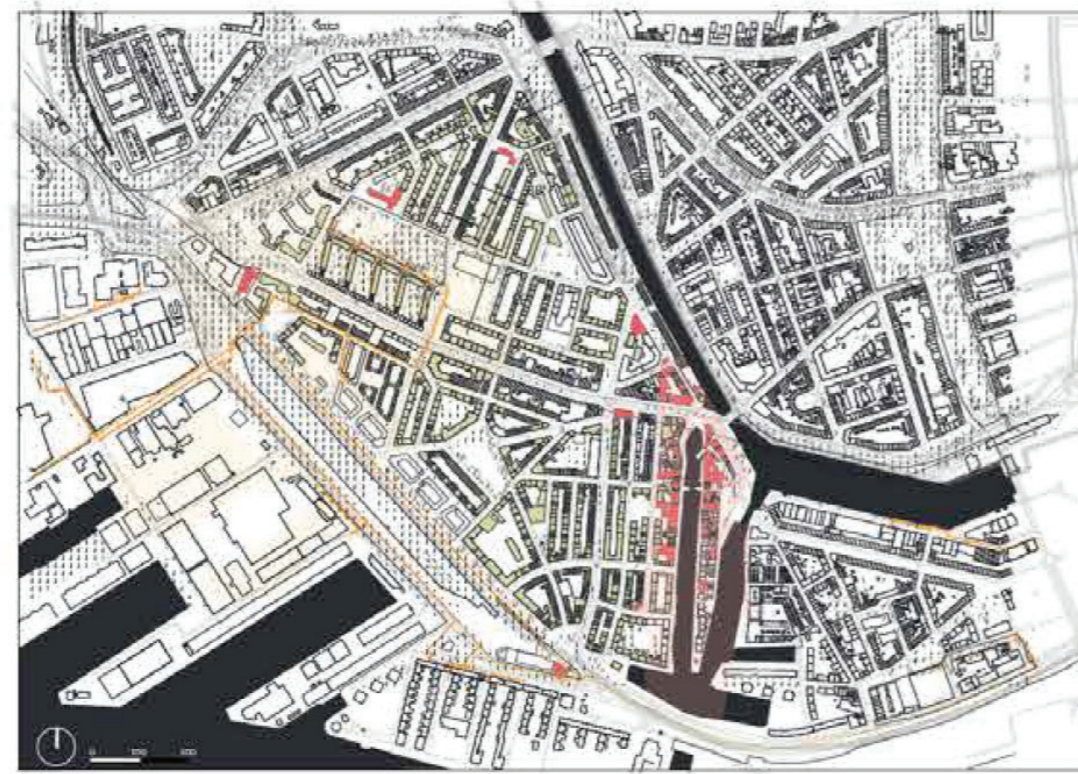


TU Delft | Delft University of Technology | Urban

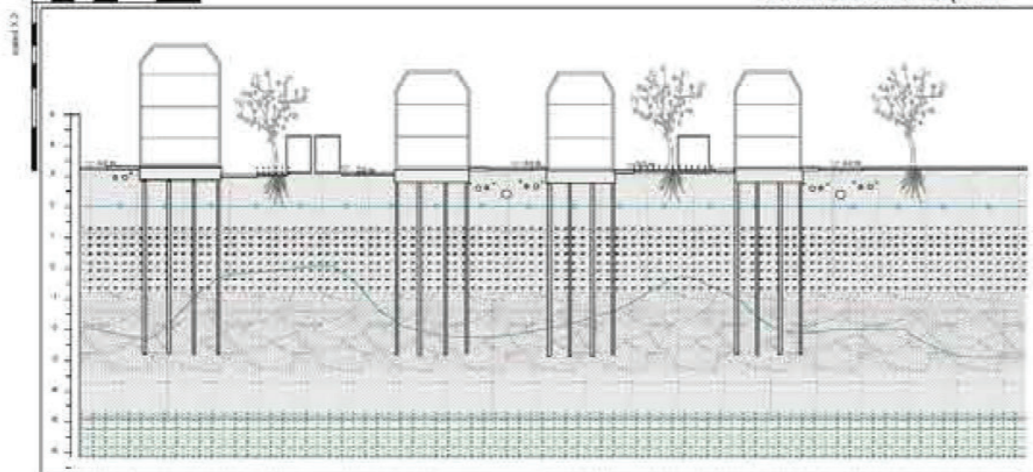
Macro scale: Territorial condition



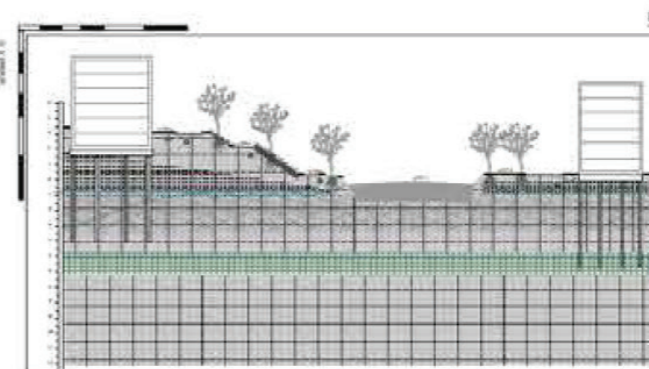
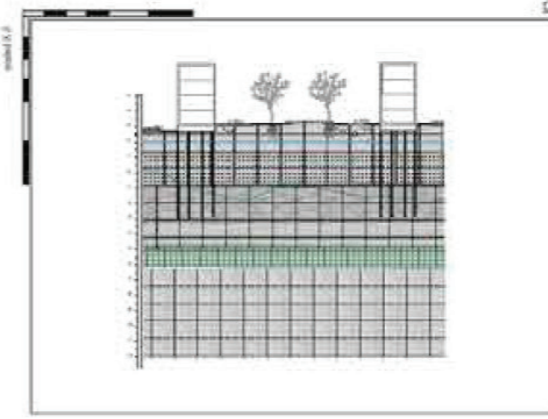
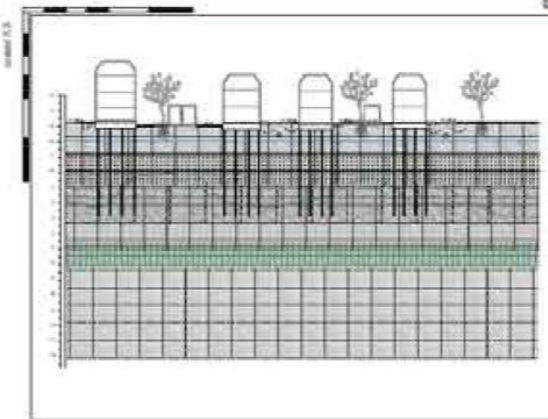
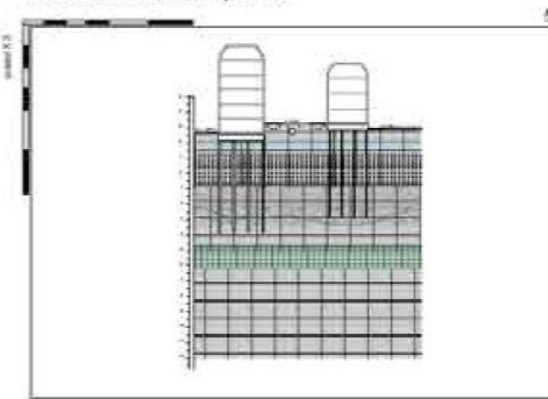
Meso scale: Plan, site investigation



BB' Nano scale: Street profile



Micro scale: Technical profile,



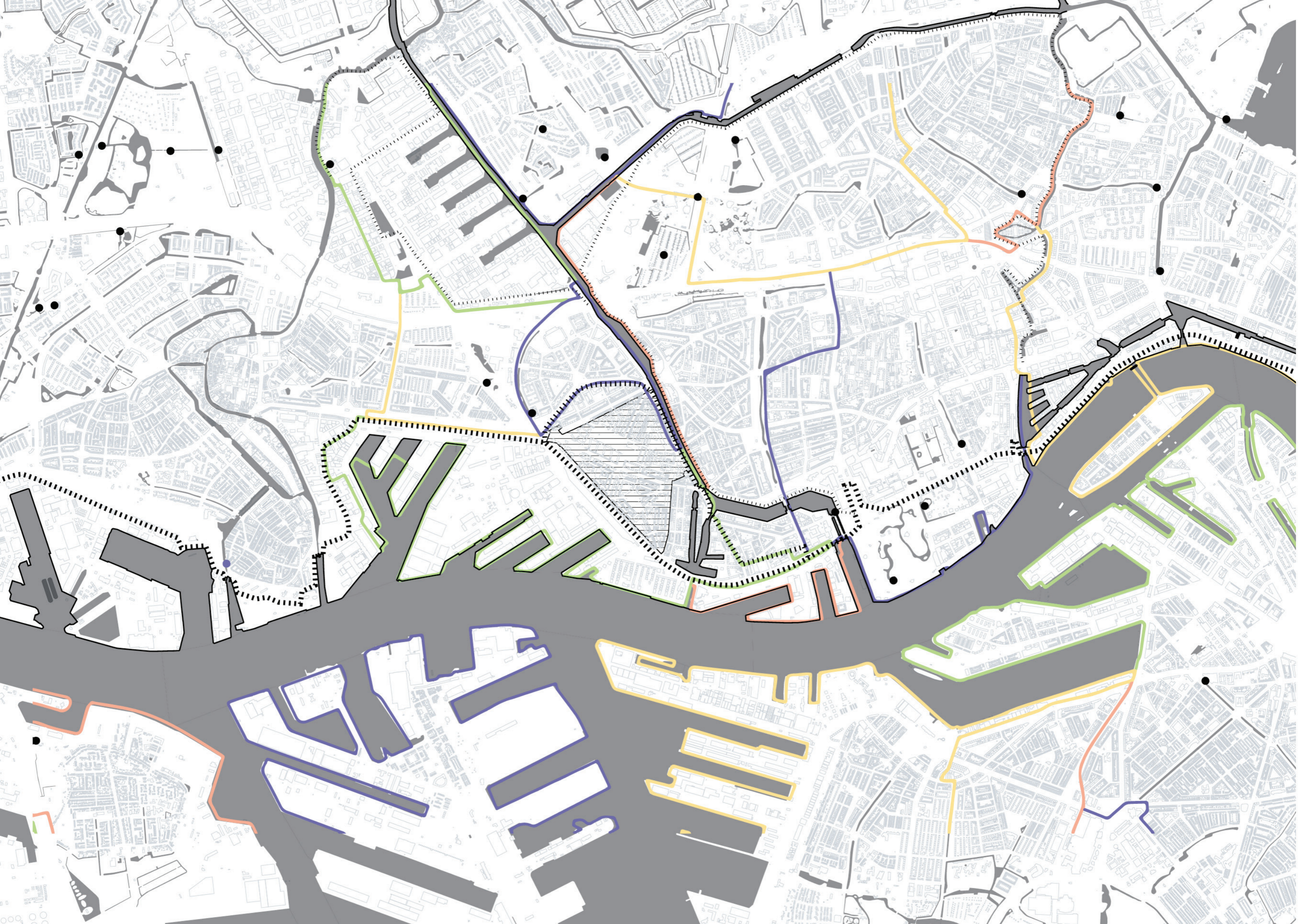
The legend: Reading sites and territories

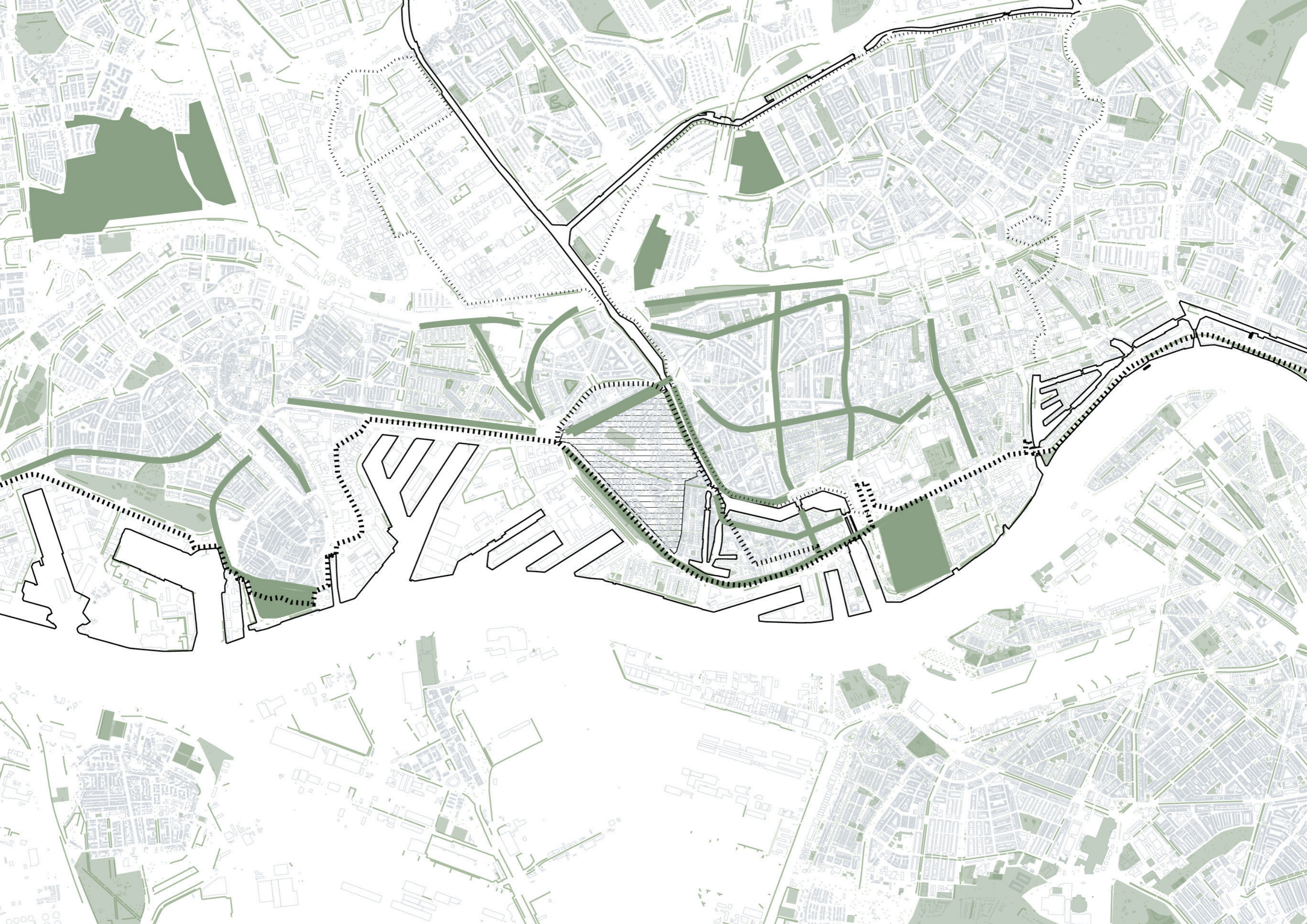
Conditions present in the area

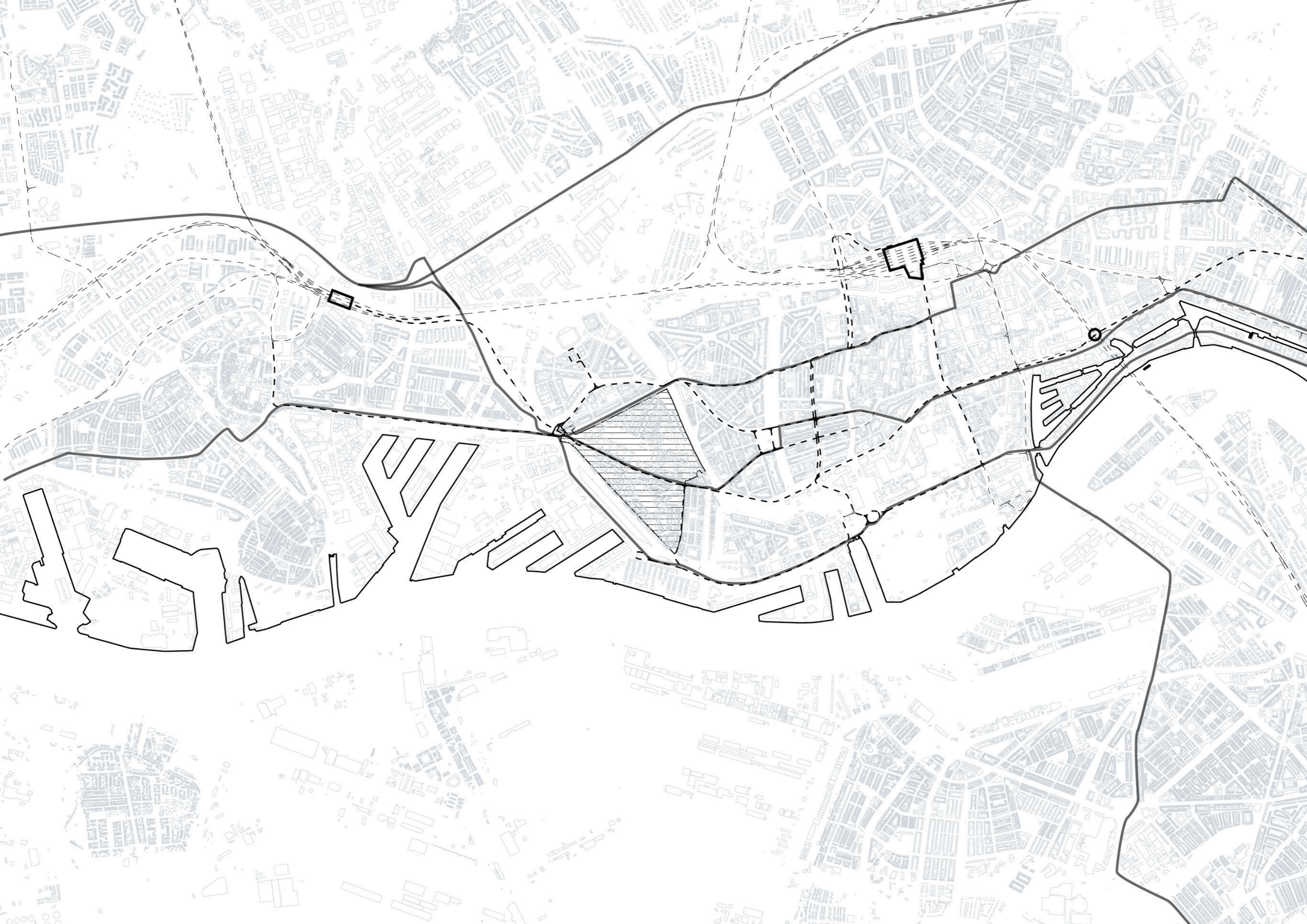
Item	Explanation
Item	Explanation
Item	Explanation
Item	Explanation
Item	Explanation

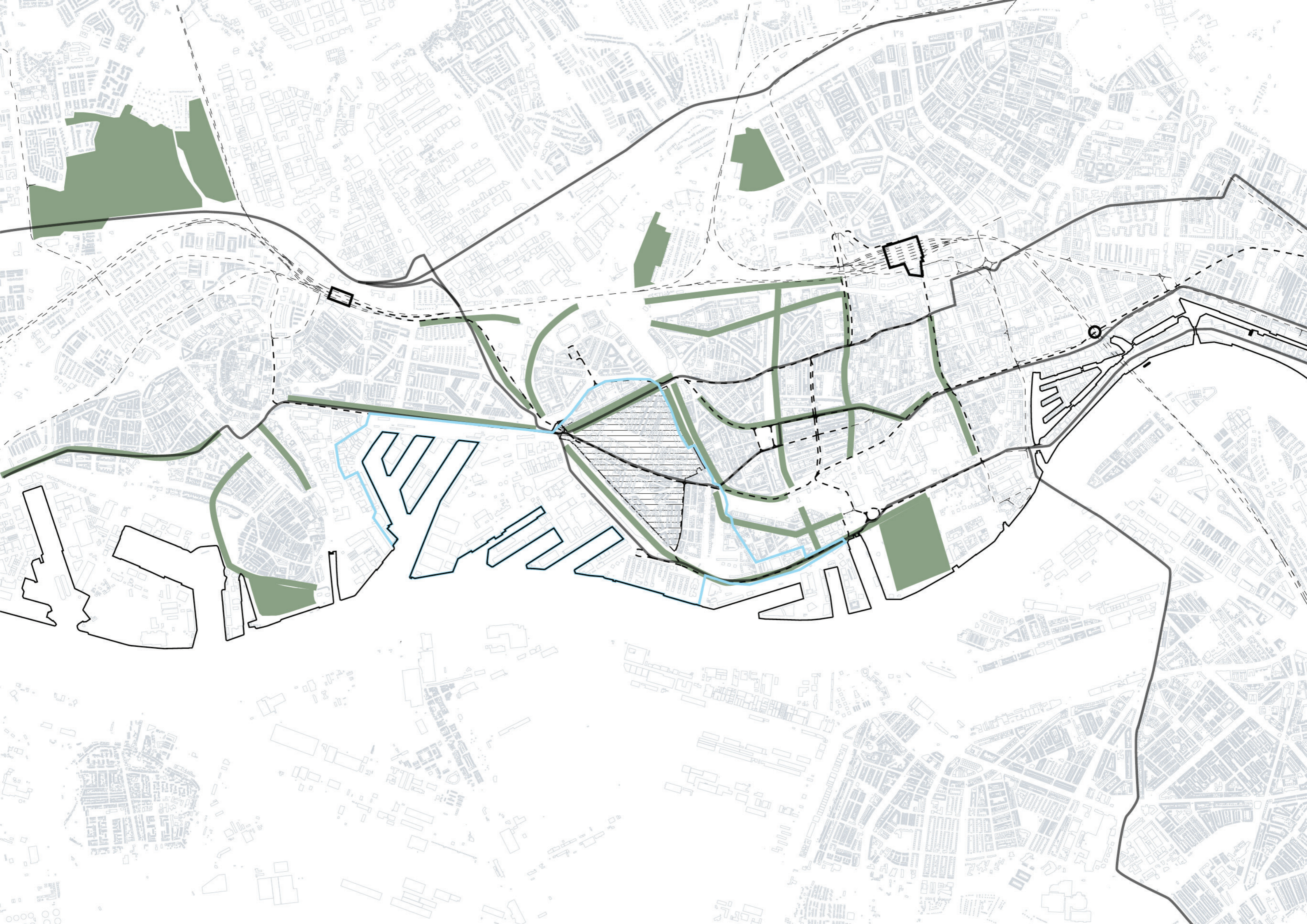
Static and dynamic conditions

	Solid / static conditions	Processes
People		
Mitigation		Less Less Less
Buildings	Footprint Energy potential rooftops	Programmatic change
Public space	Protected cityscape Monument	Biota flows Growth / succession
Infrastructure	Open soil Creeps Low medium vegetation High vegetation	Movement - flows
Civil constructions	Asphalt Permeable pavement Road Public transport	Parcel filling Site Grading Illegal filling
Energy	Underground Buildings Utilities: Cables and Pipes Archaeology Explosion Dike	Combined Utilities Street Age
Water	Fossil Fuel Energy District heating Geothermal Energy ATES (Aquifer Thermal Energy)	Electricity Heat
Soil / ecology	Groundwater Drinking water resources Open Water Rain Underground storage	Rainfall return period 1/year Eutrophication Infiltration Runoff Drainage Evapotranspiration
	Sand Silt Peat Muck Gravel Clay Mud Clay soil Bedrock Packed soil Man green structures	Subsidence mm/year Oxidation Crop Capacity Directional processes Contaminants Soil Life (microorganism)

