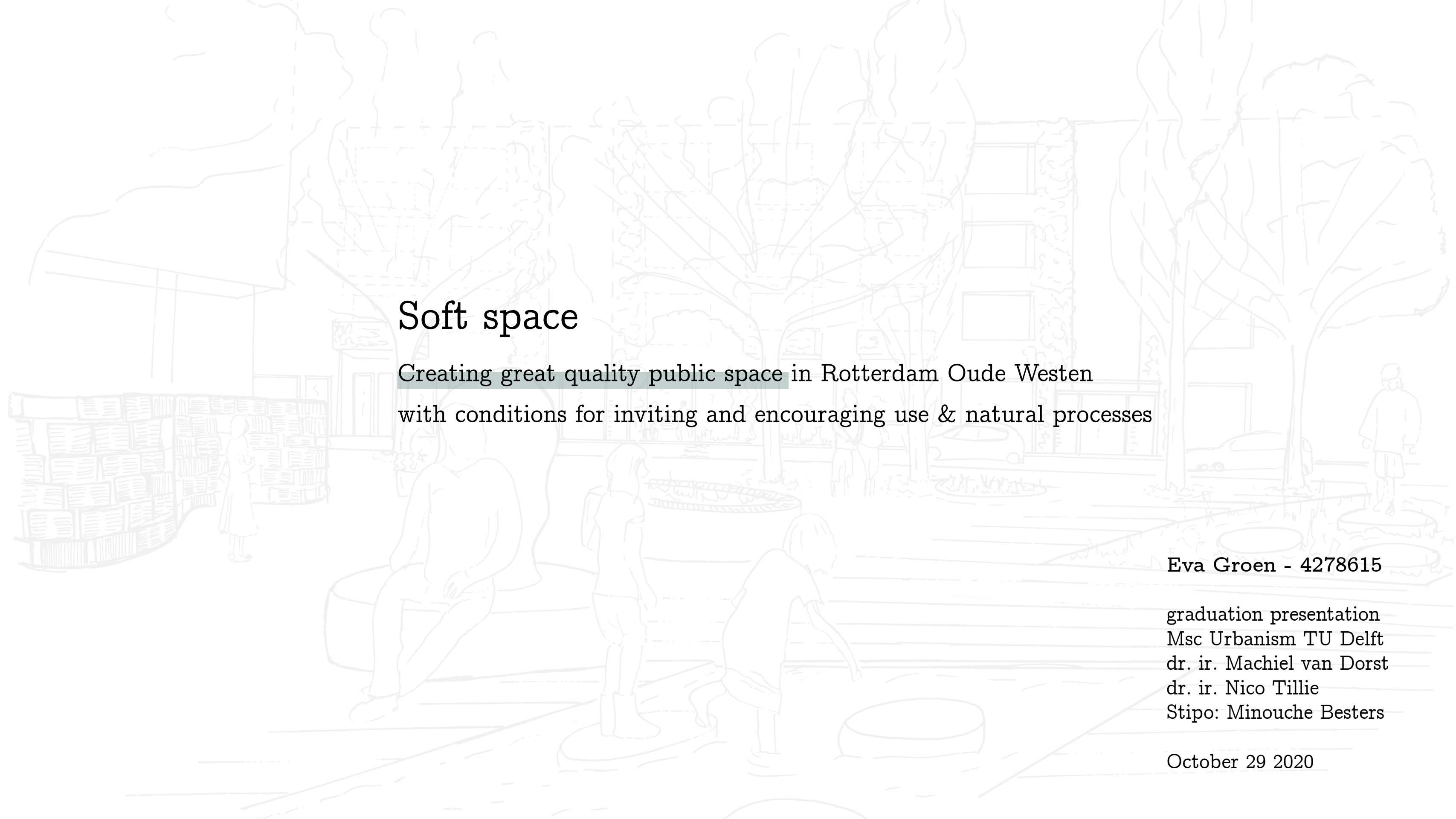




Soft space

Creating great quality public space in Rotterdam Oude Westen
with conditions for inviting and encouraging use & natural processes

Eva Groen - 4278615

graduation presentation
Msc Urbanism TU Delft
dr. ir. Machiel van Dorst
dr. ir. Nico Tillie
Stipo: Minouche Besters

October 29 2020

Rotterdam - design location

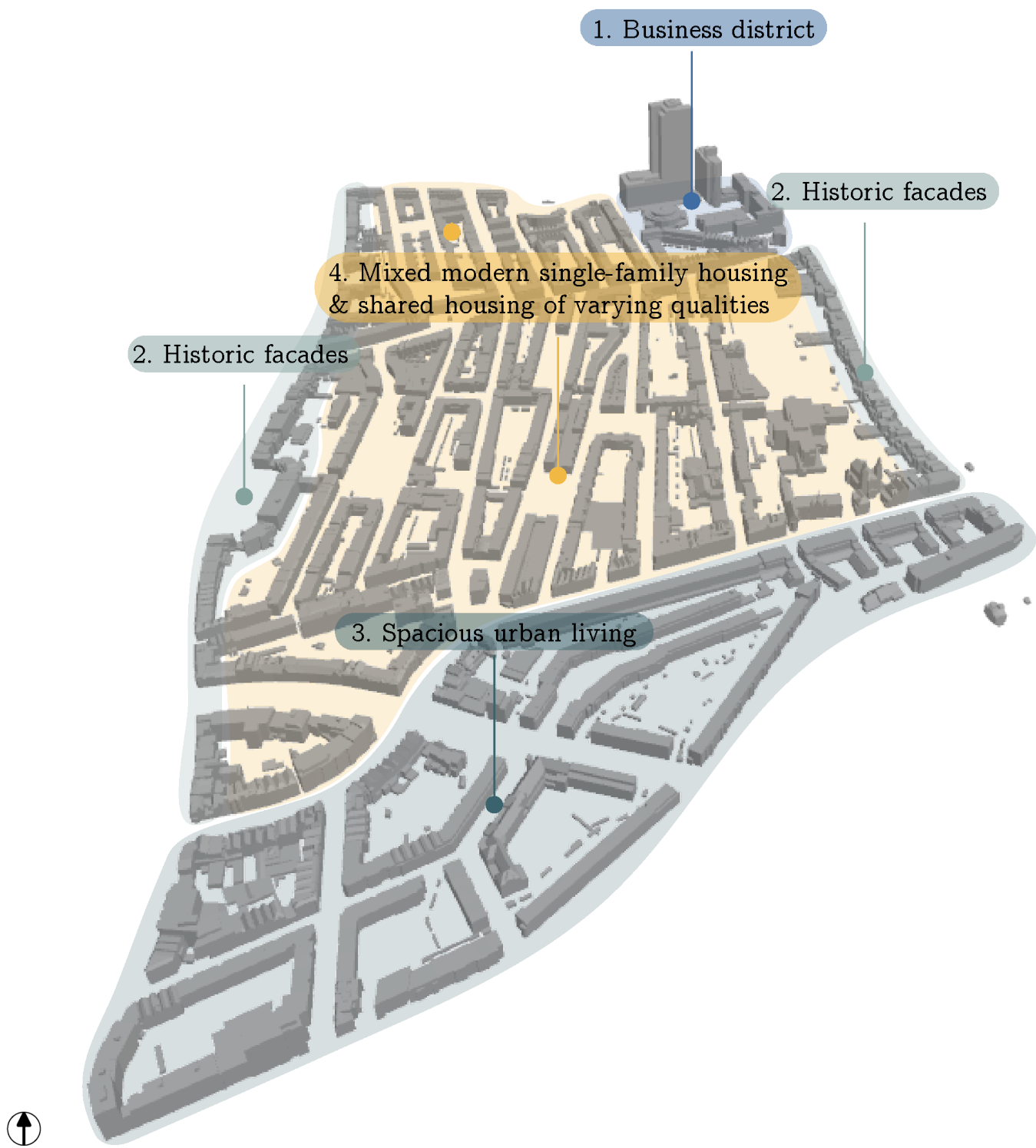


Rotterdam Oude Westen





Neighbourhood atmospheres



1. Business district
High rise office buildings



2. Historic façades
Historic, representable street-view
Varying types of shared housing



3. Spacious urban living
Apartments in spacious street profiles



4. Mixed neighbourhood
Housing with mixed use
Post-war protico flats - modern single family housing

First impression of the Oude Westen



First impression of the Oude Westen

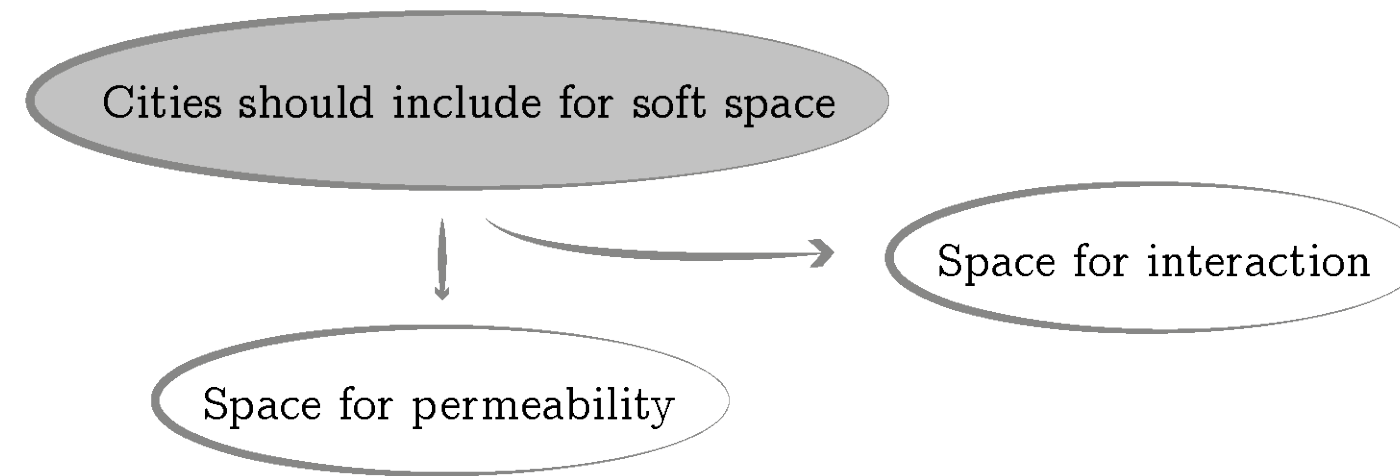


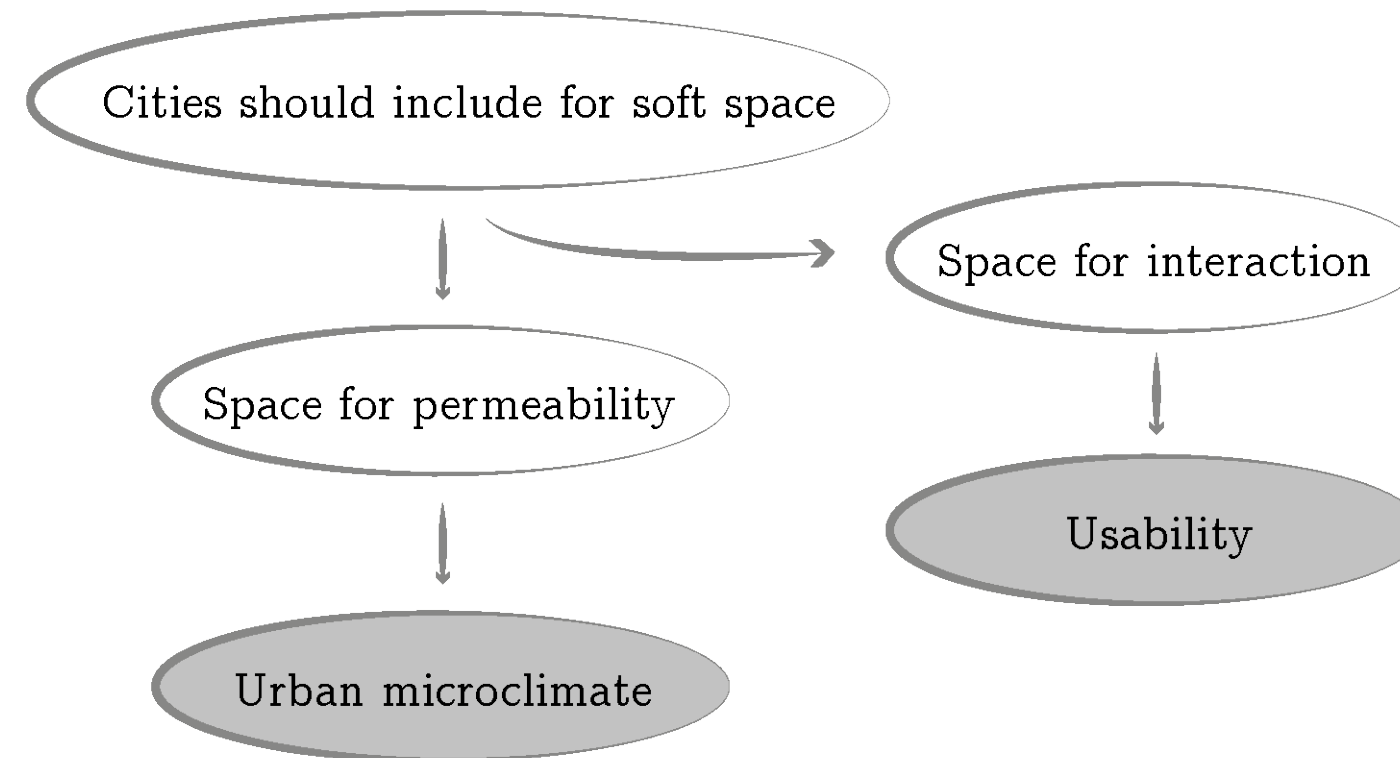
First impression of the Oude Westen



“Soft is something to do with responsiveness, sharing, ease, comfort, invitation, ecology”

- Sim, 2019 p. VII





Learn to ...

Observe



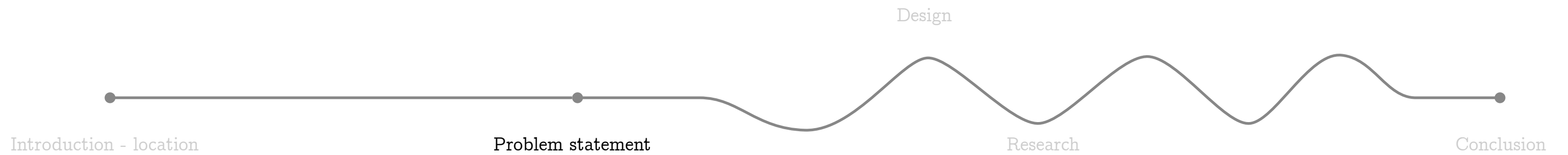
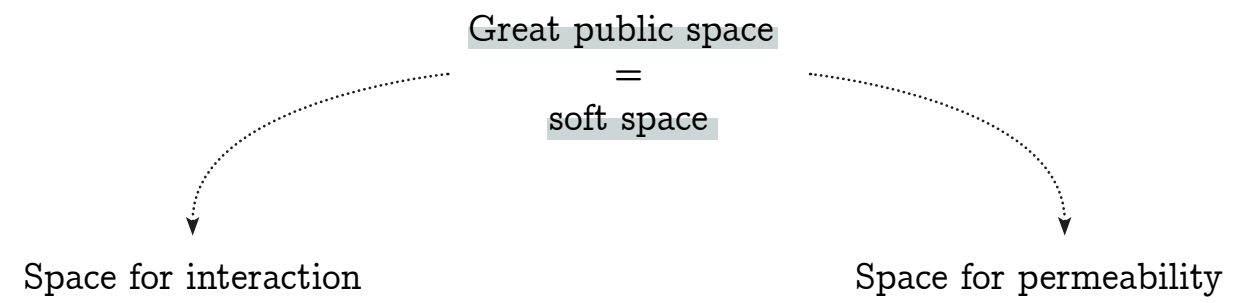
Experience



Participate

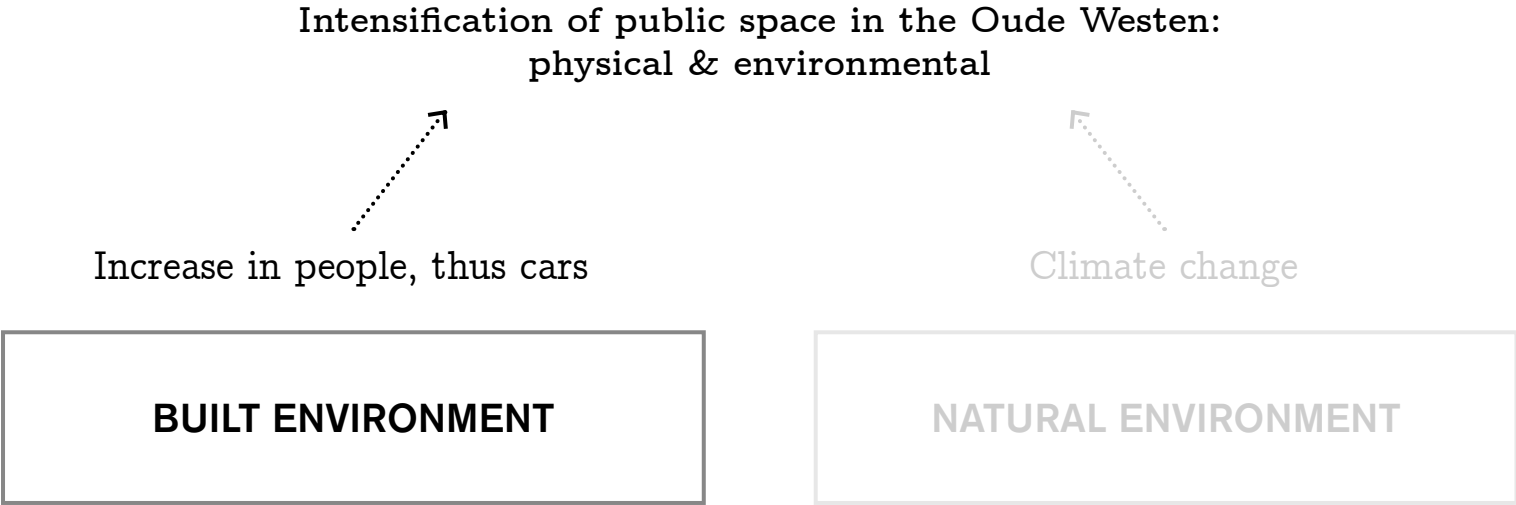
Top image by Eric Fecken



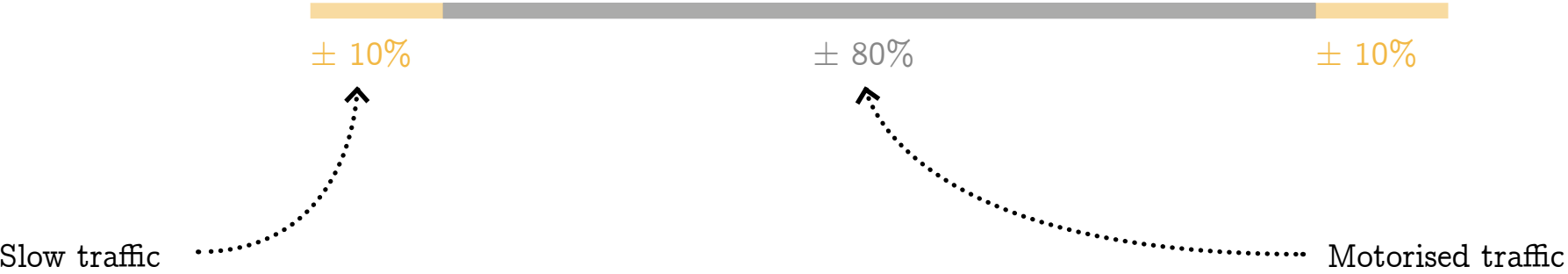
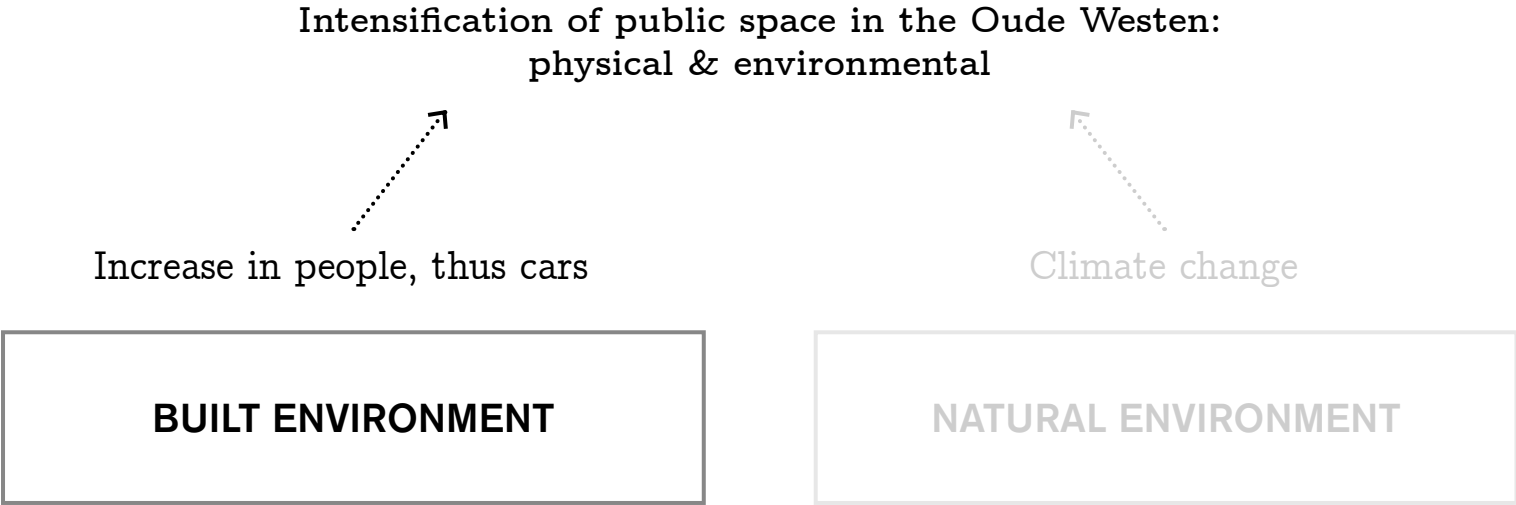


Intensification of public space in the Oude Westen:
physical & environmental

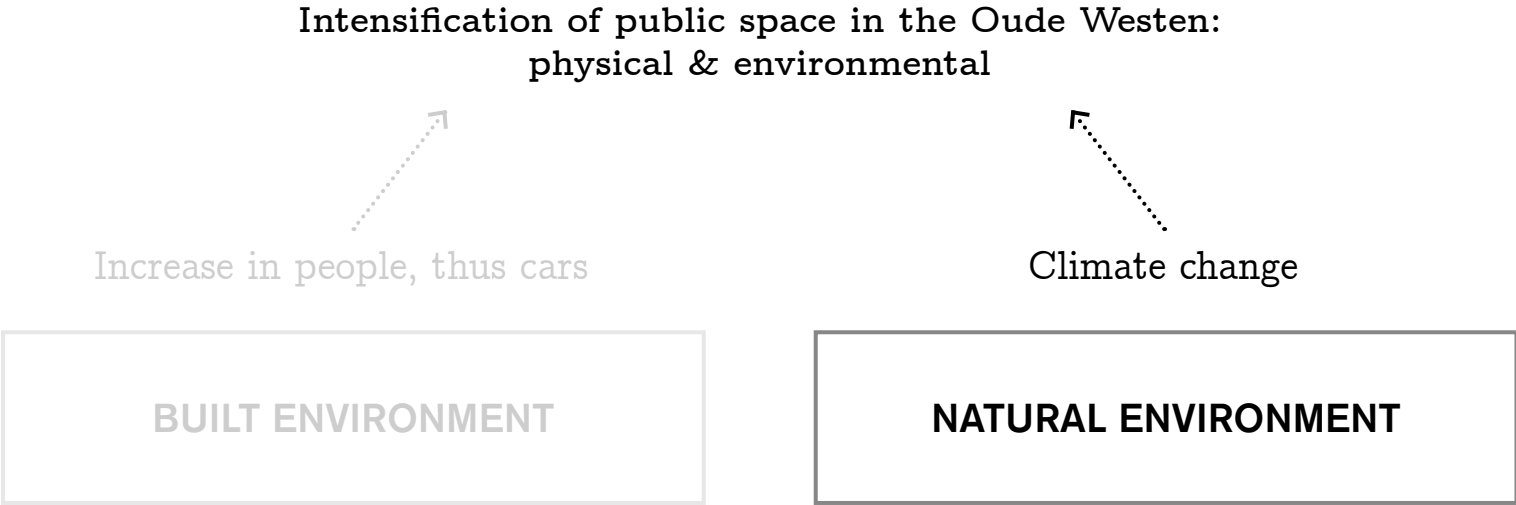
Problem statement



Problem statement



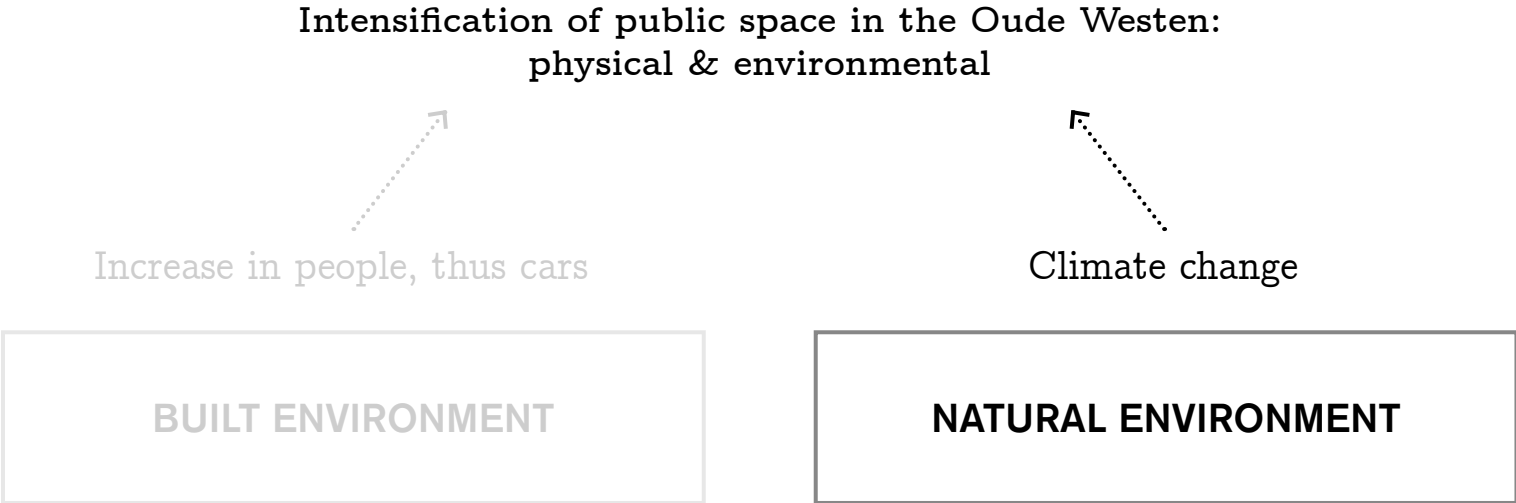
Problem statement



Climatic themes for changing climate in Rotterdams Weerwoord Urgency document (2019):

- 1. Precipitation
- 2. Heat

Problem statement



- Climatic themes for changing climate in Rotterdams Weerwoord Urgency document (2019):
- 1. Precipitation
 - 2. Heat