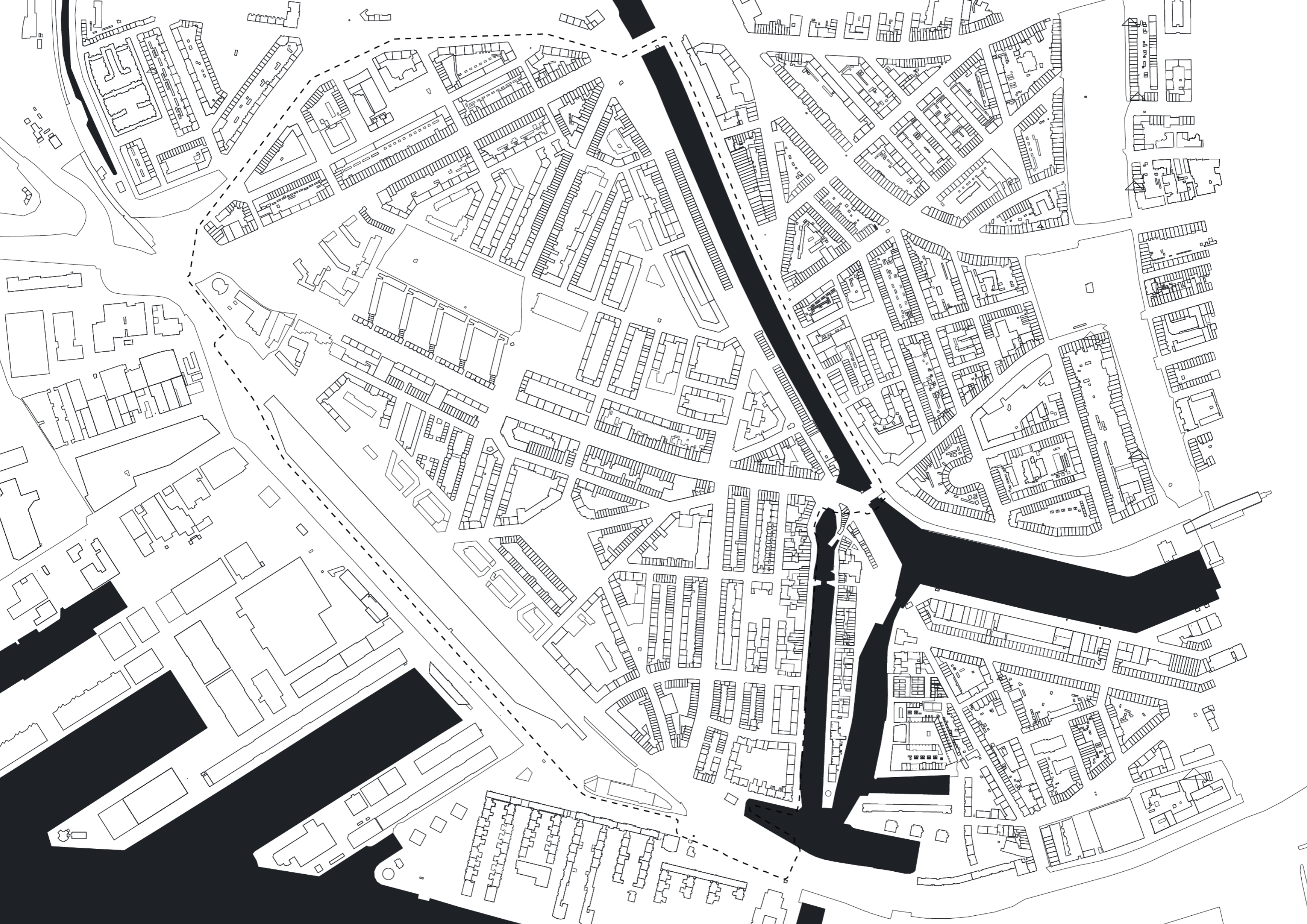








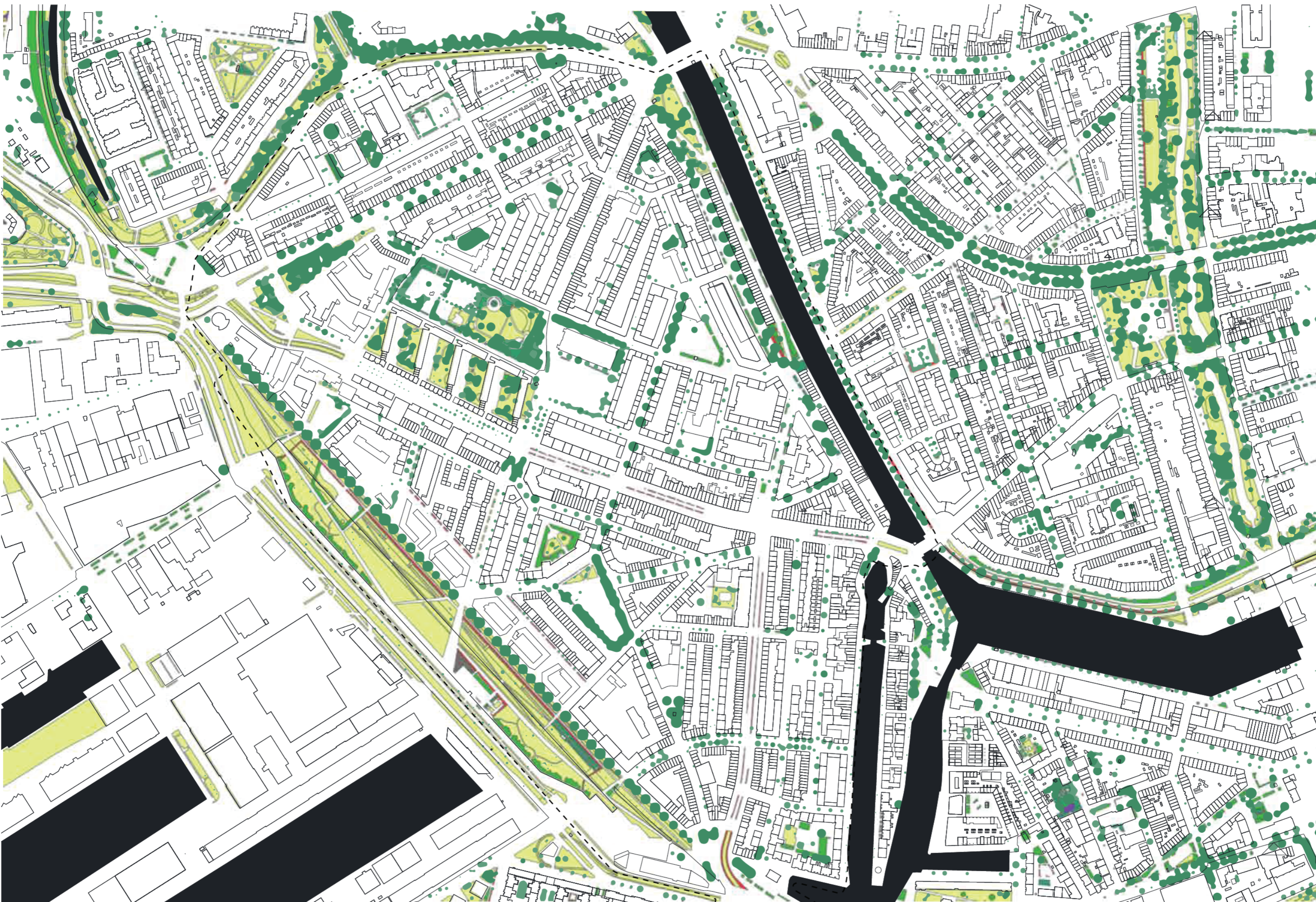


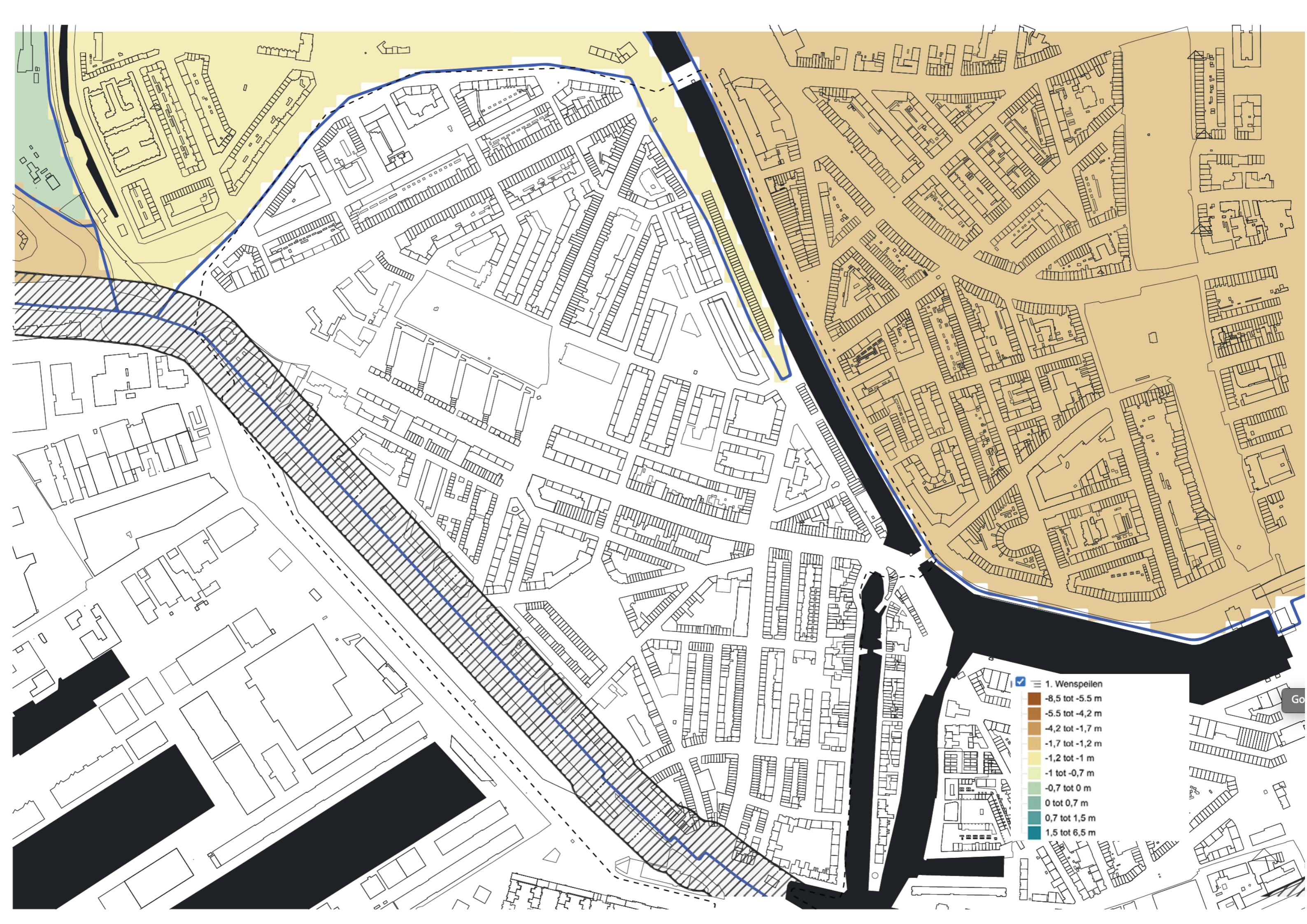






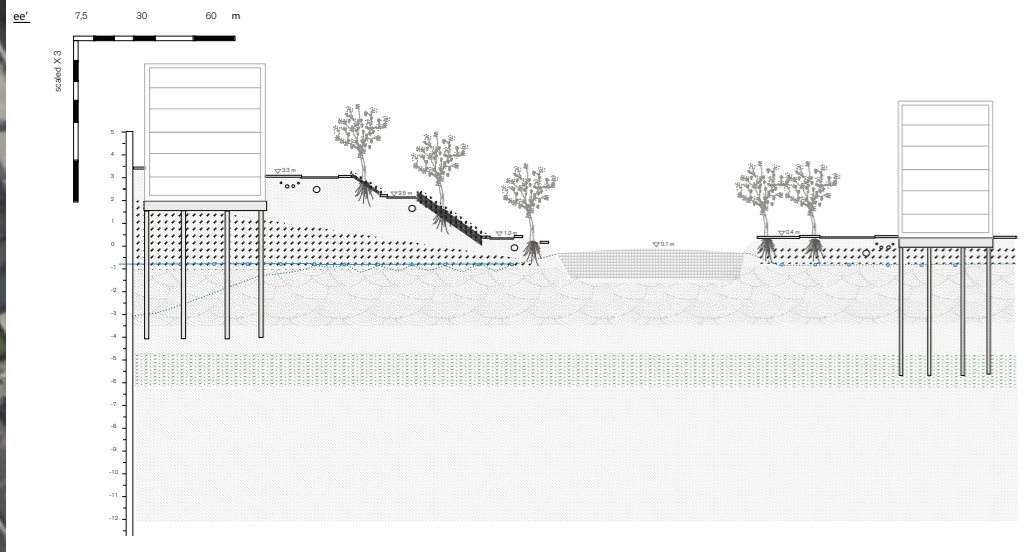
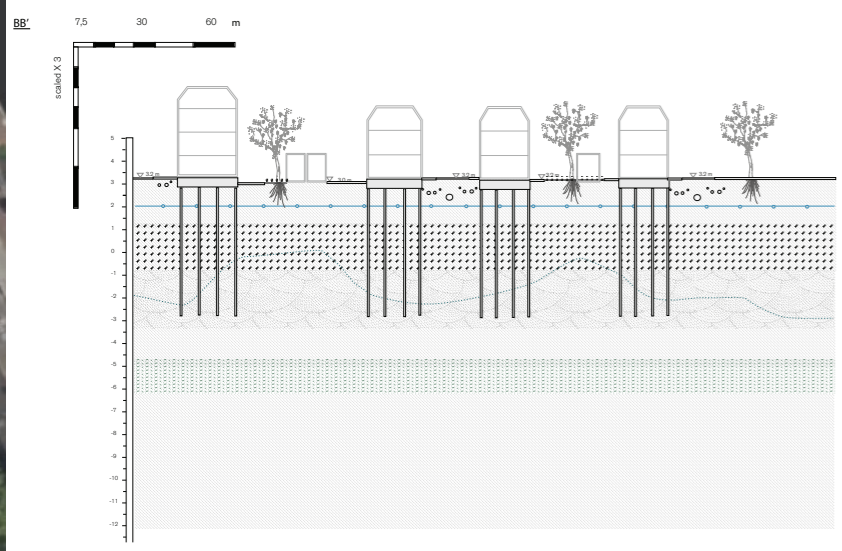
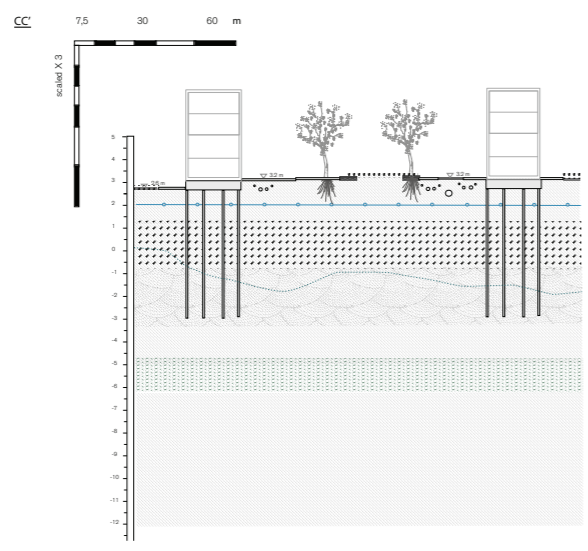
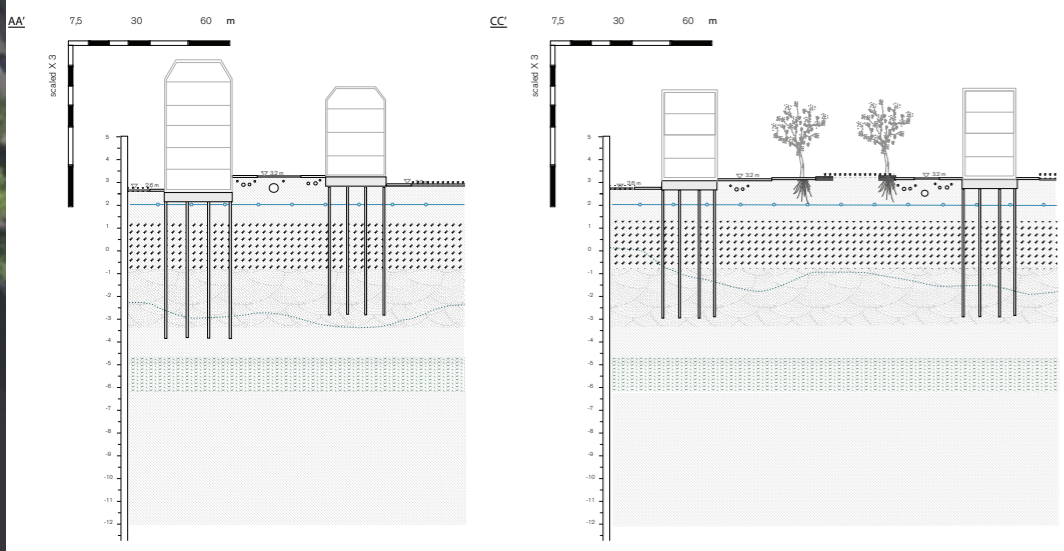
- Healthcare
- Accommodation
- Sport
- Retail
- Meeting
- Education
- Religion
- Office
- Other Utility
- Residential
- Double Function

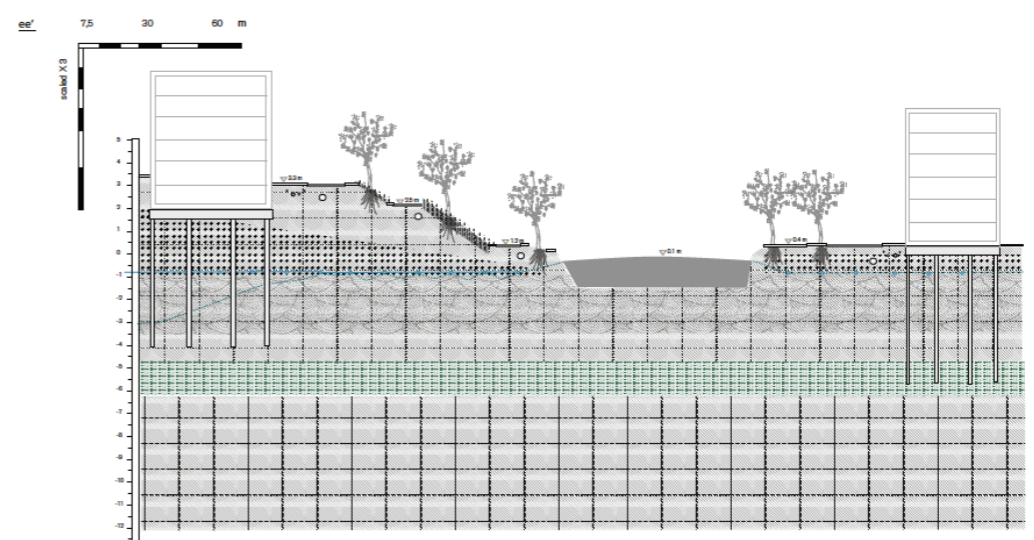
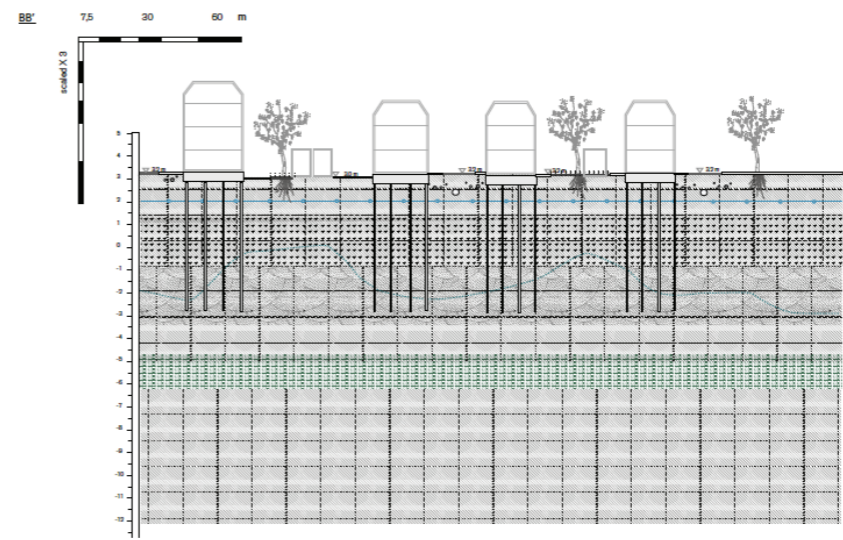
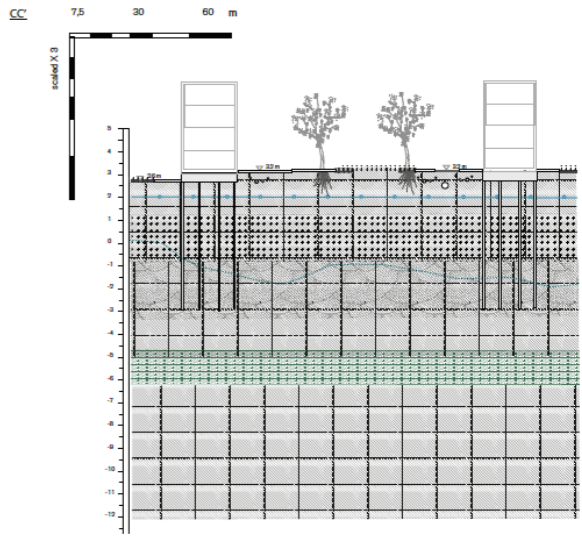
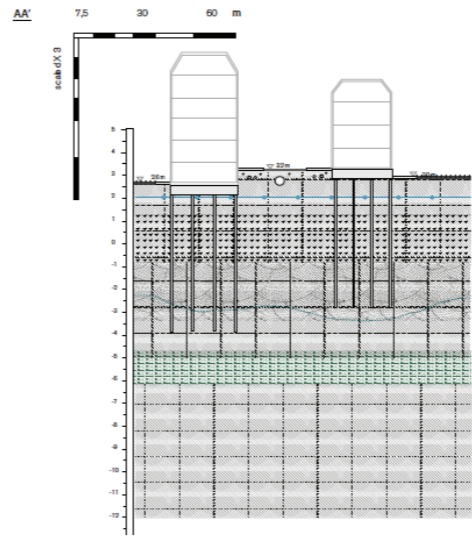
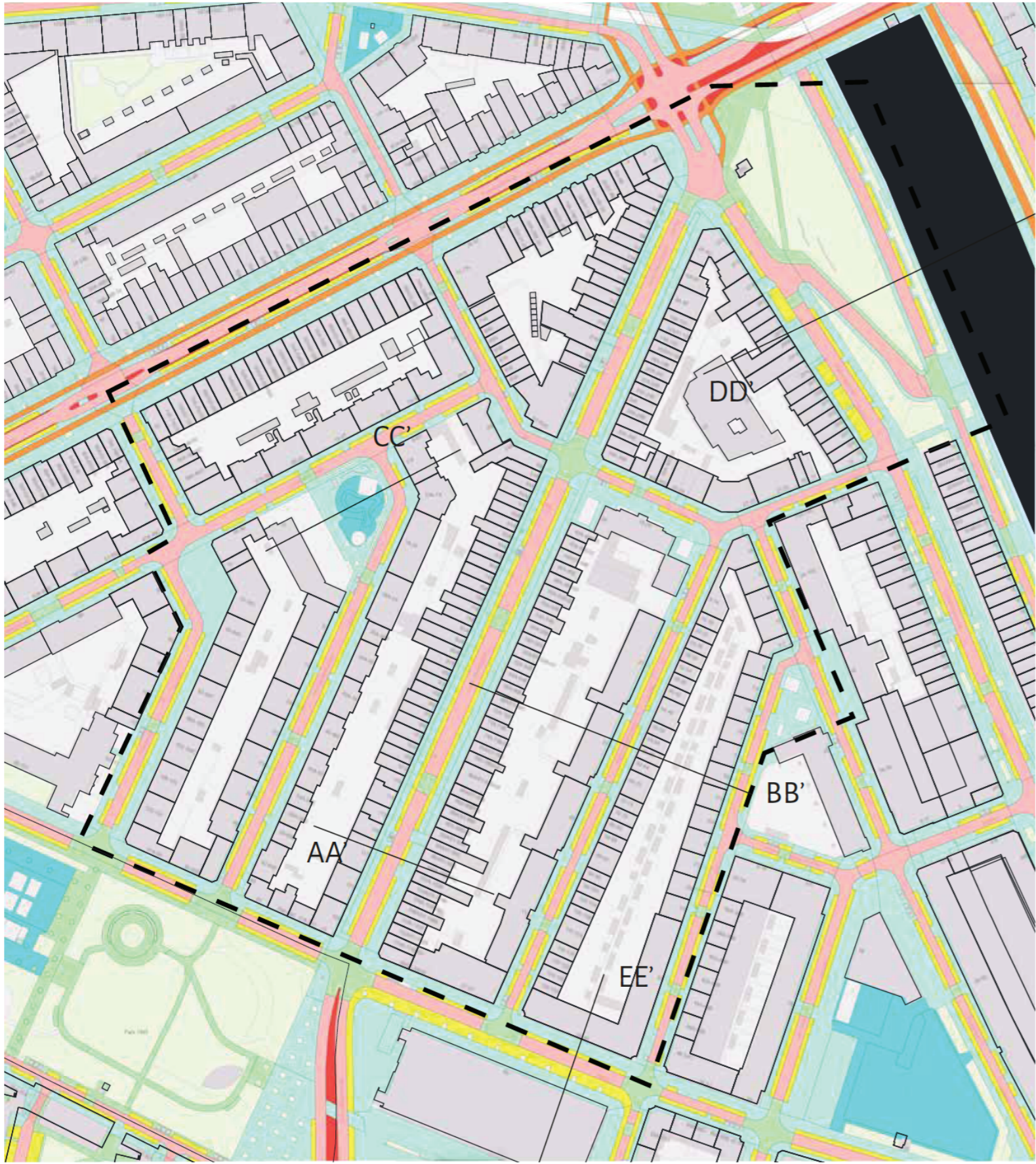








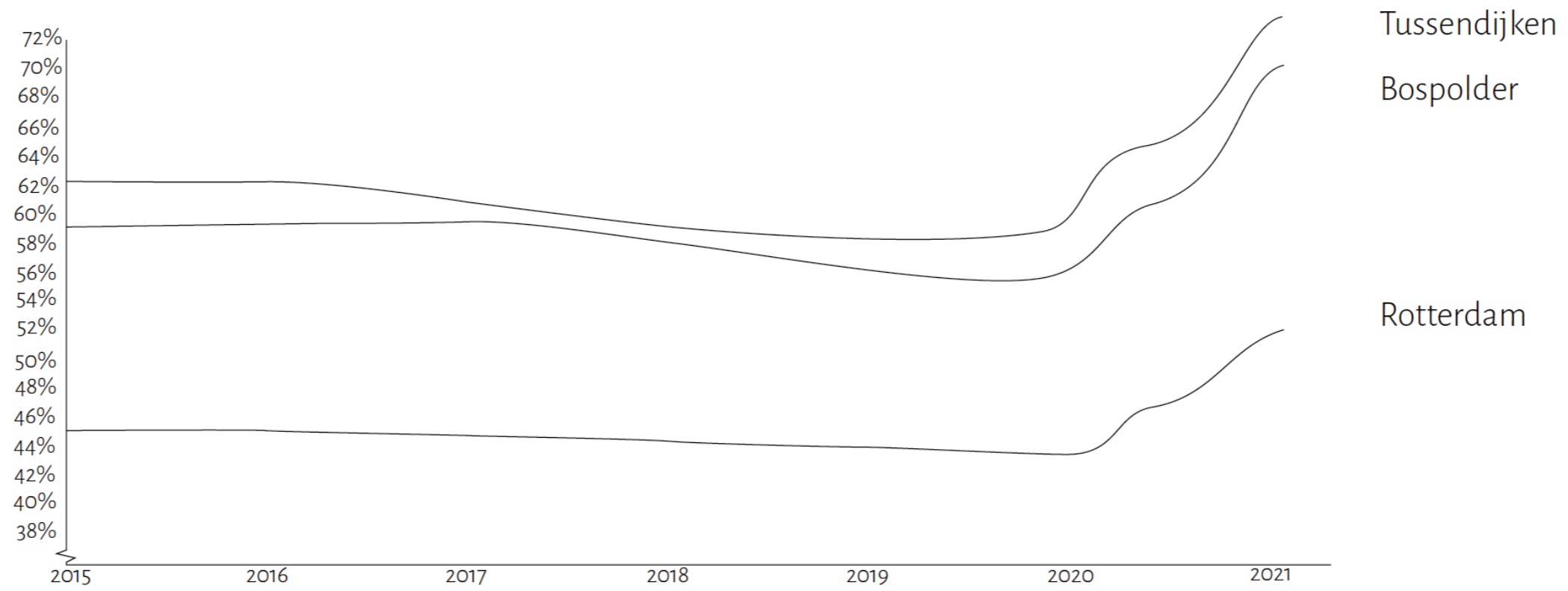






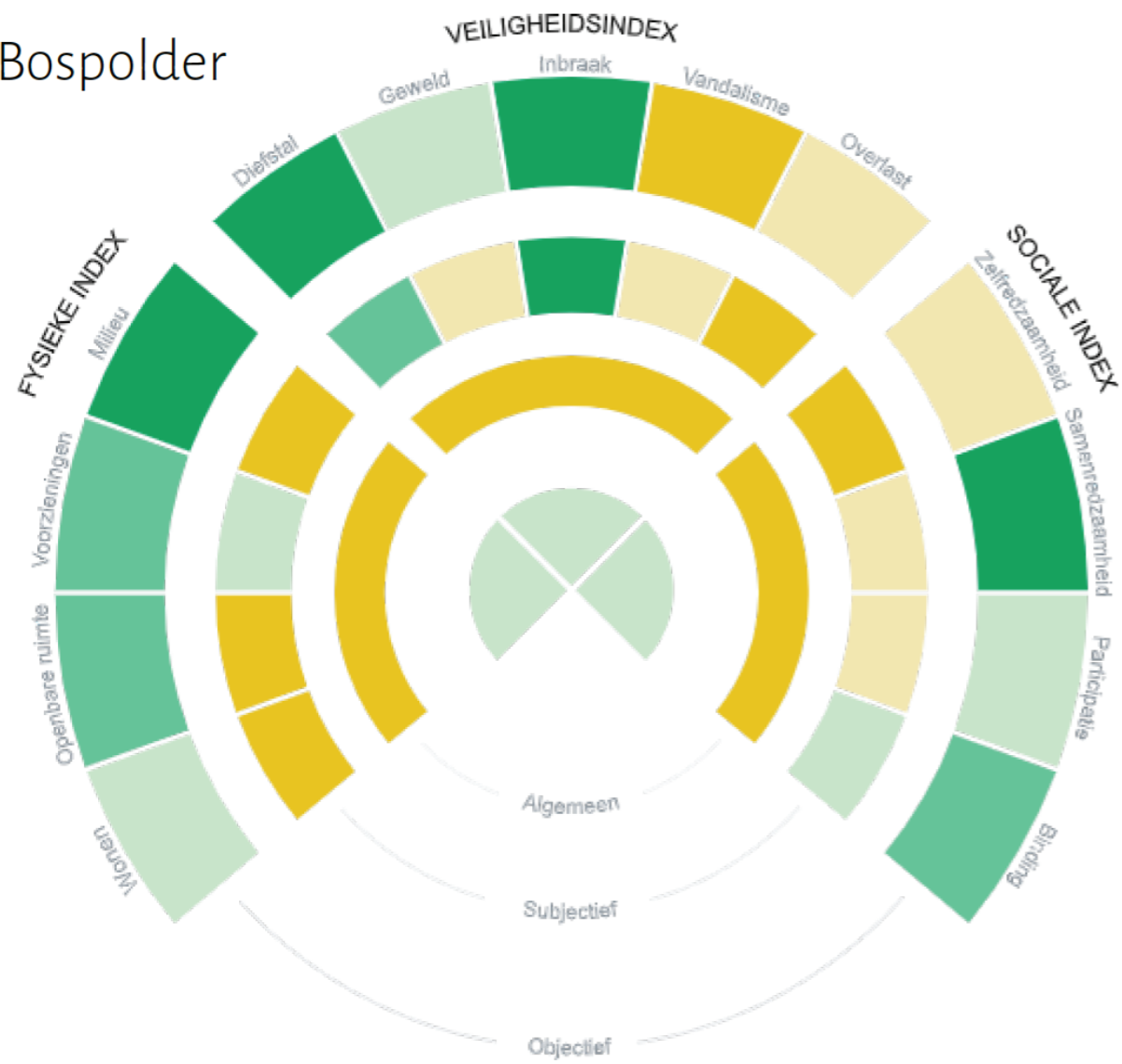
Indication Of Socio-Economic Challenges

Lowest 40%
household income

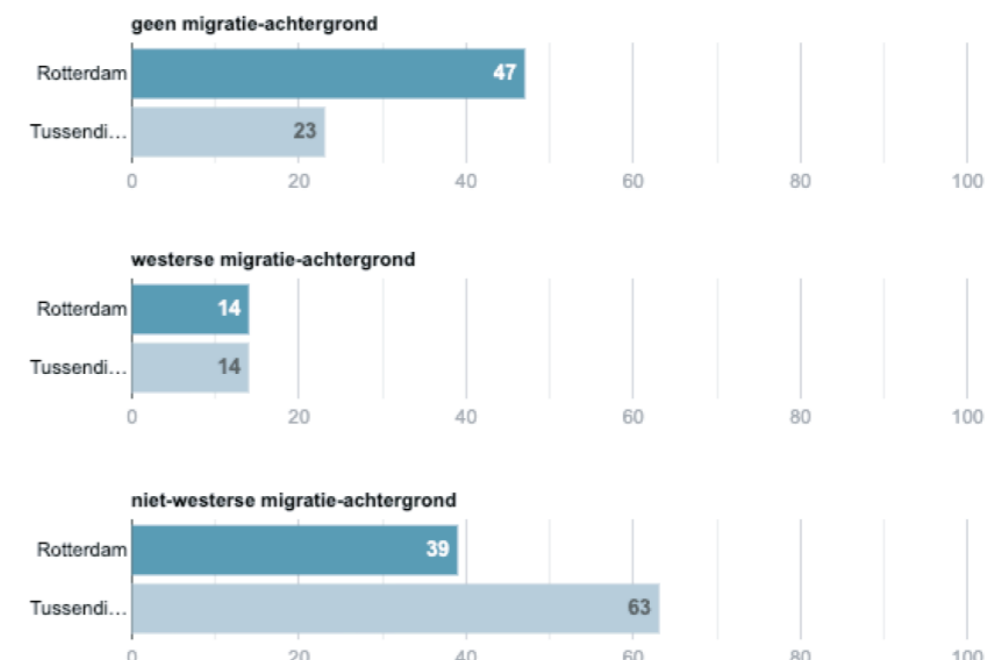
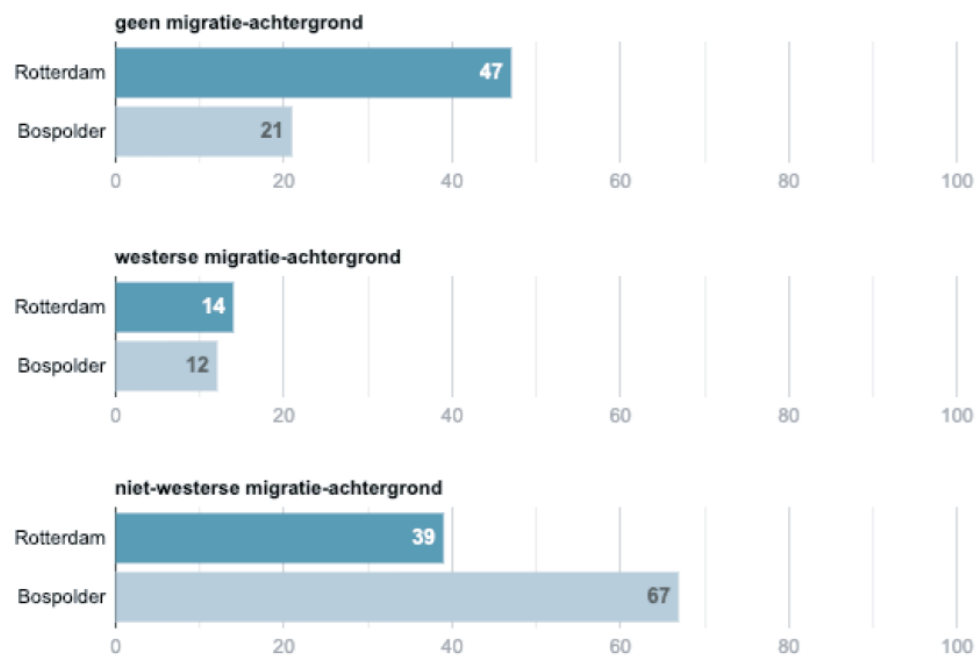
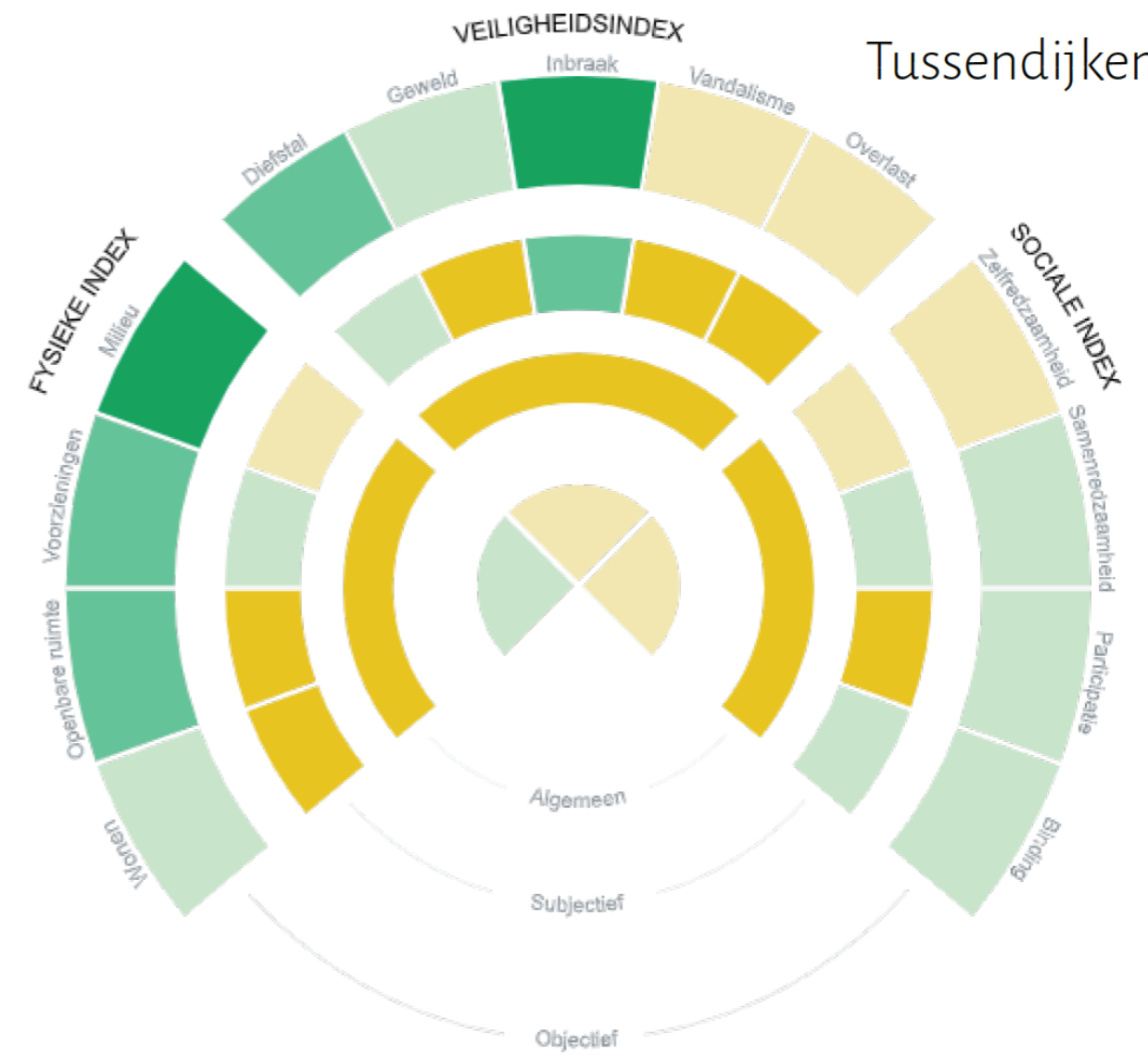


Indication Of Socio-Economic Challenges

Bospolder



Tussendijken



Case Studies

Statement of Requirements

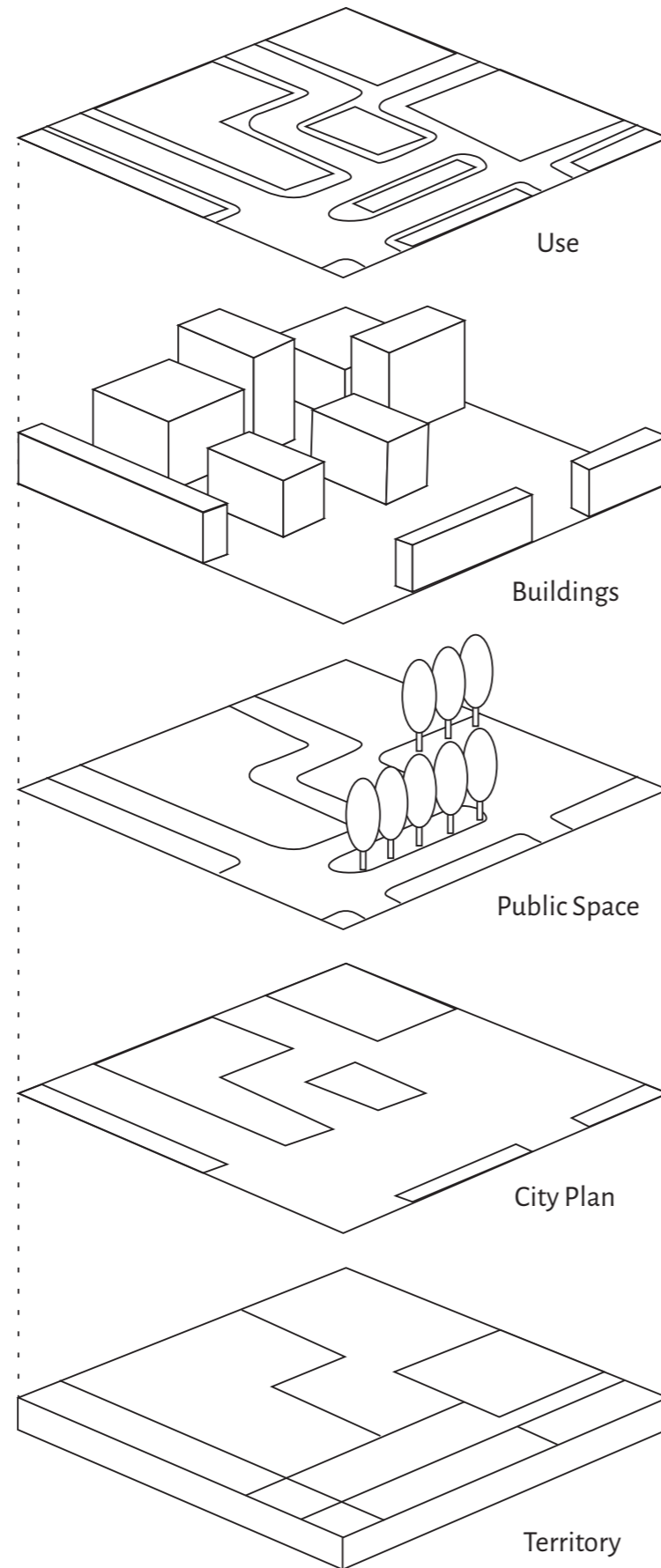
Domains of intervention

Strategy

Climate Mitigation and Adaptation

Sustainable Urban Renewal

Resilient Infrastructure



Acomodation of community development:

- Development of community centres
- Communal public spaces
- Continuation of social economic policy

All Buildings need to be Renewed:

- Phasing for the renewal of houses
- Construction of new houses
- Adaption of buildings to demand
- Housing typology diversification
- Adaptation to water assignment
- Energy transition

Retrofitting of public space for resilience and climate adaption

- Blue Green Infrastructure
- Reorganizing car parking
- adaption to and development of green mobility

Adjusting city plan to accommodate densification

- allow for new construction of denser housing buildings
- allow for more public facilities
- allow for more mix use development

Complete redesign of subsurface infrastructure

- Expand data network
- district Heating expansion
- adapting electricity network for electric cars
- separated sewer system
- increase water storage capacity
- remove natural gas network
- more space for ecological performance

Aided Self Help

&

Sites and Services

Source:

Hoekstra, M., Heeling, J., Meyer, H., & Westrik, J. (2002). Het ontwerp van de stadsplattegrond.

Program of requirements

Acomodation of community development:

- Development of community centres
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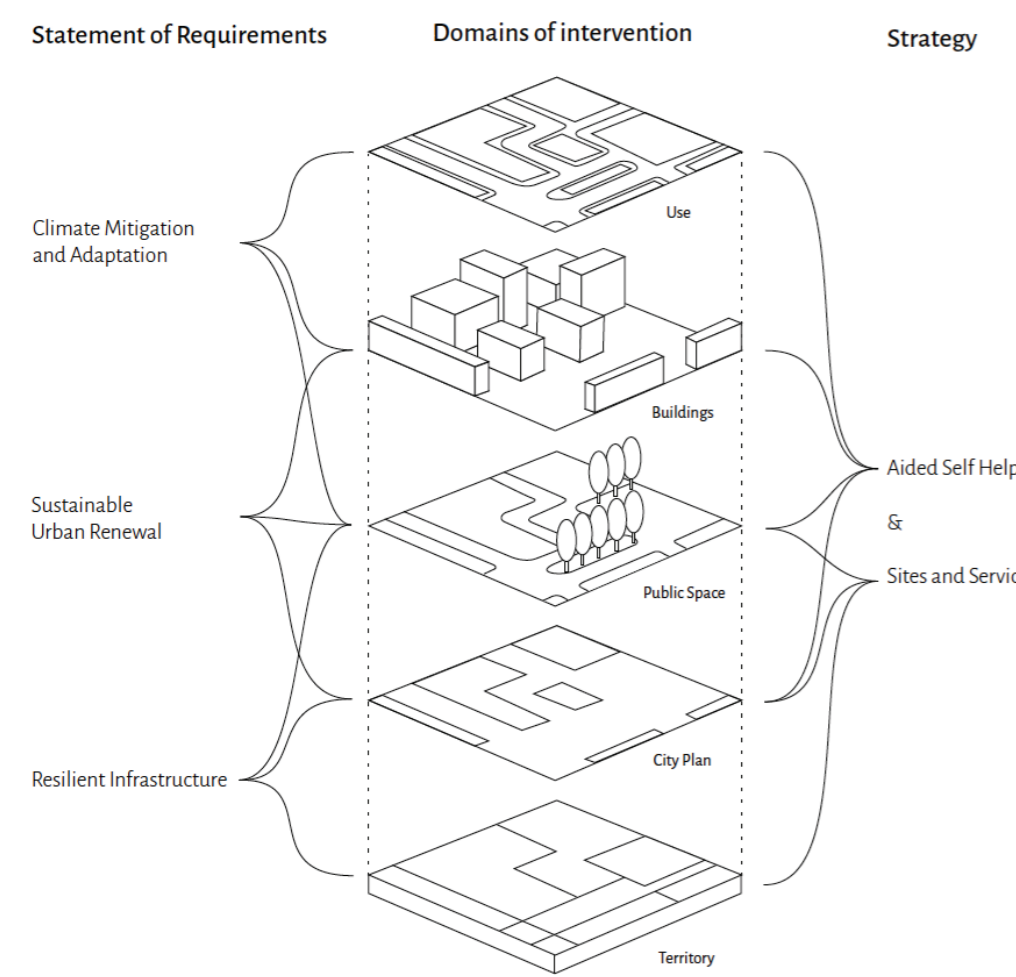
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Case studies