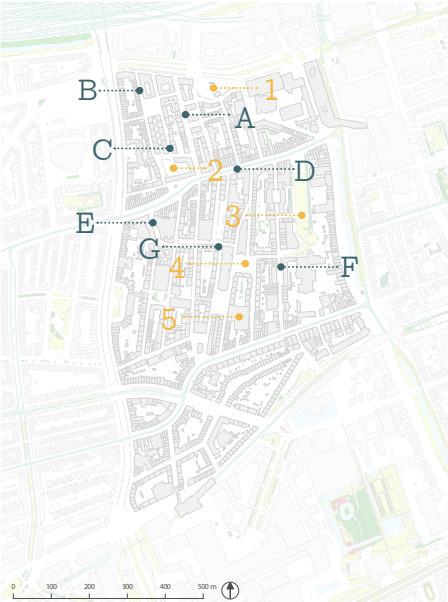
Source: Paul Rapp in AD (2020)

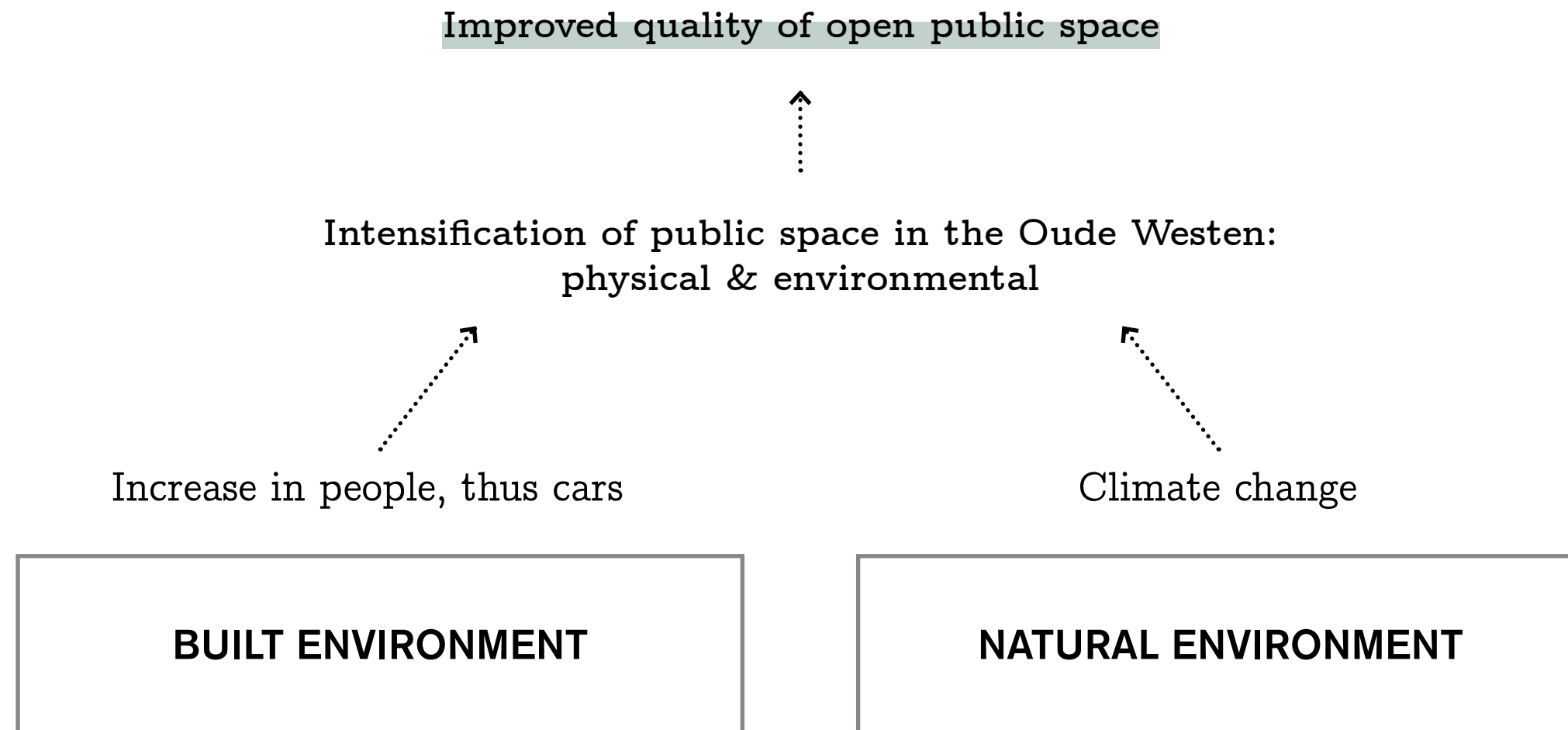


Source: Marco de Swart in AD (2017)

Problem statement

Current spatial quality





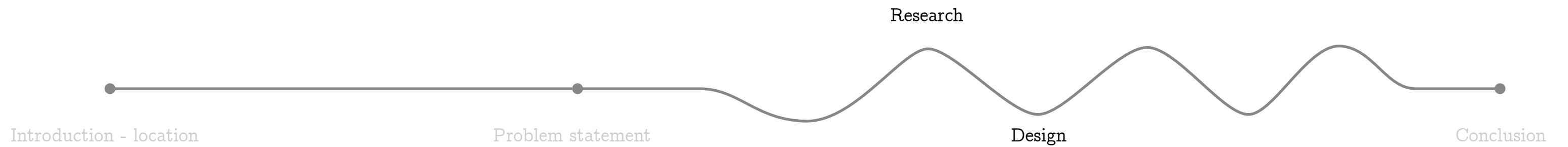
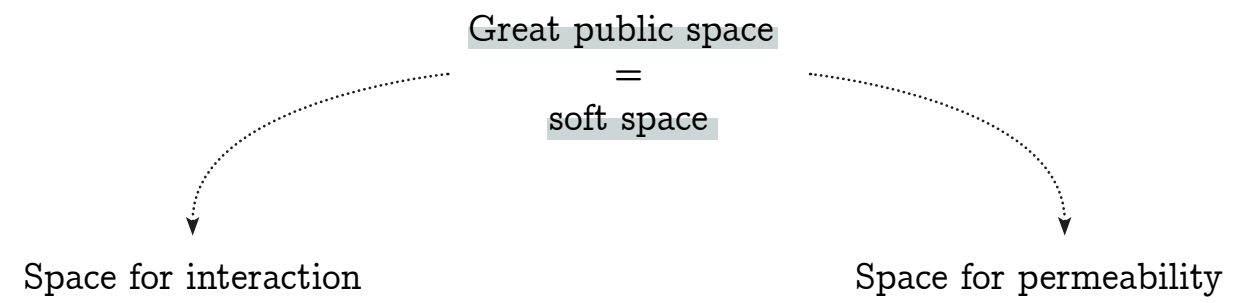
Problem statement

Research question

In the context of densification, what are the synergies of the urban microclimate and usability for the public space of the Oude Westen?

Design goal

What interventions within the street scape can improve the public space by an integrated approach of the urban microclimate and usability in relation to densification for Rotterdam Oude Westen?



Research approach

Urban microclimate

- Specific climatic conditions at eye level, influenced by artificial and natural elements
- Relation vegetation to the microclimate

“The effects of vegetation [on the microclimate of the sites - red.] is quite complex, and varies with the type plant, meteorological conditions and the time of day” - Errell et al, 2010, p.165

Research approach

Urban microclimate

- Specific climatic conditions at eye level, influenced by artificial and natural elements
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Usability - improving relation people to place

- Designing for affordances and facilitating appropriation of space:

“The more choice and options there are for people to use the space, the more the space will be used” - Whyte, 1980a

- Placemaking as method for including (future) users in process of shaping public space

Stimulating sense of ownership by users

Creating conditions for a place to be a destination

Research approach

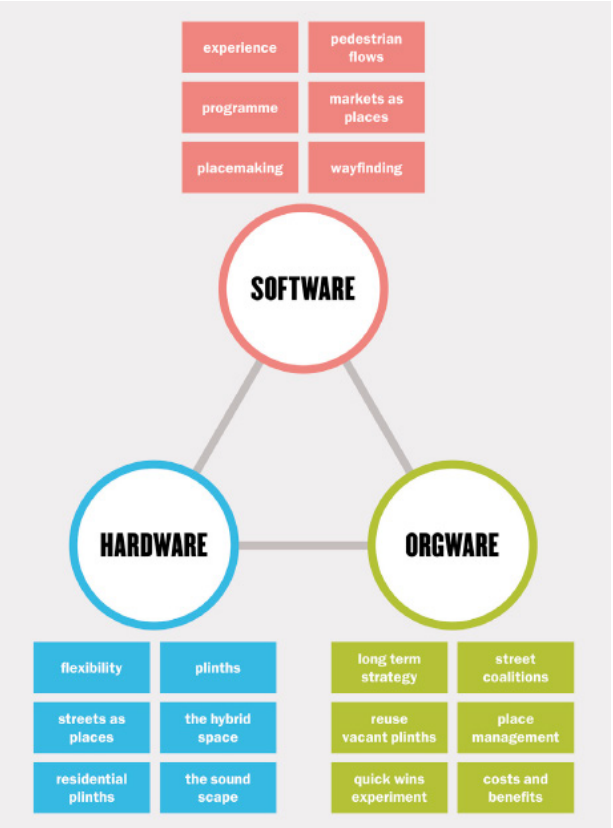
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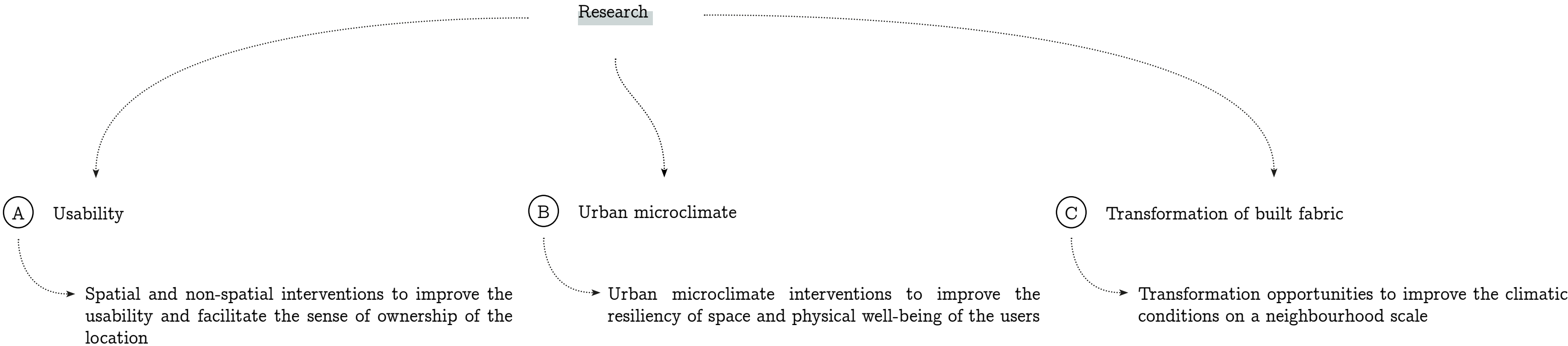
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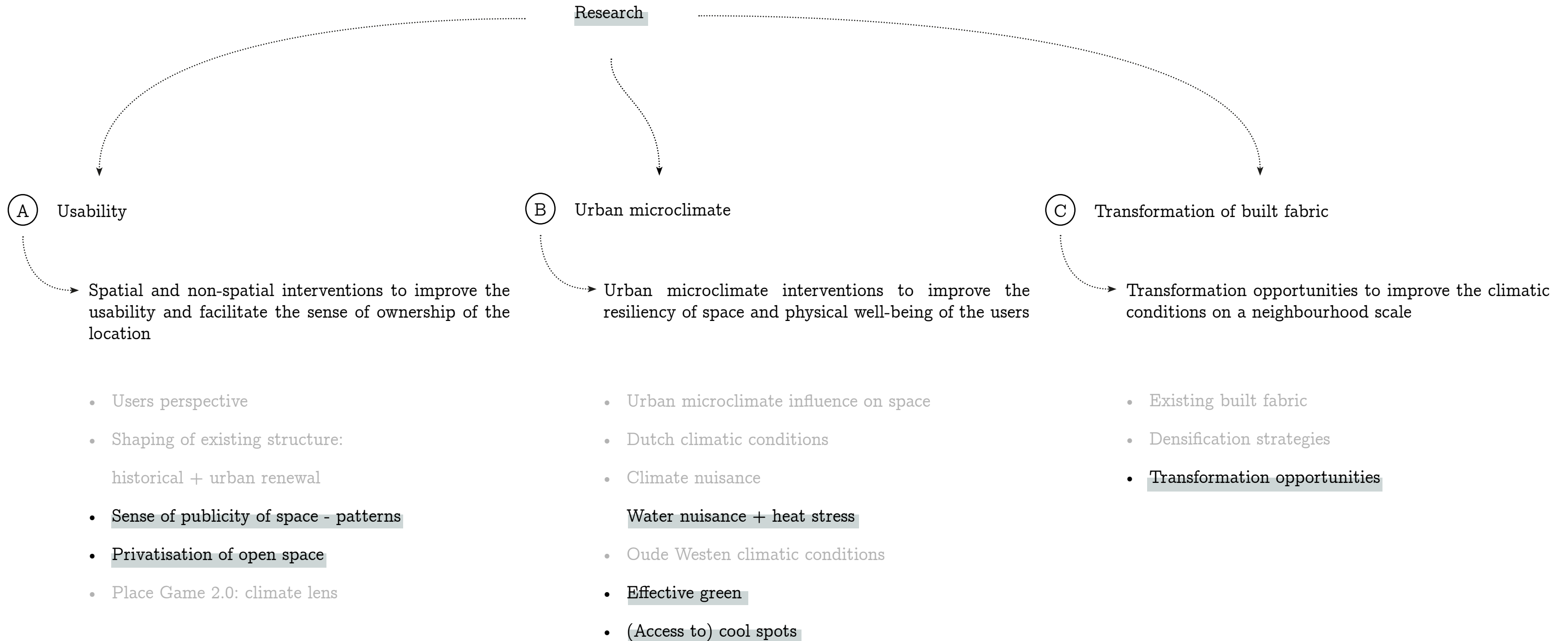
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- Placemaking as method for including (future) users in process of shaping public space
Stimulating sense of ownership by users
Creating conditions for a place to be a destination



Source: Karssenberg, Laven, Glaser & Van ‘t Hoff, 2016



Research approach



Research - learnings for the design

Research question In the context of densification, what are the synergies of the urban microclimate and usability for the public space of the Oude Westen?

Research learnings

1. Designing for interpretation
2. Legibility in public space
3. Balancing greenery and permeable surface in public space
4. Include locals + users in solutions for climatic stress

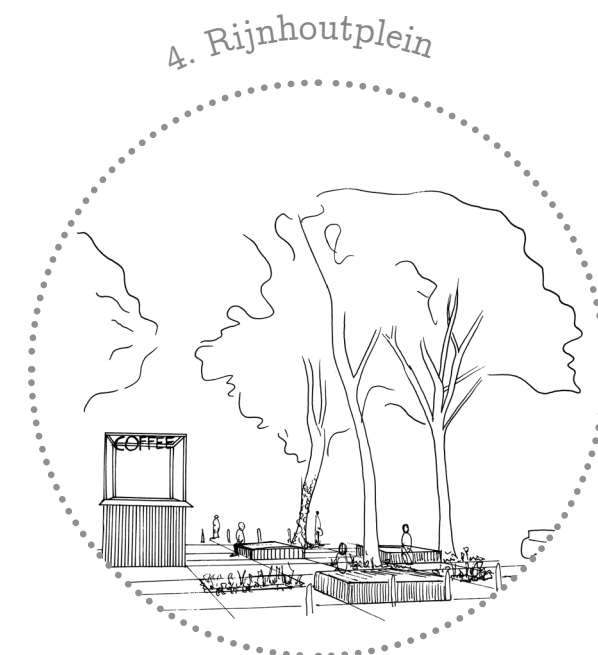
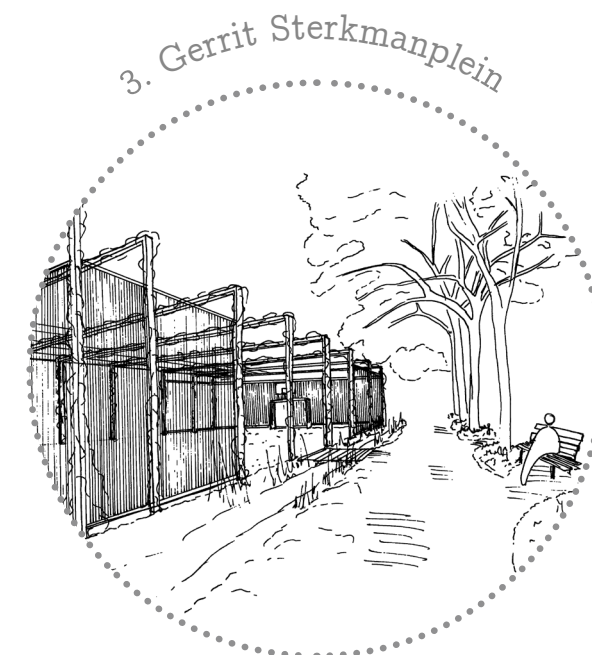
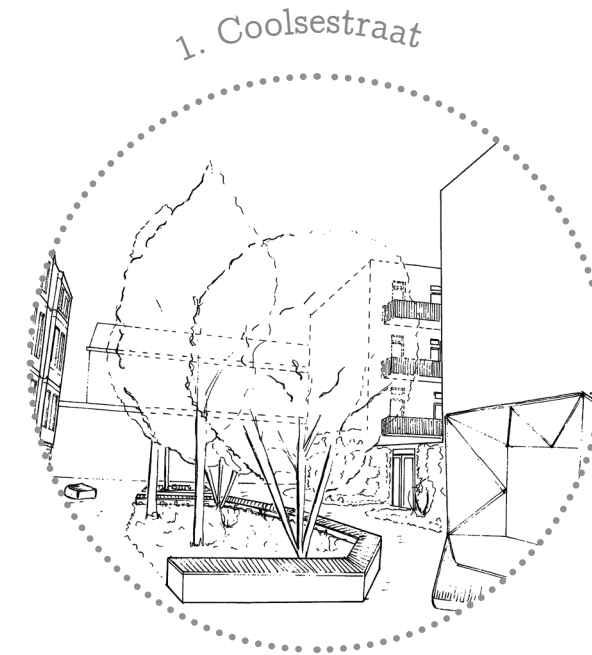
Research - learnings for the design

Research question

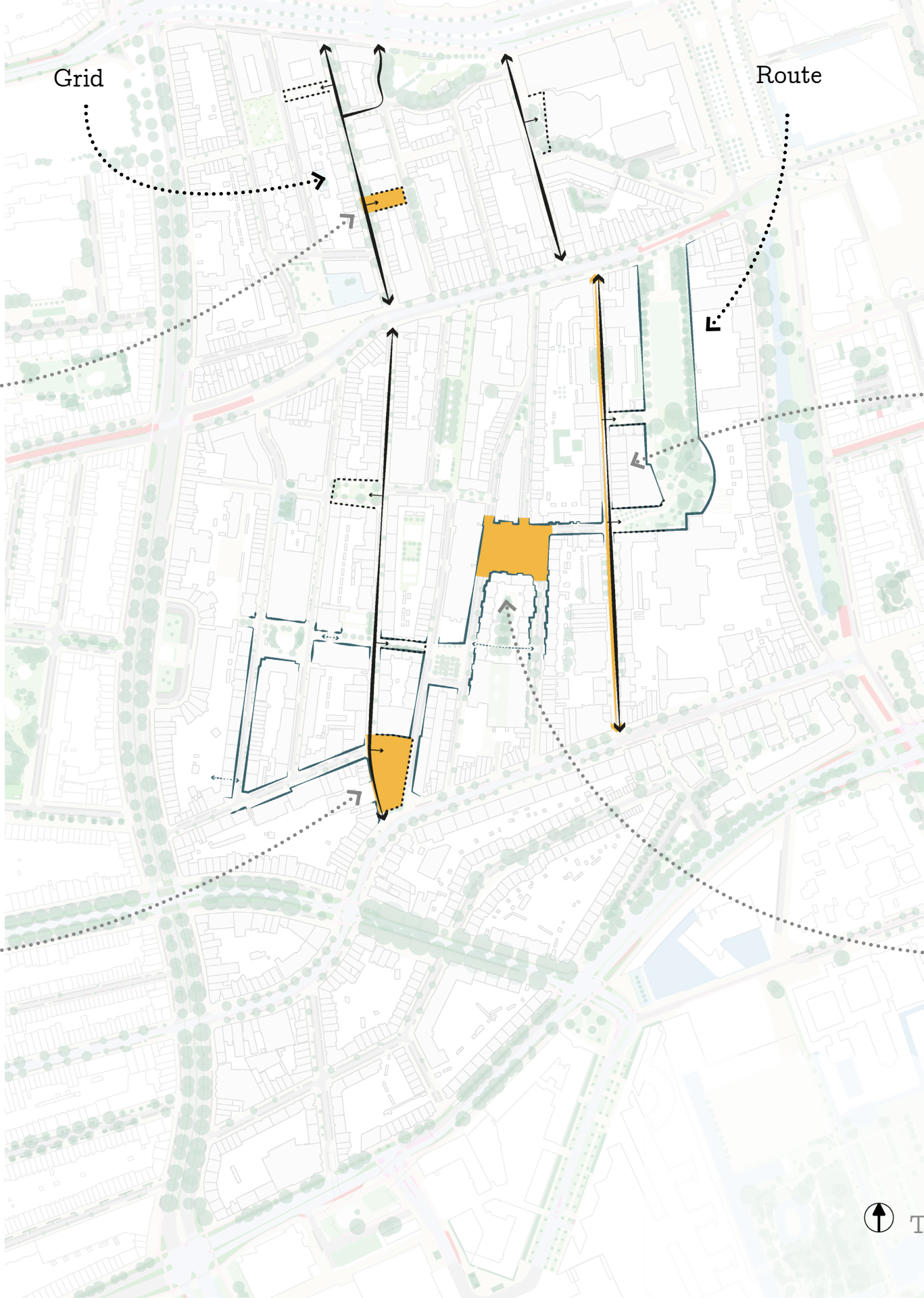
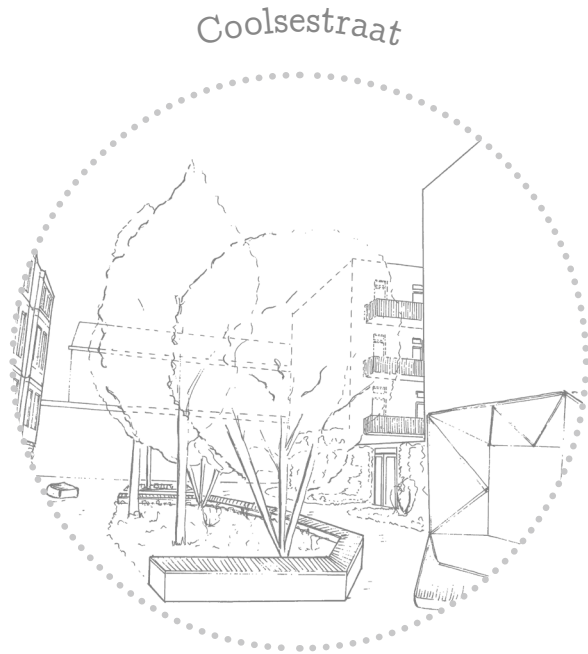
In the context of densification, what are the synergies of the urban microclimate and usability for the public space of the Oude Westen?

Research learnings

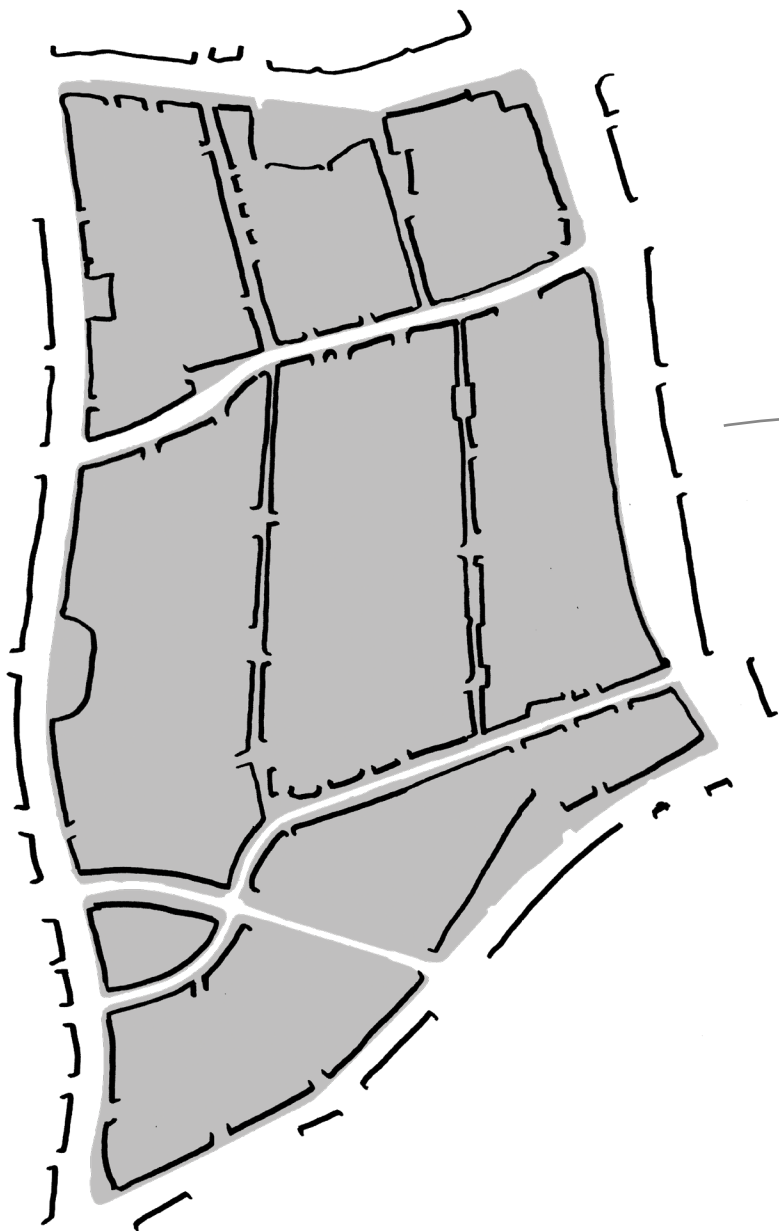
1. Designing for interpretation
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3. Balancing greenery and permeable surface in public space
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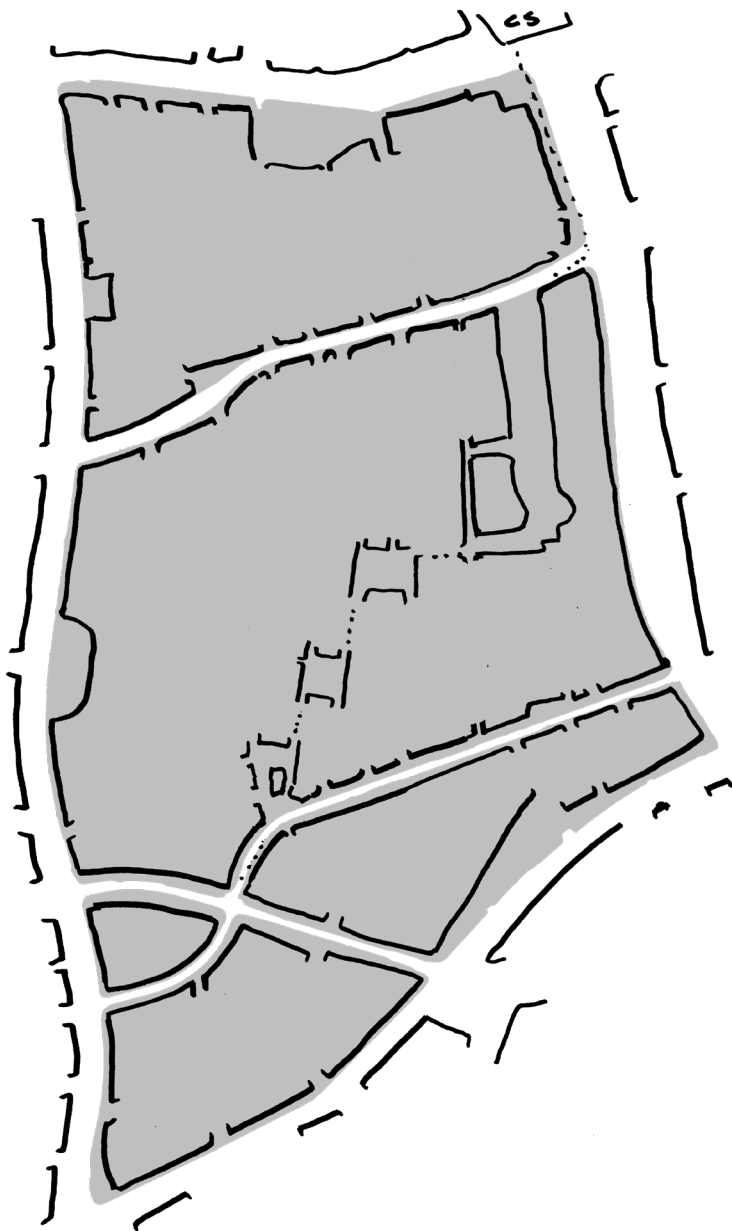
Design locations



Functional grid



Experiential route



Level of interpretation	Understanding	Exploration
Present or immediate	Coherence (making sense)	Complexity (involvement)
2D		
Future or promised	Legibility (the promise of making sense)	Mystery (the promise of involvement)
3D		

Design neighbourhood structures

Functional grid with adjacent pocket parks

- Opening up the bubbles of the neighbourhood for local inhabitants and visitors
- Increase legibility & accessibility of the Oude Westen on vertical axes: creating higher-used streets to relieve pressure on other streets



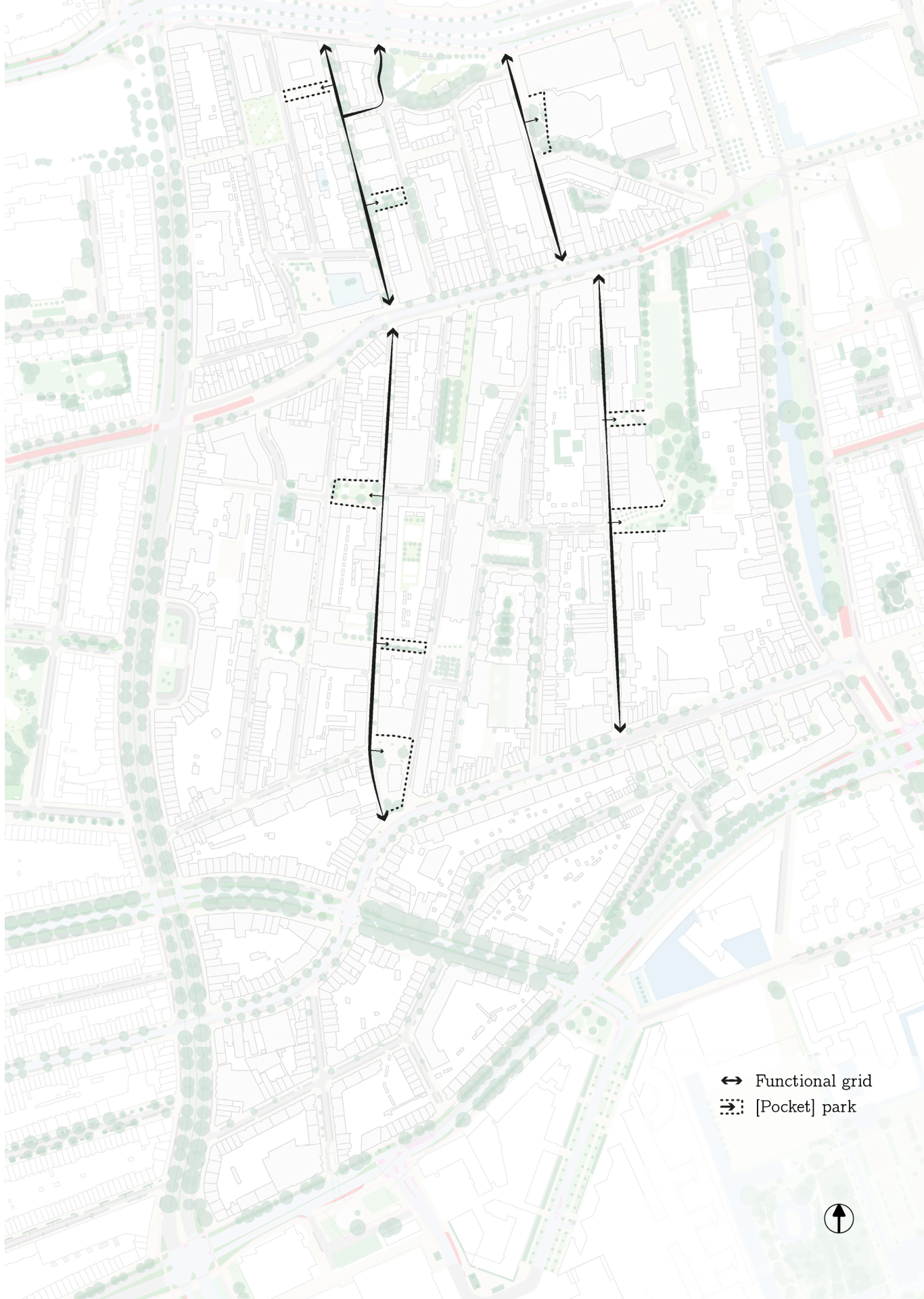
Current situation



Improve permeability with new arteries



Relieve pressure on adjacent streets



↔ Functional grid
⋯ [Pocket] park

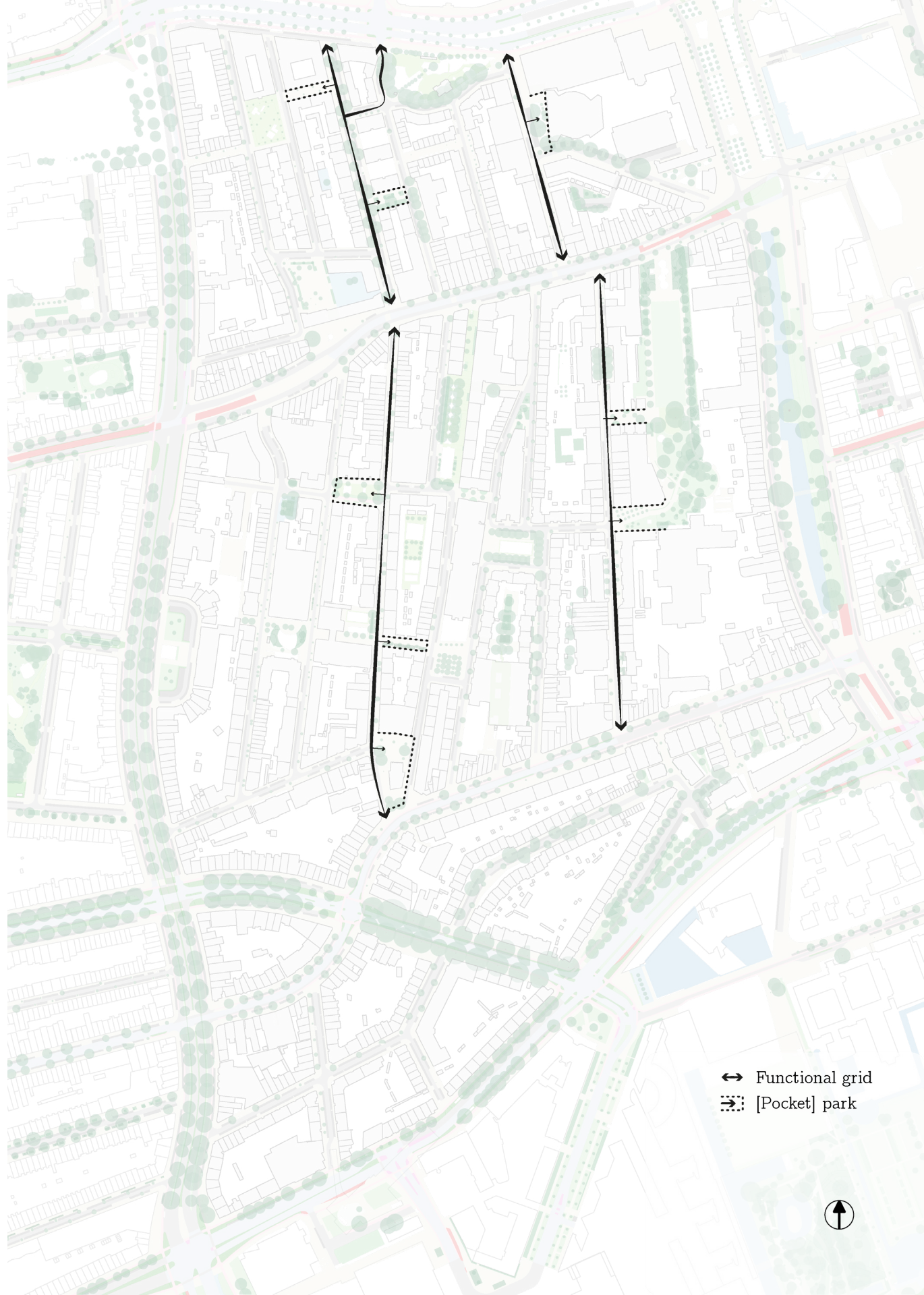
Design neighbourhood structures

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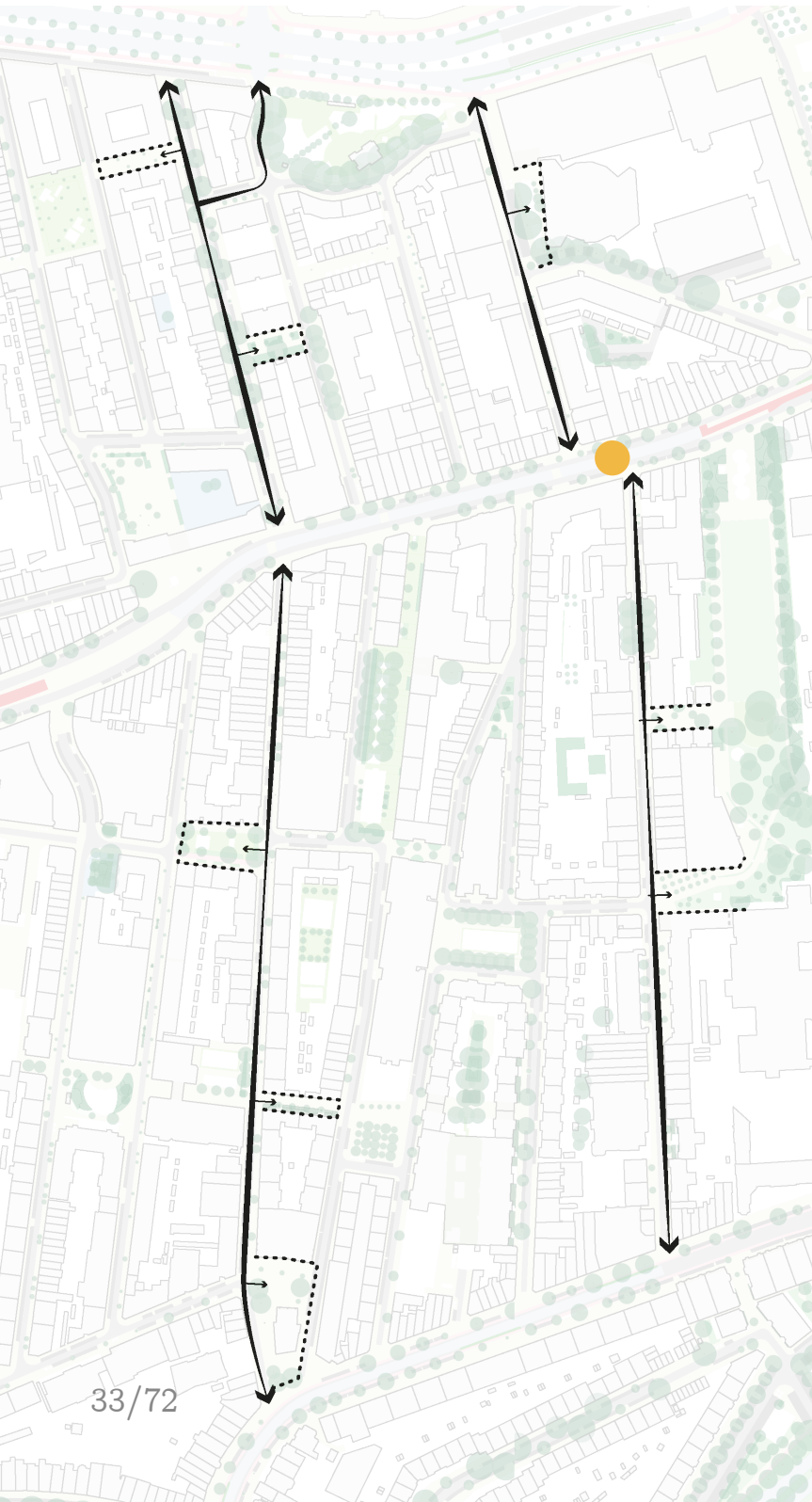


Bottom right image: Renée Rooijmans



Design neighbourhood structures

Crossing West-Kruiskade



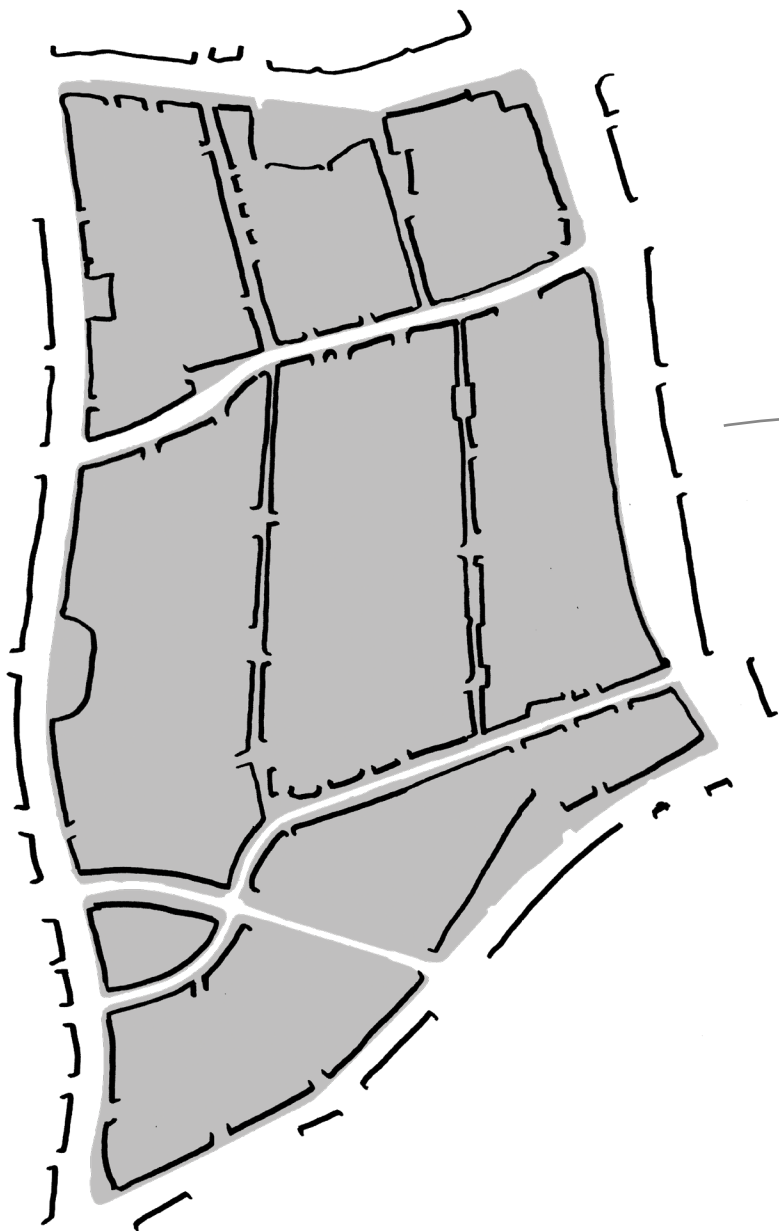
2. Indication of something happening



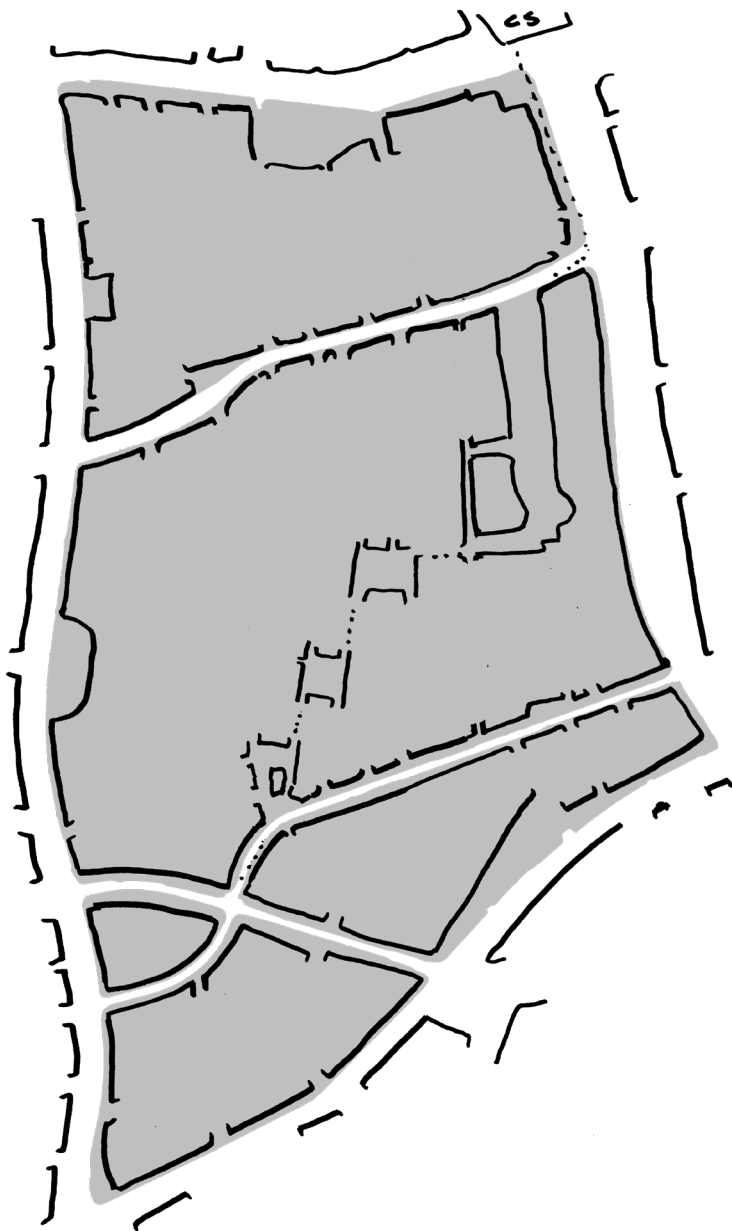
1. Materiality

3. Facilitate ease of movement

Functional grid



Experiential route



Level of interpretation	Understanding	Exploration
Present or immediate	Coherence (making sense)	Complexity (involvement)
2D		
Future or promised	Legibility (the promise of making sense)	Mystery (the promise of involvement)
3D		

Design neighbourhood structures

Experiential route

- Provide options for an exploration, nature-inclusive route through the neighbourhood
- Creating destinations for places while highlighting the existing community initiatives



Wijktuin



Gaffelhofje



Tuin de Bajonet (top)
Climate street Doorbraak (middle)
Dierenhofje (bottom)

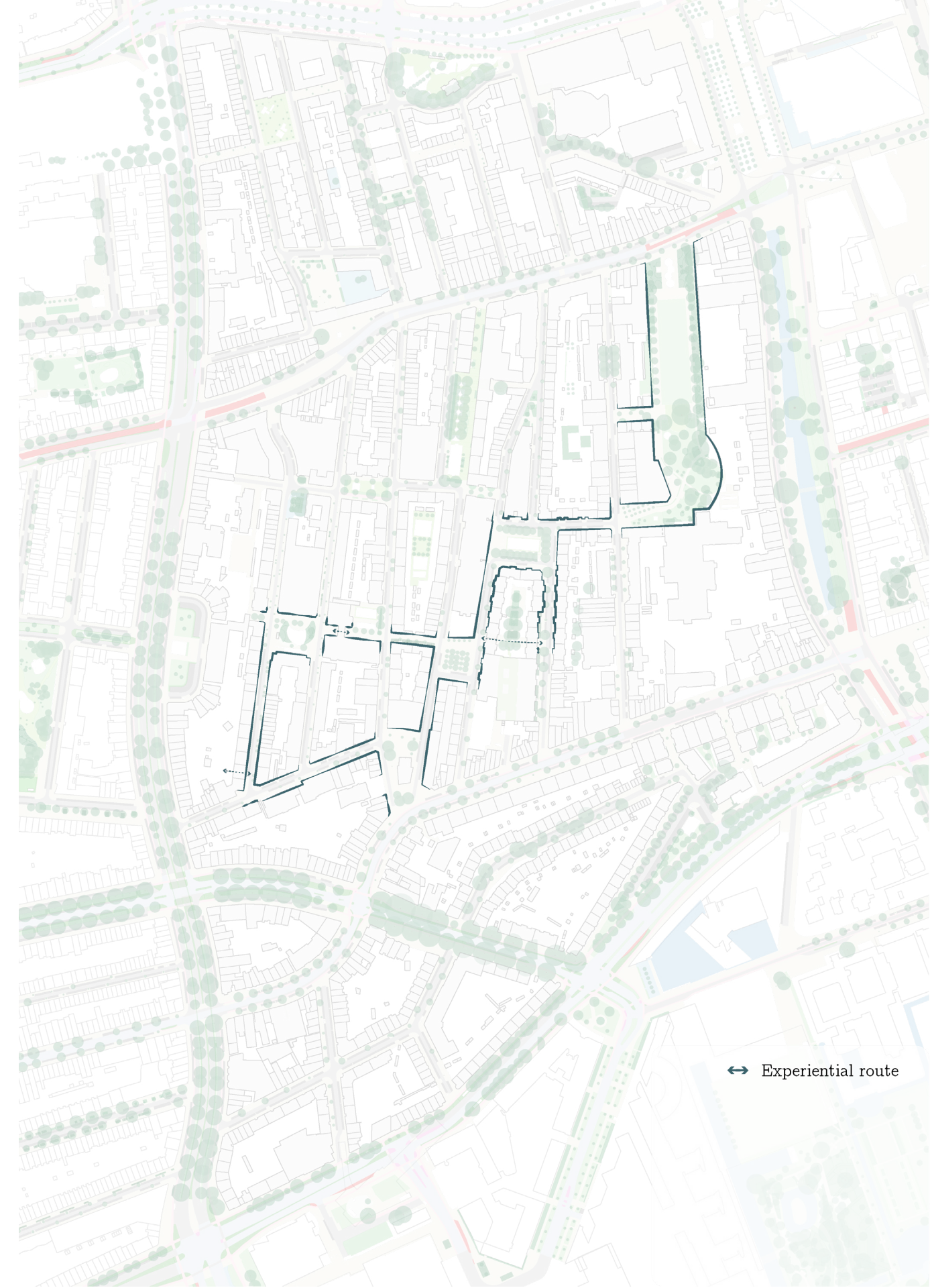
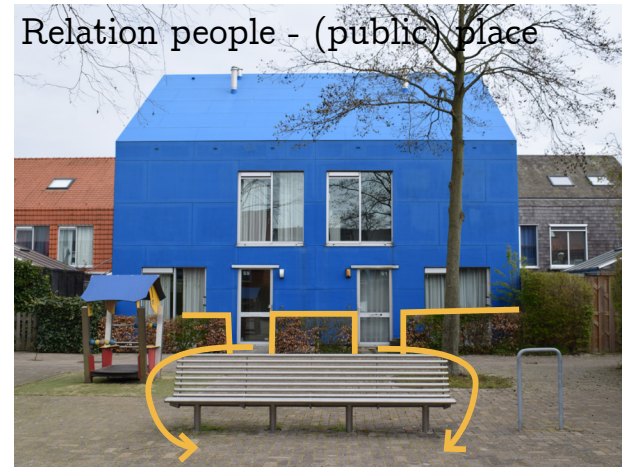
Top image: Tuin de Bajonet,
retrieved 2020



Design neighbourhood structures

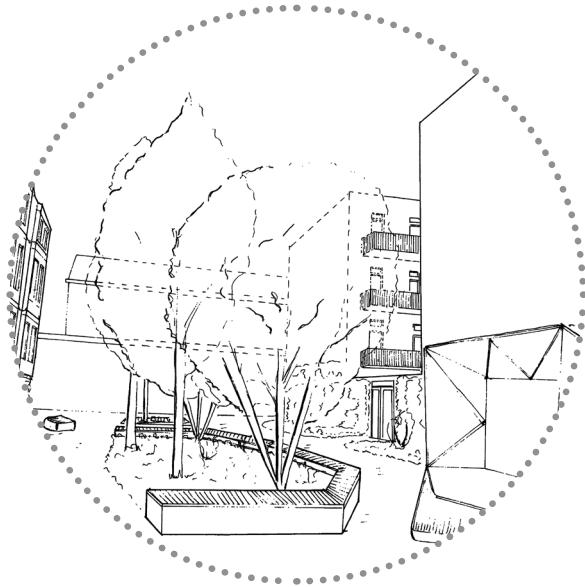
Experiential route

- Provide options for an exploration, nature-inclusive route through the neighbourhood
- Creating destinations for places while highlighting the existing community initiatives