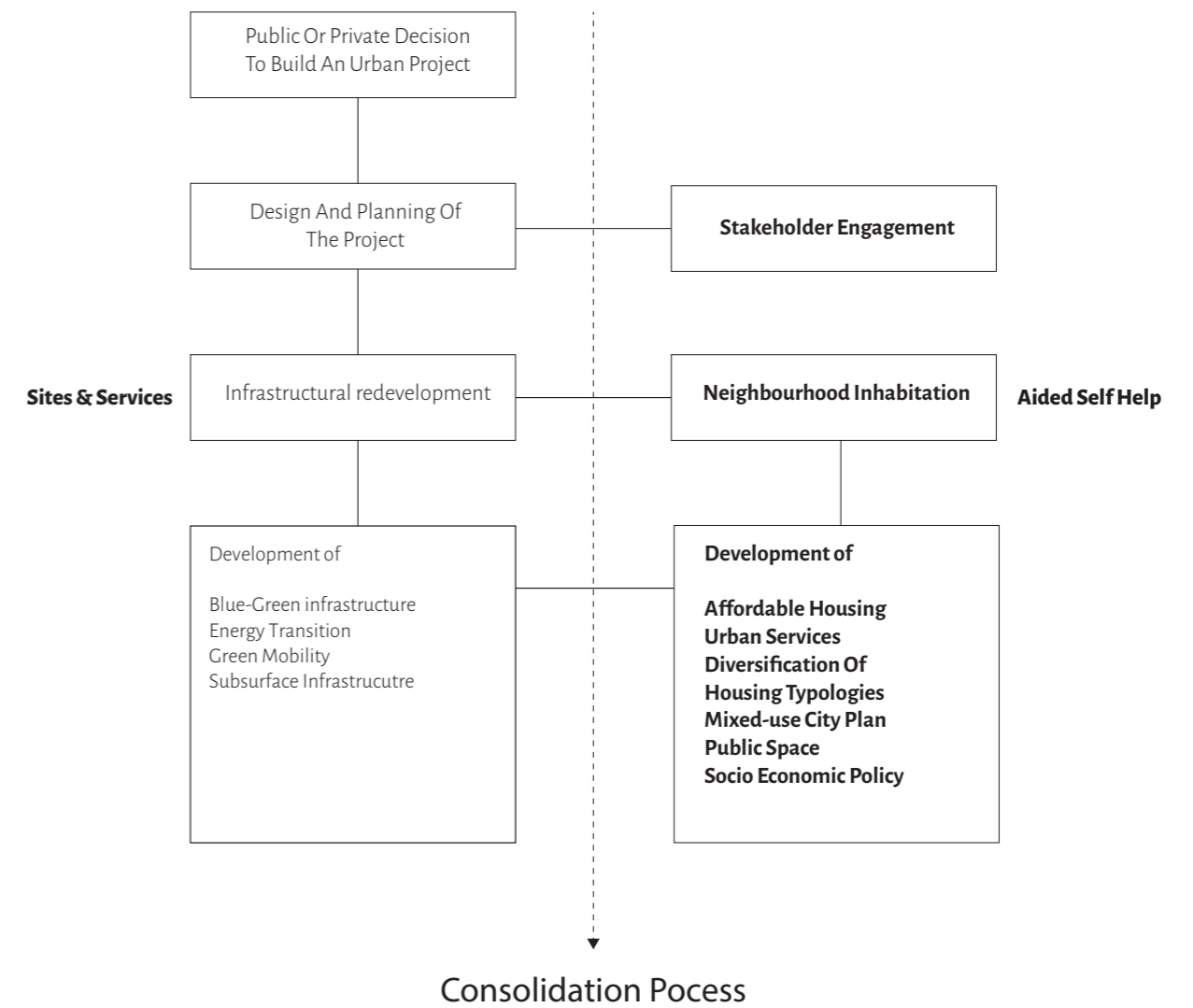
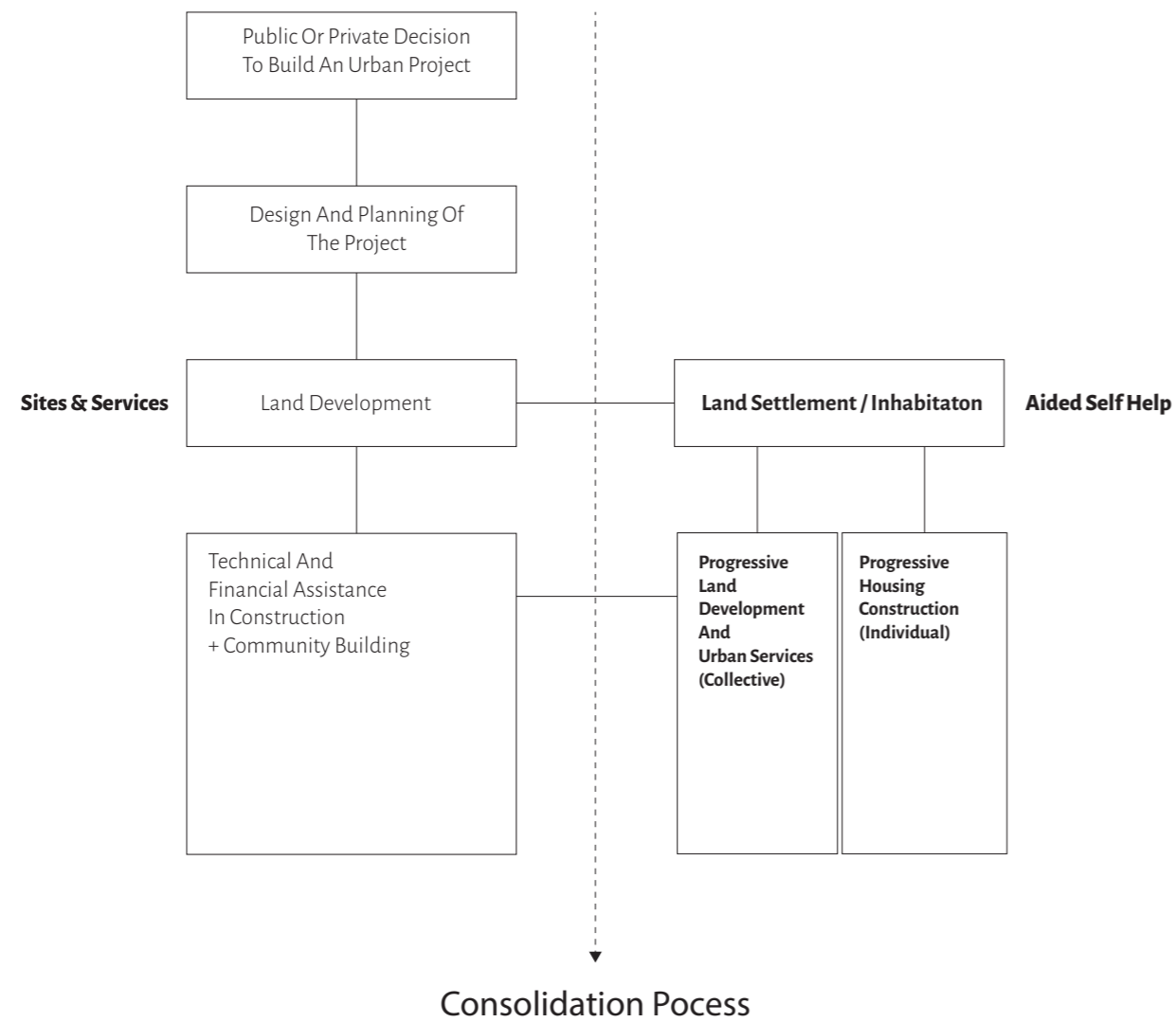
Aided Self-Help and Sites & Services Model

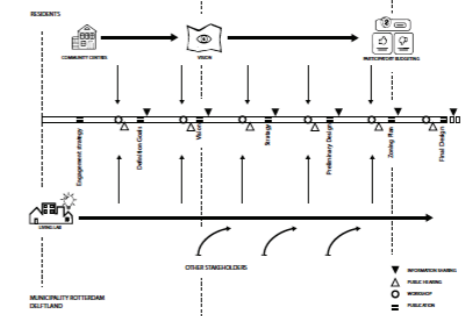
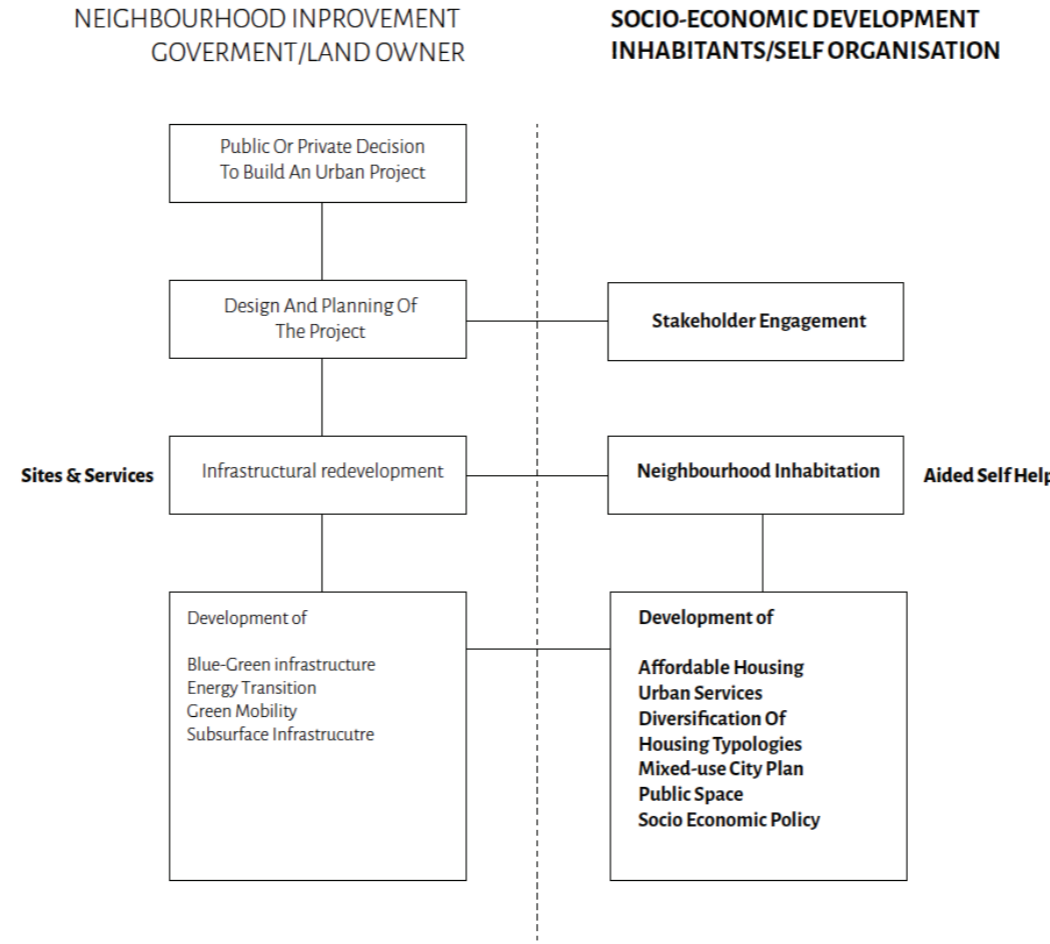
CONVENTIONAL URBAN DEVELOPMENT
GOVERNMENT/LAND OWNER

INFORMAL URBAN DEVELOPMENT
INHABITANTS/SELF ORGANISATION

NEIGHBOURHOOD IMPROVEMENT
GOVERNMENT/LAND OWNER

SOCIO-ECONOMIC DEVELOPMENT
INHABITANTS/SELF ORGANISATION





Mindaraproject, Bissau, Guinea Bissau



Mindaraproject, Bissau, Guinea Bissau

Statement of Requirements

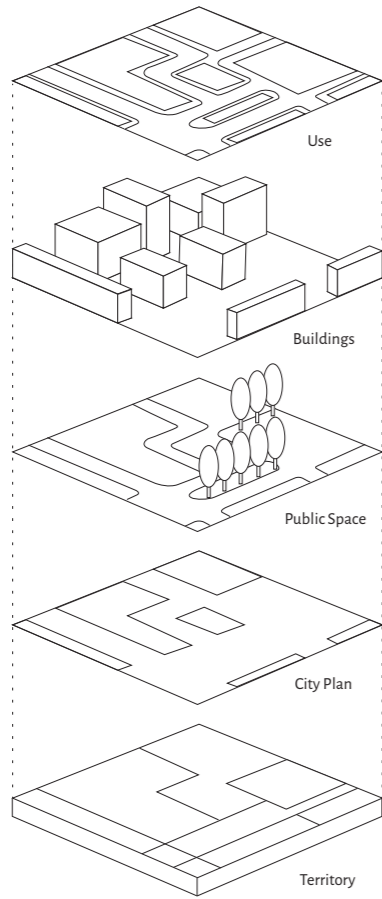
Domains of intervention

Strategy

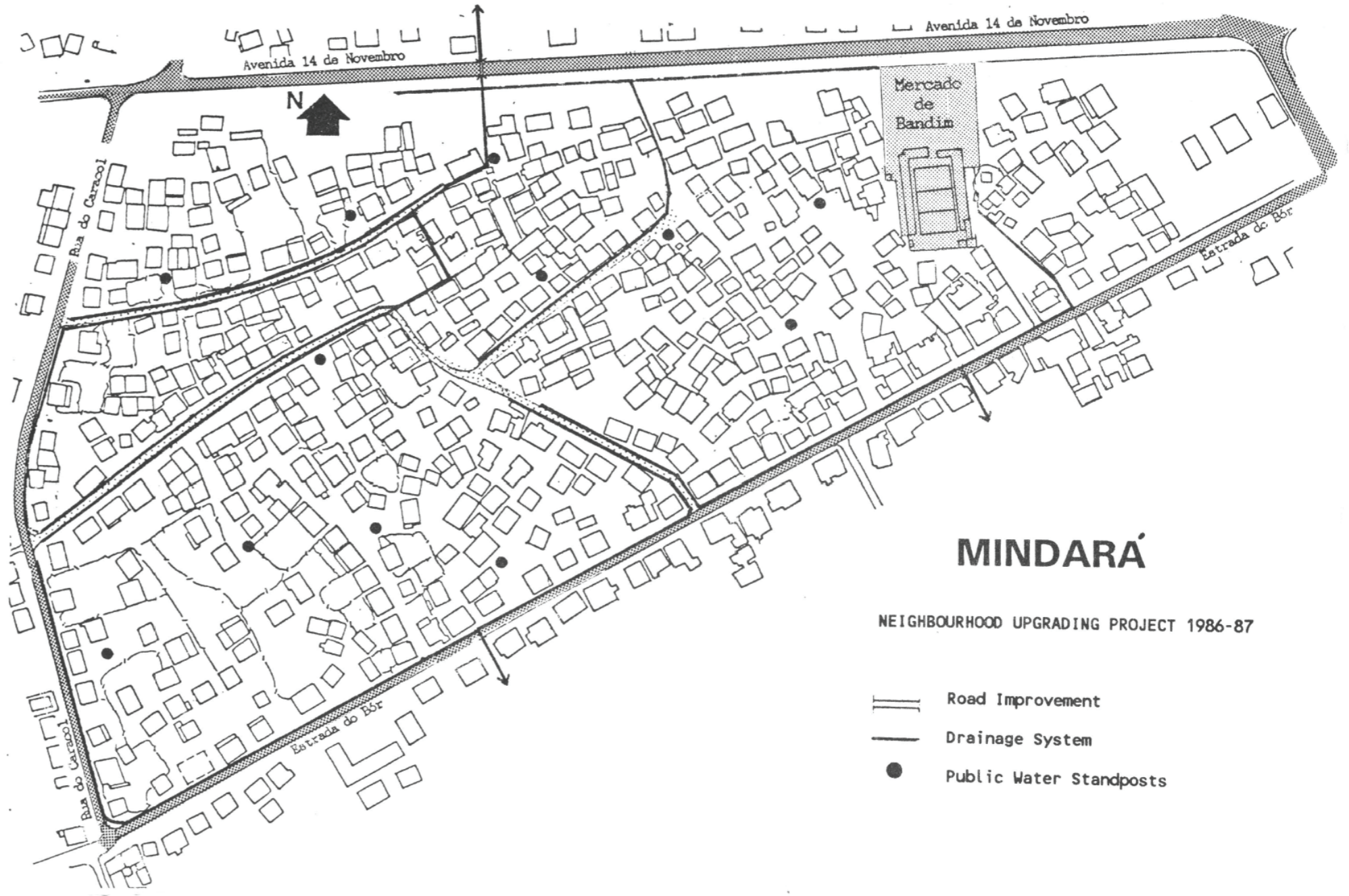
Climate Mitigation and Adaptation

Sustainable Urban Renewal

Resilient Infrastructure






Aided Self-Help
&
Sites and Services



MINDARA

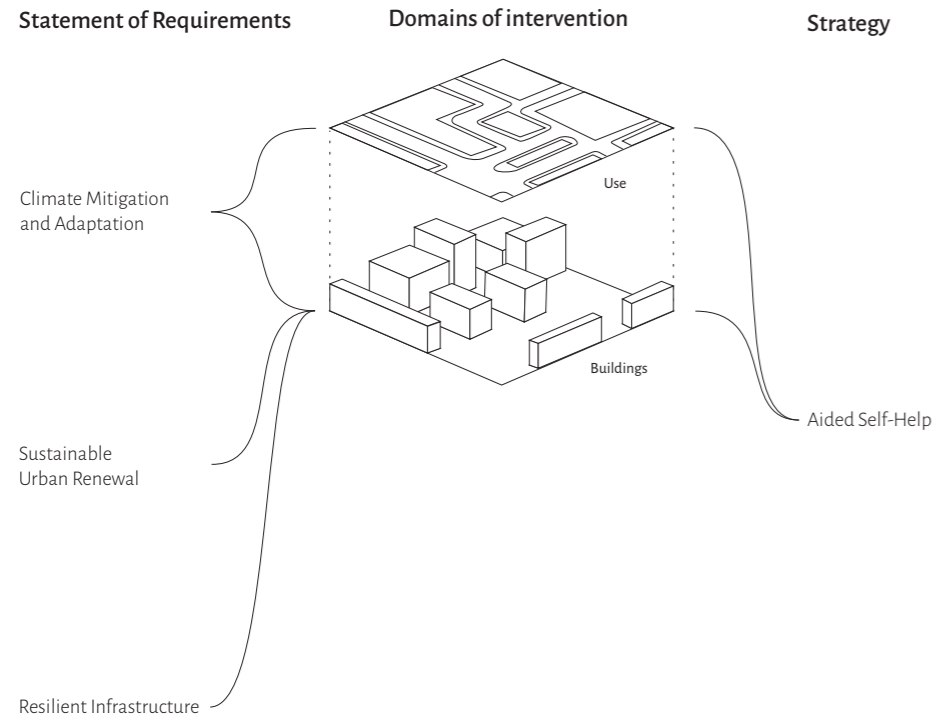
NEIGHBOURHOOD UPGRADING PROJECT 1986-87

-  Road Improvement
-  Drainage System
-  Public Water Standposts

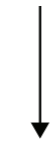
Het Nationaal Programma
ROTTERDAM ZUID



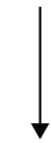
Nationaal Programma Rotterdam Zuid



Vision and ambitions municipality Rotterdam



standardized analysis methodology for socio-economic problems per neighbourhood

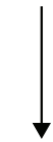


determining relevant financial partners

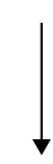


connecting financial partners with public and private facilities that deal with the most prevalent socio-economic problems

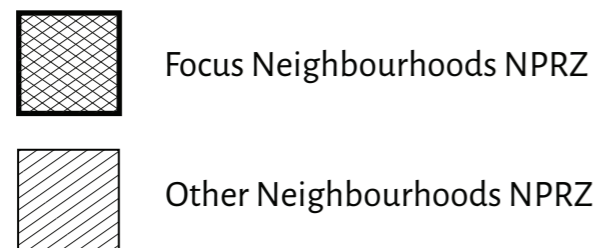
Socio-economic problems discovery sites: Schools, debt service, GPs, police



wijkteam - Social Workers



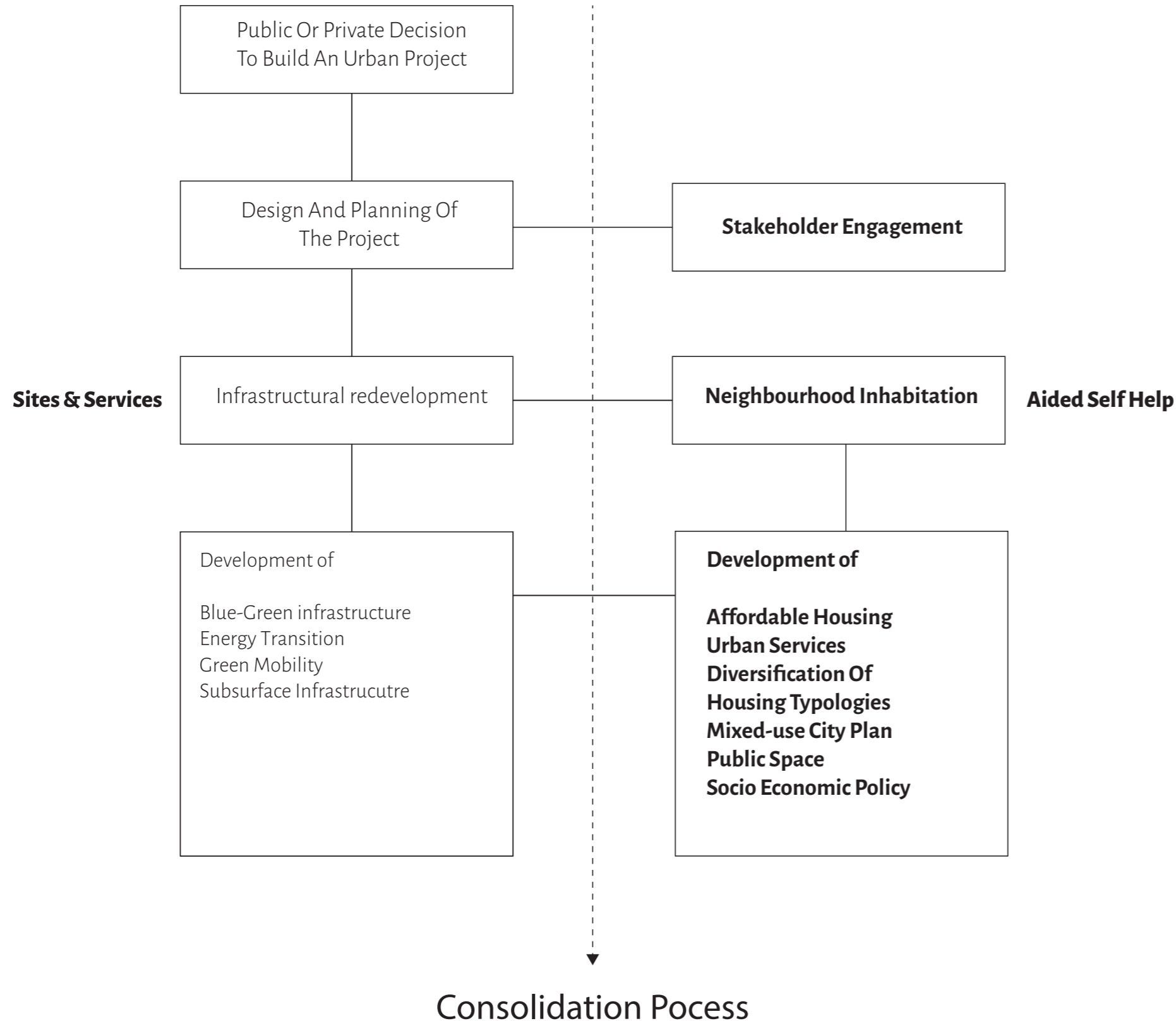
connecting with public and private facilities that deal with the socio-economic problems



Available subsidies in Rotterdam

NEIGHBOURHOOD IMPROVEMENT GOVERNMENT/LAND OWNER

SOCIO-ECONOMIC DEVELOPMENT INHABITANTS/SELF ORGANISATION



Werk en inkomen

- > [Subsidie Rijnmonds arbeidsmarkt perspectiefonds \(RAP\)](#)
- > [Subsidie Scholingsvouchers](#)

Uw eigen idee

- > [Bewonersinitiatief](#)
- > [Subsidie Oranjebonnen](#)
- > [Subsidie CityLab010](#)

Duurzaamheid

- > [Isolatiesubsidie VvE's Bospolder-Tussendijken](#)
- > [Subsidie Circulaire initiatieven](#)
- > [Subsidie Groenblauwe schoolpleinen](#)
- > [Subsidies Duurzaam010.nl](#)
- > [Haalbaarheidsonderzoek walstroom aanvragen](#)
- > [Subsidie Bouwlogistiek](#)
- > [Subsidie Klimaatadaptatie](#)
- > [Subsidie Centrale aansluitingen](#)
- > [Subsidie Smart energy systems aanvragen](#)