Design locations

Coolsestraat



Coolsestraat

Existing situation

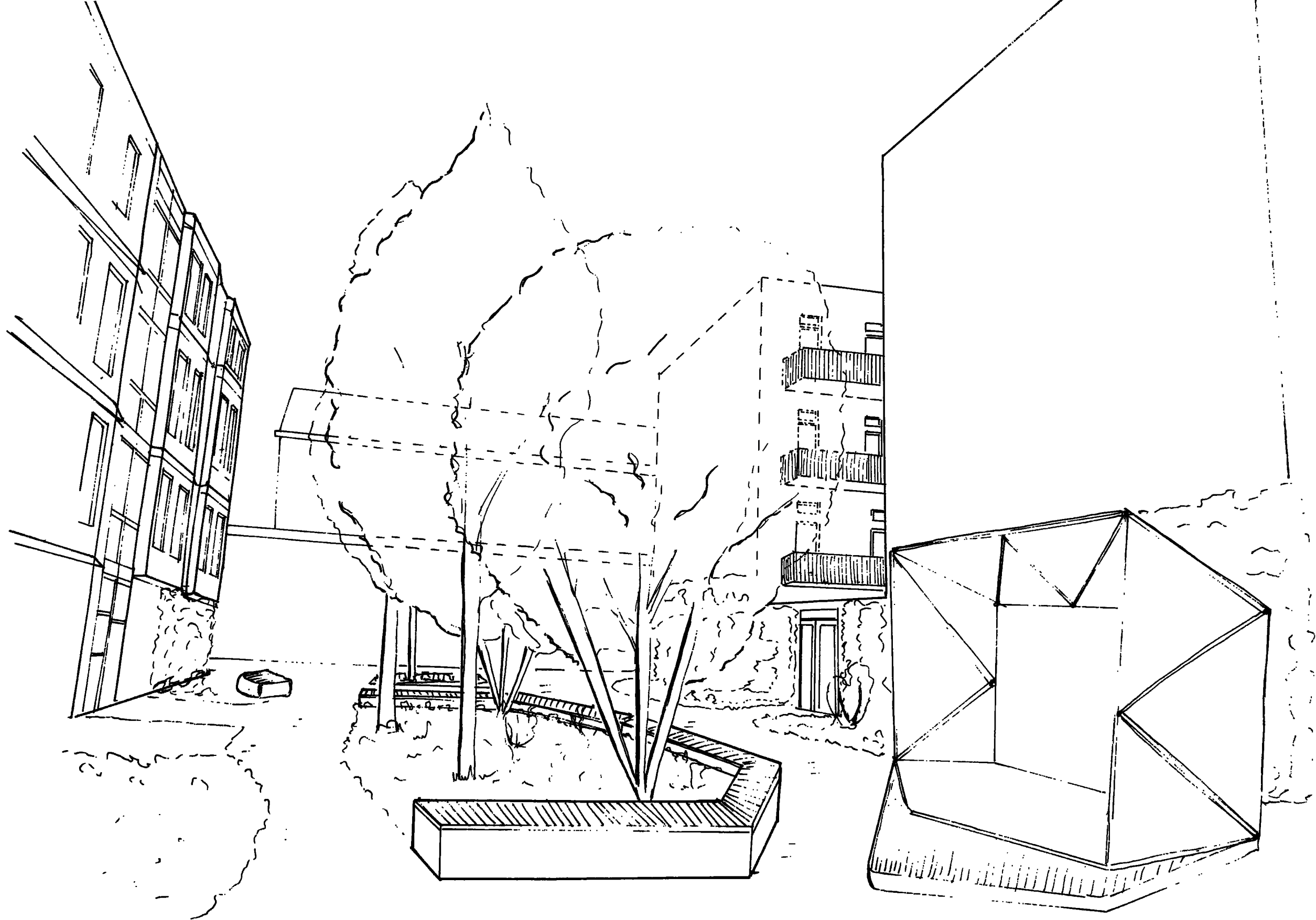
13.00
Sunny day, 22 degrees



Coolsestraat

Design proposal

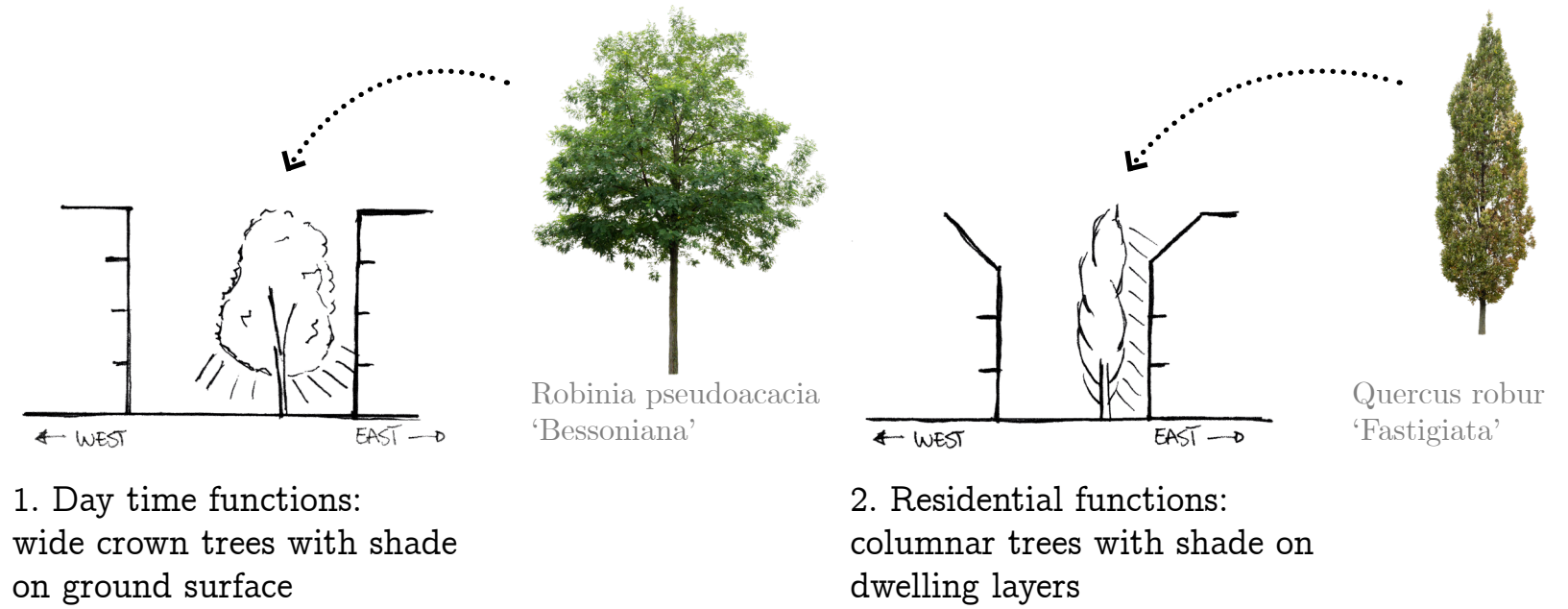
Creating an interesting place to stay
for each preference



Research learning 1 - designing for interpretation

Designing for a variety of choices, solar exposure preferences and user (groups)

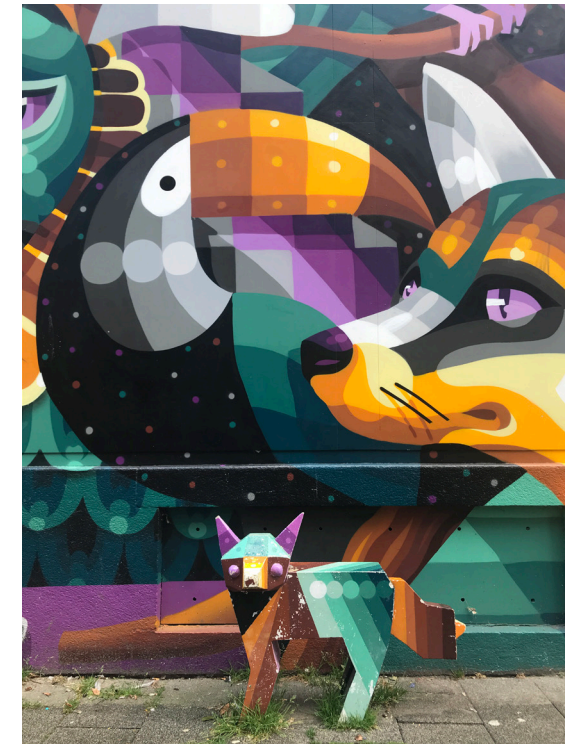
- Design for variety in microclimates in public space to facilitate a diversity in (solar exposure) preferences for users.
 - Facilitate freedom to decide and room for (individual) influence
 - Support local collaborations
- Klemm, 2018



Research learning 1 - designing for interpretation

Designing for a variety of choices, solar exposure preferences and user (groups)

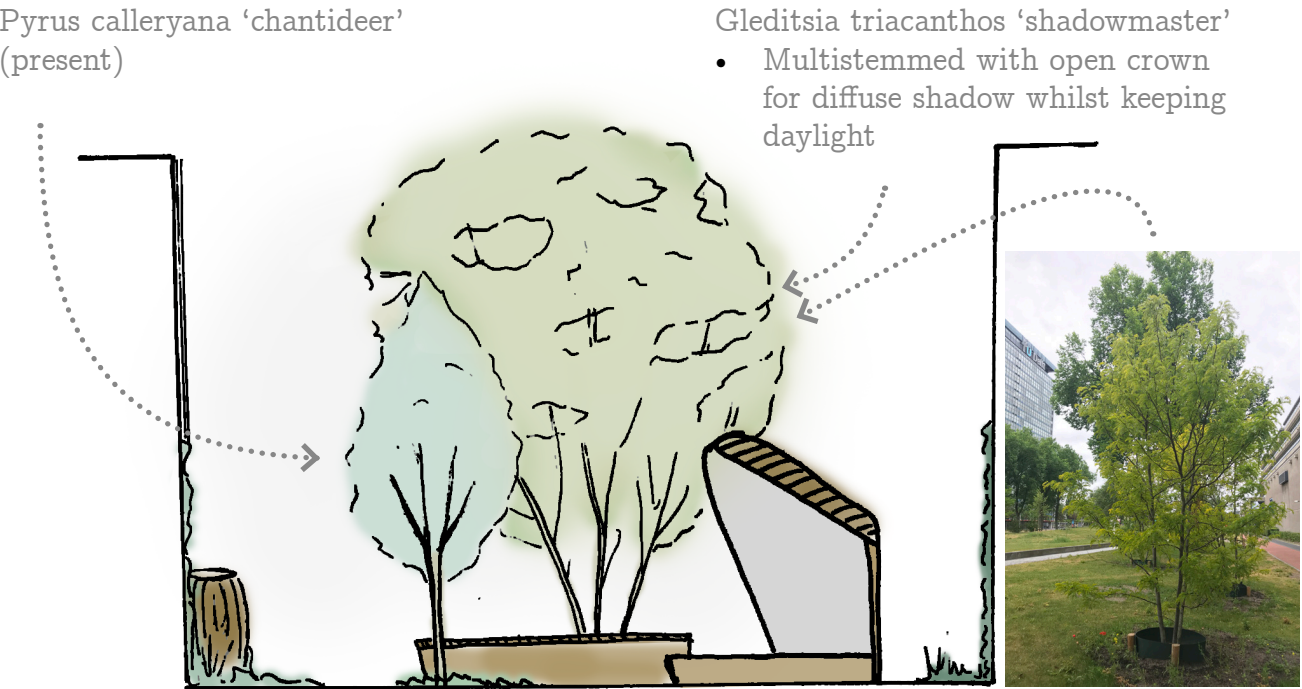
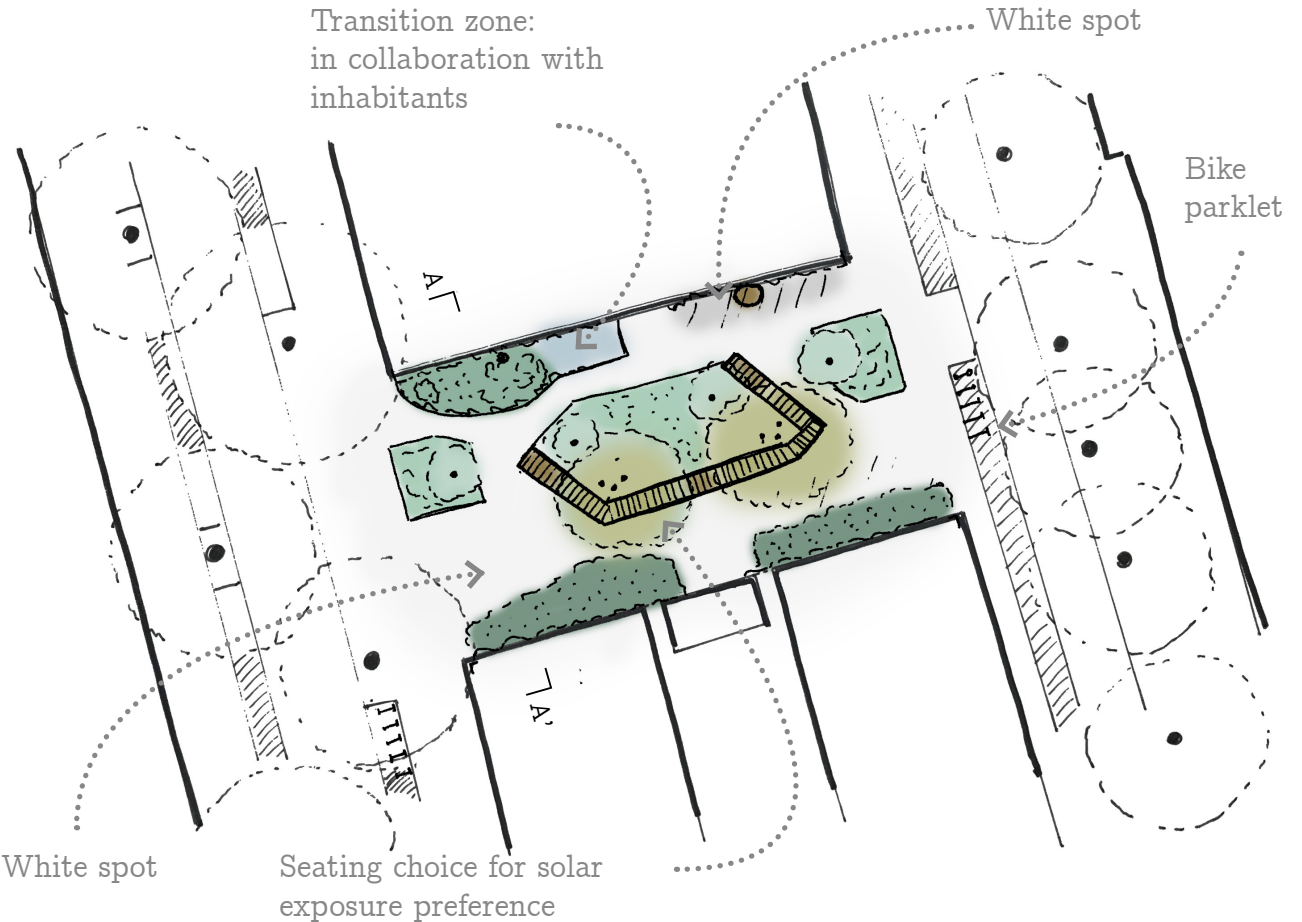
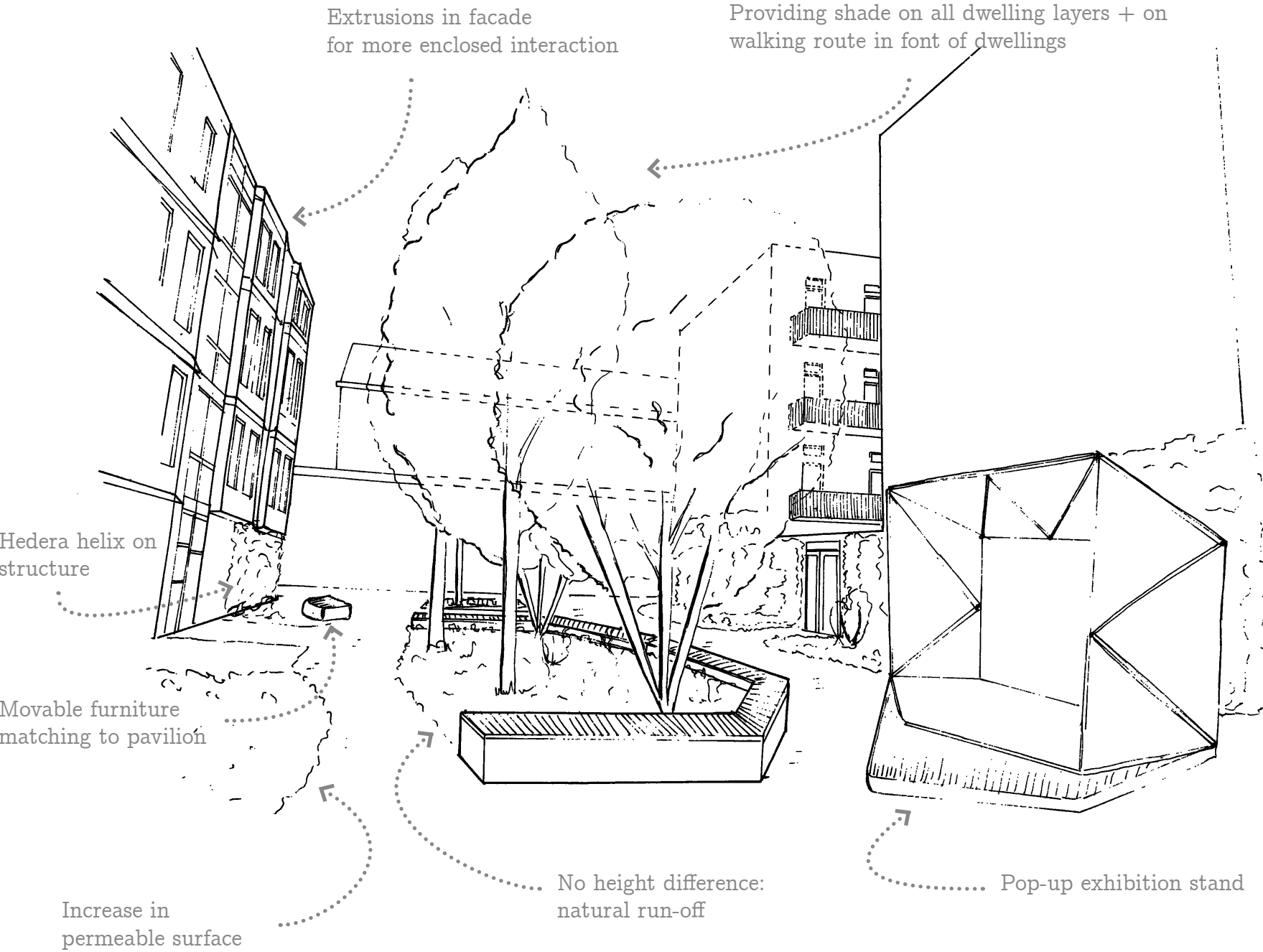
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- Klemm, 2018



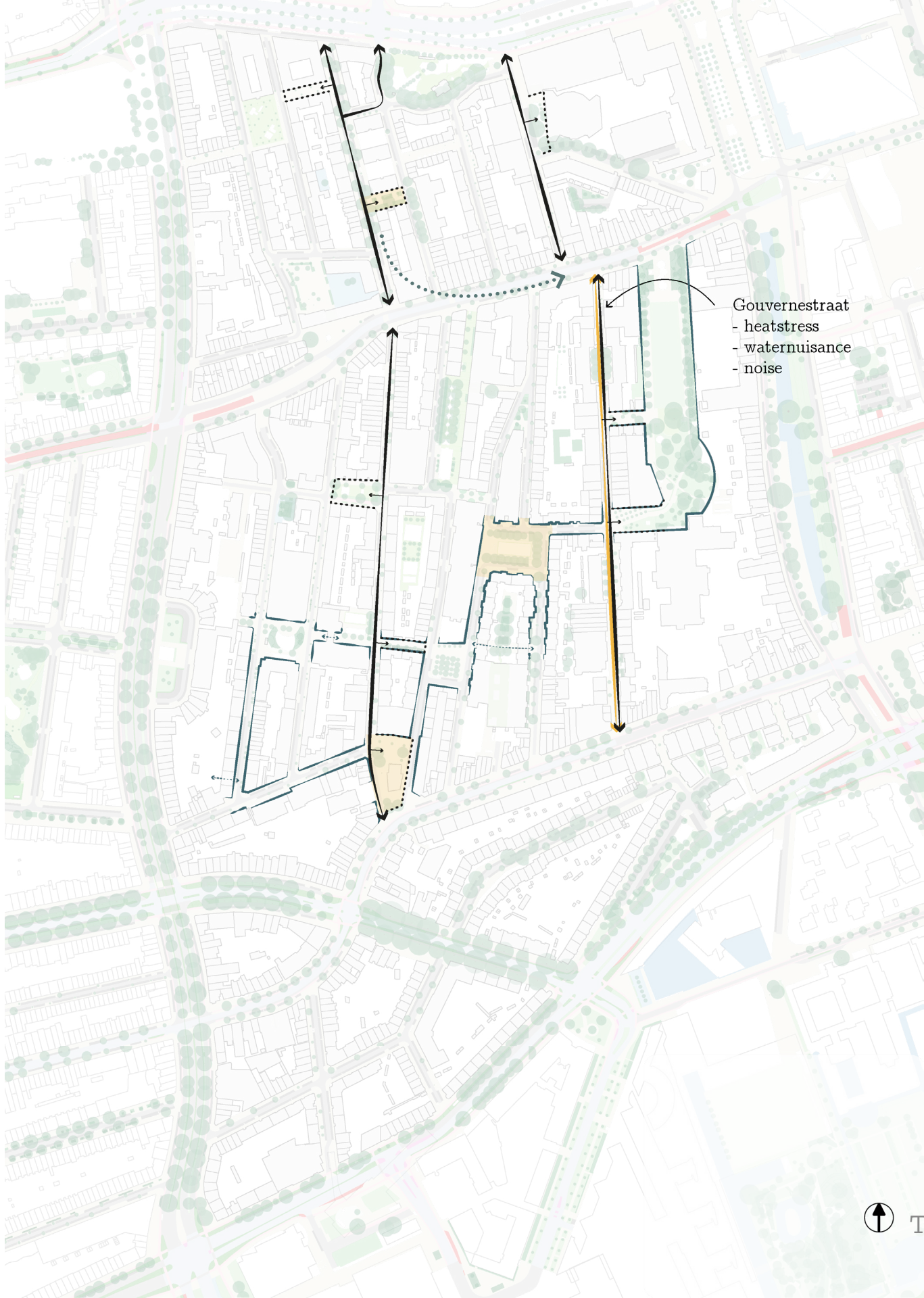
Coolsestraat

Design proposal

Creating an interesting place to stay for each preference

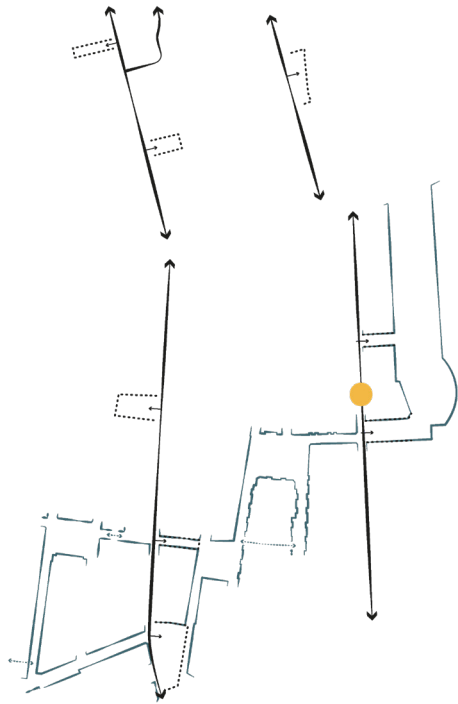


Design locations



Gouvernestraat

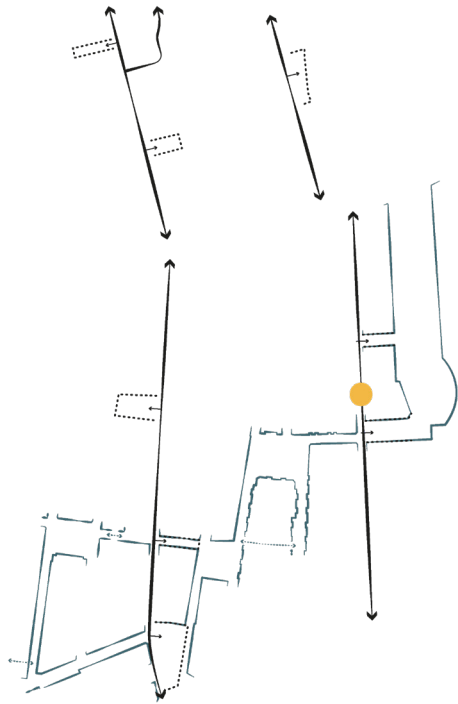
Existing situation



Gouvernestraat

Design proposal

Facilitating on-going movement for locals and visitors, while interacting with adjacent dwellings and providing softness of space



Research learning 2 - legibility

Legibility - for whom is the space designed?

- Trend of privatisation of open space
- Identifying the shift in perception: patterns on sense of publicity of space



Entrance from
public realm



Collective courtyard,
accessible for surrounding
inhabitants

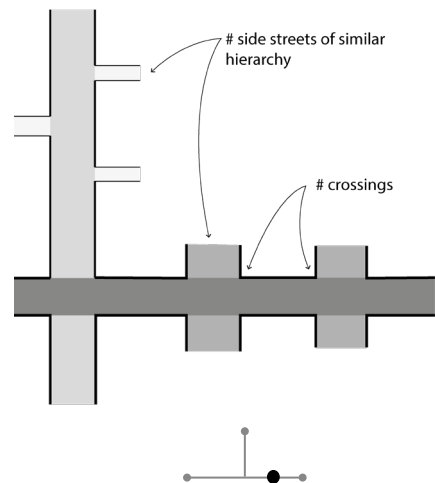


Individual appropriation
of space

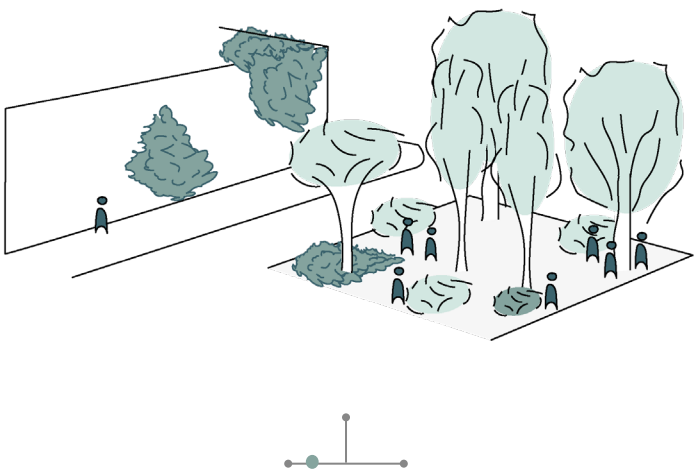
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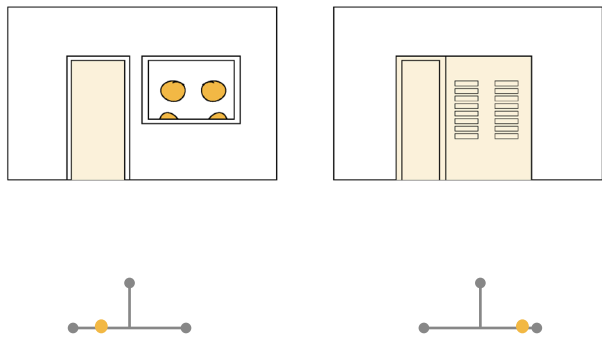
Connectivity



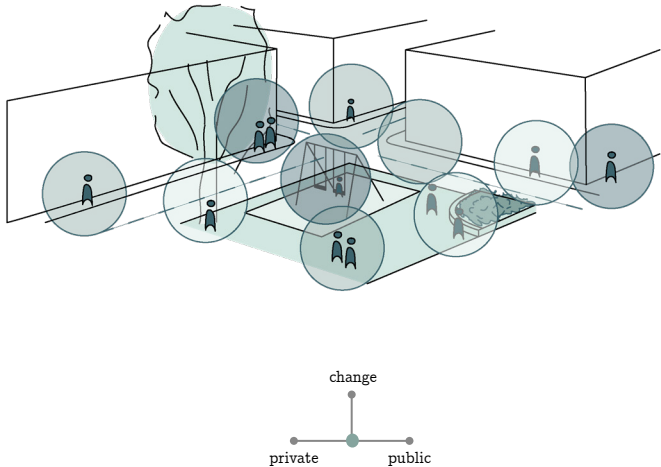
Permeability: softness of open space



Amount + type of front doors



10+ Activities



Research learning 3 - balancing greenery

Balancing type and amount of greenery in public space

- Liveability & attractiveness of the street vs. adding to improved microclimate
(cooling + local water absorption)
- Shared sense of ownership of locals - municipal level

Increased liveability of space
& attractive street



Research learning 3 - balancing greenery

Balancing type and amount of greenery in public space

- Liveability & attractiveness of the street vs. adding to improved microclimate
(cooling + local water absorption)
- Shared sense of ownership of locals - municipal level



Limited cooling effect:
up to $-0,6\text{ }^{\circ}\text{C}$ to immediate surroundings
(Hogeschool van Amsterdam, 2020)

Collaborative, local interventions &
local sense of ownership



Substantial cooling effect:
up to $-15\text{ }^{\circ}\text{C}$ to immediate surroundings
(Hogeschool van Amsterdam, 2020)

Municipal interventions &
ownership

Research learning 3 - balancing greenery

Balancing type and amount of greenery in public space

- Liveability & attractiveness of the street vs. adding to improved microclimate (cooling + local water absorption)
- Shared sense of ownership of locals - municipal level

Individual initiative



Collective initiative

Gouvernestraat

Design proposal

Facilitating on-going movement for locals and visitors, while interacting with adjacent dwellings and providing softness of space

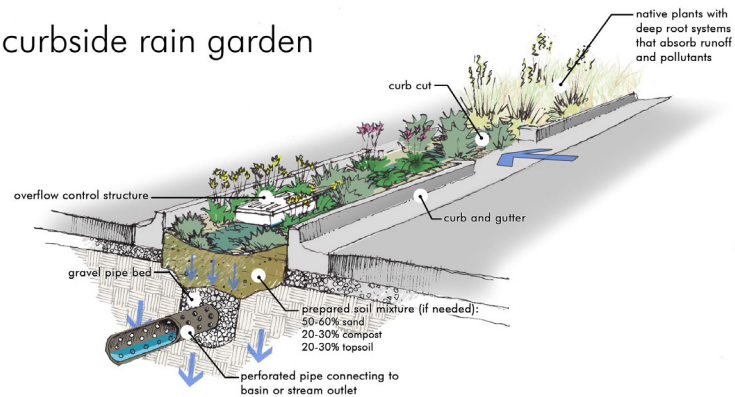


Diversity in tree type:

Gleditsia triacanthos 'shadowmaster' for shade on sidewalk

Populus nigra 'Italica' for shade on residential dwellings

curbside rain garden



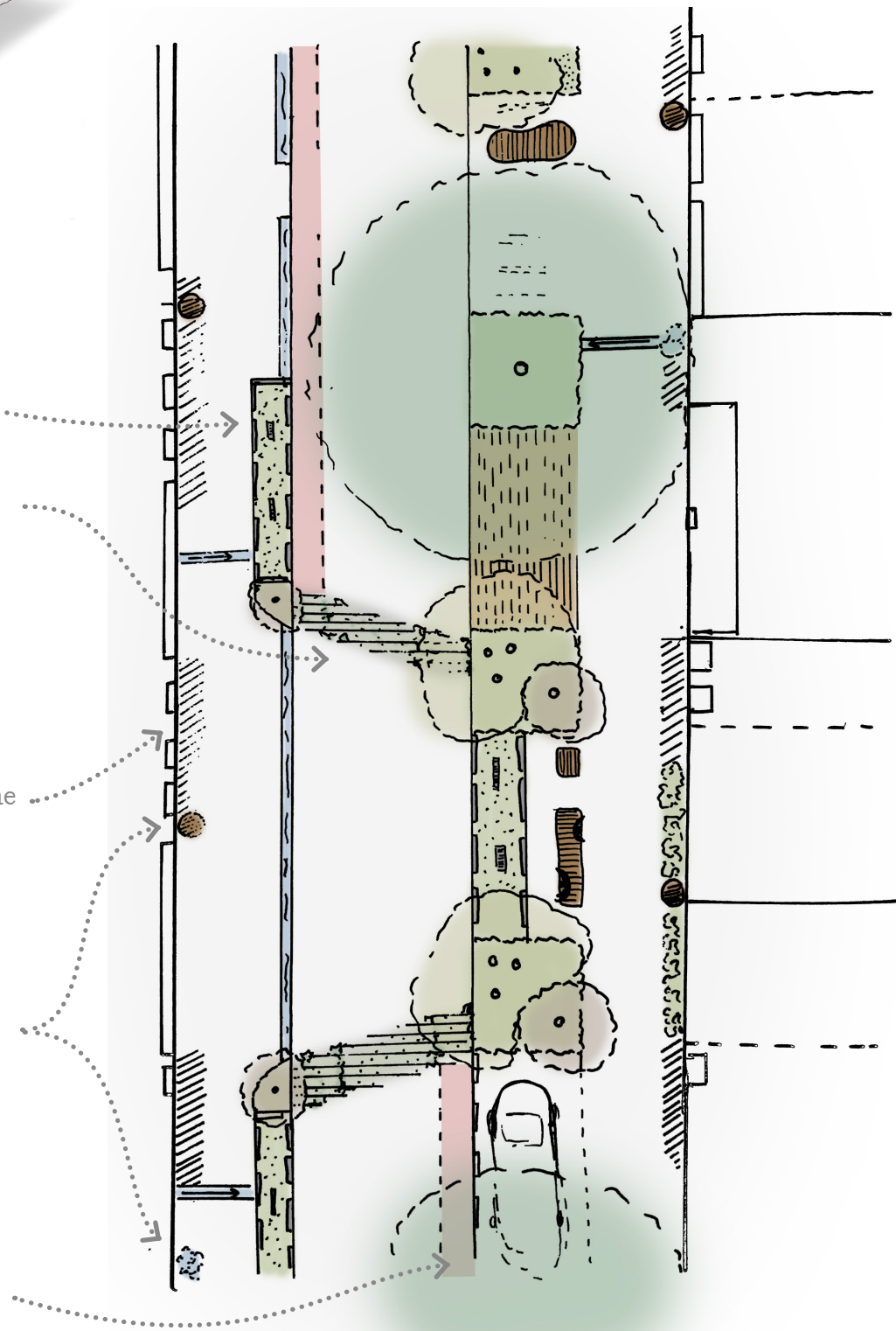
Source: City of Lancaster, 2020, retrieved from <http://www.saveitlanaster.com/curb-side-gardens/>

Ongoing road for legibility, with visual meandering for slow experience

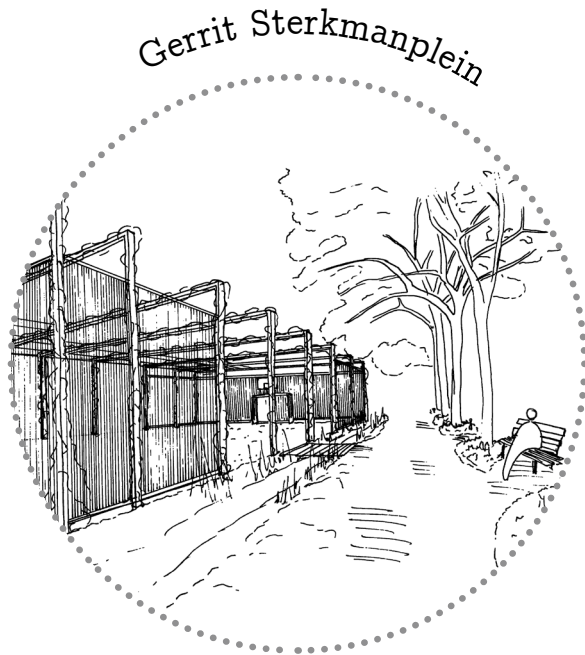
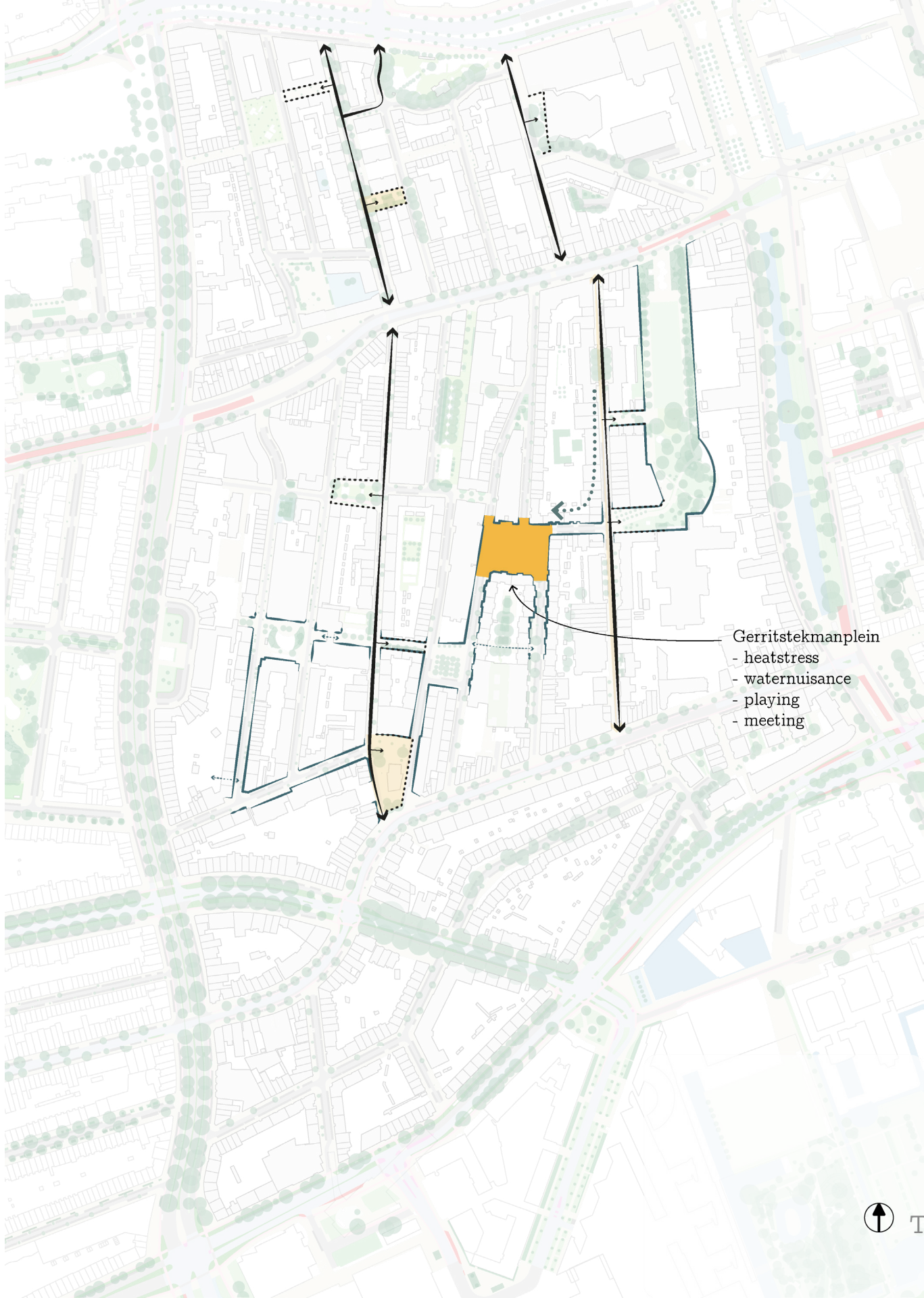
Spacious transition zone for residential plinth

Optional: rain barrel or rain water garden

Alternating designated bicycle path



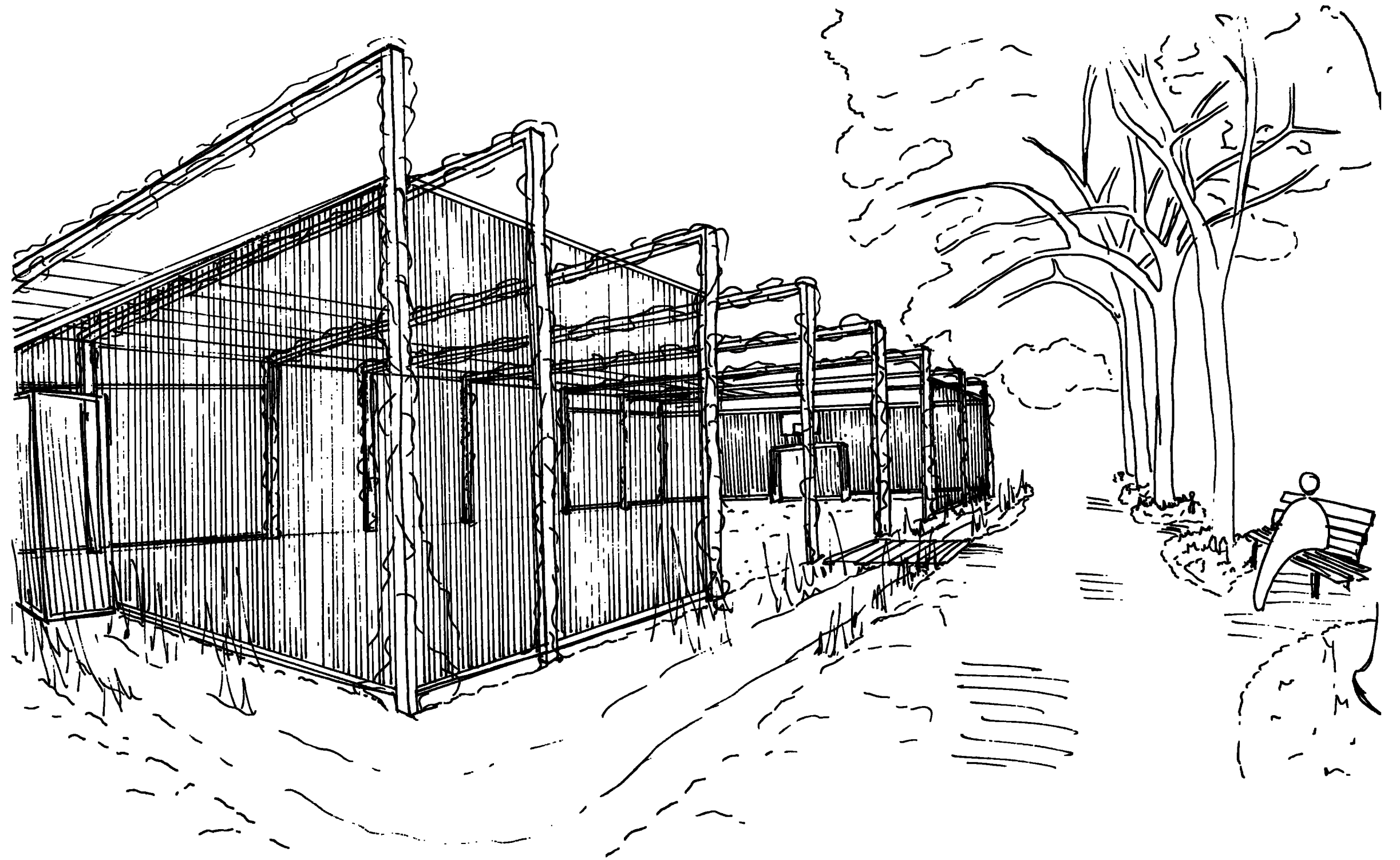
Design locations





Design proposal

Increasing sponge - capacity & facilitating safe
and interesting playing



Research learning 3 - balancing greenery

Balancing type and amount of permeable surface in public space

- Usability of space vs. adding to (micro)climatic conditions
(cooling + local water absorption)
- Design effective green, not just more green - Klemm, 2018

Permeable surface -
car zone?



Wijkpark

Elements for use - impermeable



Gerrit Sterkmanplein

Balancing type and amount of permeable surface in public space

- Usability of space vs. adding to (micro)climatic conditions
(cooling + local water absorption)
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Permeable surface -
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Wijkpark

Elements for use - impermeable



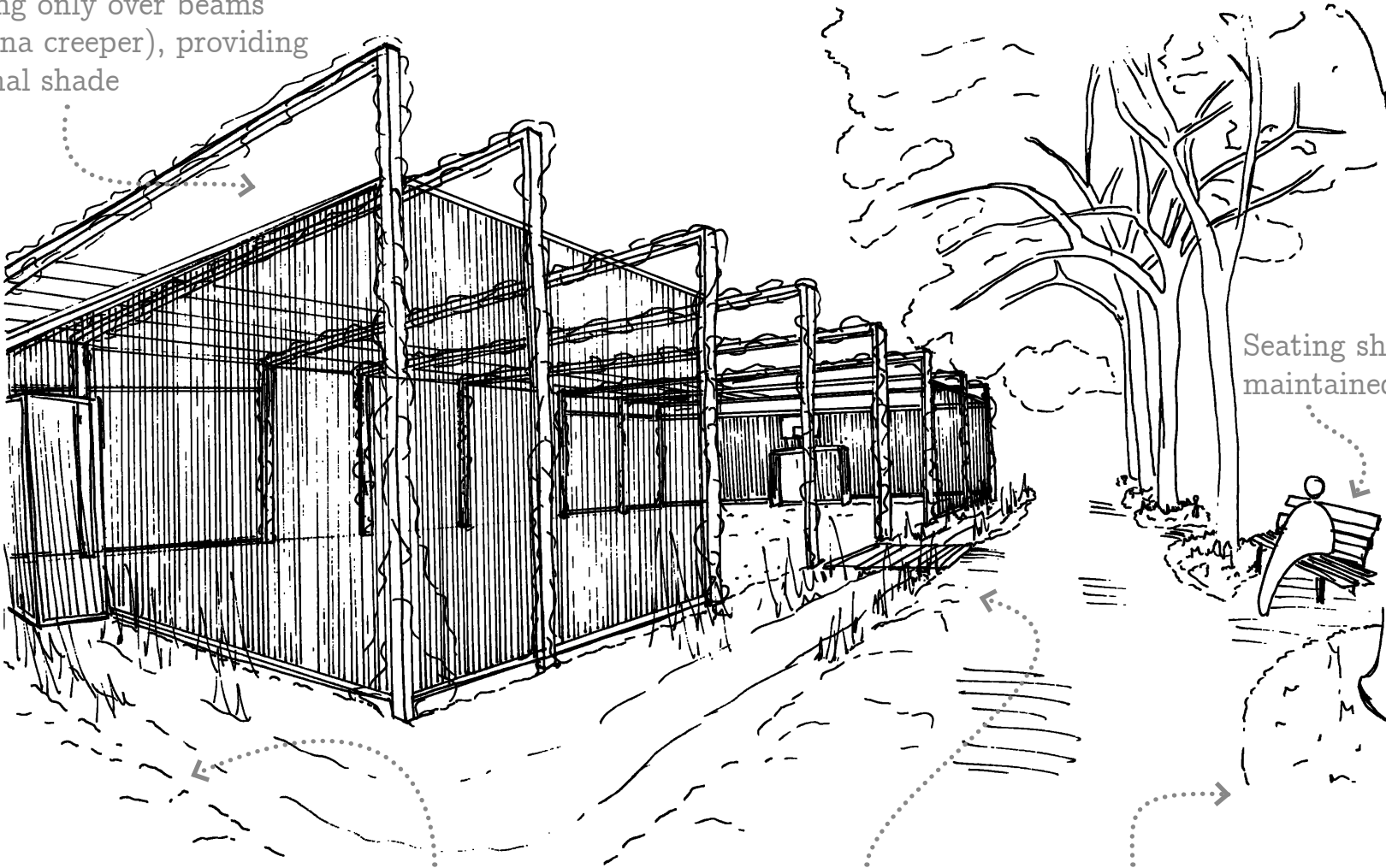
Gerrit Sterkmanplein

Source: Klimaateffectatlas, retrieved 2020



Design proposal
Increasing sponge - capacity & facilitating safe and interesting playing

Structure with vegetation
growing only over beams
(Virginia creeper), providing
seasonal shade

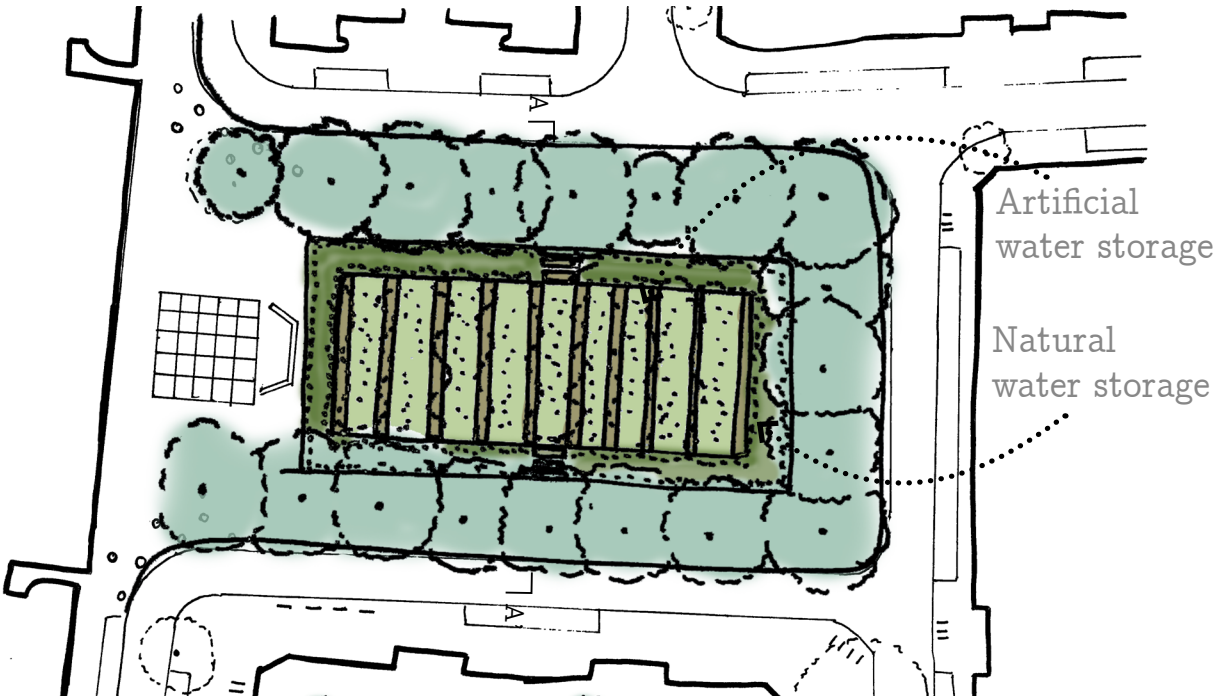


Wadi is no collection
ditch for soccer balls

Bridge over wadi for
access to play-court

Tree planter XL

Seating shelter
maintained

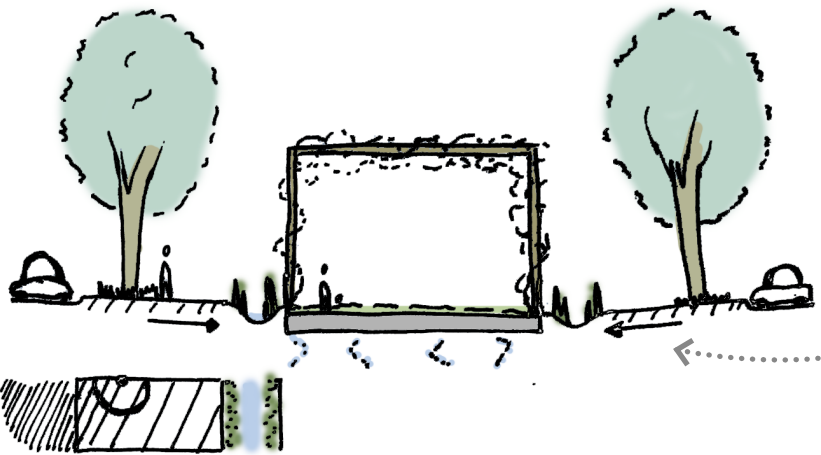


Artificial
water storage

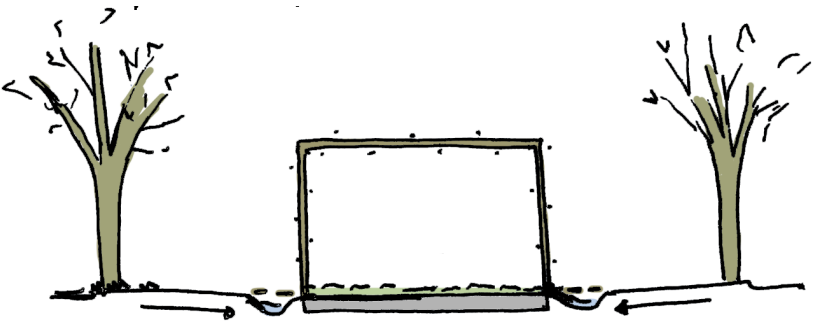
Natural
water storage

Gradient in
permeability

Gradient for
natural run off



Section AA': Summer scenario

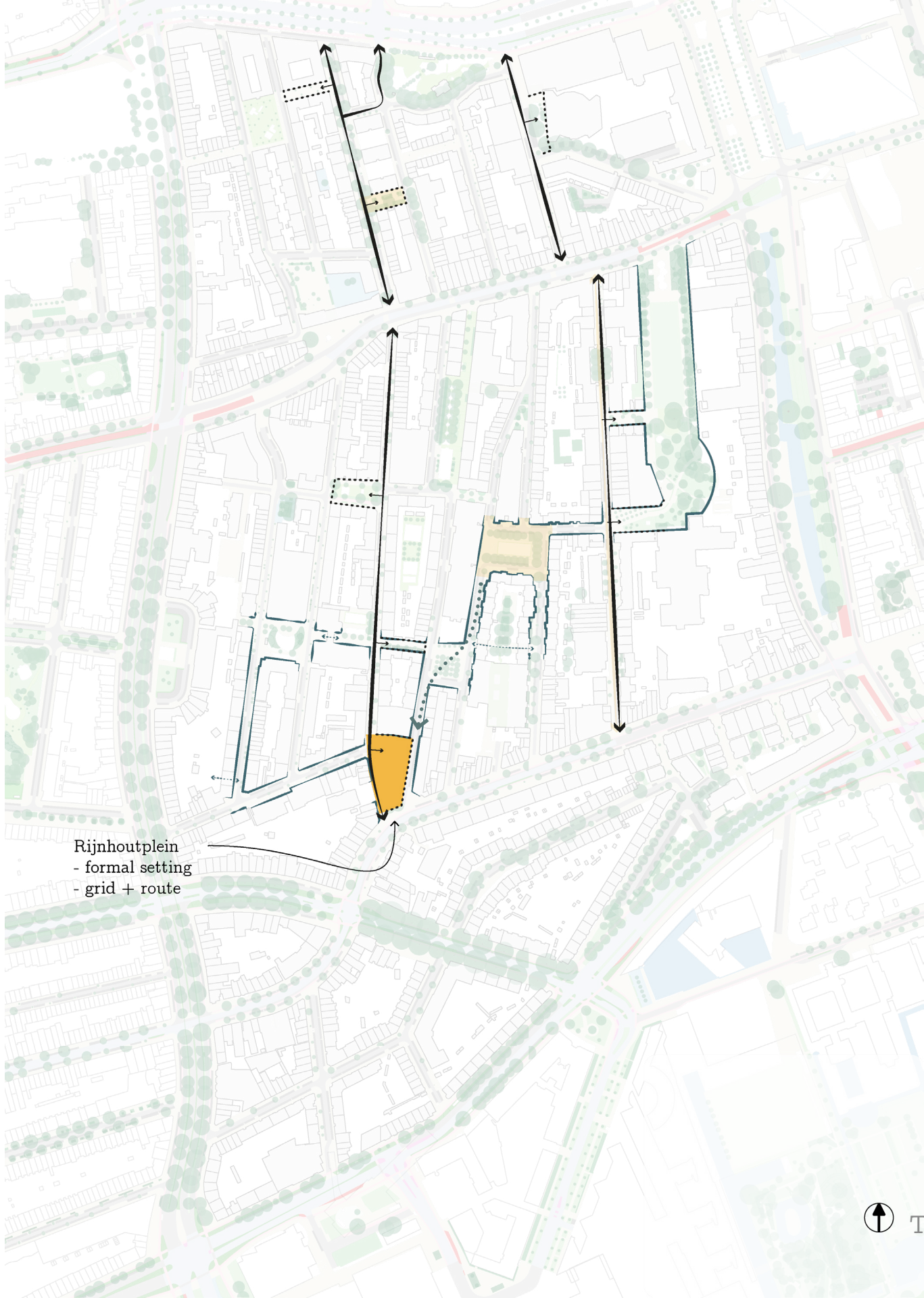
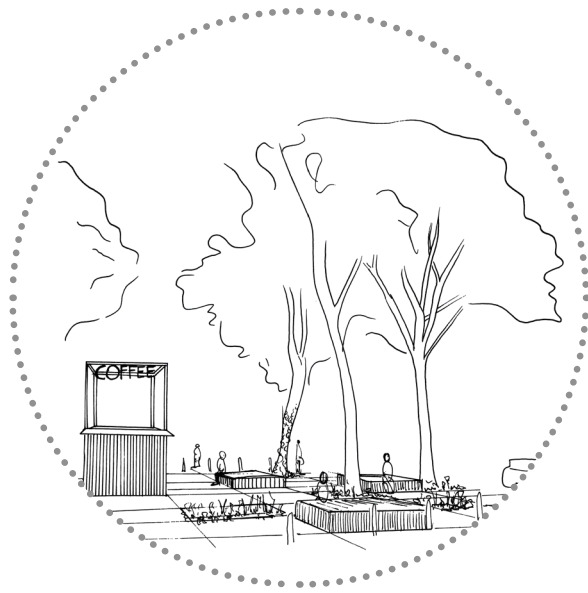