Economie

- > [Subsidie Bedrijfsruimte maakindustrie](#)
- > [Subsidie Vitale kerngebieden](#)
- > [Subsidie Uitstralingproject Katwol 2022-2025](#)
- > [Subsidie Bedrijfsruimte maakindustrie](#)
- > [Subsidie Economie](#)
- > [Subsidie Winkelgebieden en bedrijventerreinen](#)

Jeugd

- > [Subsidie Voorschoolmaatschappelijk werk](#)
- > [Subsidie Schoolmaatschappelijk werk](#)
- > [Subsidie Risicjongeren \(voortijdige schoolverlaters, mentoring\)](#)
- > [Subsidie Jeugdparticipatie](#)
- > [Aanvraag Sociaal Medische Indicatie voor kinderopvang \(SMI\)](#)
- > [Subsidie Kinderopvang Plus](#)
- > [Subsidie Stevige start \(onder andere JGZ\)](#)
- > [Subsidie Couleur locale Jeugd](#)
- > [Subsidie Jeugdparticipatie](#)
- > [Subsidie Jeugdreventie 2024](#)

Kunst en cultuur

- > [Subsidie Kunst en cultuur](#)
- > [Subsidie cultuurcoach](#)
- > [Jaarsubsidie Amateurverenigingen](#)
- > [Subsidie Pitcher Perfect 010](#)
- > [Subsidie cultuurplan 2025-2028](#)
- > [Subsidie Immuusregeling cultuur](#)
- > [Subsidie Lokale Culturele Programmering](#)
- > [Projectsubsidies Cultuur](#)

Onderhoud of verbetering woning

- > [Subsidie Funderingsonderzoek](#)
- > [Subsidie Vergrotten woning](#)
- > [Subsidie en lening voor Woningverbetering VVE010](#)
- > [Subsidie Samenvoeging woningen](#)
- > [Subsidie en lening Woningverbetering](#)

Onderwijs

- > [Subsidie Rotterdams onderwijsbeleid](#)
- > [Subsidie Leerlingvervoer](#)
- > [Subsidie Onderwijshuisvesting](#)
- > [Subsidie Scholingsvouchers](#)
- > [Subsidie Voorschoolse educatie](#)
- > [Subsidie Bewegingsonderwijs \(gymnastiek en schoolzwemmen\)](#)
- > [Subsidie VSV programma Rijnmond 2020-2024](#)
- > [Subsidie Begeleiding ontwikkeling kindcentra](#)

Samenleven, welzijn en basisvaardigheden

- > [Subsidie Armeede en schulden](#)
- > [Subsidie Couleur locale 2024](#)
- > [Subsidie Stedelijk welzijn](#)
- > [Subsidie Zorg en wijkrestaurants voor ouderen](#)
- > [Subsidie Samenleven in een stad](#)
- > [Subsidie Couleur locale 2023](#)
- > [Subsidie Huis van de Wijk](#)
- > [Subsidie Wijkvervoer](#)
- > [Subsidie Schoolmaatschappelijk Werk in Schoolzorgteams](#)
- > [Subsidie Basisvaardigheden taal, rekenen en digitale vaardigheden](#)

Sport en recreatie, natuur en milieu

- > [Subsidie Aanpasta sporten](#)
- > [Subsidie Breedtesport \(jaarlijks\)](#)
- > [Subsidie Combinatiefuncties sport-, natuur- en recreatiegerichte inzet](#)
- > [Subsidie Scouting](#)
- > [Subsidie Topsport \(jaarlijks\)](#)
- > [Subsidie Natuur- en milieu-educatie \(jaarlijks\)](#)
- > [Subsidie Rotterdam Lekker Fit](#)
- > [Subsidie Brede repelling combinatiefuncties Rotterdam Sport](#)
- > [Subsidie Breedtesport, scouting- en speeltuinverenigingen \(eenmalig\)](#)
- > [Subsidie Recreatie \(jaarlijks\)](#)
- > [Subsidie Speeltuinen \(jaarlijks\)](#)
- > [Subsidie Urban sports](#)
- > [Subsidie Vogelopvang \(jaarlijks\)](#)
- > [Subsidie 010 Sport en Soel](#)

Vieringen, herdenkingen en stimulering woningcorporaties

- > [Subsidie Vieringen en herdenkingen](#)
- > [Subsidie Directie veiligheid](#)
- > [Subsidie Stimulering woningcorporaties](#)

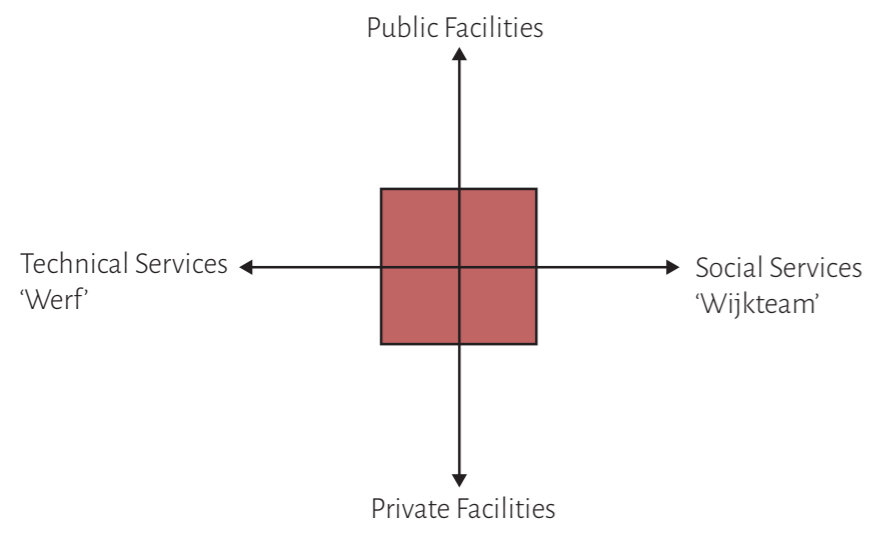
Volksgeneeskunde

- > [Subsidie Bestrijding huiselijk geweld](#)
- > [Subsidie Rolstoelgeschikte woningen](#)
- > [Subsidie Goed voor elkaar](#)
- > [Subsidie Rotterdamse Hospices](#)
- > [Subsidie Woningaanpassingen en scootmobielstallingen](#)

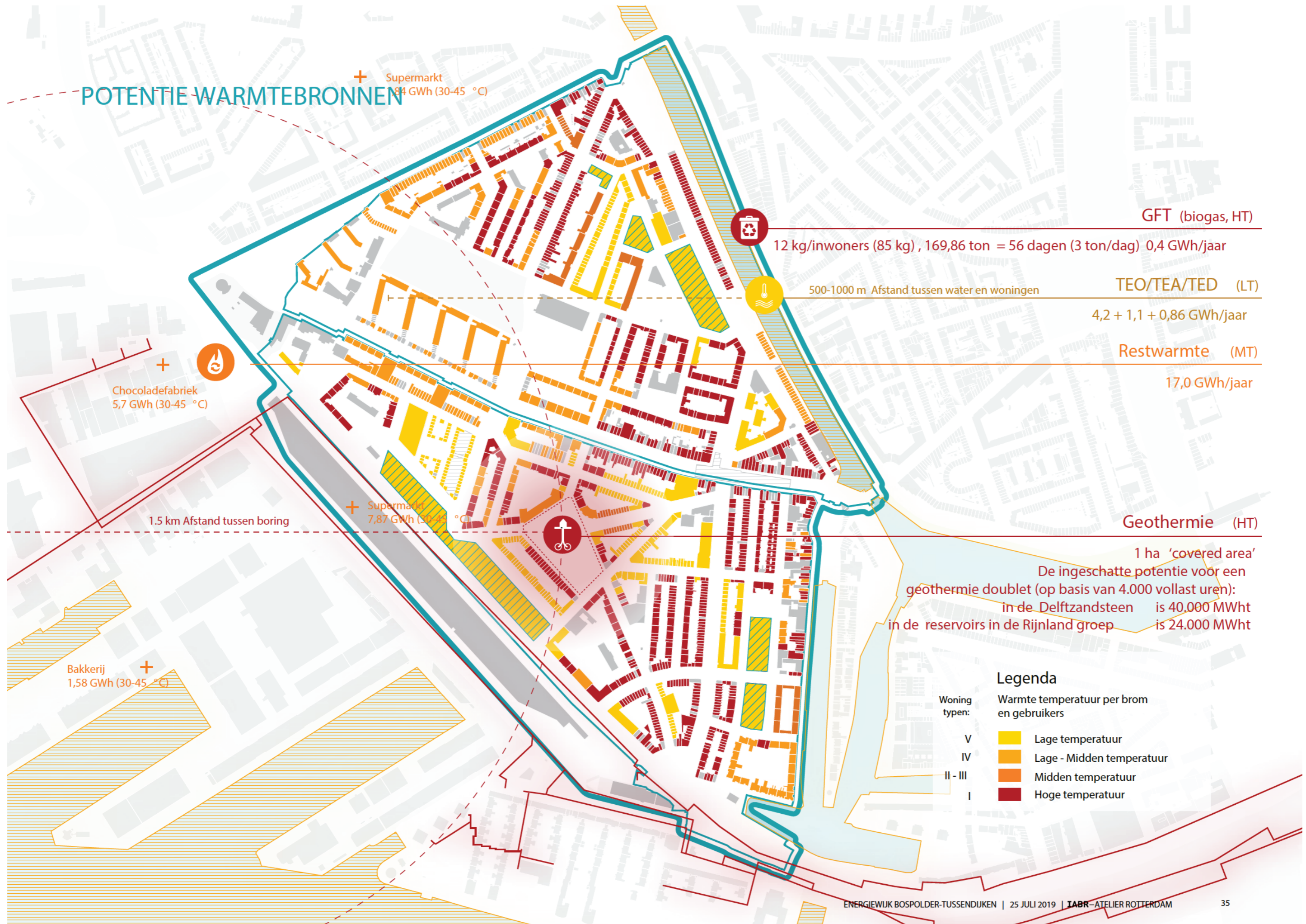
Subsidiebedragen

De subsidie bedraagt:

- € 250 per toegevoegde 500 liter waterberging
- een vast bedrag van €500 per pand of perceel voor de regenaansluiting op een gemeentelijk regenwater rioolstelsel of voor het voorbereiden van de aansluiting op een gemeentelijk regenwater rioolstelsel dat nog aangelegd moet worden
- € 10 per toegevoegde vierkante meter gerealiseerd groenoppervlak en:
 - € 1 per plant of kruid, genoemd in Bijlage 1. Plantenlijst biodiversiteit
 - € 2 per heester of struik, genoemd in Bijlage 1. Plantenlijst biodiversiteit
 - € 10 per boom, genoemd in Bijlage 1. Plantenlijst biodiversiteit
- € 10 per toegevoegde vierkante meter verticaal groeiend groen van minimaal twee vierkante meter per woning of bedrijfspand
- € 62,50 per m2 toegevoegde zonwerende screens met een maximum van € 700 per woning of bedrijfspand
- € 150 per m breedte toegevoegde zonnenscherm met een maximum van € 700 woning of bedrijfspand
- € 70 per m2 zonwerende folie met een maximum van € 700 woning of bedrijfspand
- € 50 per toegevoegde ventilatierooster met een maximum van één rooster per ruimte van de woning of het bedrijfspand
- € 15 per schaduwdoek met een maximum van twee doeken per woning/bedrijfspand
- € 42,50 per m2 zonwerend glas met een maximum van € 400 per woning of bedrijfspand
- De subsidie bedraagt ten hoogste € 40.000 per aanvraag.



ENERGIEWIJK BOSPOLDER-TUSSENDIJKEN

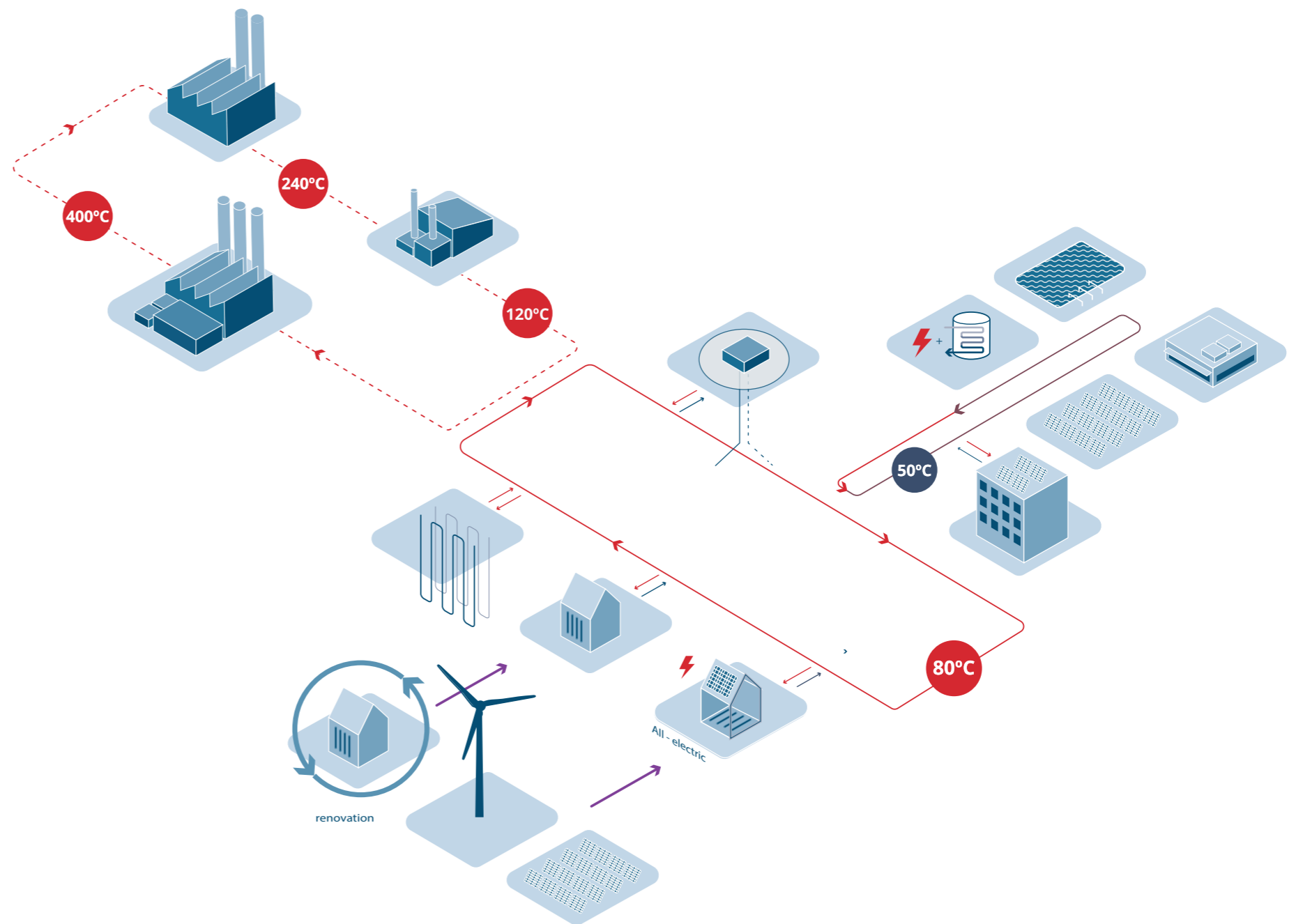
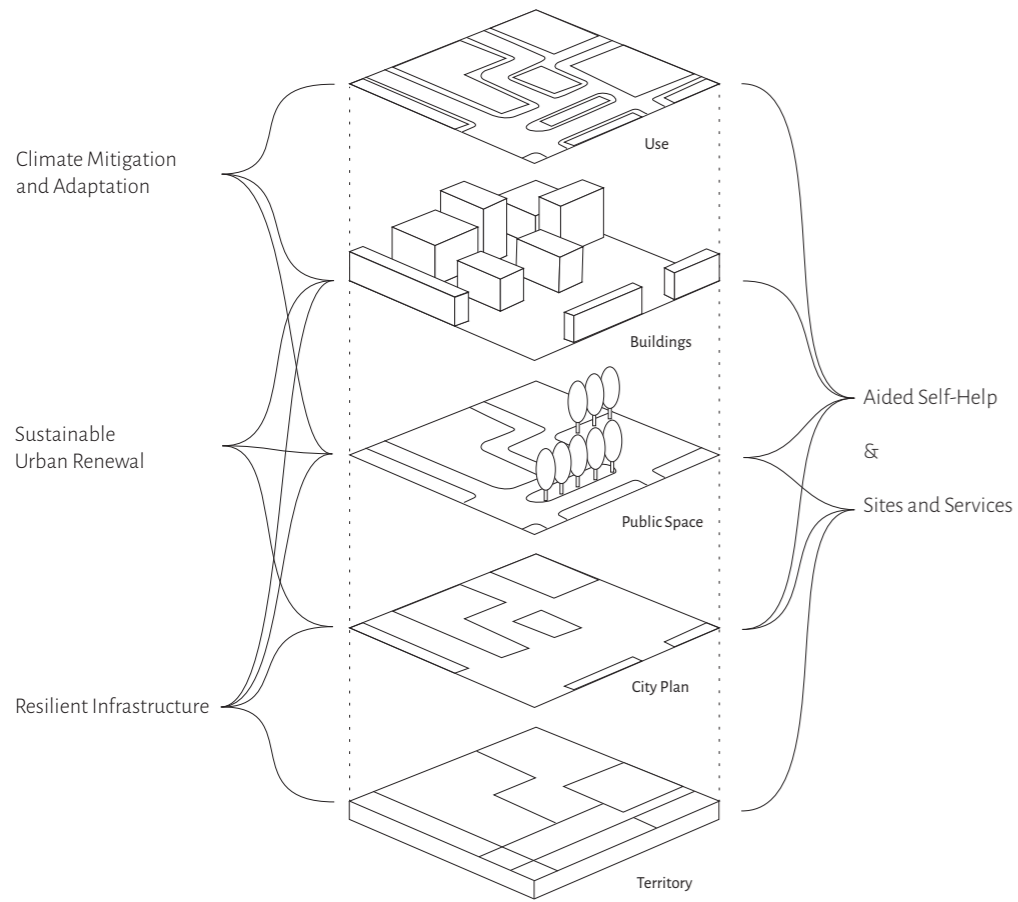


Source: Kuijers, T., Voorde, J. t., Klundert, F. v. d., & Becchi, F. (2019). ENERGIEWIJK BOSPOLDER-TUSSENDIJKEN. Den Haag: IABR-ATELIER ROTTERDAM

Statement of Requirements

Domains of intervention

Strategy

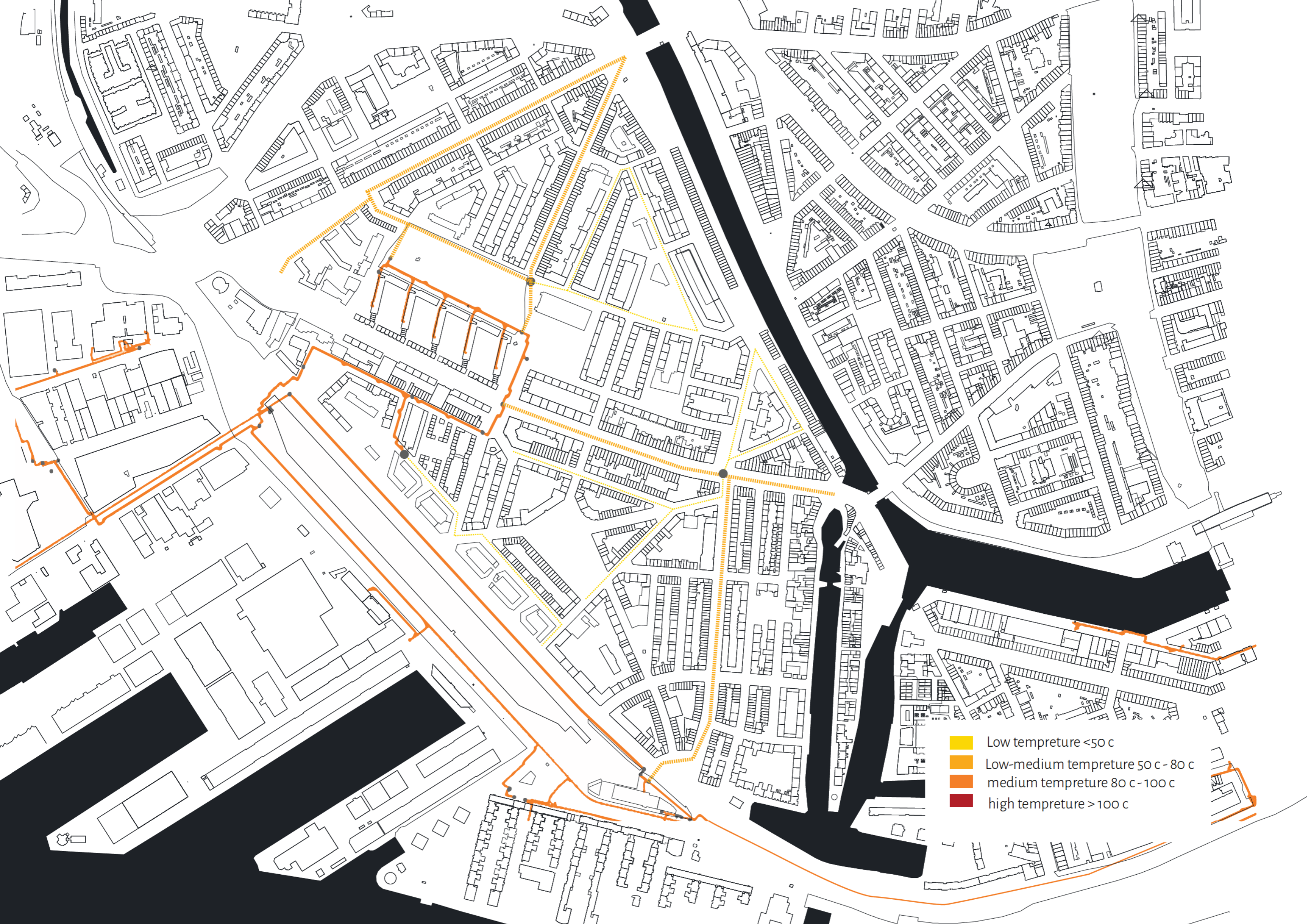


COLLECTIEVE WARMTEVOORZIENING

met verschillende temperatuurregimes en gekoppelde netwerken, gevoed door externe en wijkbronnen

INDIVIDUELE BRONNEN

en eventueel aanvullende lokale LT bronnen op collectief net



- Low temperature <50 c
- Low-medium temperture 50 c - 80 c
- medium temperture 80 c - 100 c
- high temperture >100 c



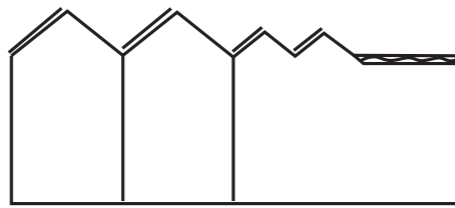
- Water roof
- Solar Roof
- Unsuited

solar/ water roof collective investment

Portion of income from energy production goes to lower rent



can buy out solar panel remaining lifespan.