Section AA': Winter scenario

Design locations



Rijnhoutplein



Rijnhoutplein

Existing situation



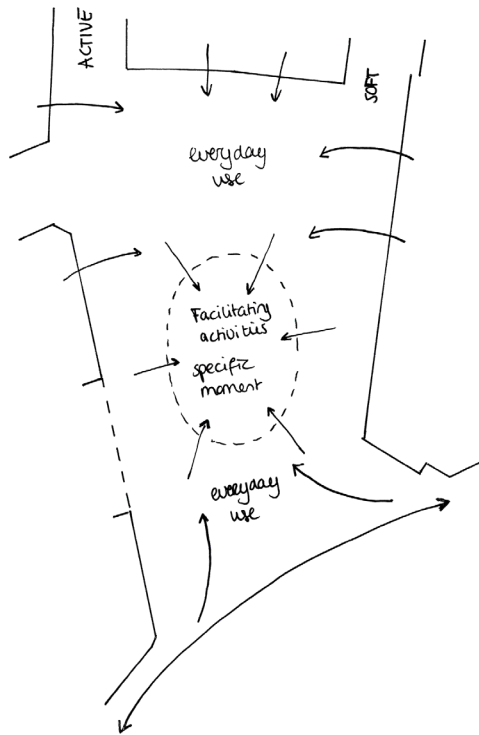
Rijnhoutplein

Existing situation



Rijnhoutplein

Design proposal
Inclusive and attractive to all users



Research learning 4 - understanding of climate nuisance

Include locals + users in solutions for water nuisance and heat stress

- **Actively:** educating + incorporating at local activities, nudging towards initiatives, including climate nuisance and adaptability in assessment of space with users
- **Passively:** visualising the interventions and its effects, increases understanding of need, urgency and effectiveness

Research learning 4 - understanding of climate nuisance

Water nuisance

- Water depth after short-term heavy rainfall [map]
- Possibilities for site to locally store, hold and drain water:
artificially or naturally [observations]



Waterdiepte bij kortdurende
hevige neerslag - 1:100 jaar

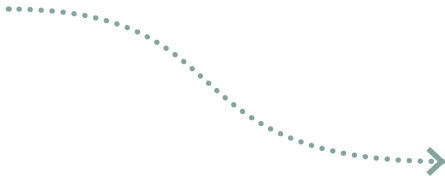
5 - 10 cm
10 - 15 cm
15 - 20 cm
20 - 30 cm
> 30 cm

Source: Klimateffectatlas, retrieved 2019

Research learning 4 - understanding of climate nuisance

Experience of water nuisance

- Water depth after short-term heavy rainfall [map]
- Possibilities for site to locally store, hold and drain water:
artificially or naturally [observations]
- Function of the place and its use affected by non-drainage or precipitation [observations]
- Expectation of the user + duration of water nuisance



Waterdiepte bij kortdurende hevige neerslag - 1:100 jaar

5 - 10 cm
10 - 15 cm
15 - 20 cm
20 - 30 cm
> 30 cm

Places to stay
= want to have



Source: Klimaateffectatlas, retrieved 2019

Everyday use of space
= must have space



Heat stress

- City scale: decreasing air temperature with evapotranspiration (twofold) & shade
- Local scale: decreasing perceived air temperature (PET) with shade & ventilation

Anthropogenic heat: transmission of heat from human activity e.g. cars [observations]

- Heat stress from UHI & increased PET require different approach



Source: Klimaateffectatlas, retrieved 2020



Source: Klimaateffectatlas, retrieved 2020

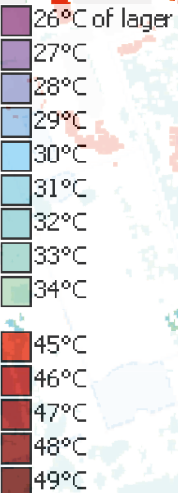
Research learning 4 - understanding of climate nuisance

Cool spots < 35°C + Hotspots: PET > 45°C

(narrow)
Breakthrough streets

Squares without shading

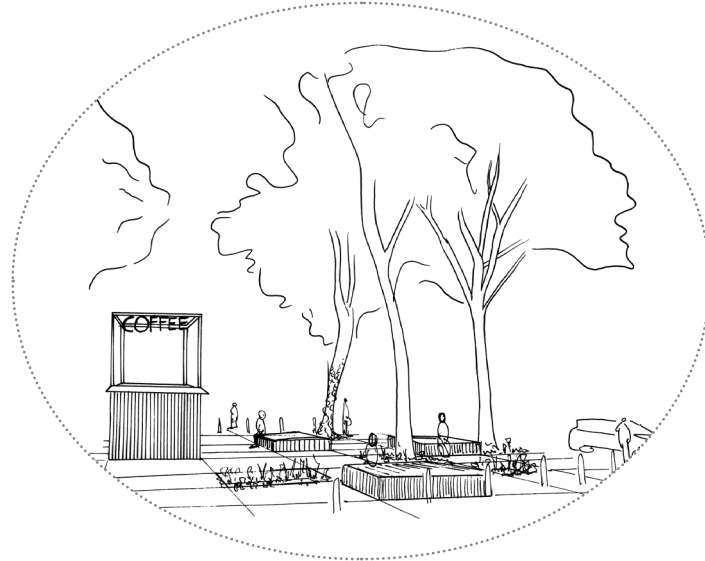
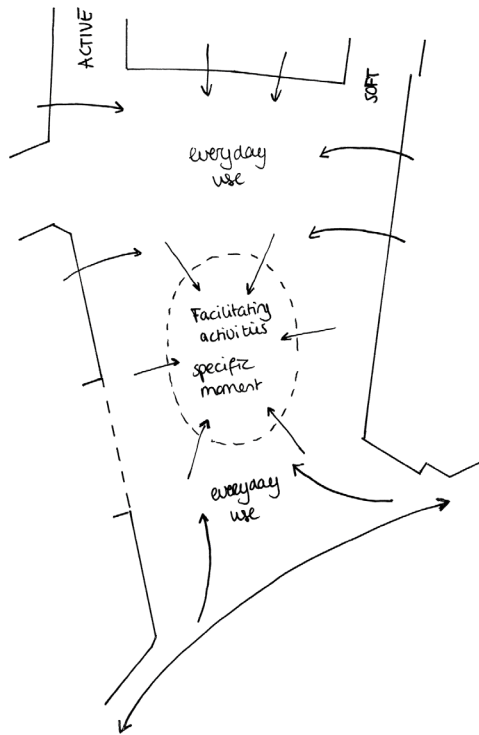
Wijkpark
grass surface
without trees



Rijnhoutplein

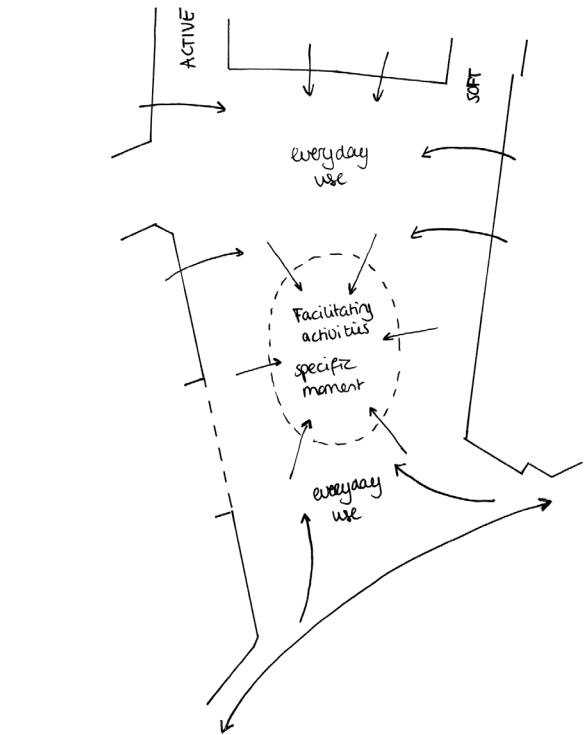
Design proposal

Inclusive and attractive to all users



Rijnhoutplein

Design proposal
Inclusive and attractive to all users



Grid = active transition

Space for outdoor play
(chalking-preferred tiles)

Artificial water storage +
multi-usable elements for
everyday use & special
activities

Vegetated height increase
towards soft side for leisure

Facilitating temporary
shade & lighting +
space for outdoor
activities

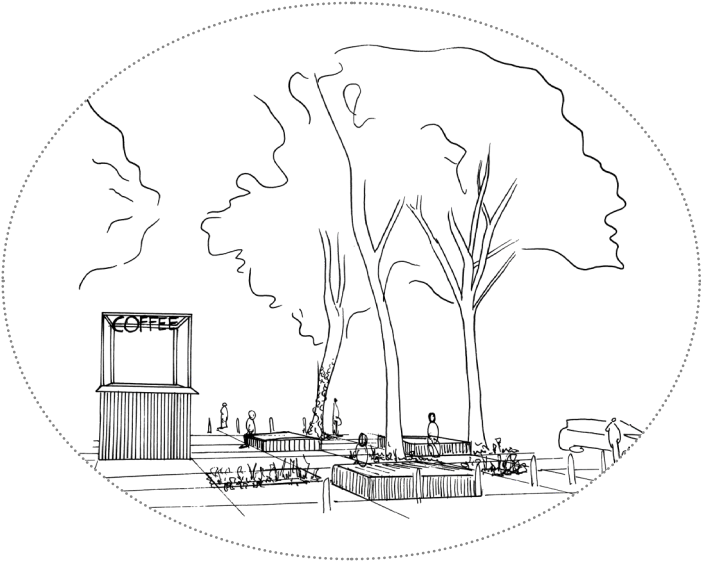
Route = soft transition

Space for residents in plinth
= eyes on the street & square

Ease of movement onto square
with vegetated crossing

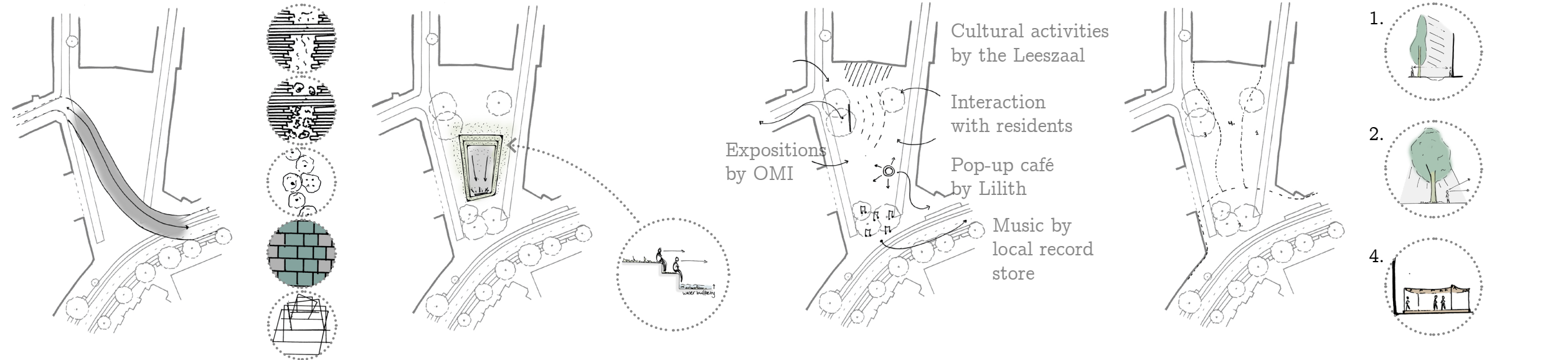
Diversity in tree shapes for
shade on dwellings
+ surface below

Slow path guiding users onto the square
1. indicating the softness of the route
2. leaving sidewalk open for residents

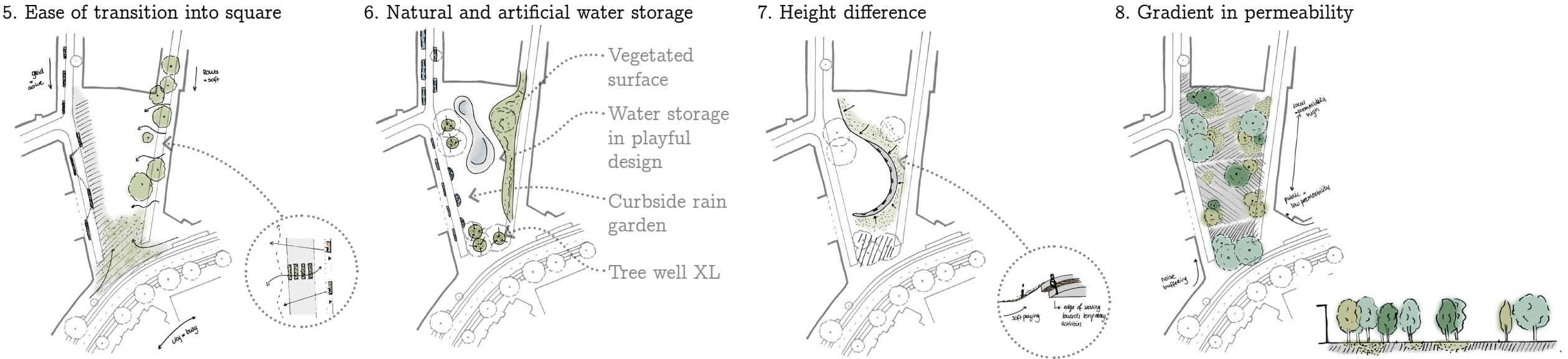


Rijnhoutplein

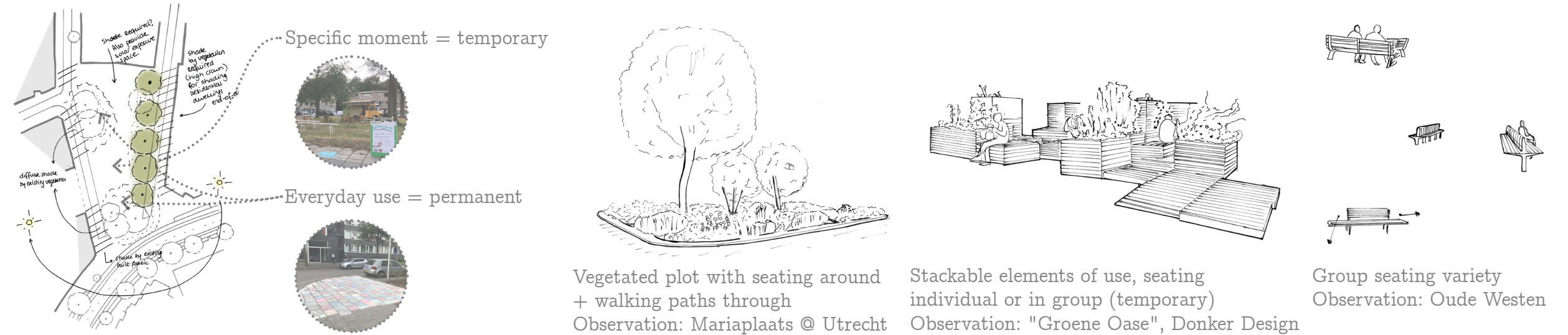
1. Following the Oude Binnenweg
2. Outline of building
3. Local actor collaborations potential
4. Match type of experience to connect use of space

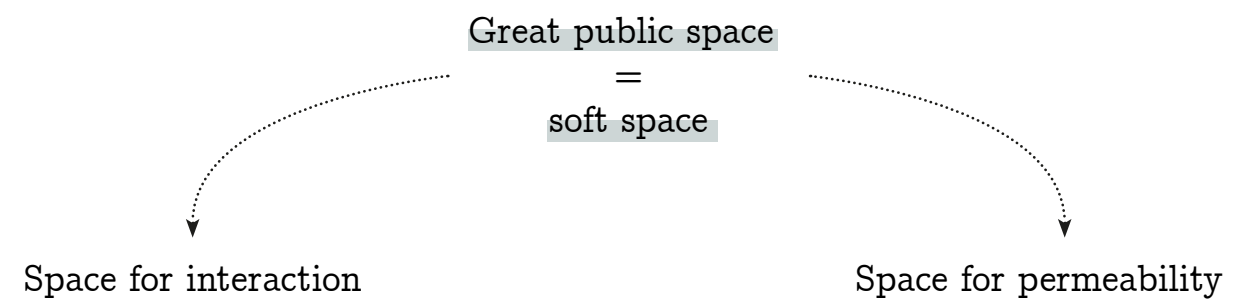


1. water ● +
heat ● +
usability ● ++
● long-term
● multi-use
2. ● +
● +
● +
● long-term
● multi-use
3. ● ±
● ±
● +
● temporary
● multi-use
4. ● +
● +
● +
● long-term
● multi-use
5. ● +
● +
● +
● long-term
● multi-use
6. ● +
● ±
● +
● long-term
● multi-use
7. ● ++
● ±
● +
● long-term
● multi-use
8. ● ++
● +
● ++
● long-term
● multi-use
9. ● ±
● +
● ++
● long-term
● multi-use
10. ● ±
● ±
● ++
● temporary
● multi-use



9. Match type of shade & vegetation to activities
10. Seating choice (selection)







Design goal

What interventions within the street scape can improve the public space by an integrated approach of the urban microclimate and usability in relation to densification for Rotterdam Oude Westen?

- ① Designing space for slow traffic creates more slow traffic
- ② Cater to the transformation of public space from space of movement into gathering space with different expectations
- ③ Proposed interventions do not require additional space: a change of priorities and a different approach
- ④ Improved experience of space: alterations in physical context + flexibility of the user

Conclusion learnings

Research & design

- Observation is a valuable and effective part of (inter-subjective) research and design
- Site specific context (built fabric + users) as well as generic knowledge and principles affect design research
- Address urban microclimate and usability simultaneously, with sensitivity to the scale of intervention & actor level
- Continuation design: community-driven approach



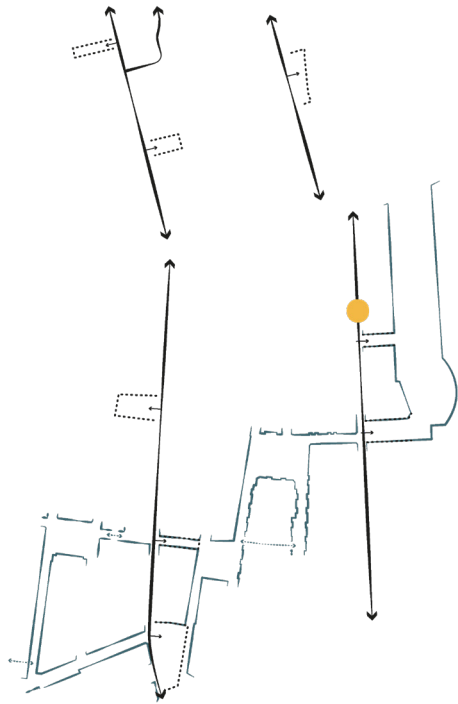


Thank you for your attention!



Gouvernestraat

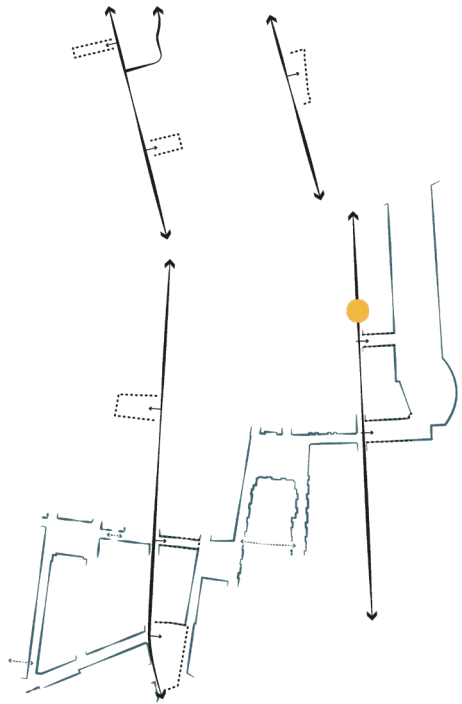
Existing situation



Gouvernestraat

Design proposal

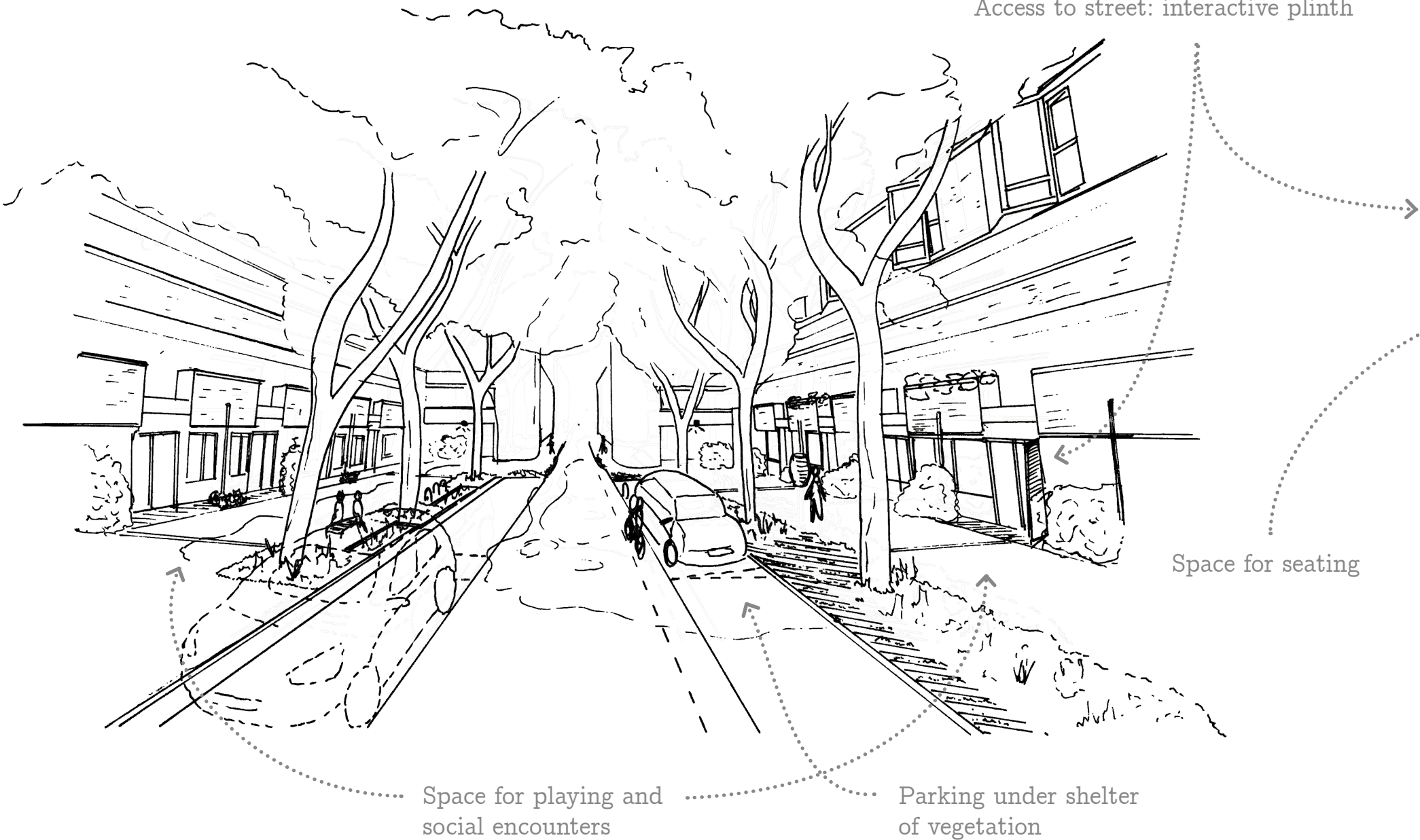
Increase of space + changed atmosphere resulting in an increase in possibilities for slow movement/staying



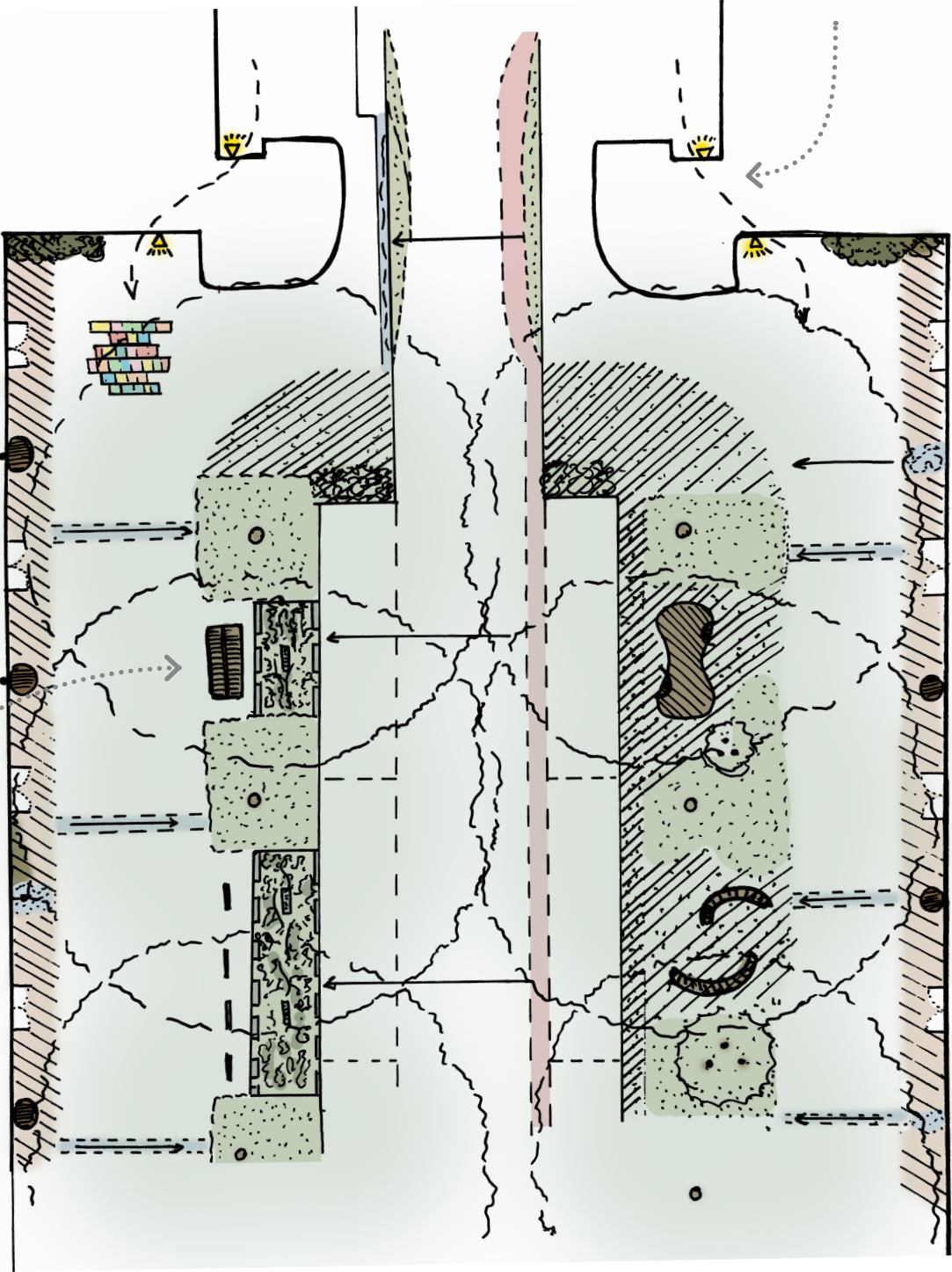
Gouvernestraat

Design proposal

Increase of space + changed atmosphere resulting in an increase in possibilities for slow movement/staying



Access to street: interactive plinth



Continuation of street design

Increased soft space

Research conclusion 3 - legibility

Legibility - neighbourhood structure + for whom is the space designed?

- Unclear neighbourhood lay-out for non-locals
- Trend of privatisation of open space
- Identifying the shift in perception: patterns on sense of publicity of space



Research conclusion 3 - legibility

Legibility - neighbourhood structure + for whom is the space designed?

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- Trend of privatisation of open space
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Rijnhoutplein



Rijnhoutplein

Observations microclimate

Microclimate analysis
Date: 2nd of September, 2020
Time: 12:30
Conditions: Sunny, clear sky, 20 °C
previous days cold + rainy



Rijnhoutplein

Observations microclimate

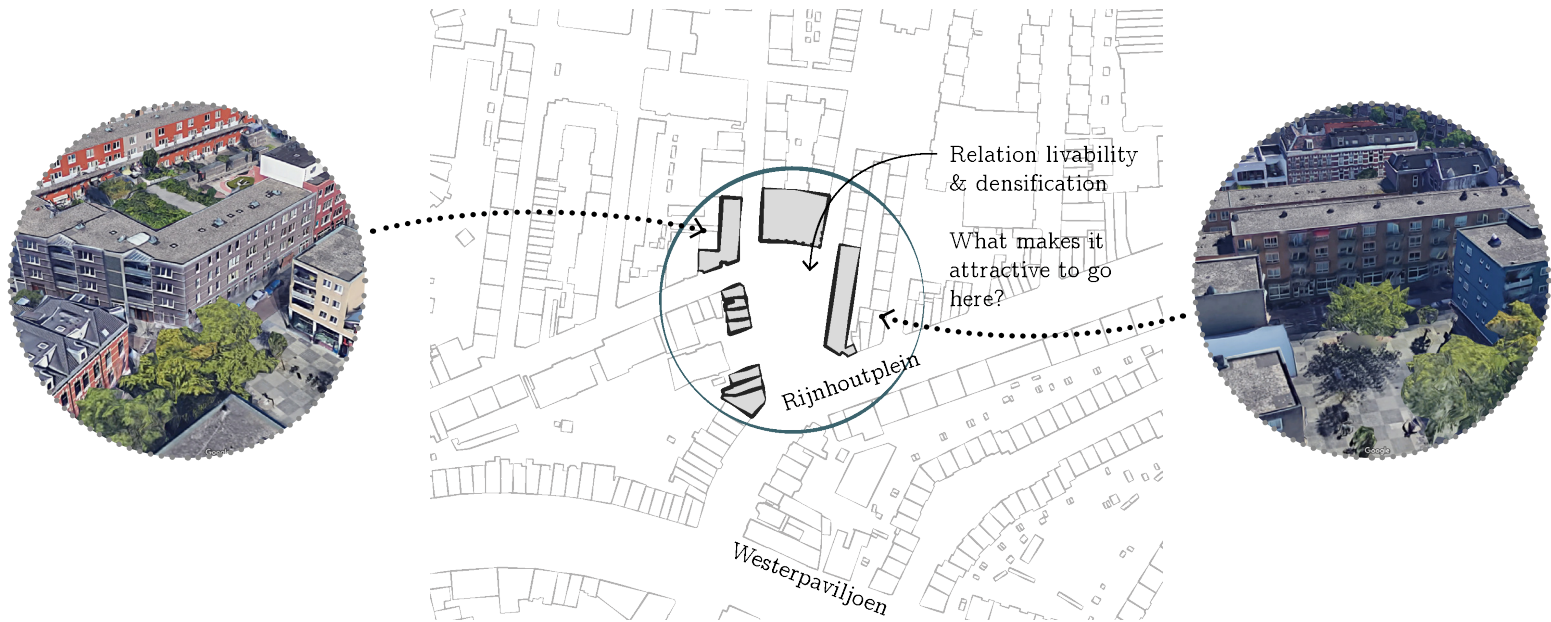
Microclimate analysis
Date: 2nd of September, 2020
Time: 12:30
Conditions: Sunny, clear sky, 20 °C
previous days cold + rainy



Rijnhoutplein

INTERMEZZO

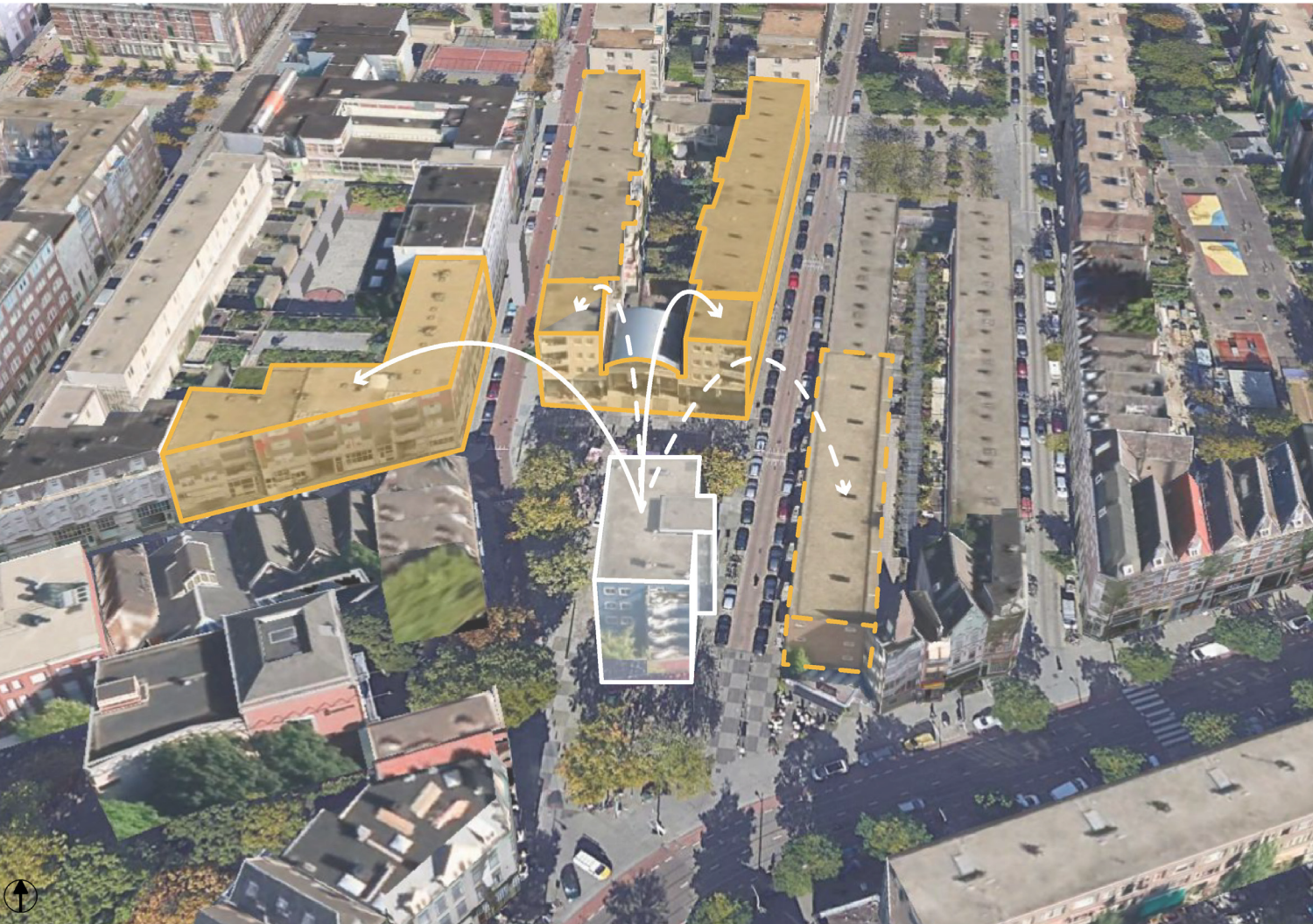
Transformation opportunities



1: Redistribute dwellings all around

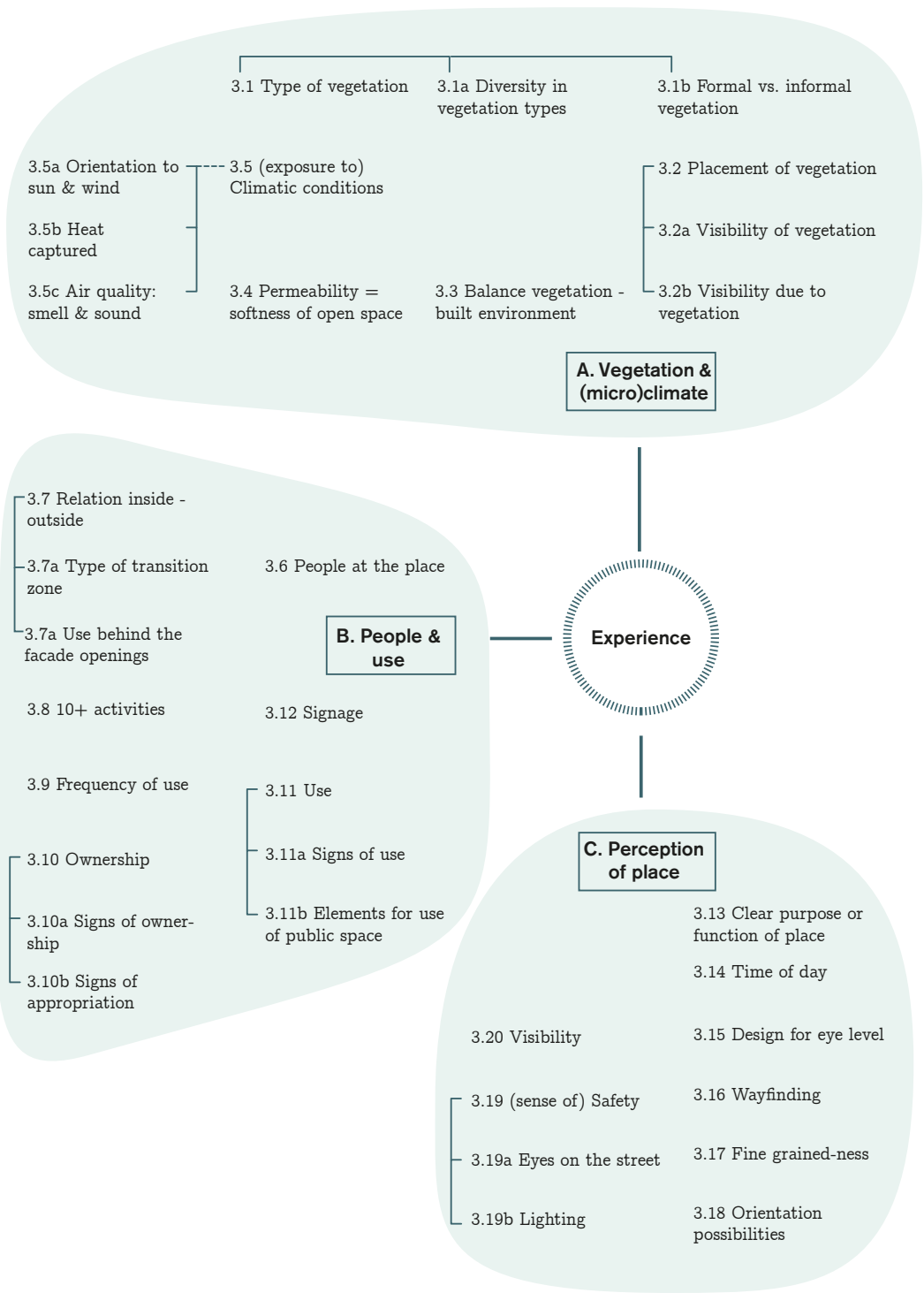
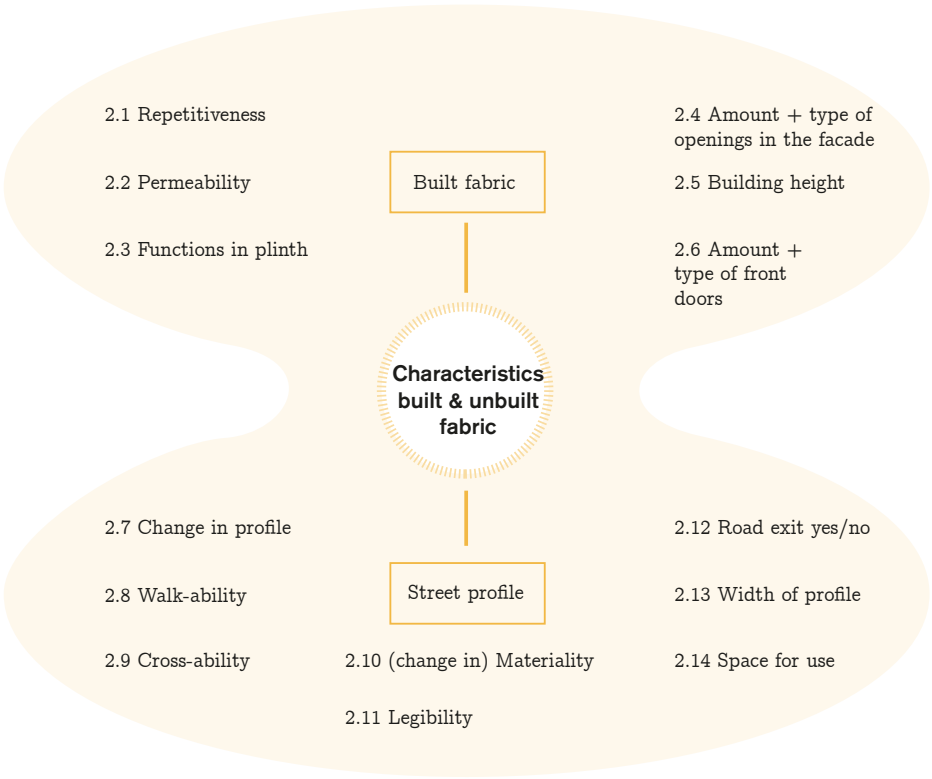
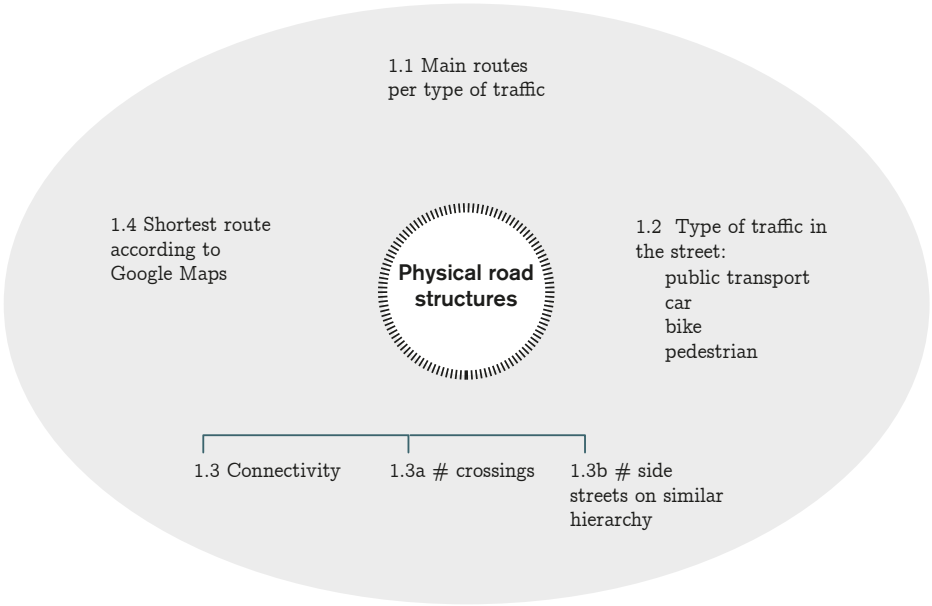


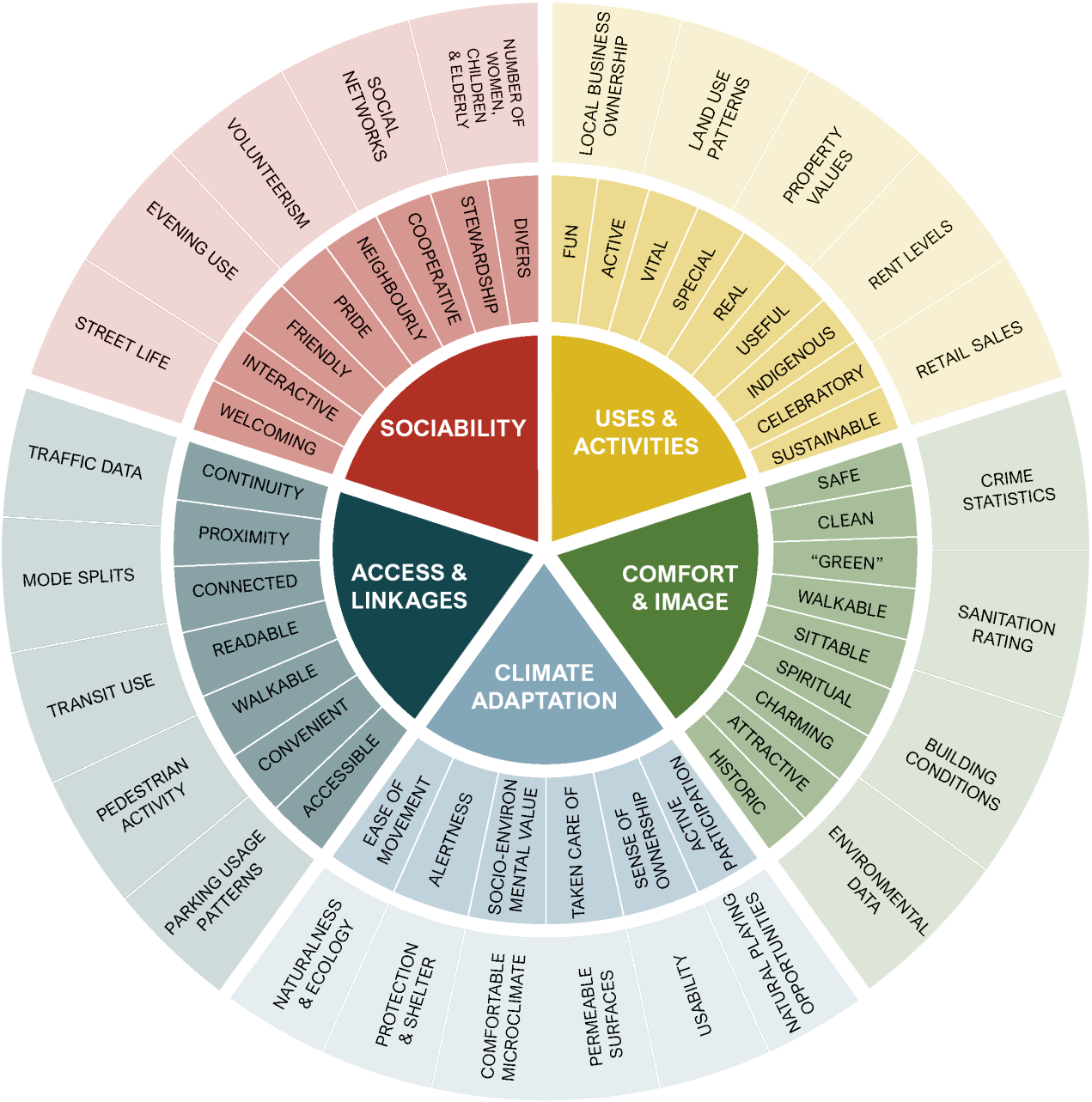
2: Redistribute dwellings on east-facing blocks



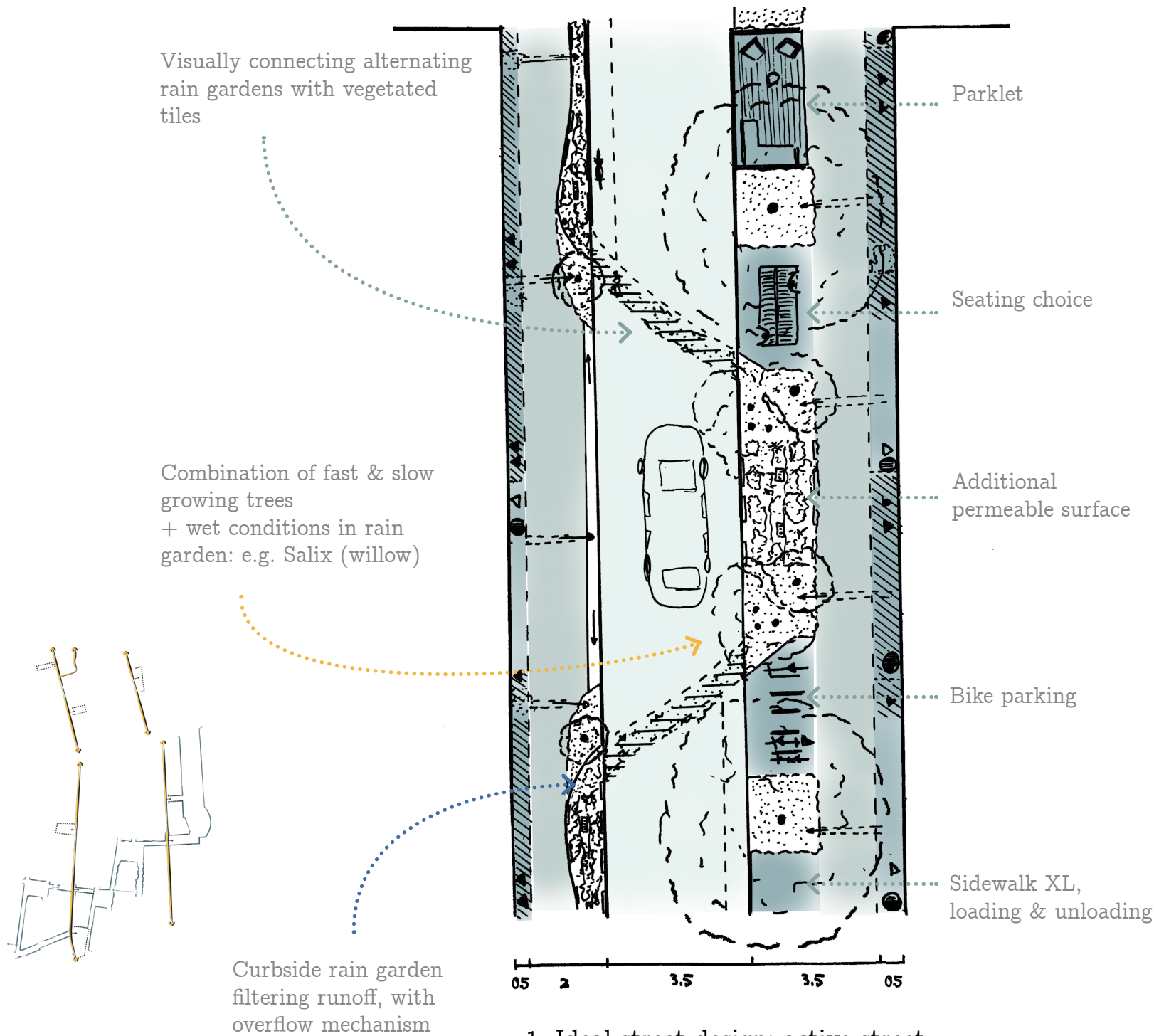
3: Redistribute dwellings on east-facing blocks + front of square & transform building blocks all around for improved connection to square