Rent out roof m²

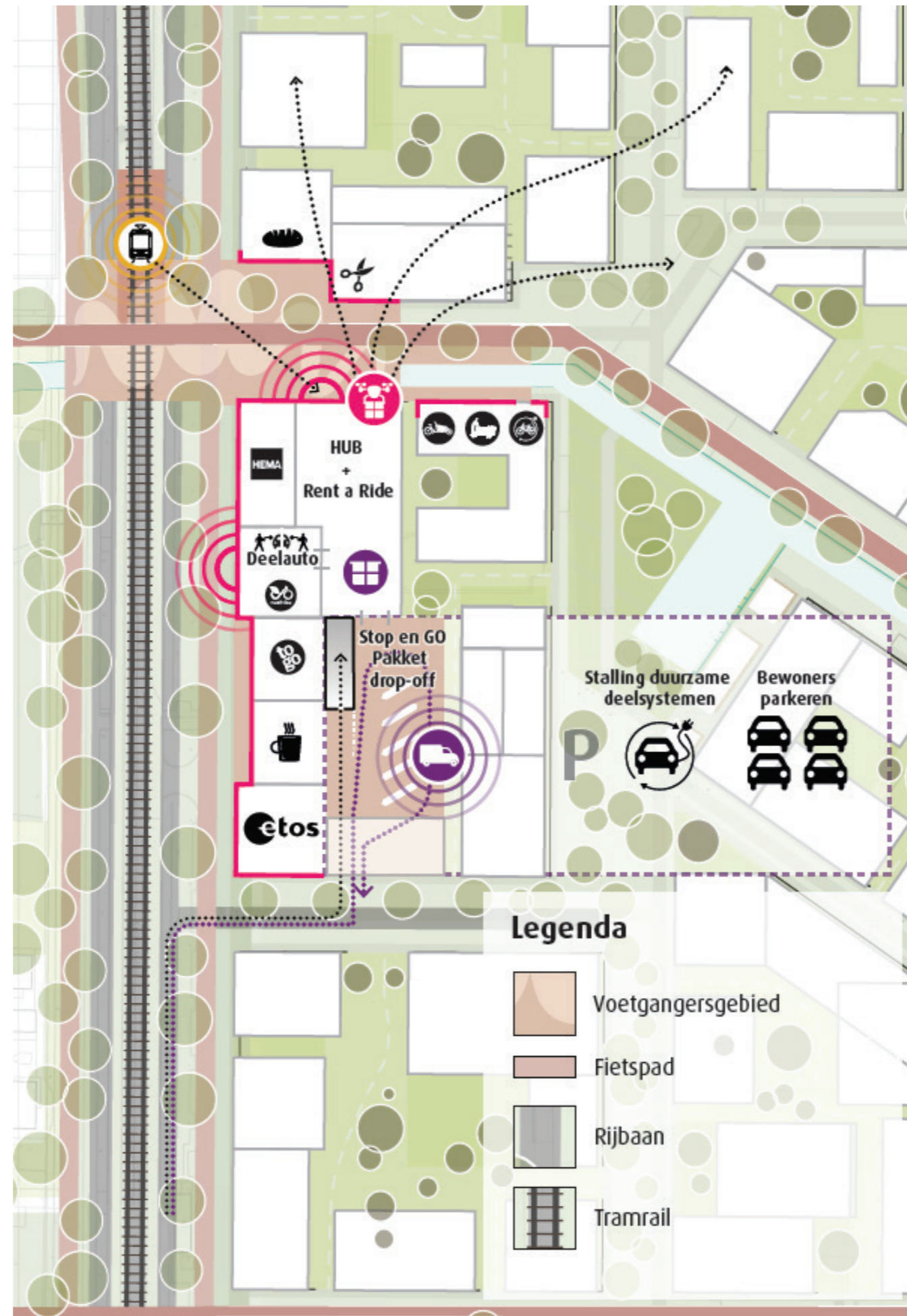


Gemeente Rotterdam

Make investment into solar or water roofs



Mobiliteitsconcept voor Merwede, Utrecht

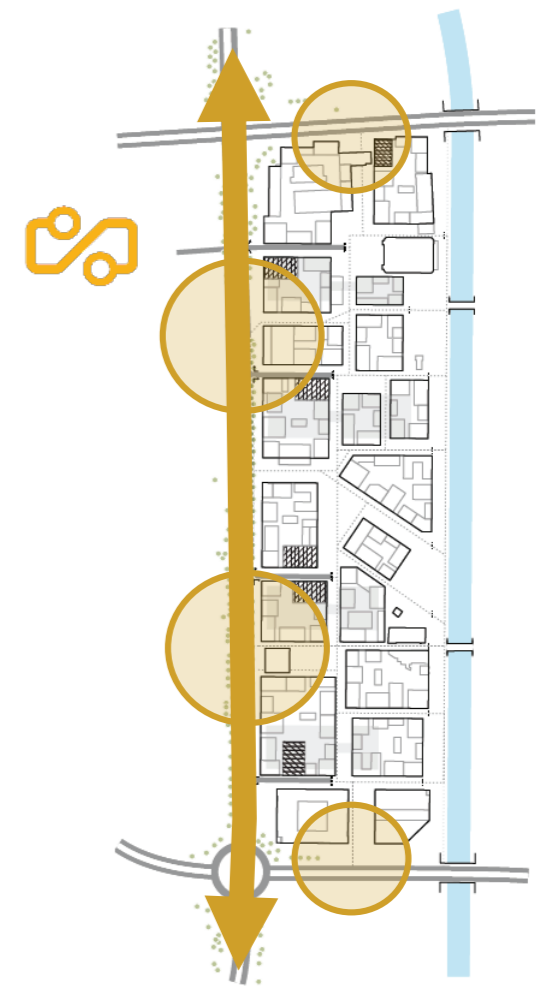
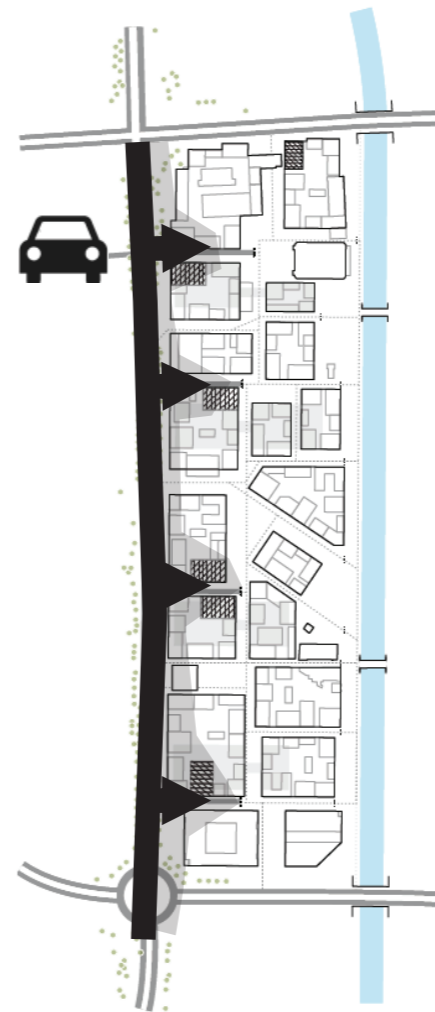
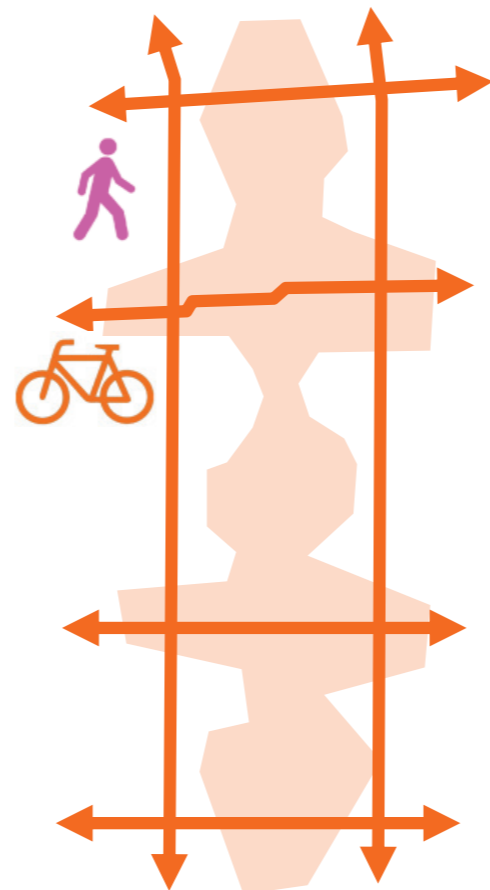
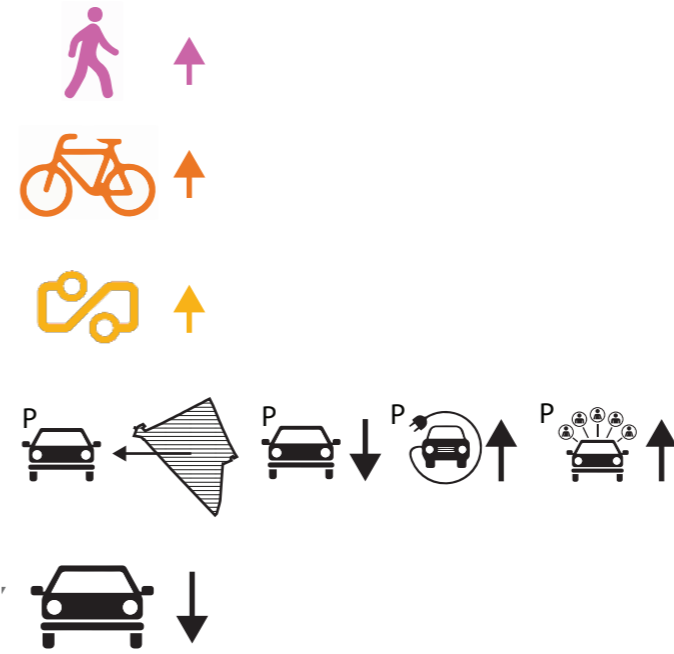
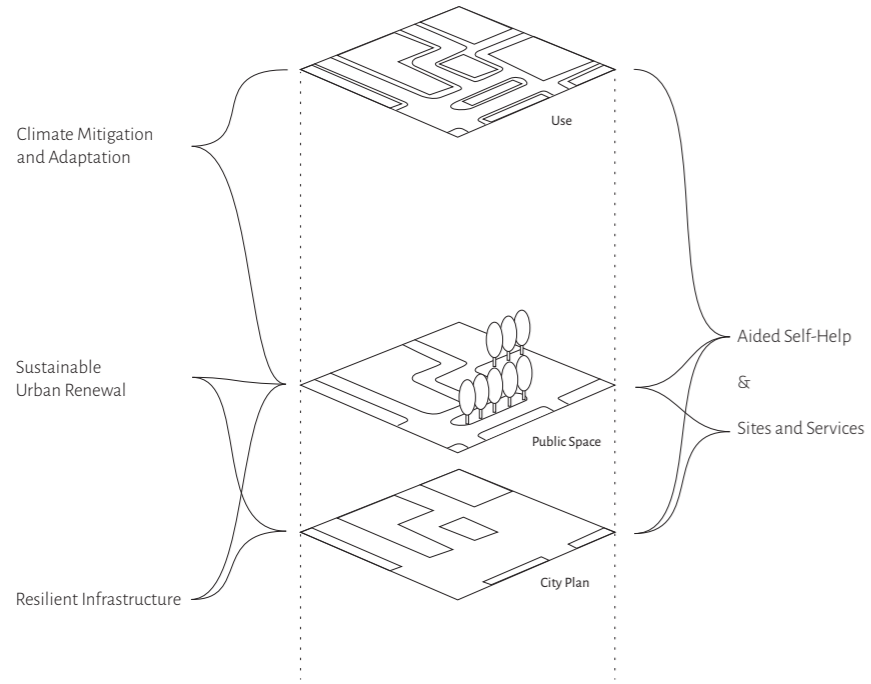


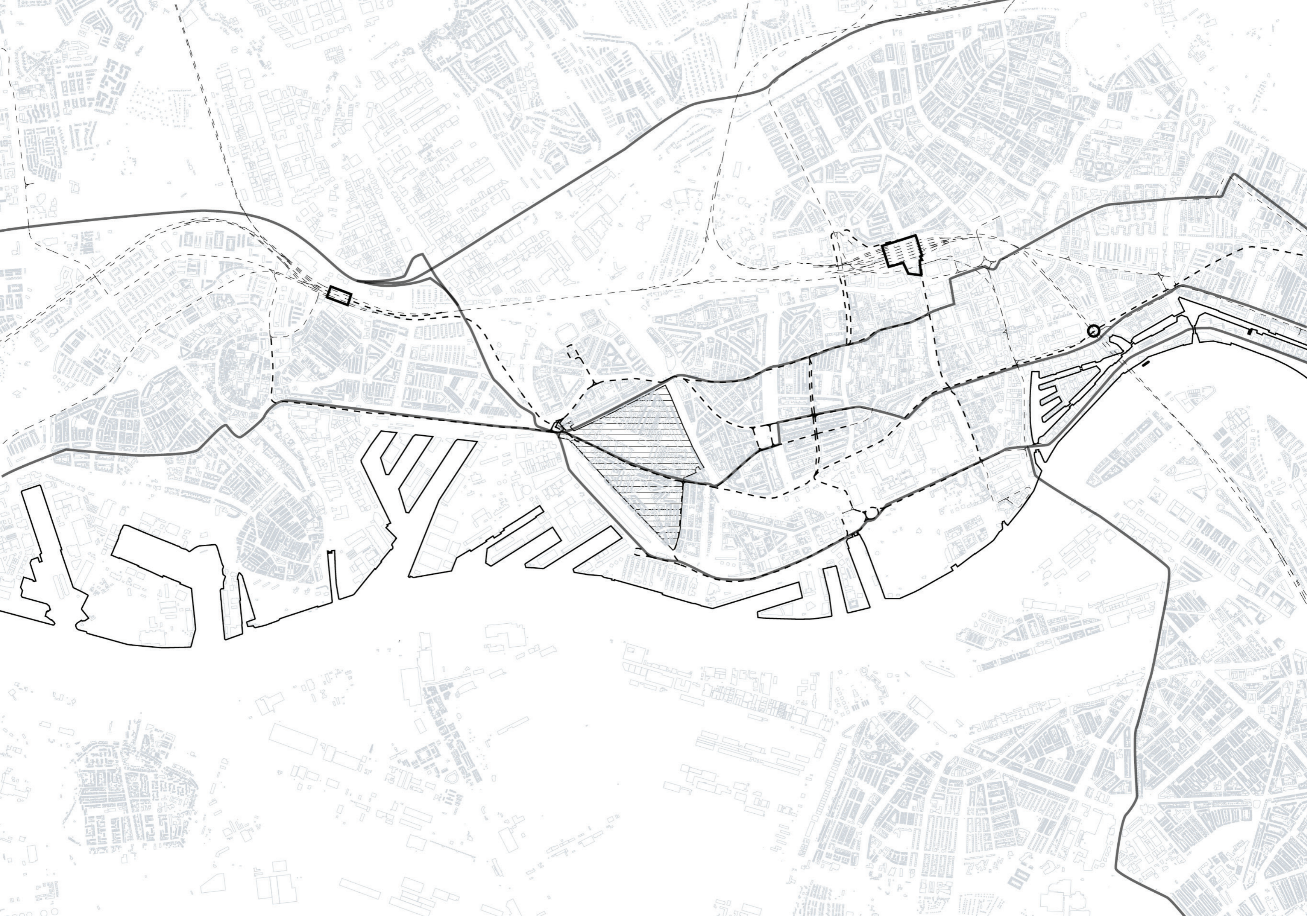
Figuur2 Plattegrond van de mobiliteitswinkel en het gebied er omheen

Statement of Requirements

Domains of intervention

Strategy









Current average parking norm: 0,5
1335 households
692 parking spaces

proposal average parking norm of: 0,4

1335 households
534 parking places

263 parking spaces removed for intervention
429 parking spaces remaining

creation of 105 parking spaces



Gebouwd Water, Bospolder, Rotterdam, The Netherlands



Afwatering naar de lagergelegen punten

Statement of Requirements

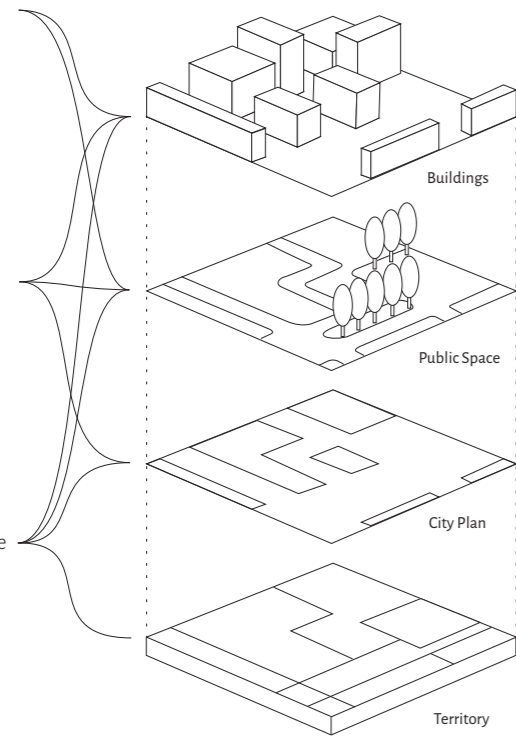
Domains of intervention

Strategy

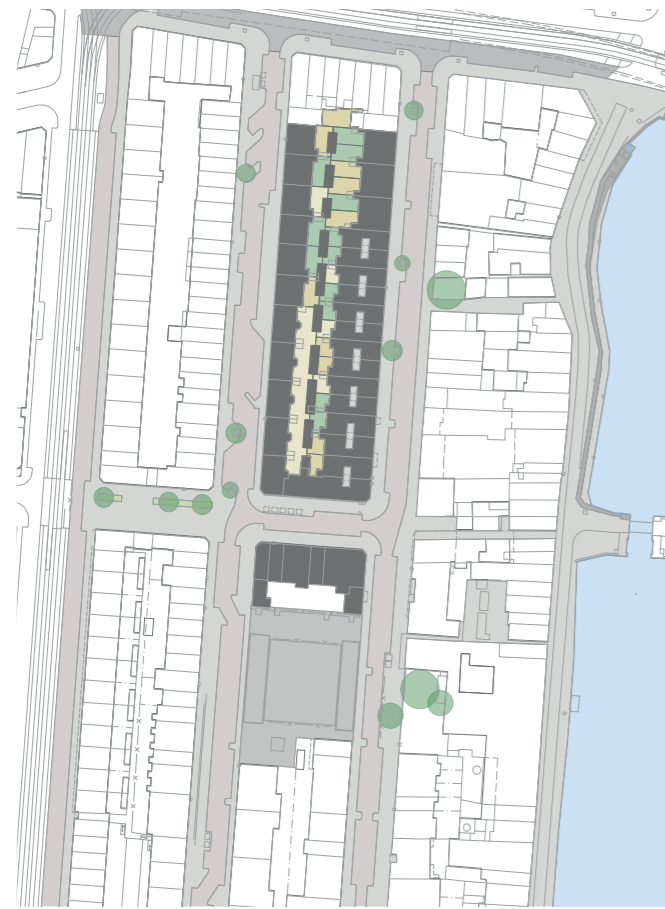
Climate Mitigation and Adaptation

Sustainable Urban Renewal

Resilient Infrastructure



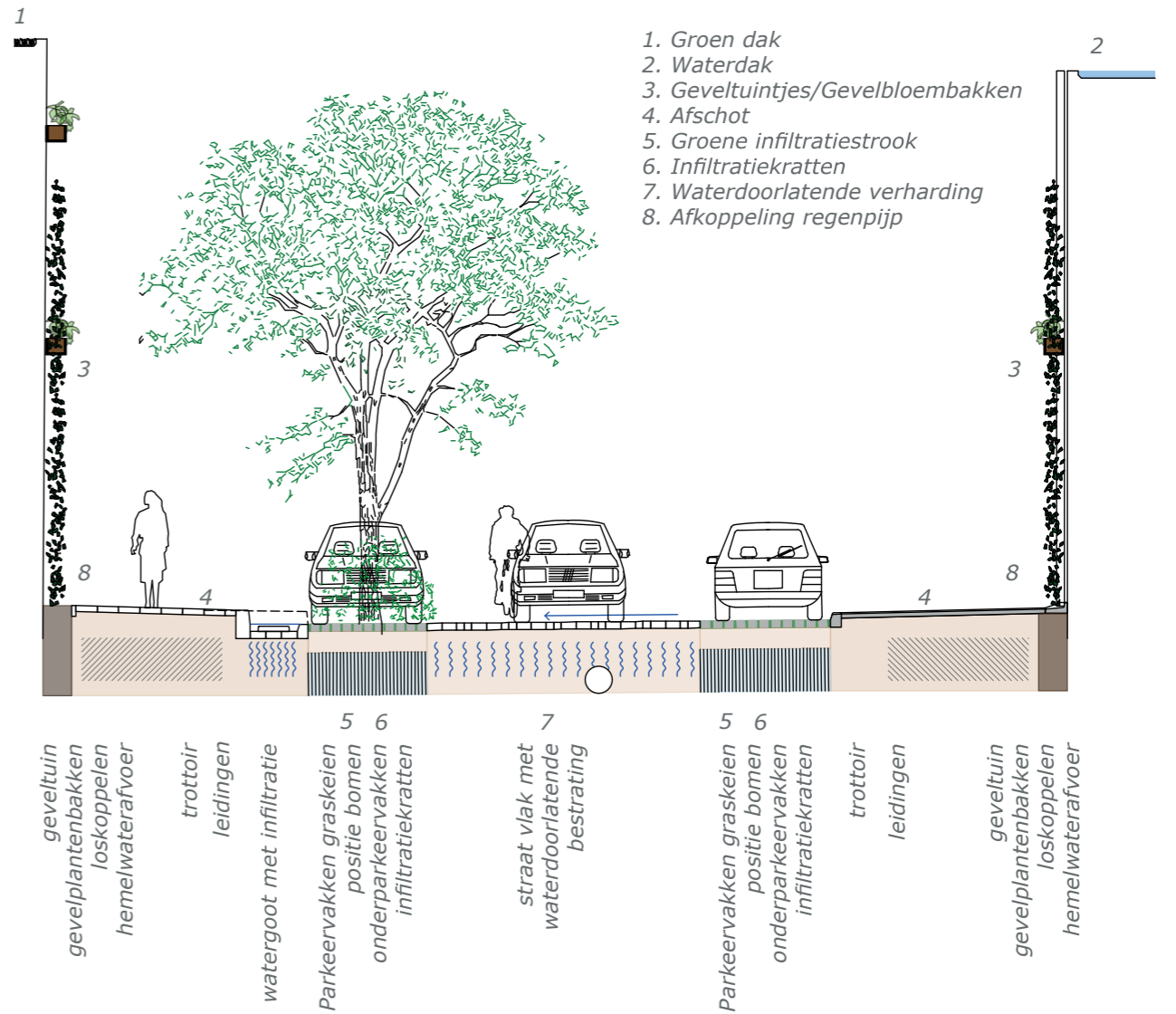
Sites and Services



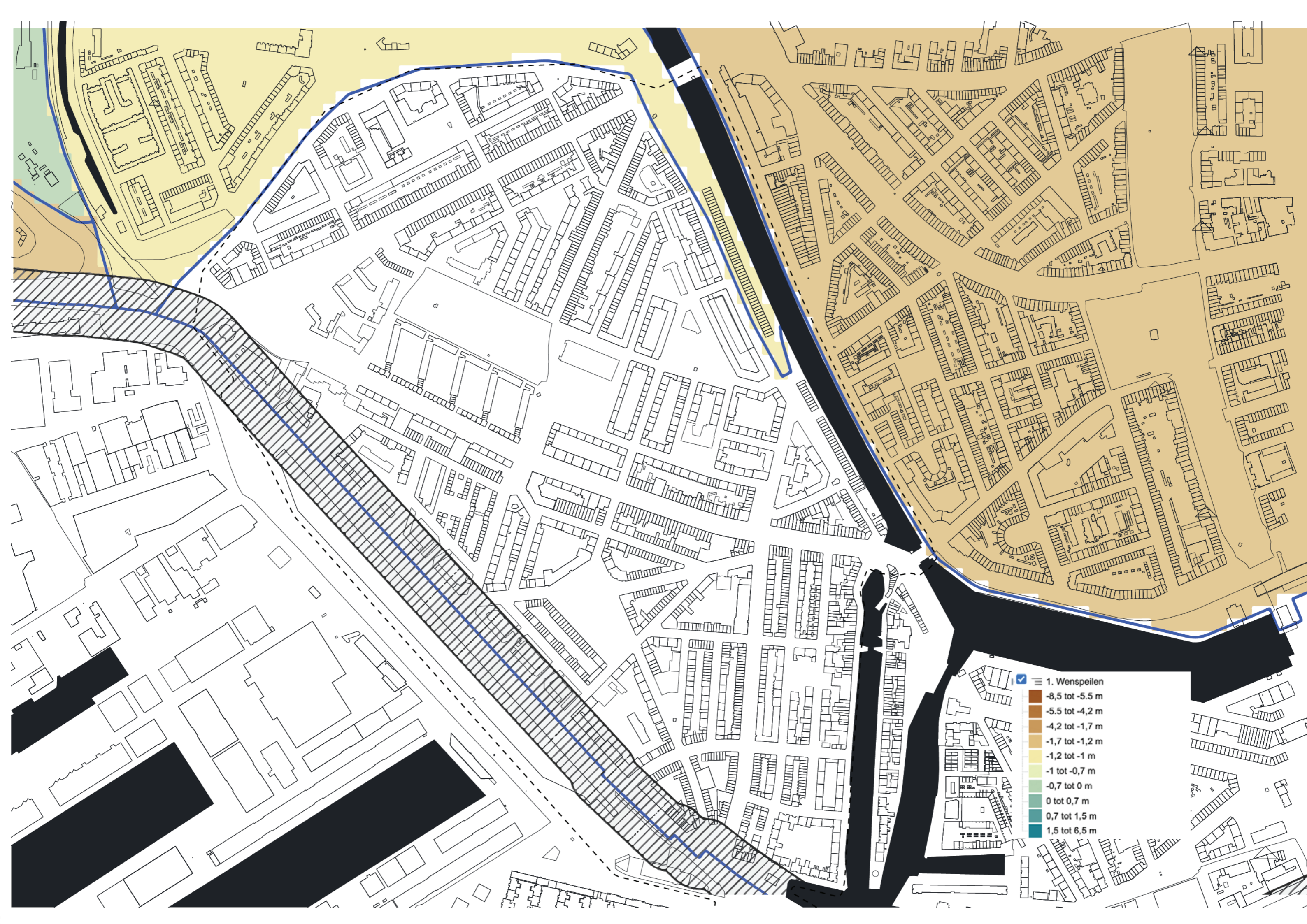
huidige situatie



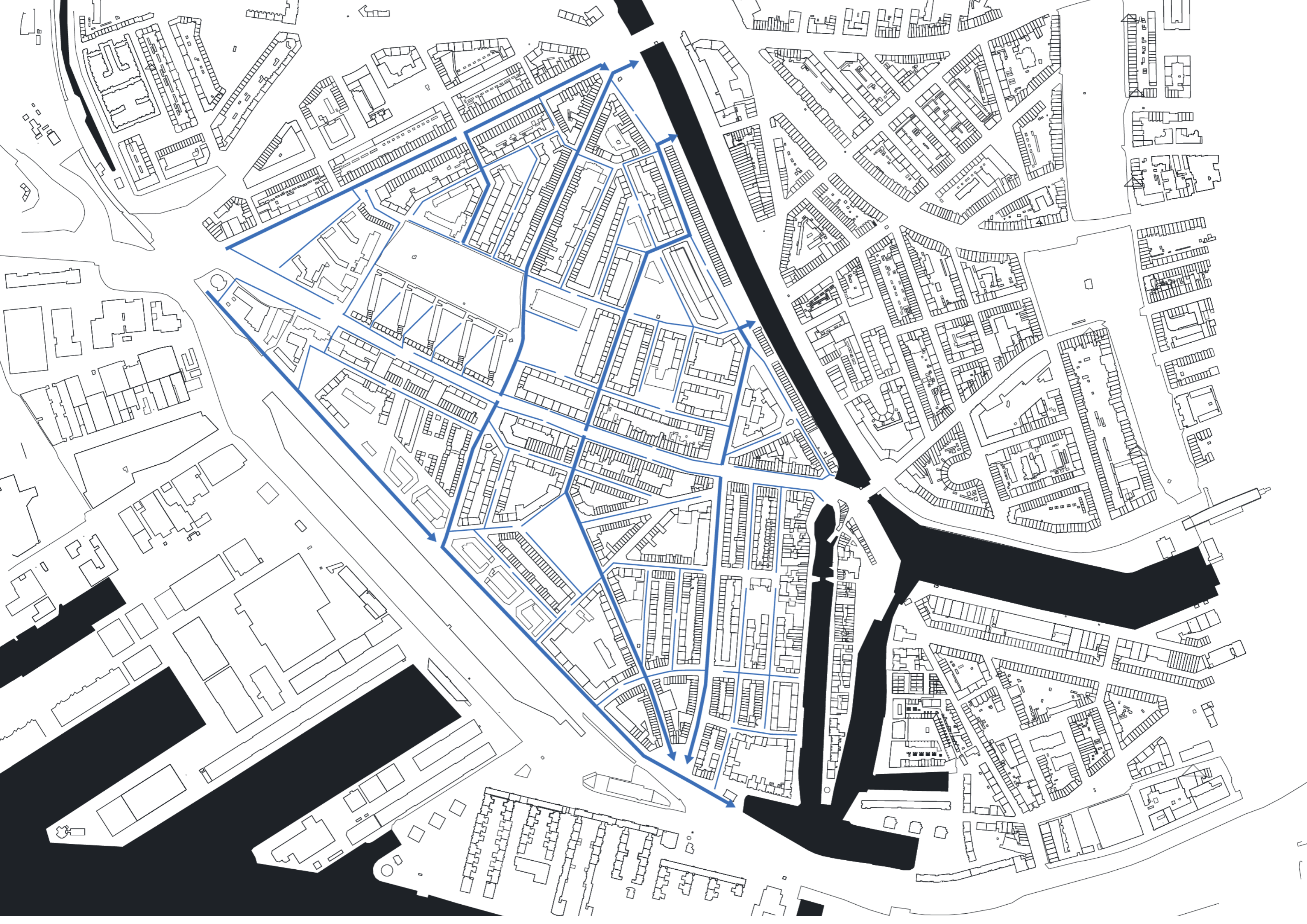
ontwerpvorstel



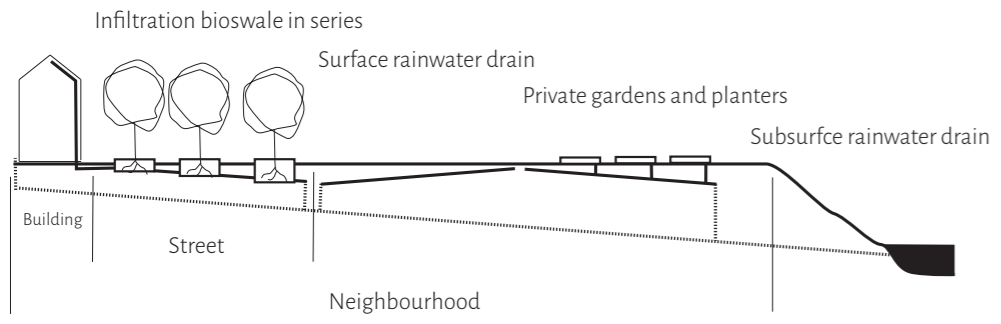




- 1. Wenspielen
- 8,5 tot -5.5 m
- 5.5 tot -4.2 m
- 4.2 tot -1.7 m
- 1.7 tot -1.2 m
- 1.2 tot -1 m
- 1 tot -0.7 m
- 0 tot 0.7 m
- 0.7 tot 1.5 m
- 1.5 tot 6.5 m



Water System



Wonen in de Stampioendwarstraten



Statement of Requirements

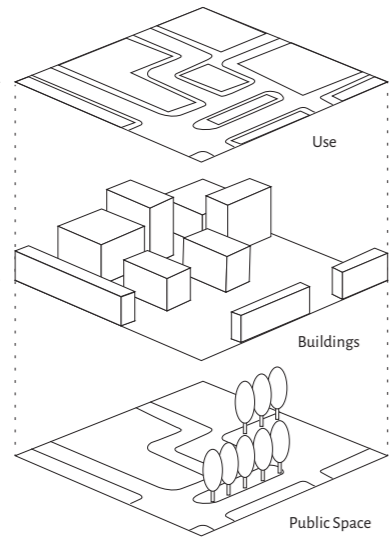
Domains of intervention

Strategy

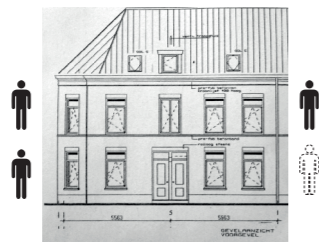
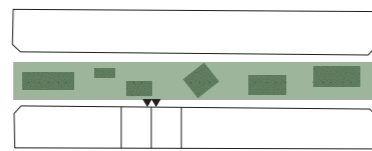
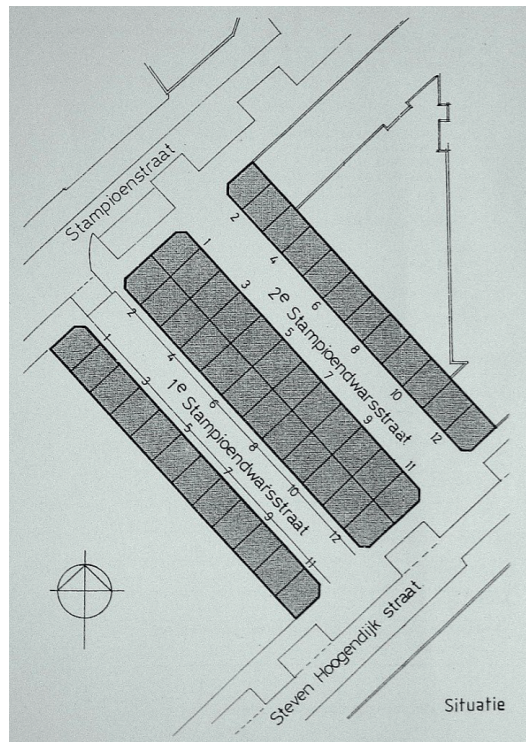
Climate Mitigation and Adaptation

Sustainable Urban Renewal

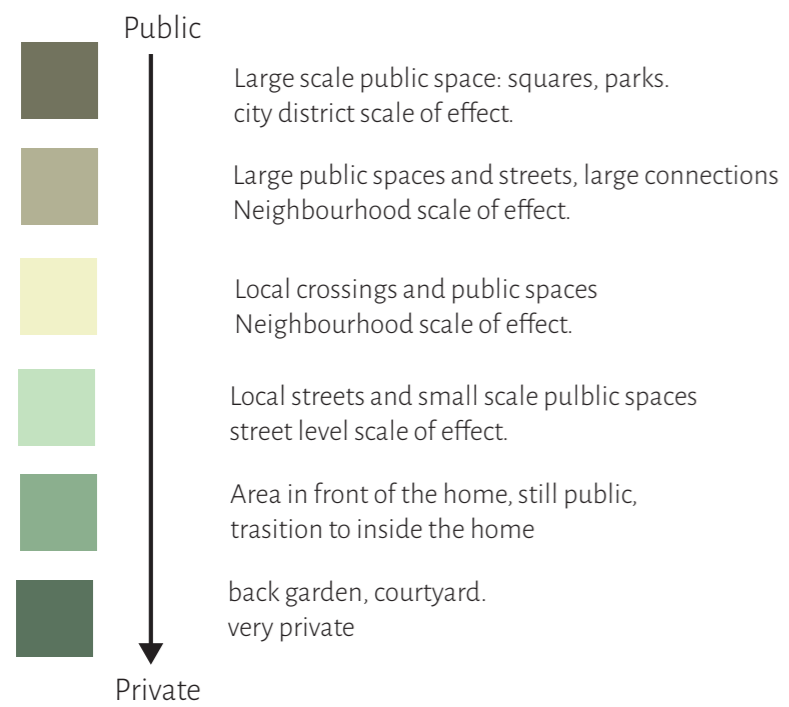
Resilient Infrastructure



Aided Self-Help



Private to public transition



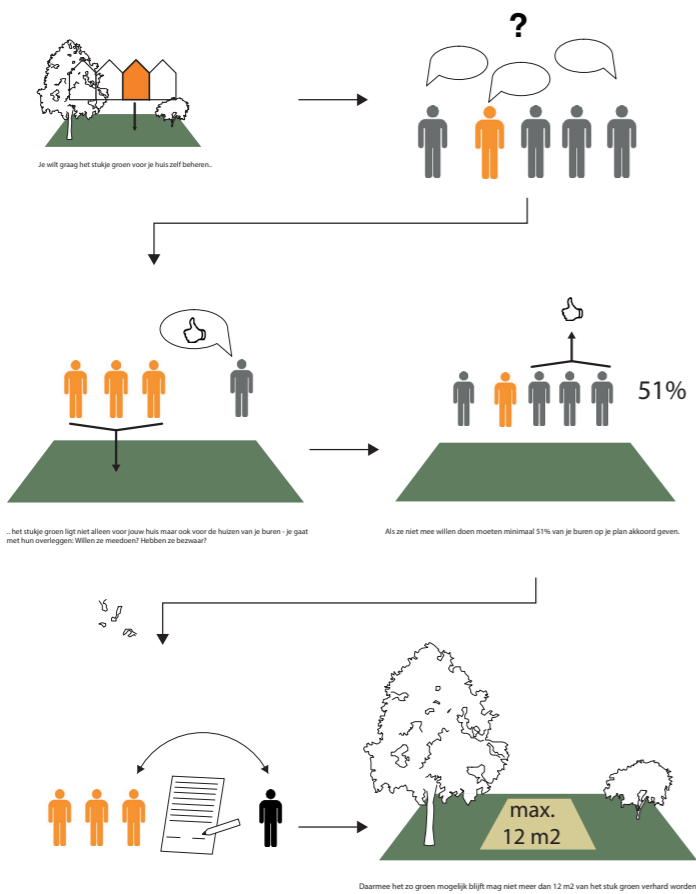
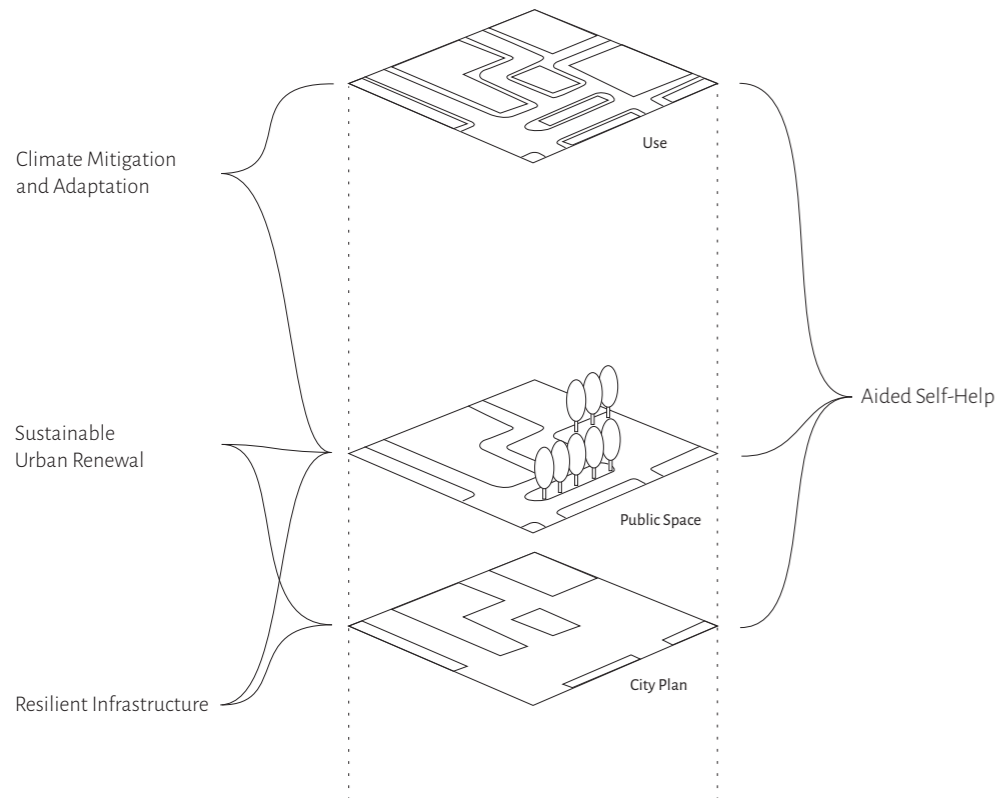
De Schepenstraat



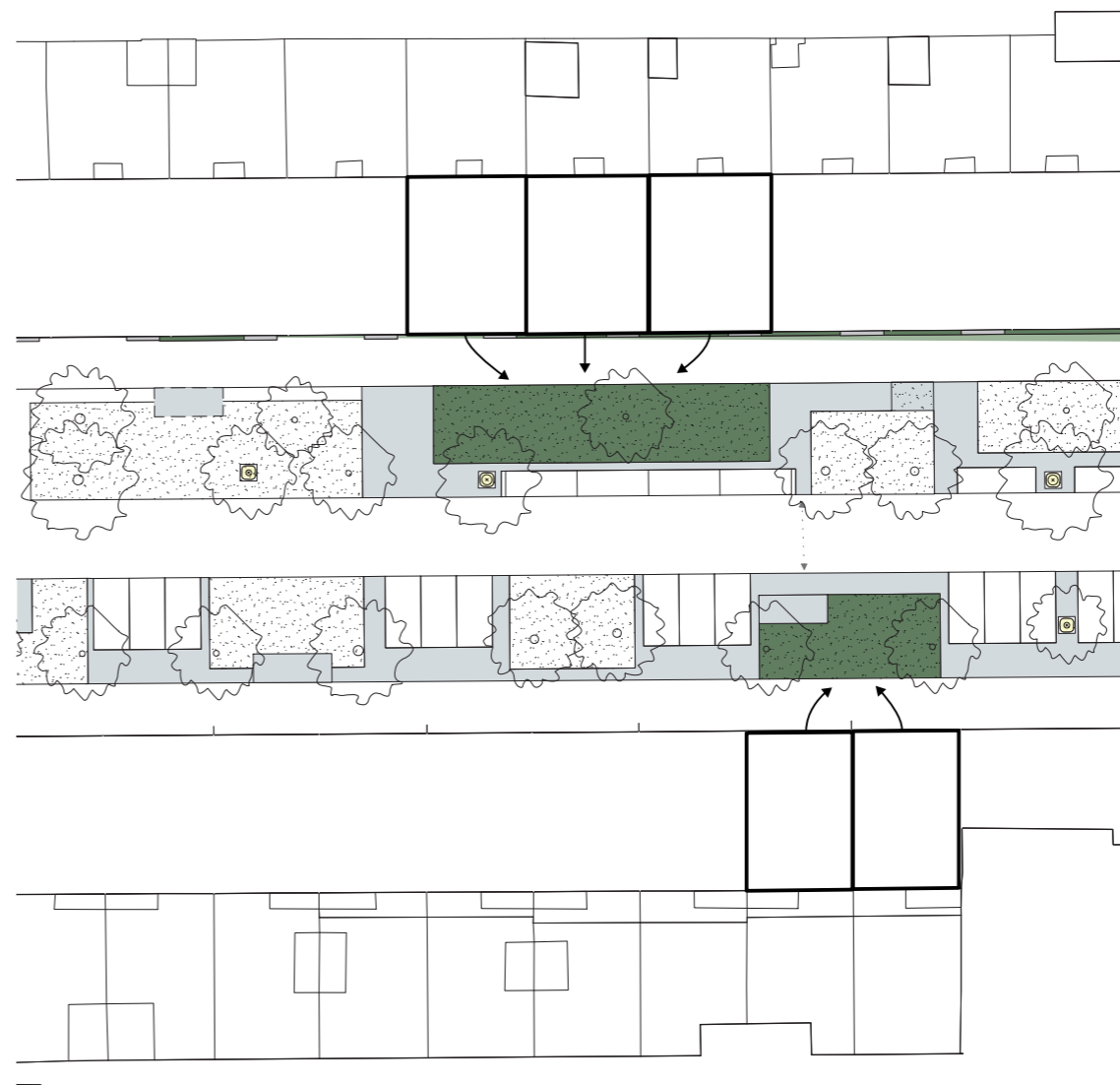
Statement of Requirements

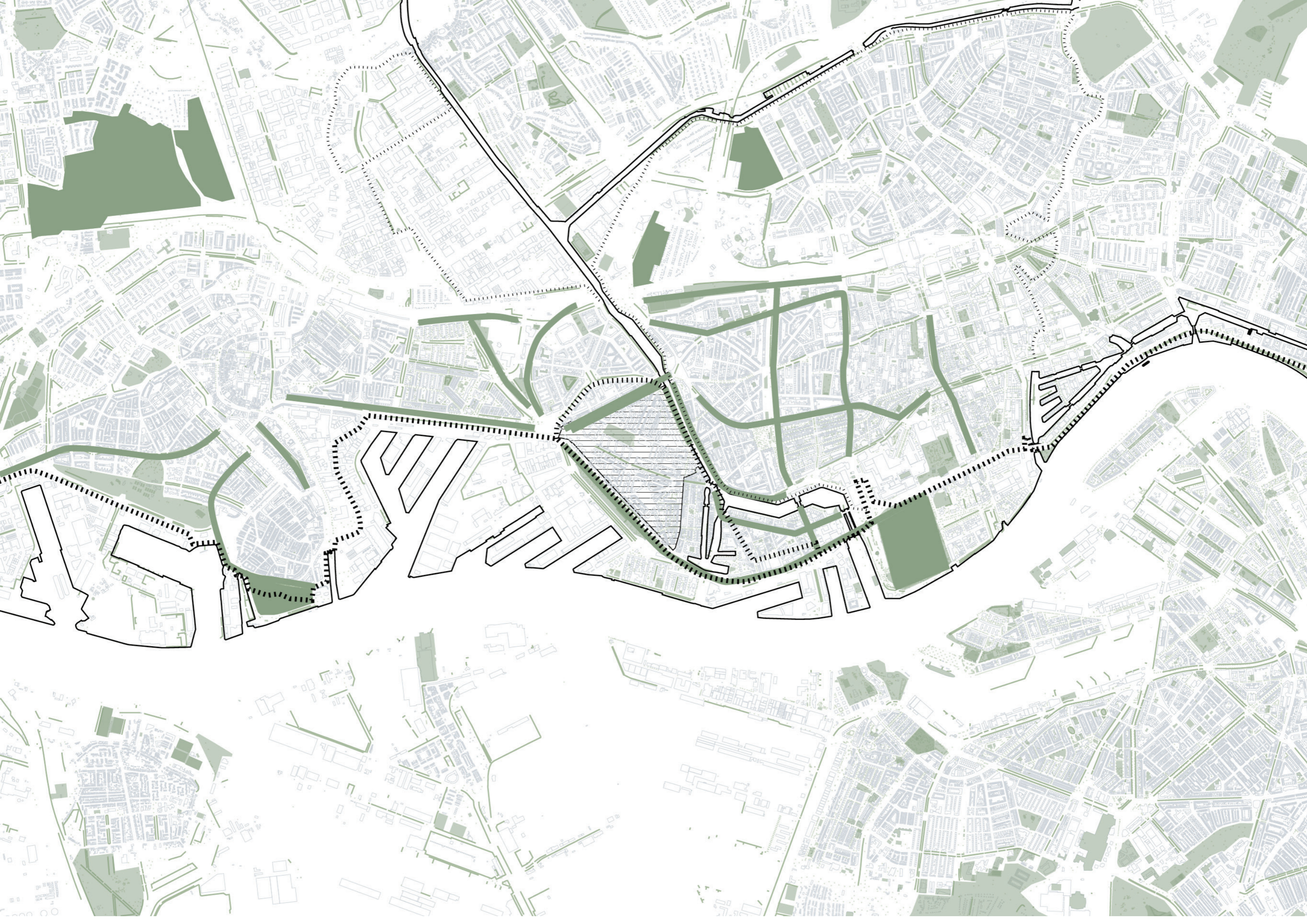
Domains of intervention

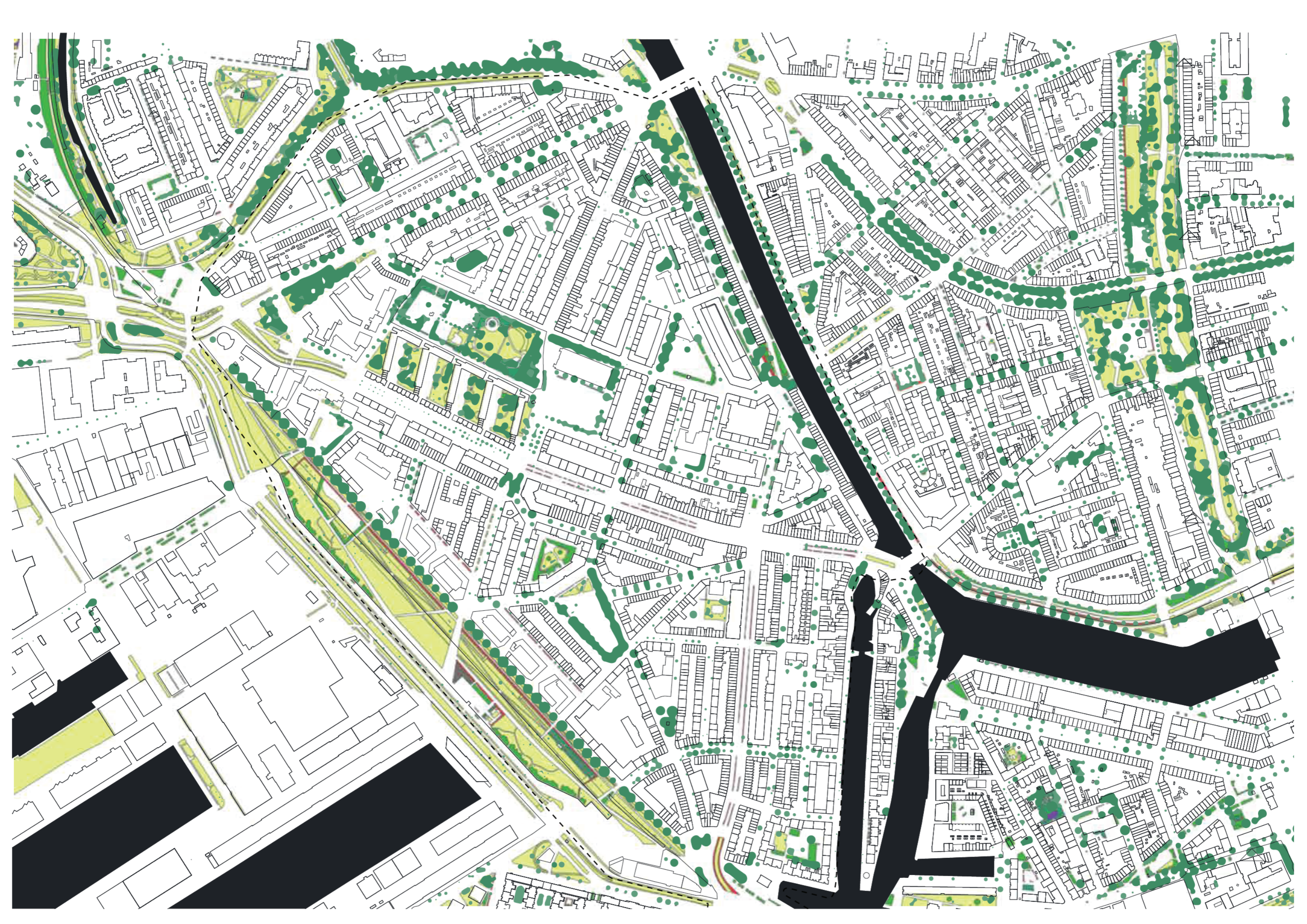
Strategy

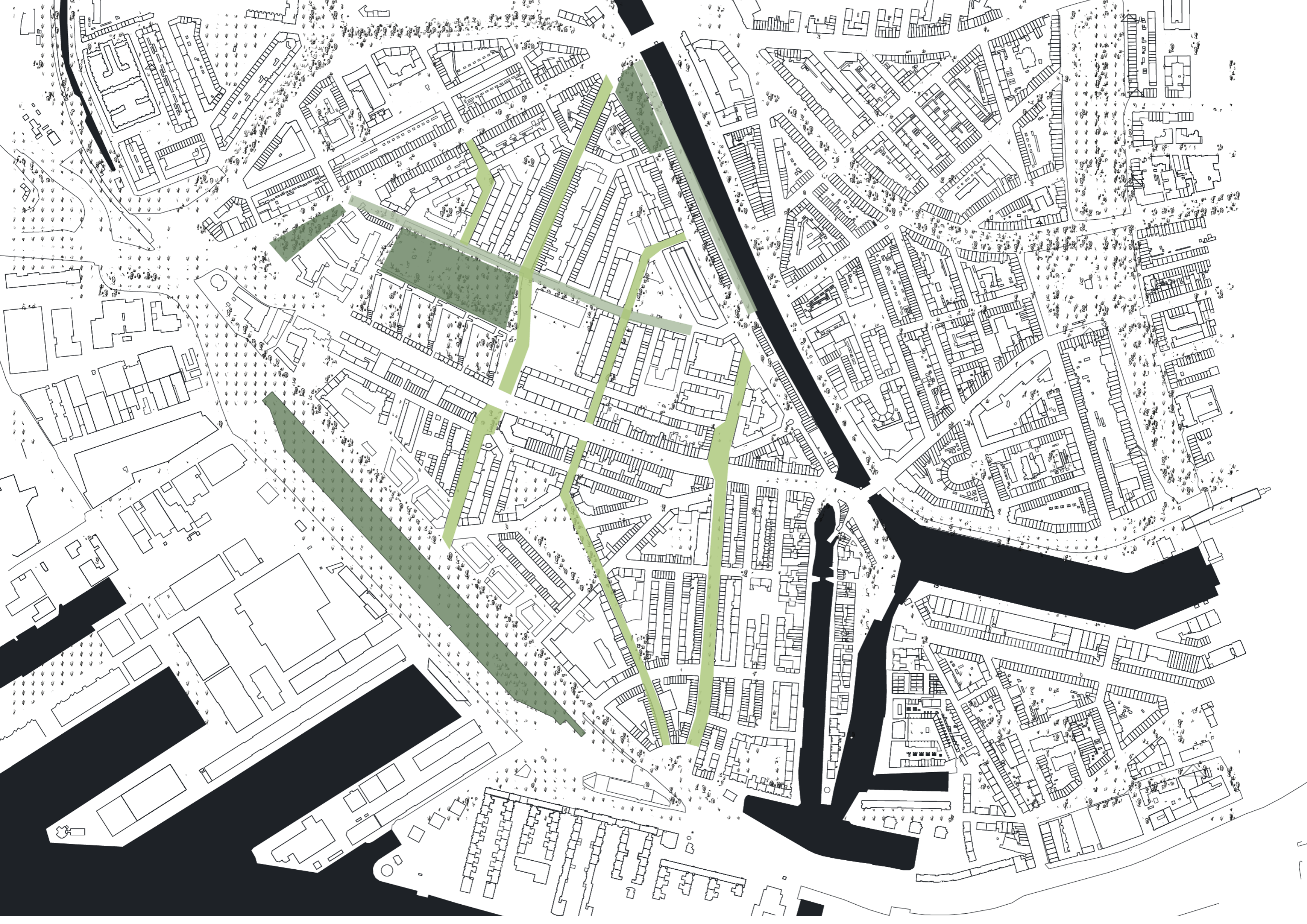


Jij tekent een convenant met stadsbeheer, gemeente Rotterdam.
Ook al doen jullie het samen, een iemand is de aanspreekpunt voor stadsbeheer.
Het stukje groen is niet jouw eigendom maar blijft openbaar gebied.

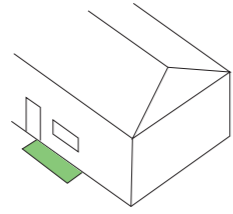




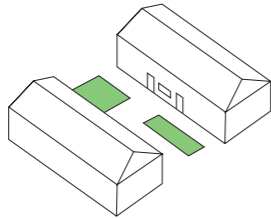




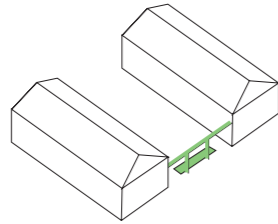
Front facade gardens



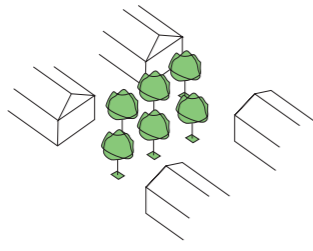
public green space and communal gardens



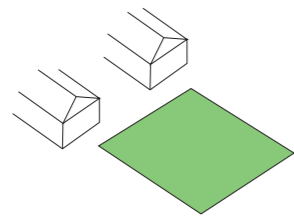
green demarcations of the street



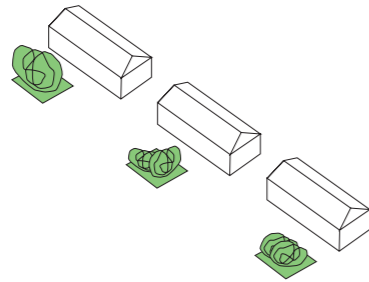
tree coverage for public square and similar public space



Large green space for active usage.



Ecological friendly green space, managed as infra



De Robert Fruistraat



Statement of Requirements

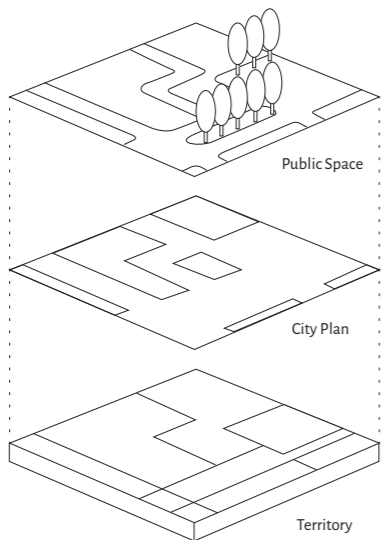
Domains of intervention

Strategy

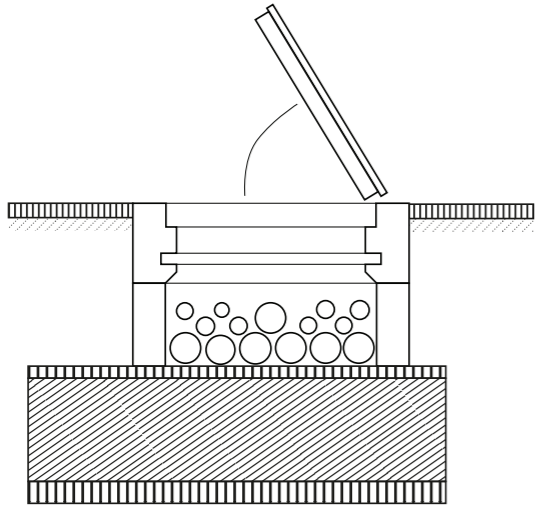
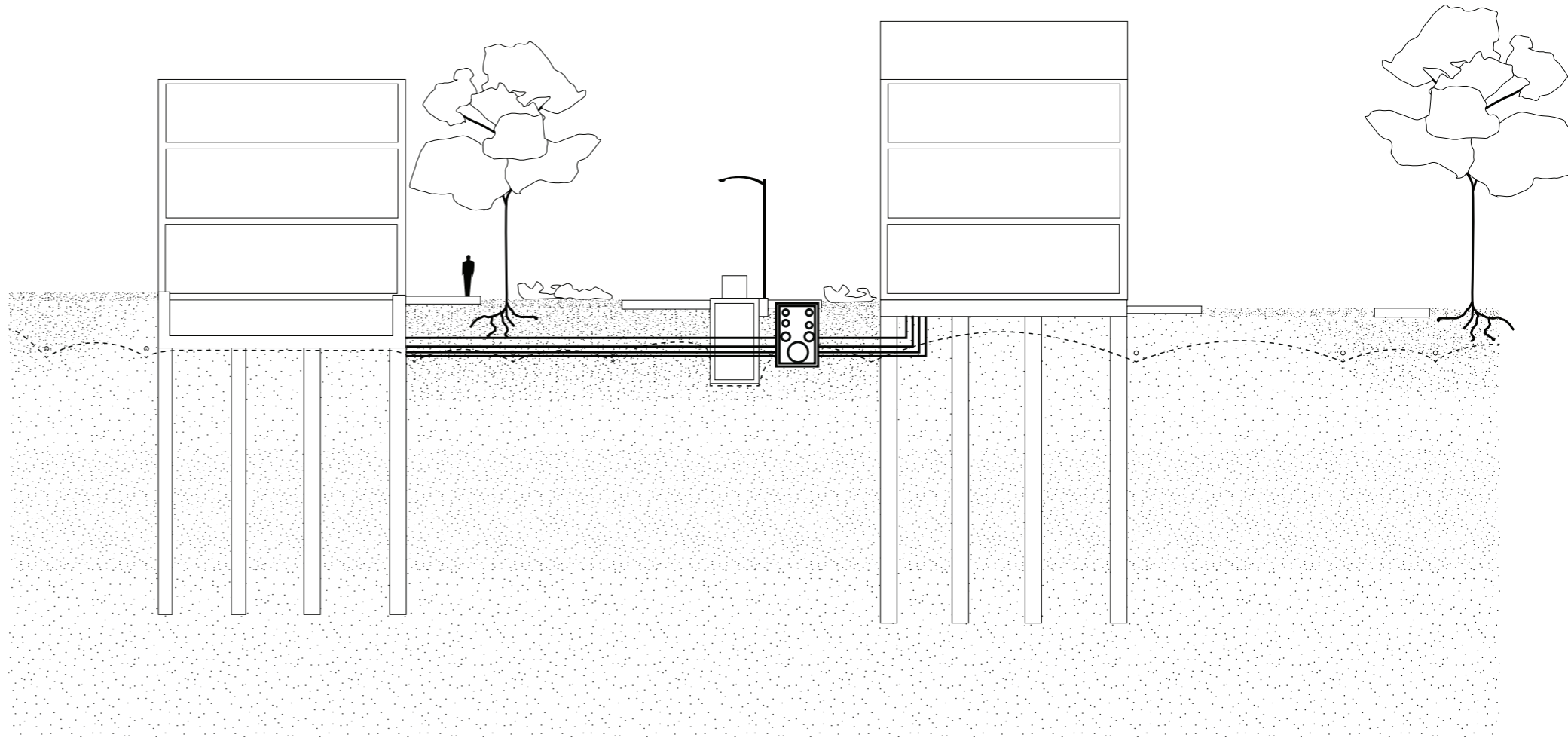
Climate Mitigation and Adaptation

Sustainable Urban Renewal

Resilient Infrastructure

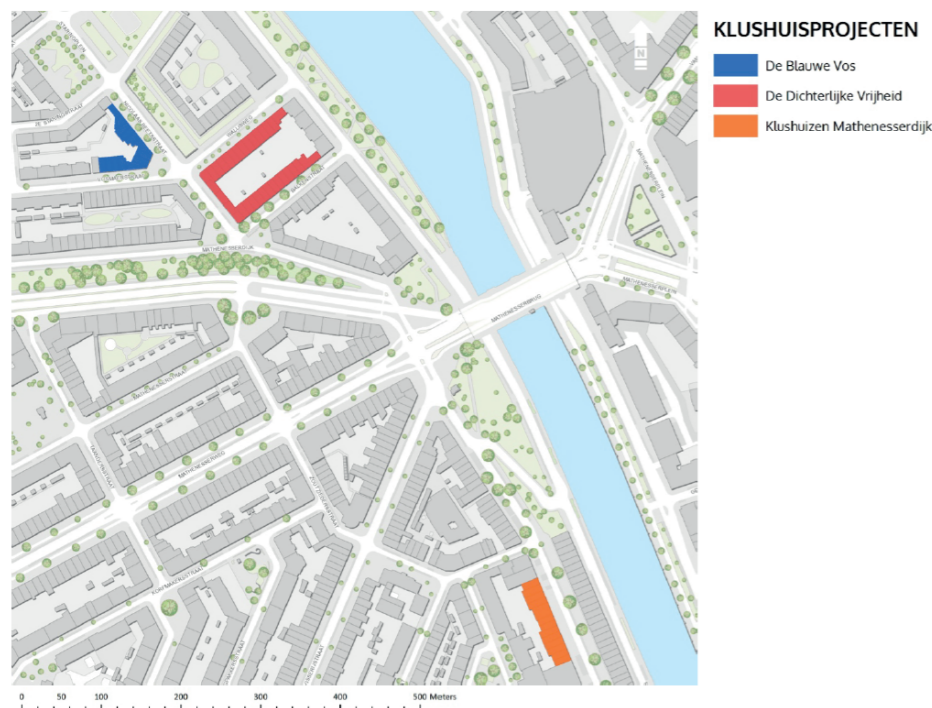
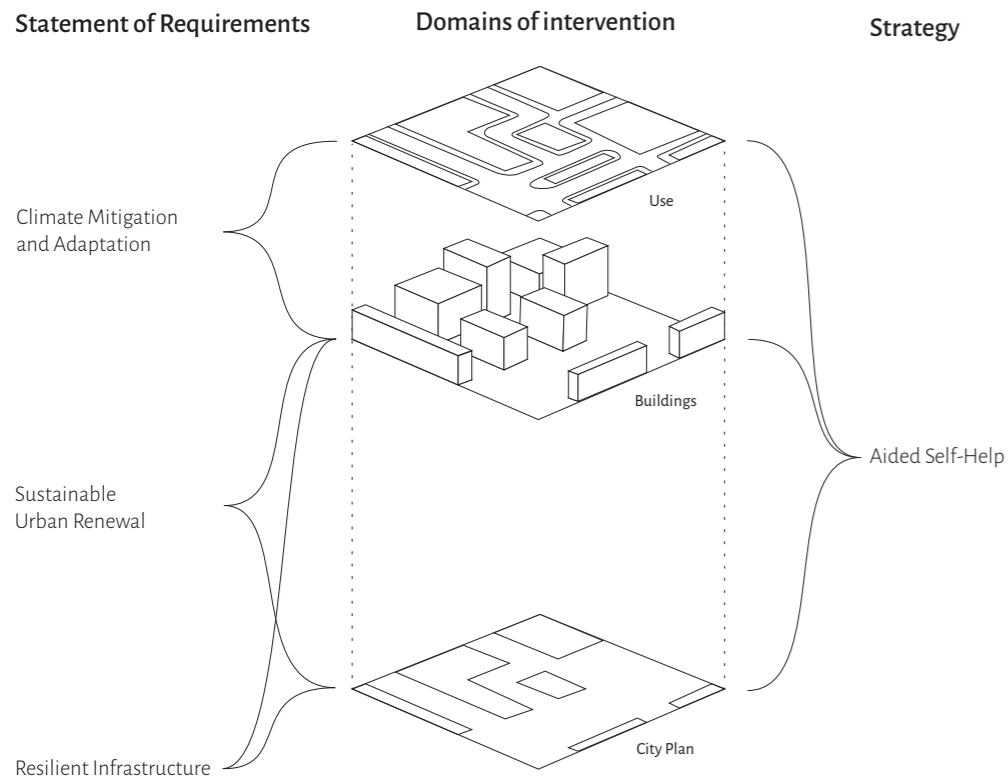


Sites and Services









Tabel 1: Verschillen reguliere herstructurering en klushuizen als herstructureringsmiddel

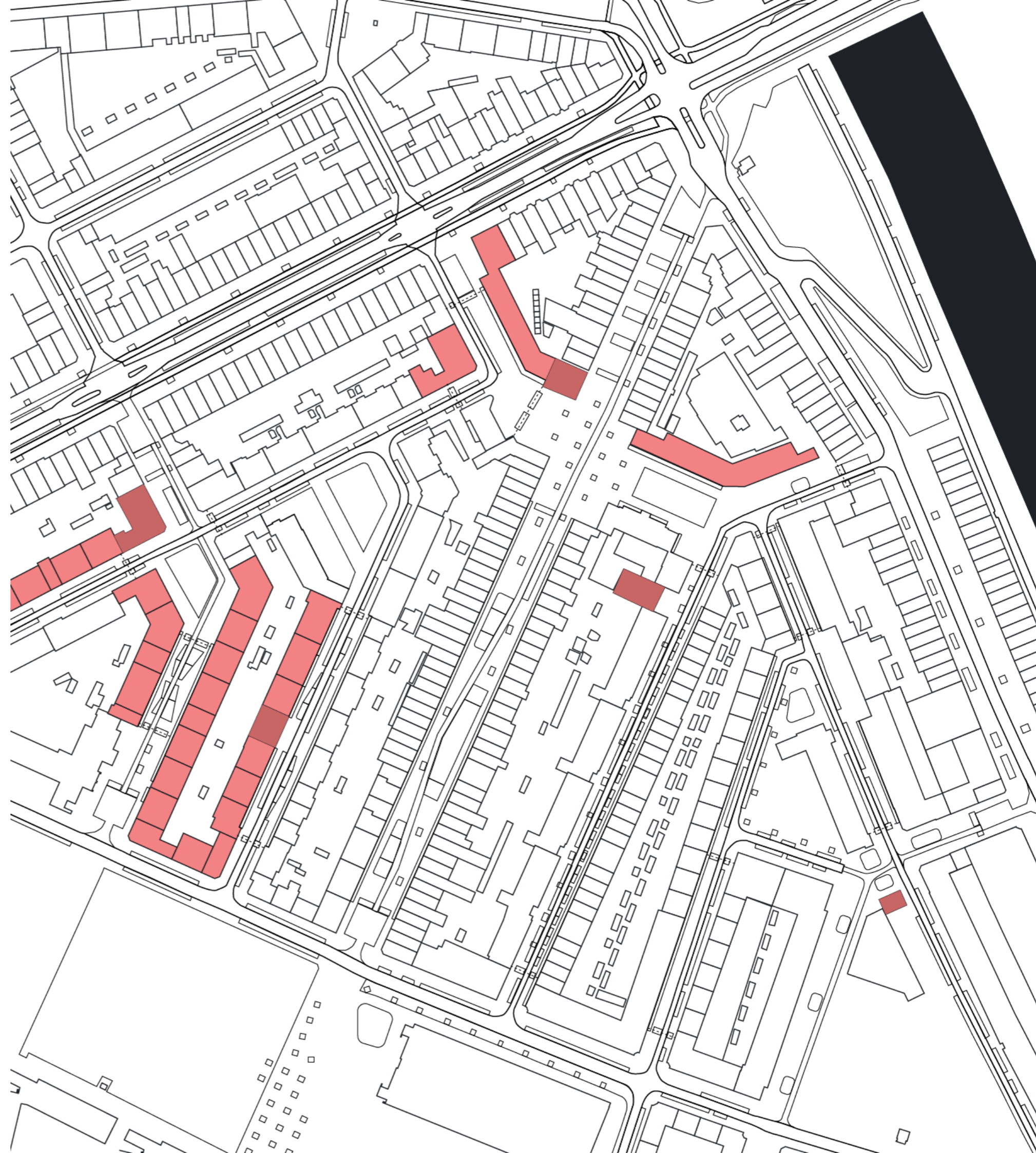
	Reguliere herstructurering	Klushuizen
Schaalniveau	Herstructurering schaalniveau van de wijk.	Herstructurering in de vorm van 'speldenprikken' op schaalniveau van de buurt.
Verantwoordelijk voor herstructurering	Gemeente, projectontwikkelaar en woningcorporatie zijn samen verantwoordelijk voor sloop en nieuwbouw of renovatie van woningen.	Klushuisbewoners in individueel of collectief verband zijn verantwoordelijk voor renovatie van hun woonblok of deel van de straat.
Ontwerp en realisatie van de woning	Projectontwikkelaar en gemeente maken ontwerp. Aannemer realiseert de woning.	Klushuisbewoners maken samen ontwerp. Aannemer en klushuisbewoners realiseren de woning.
Contact medebewoners	Woningeigenaren zitten samen in VvE maar hoeven niet samen te werken voor ontwerp en realisatie van de woningen in het woonblok of het deel van de straat.	Klushuisbewoners van een collectief klushuisproject hebben intensief contact met medebewoners van het woonblok of deel van de straat i.v.m. realisatie van woningen en tuin.
Relatie met de buurt	Woningeigenaar is slechts bewoner of verhuurder in herstructureringsbuurt en niet per se direct betrokken bij de herstructurering van de buurt.	Kluswoningeigenaar voert zelf een deel van de herstructurering in de buurt uit.
Prijsstelling en staat van de woning	Woning in goede staat. Woning in midden tot hoge prijsklasse.	Woning tegen relatief lage prijs in zeer slechte staat. Exclusief tijd en kosten renovatie.
Bewoningsplicht	Woningeigenaar mag woning op ieder gewenst moment onderverhuren of verkopen.	Klushuisbewoner heeft na renovatie zelfbewoningsplicht van twee jaar.
Buurtkeuze	Locatie en reputatie van de buurt spelen mee in de keuze voor een woning in een bepaalde buurt. Hoewel deze keuze gerelateerd is aan de financiële situatie zijn koopwoningen in meer buurten te vinden dan kluswoningen.	Het aanbod aan klushuizen is beperkt, de keuze daarmee ook. Daardoor speelt de buurt hoogstwaarschijnlijk een minder grote rol bij keuze voor de woning.





- No intervention
- Renovation
- 'Kluswoningen'
- Reconstruction





Currently 1335 households in the project area

190 homes are being demolished in the proposal

High density reconstruction for desification and diversification of housing goals.

approximately 250 homes