Research - patterns on sense of publicity of space

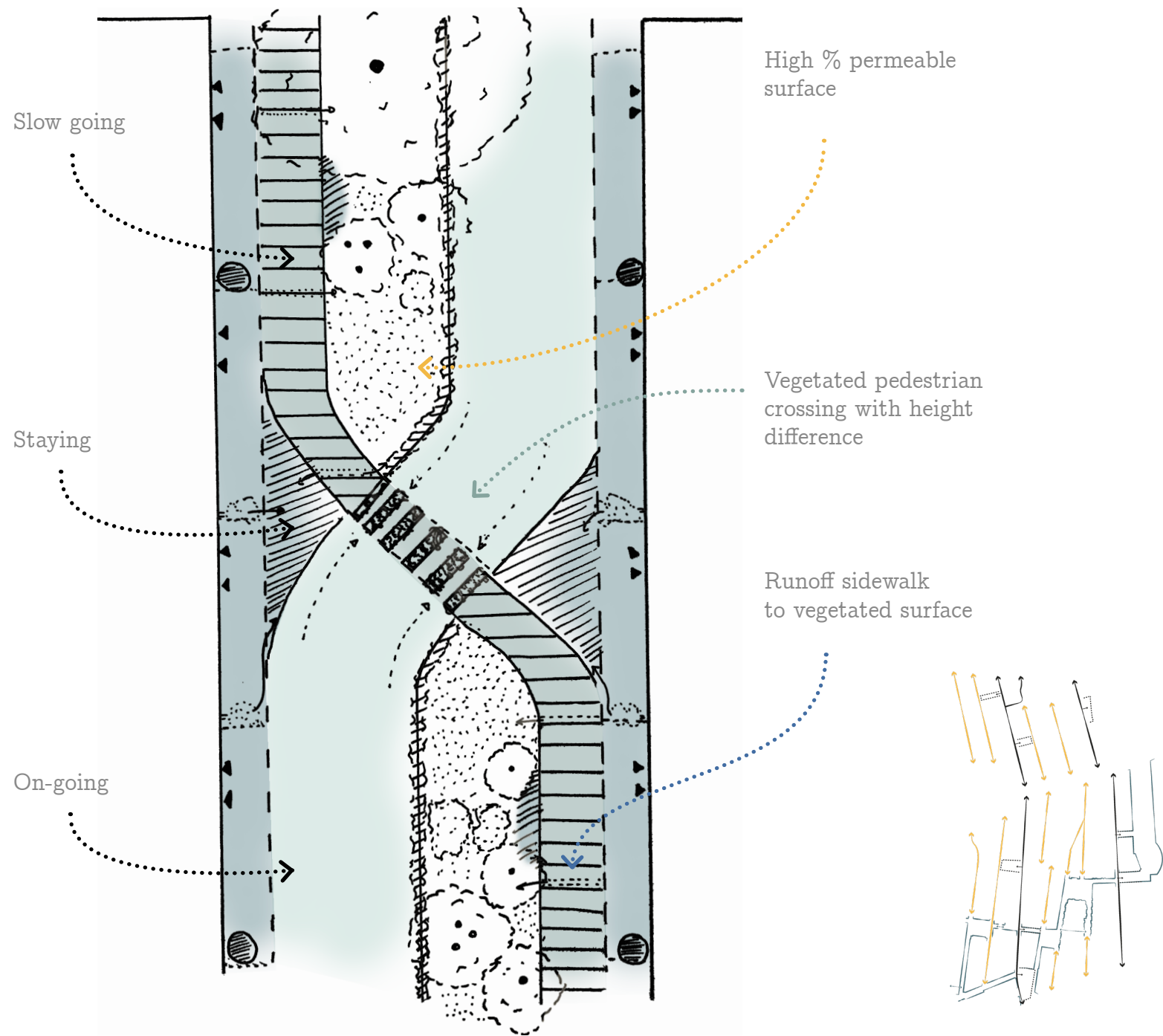




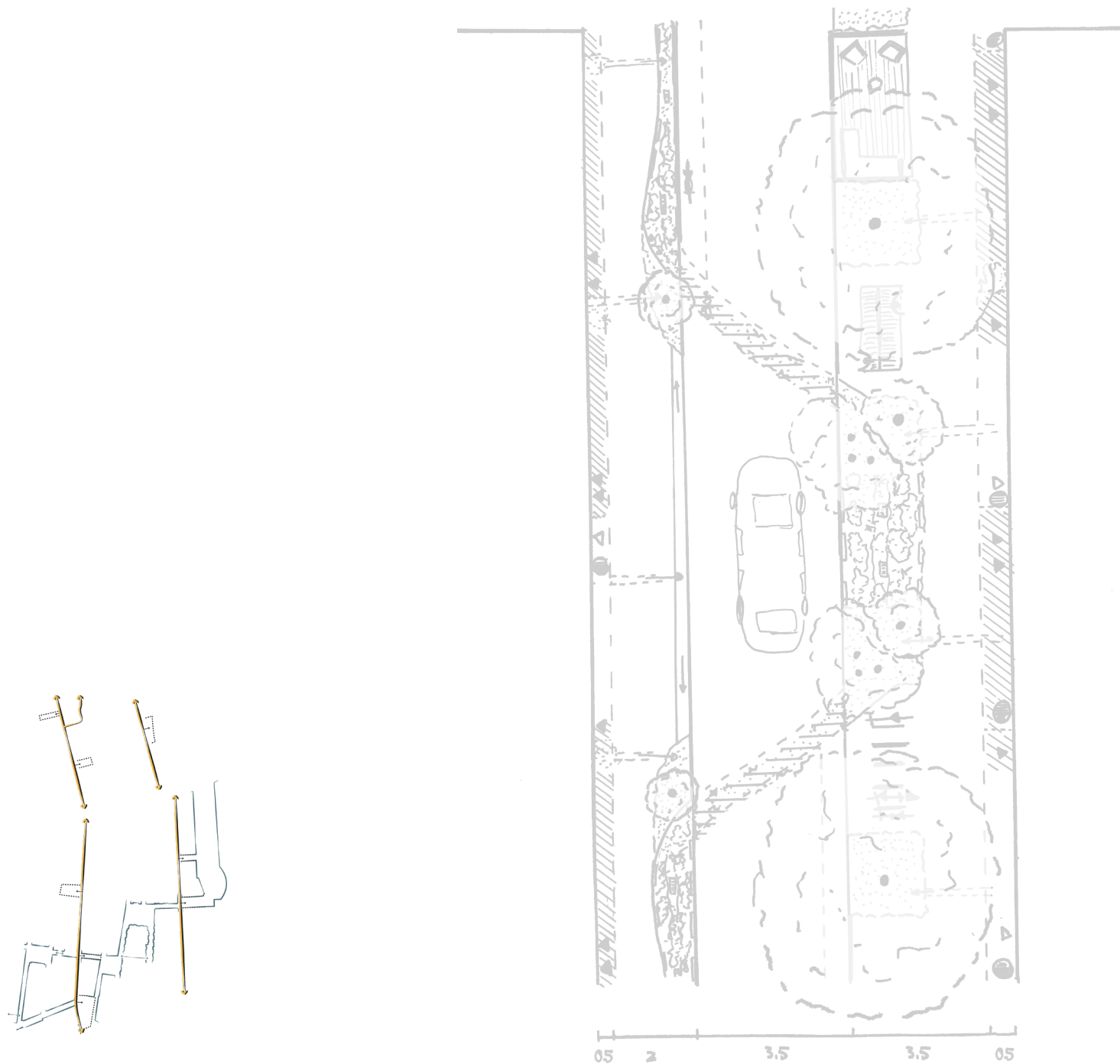
Source: Place Diagram 2.0: climate lens [PPS, 2003, adapted by Author, Vidou & Stipo, 2019]



1. Ideal street design: active street

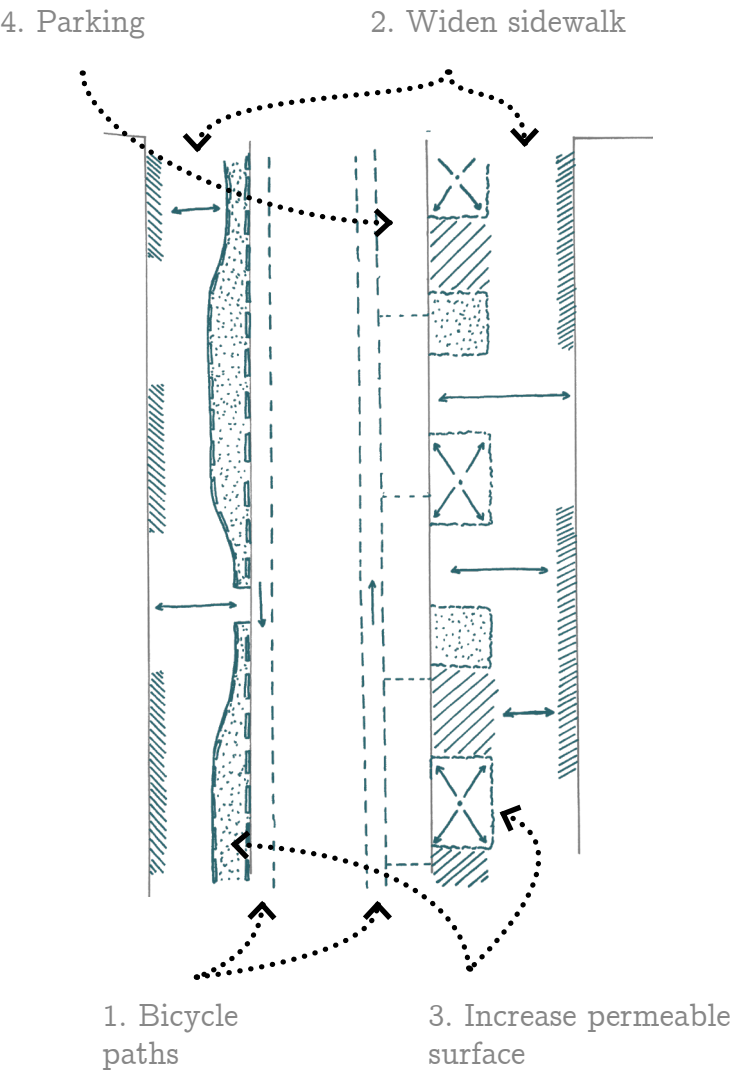


2. Ideal street design: residential street

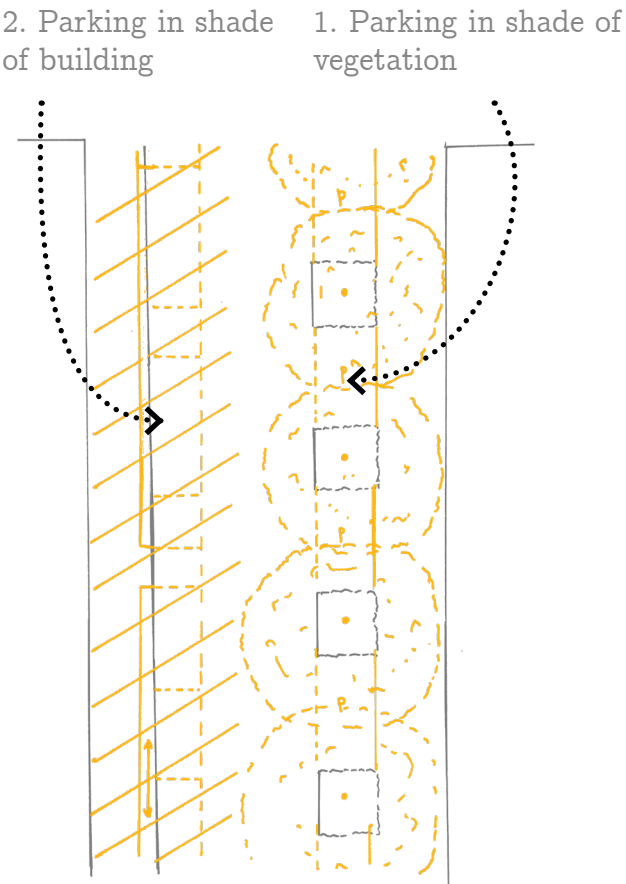


Ideal street design: active street

Priorities of alterations



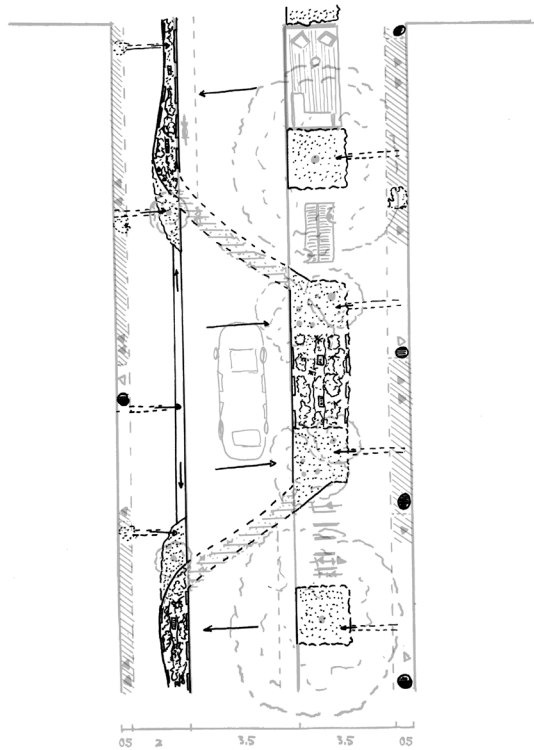
1. Increase of (soft) space



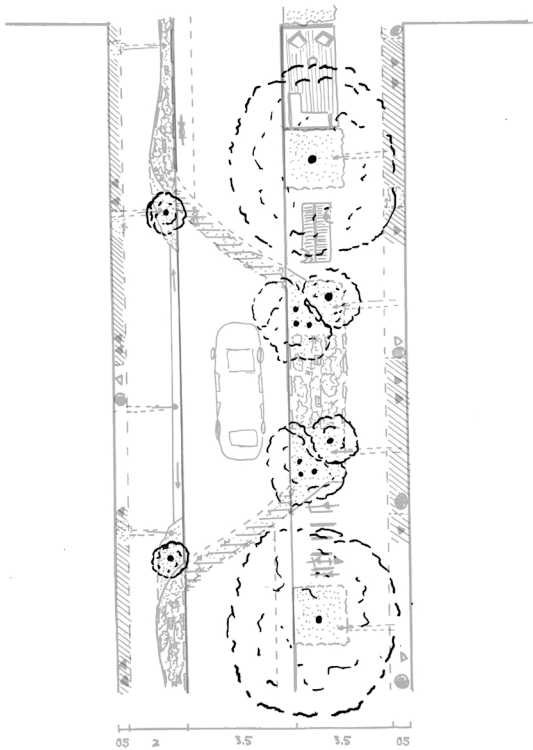
2. Parking required

Design neighbourhood structure

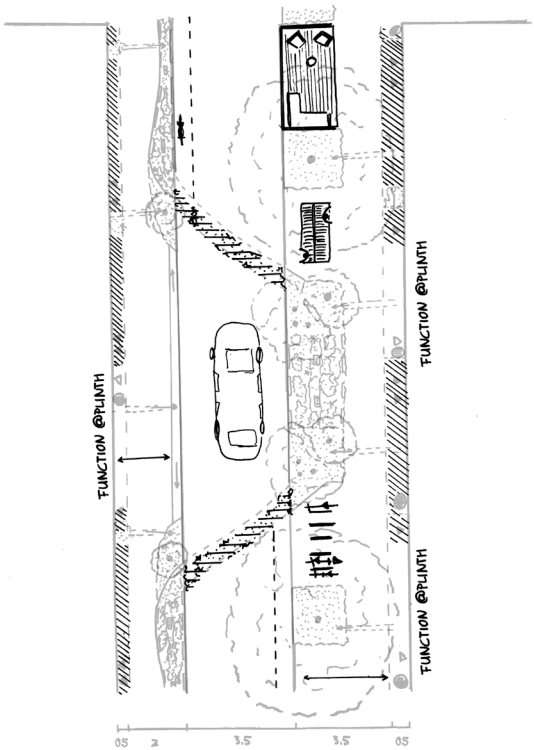
Ideal street design: higher-used street



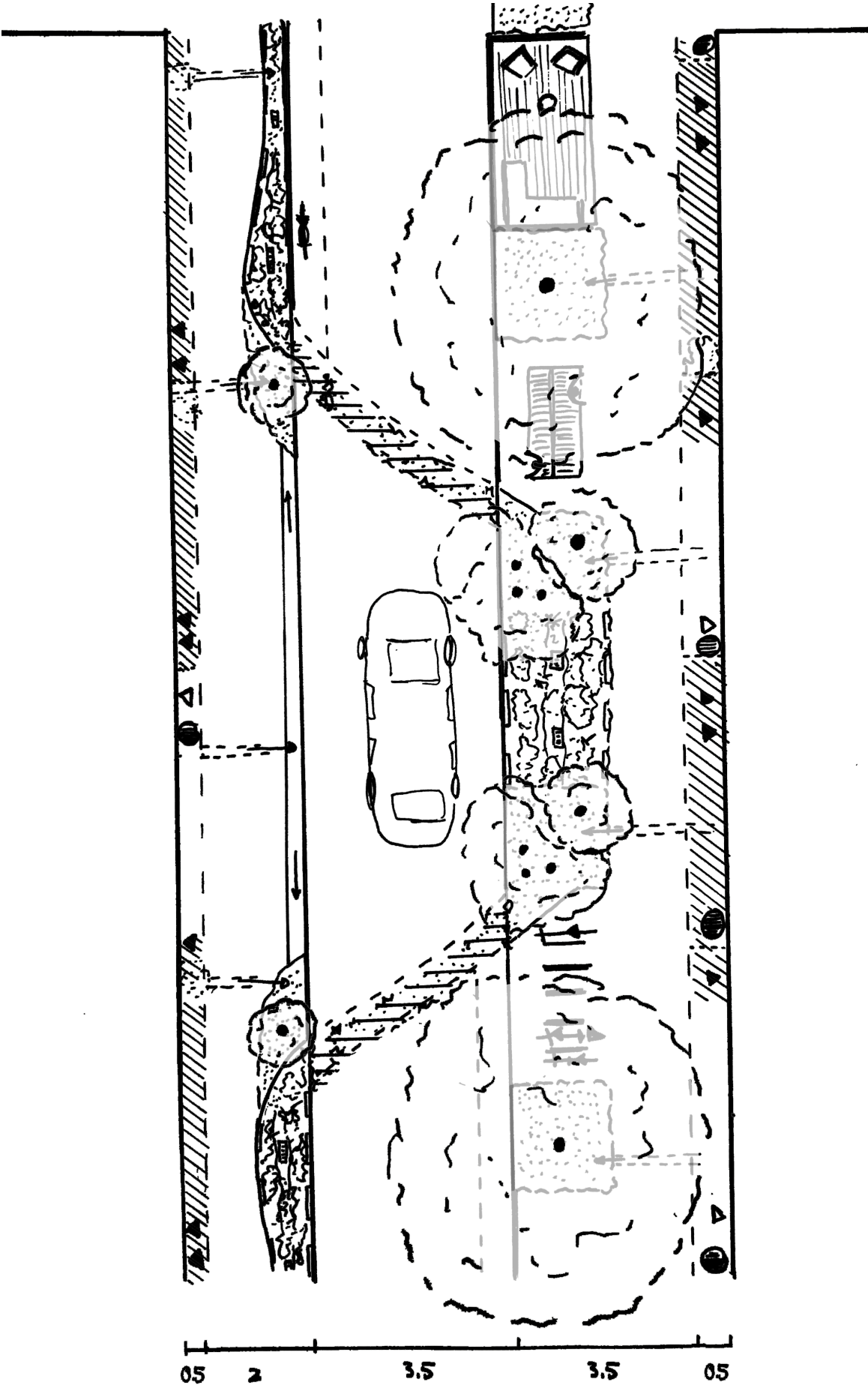
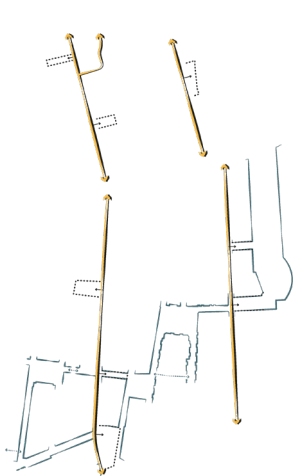
1. Water nuisance



2. Heat stress



3. Usability



Design neighbourhood structure

Ideal street design: higher-used street

Optional: rain barrel or rain water garden

Run off direction

High % permeable surface

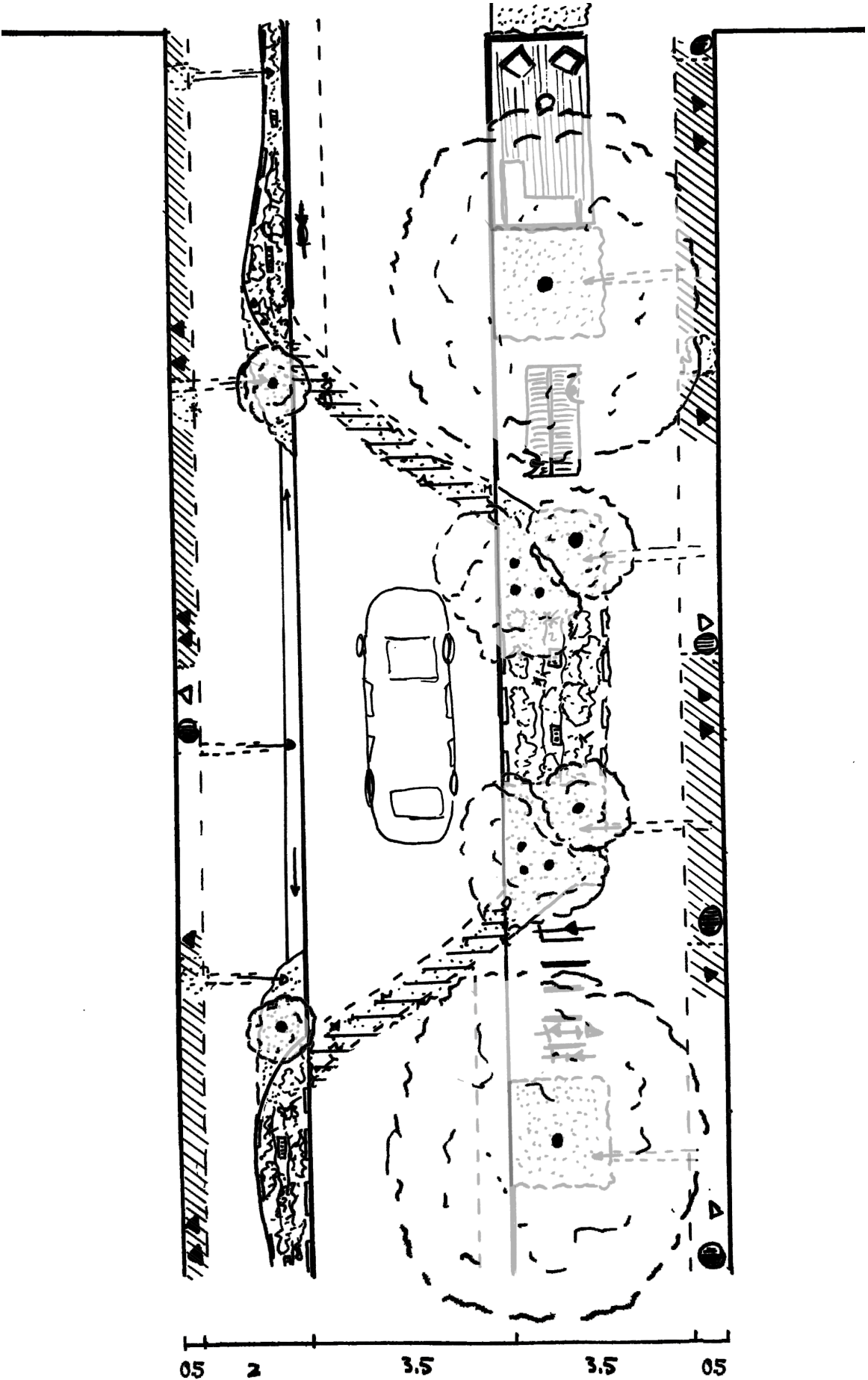
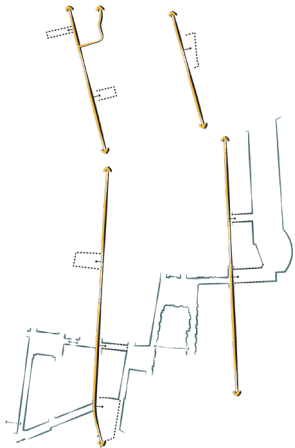
Curbside rain garden filtering runoff, with overflow mechanism

Open rain water gutter

1. Water nuisance

2. Heat stress

3. Usability



Design neighbourhood structure

Ideal street design: higher-used street

Optional: rain barrel or rain water garden

Run off direction

Combination of fast & slow growing trees

Wet conditions in rain garden:
e.g. Salix (willow)

High % permeable surface

Vegetation for indicating change

Curbside rain garden filtering runoff, with overflow mechanism

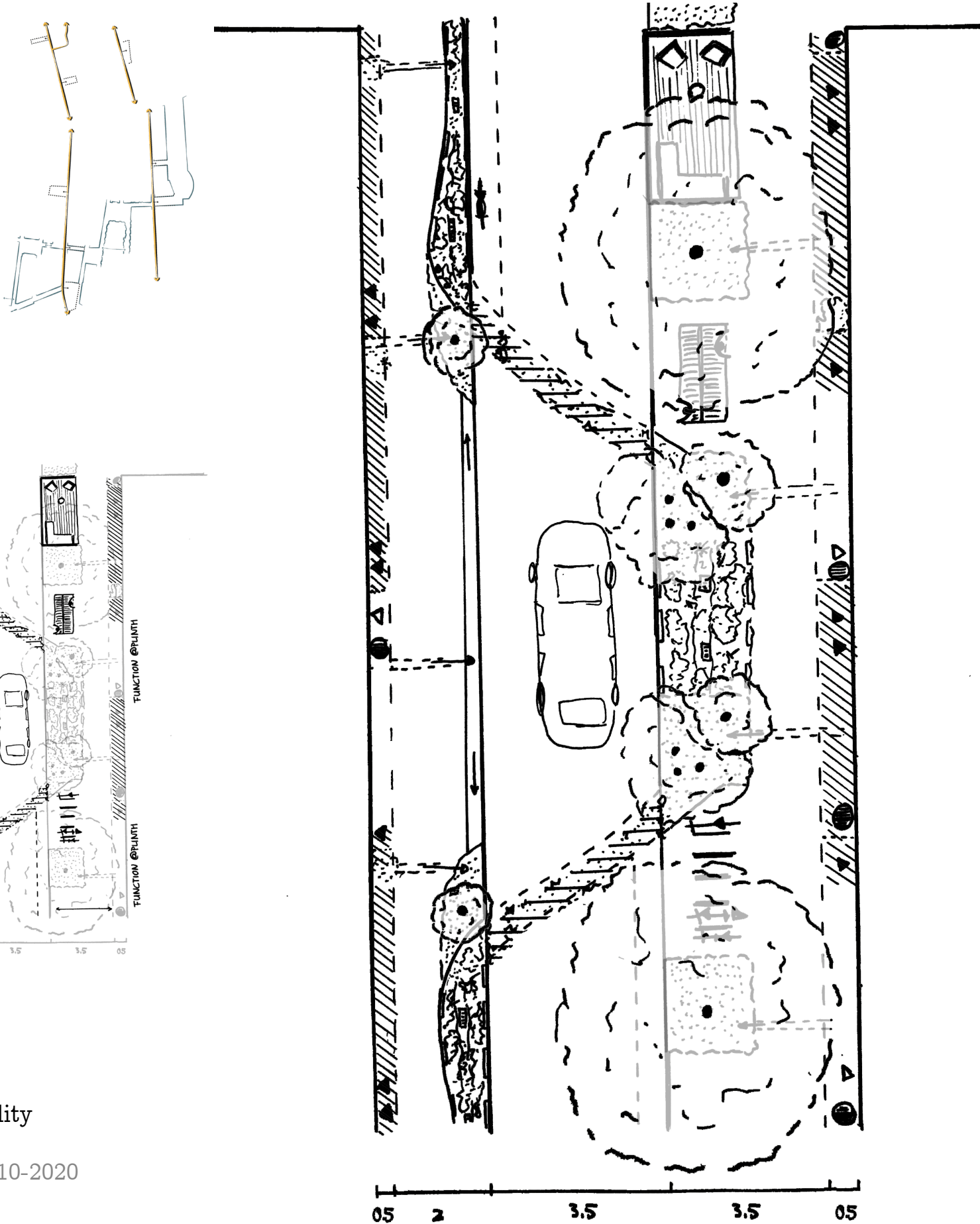
Open rain water gutter

1. Water nuisance

2. Heat stress

Variety in tree shapes and species:
- Trees with high crown along west-facing facade for shade on residential storeys
- Trees with wide crown, for shade on usable surface

3. Usability



Design neighbourhood structure

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- Trees with wide crown, for shade on usable surface

Visually connecting alternating rain gardens with vegetated tiles

Alternating designated bicycle path

Spacious transition zone

3. Usability

- Parklet
- Seating choice
- Additional permeable surface
- Bike parking
- Sidewalk XL, loading & unloading



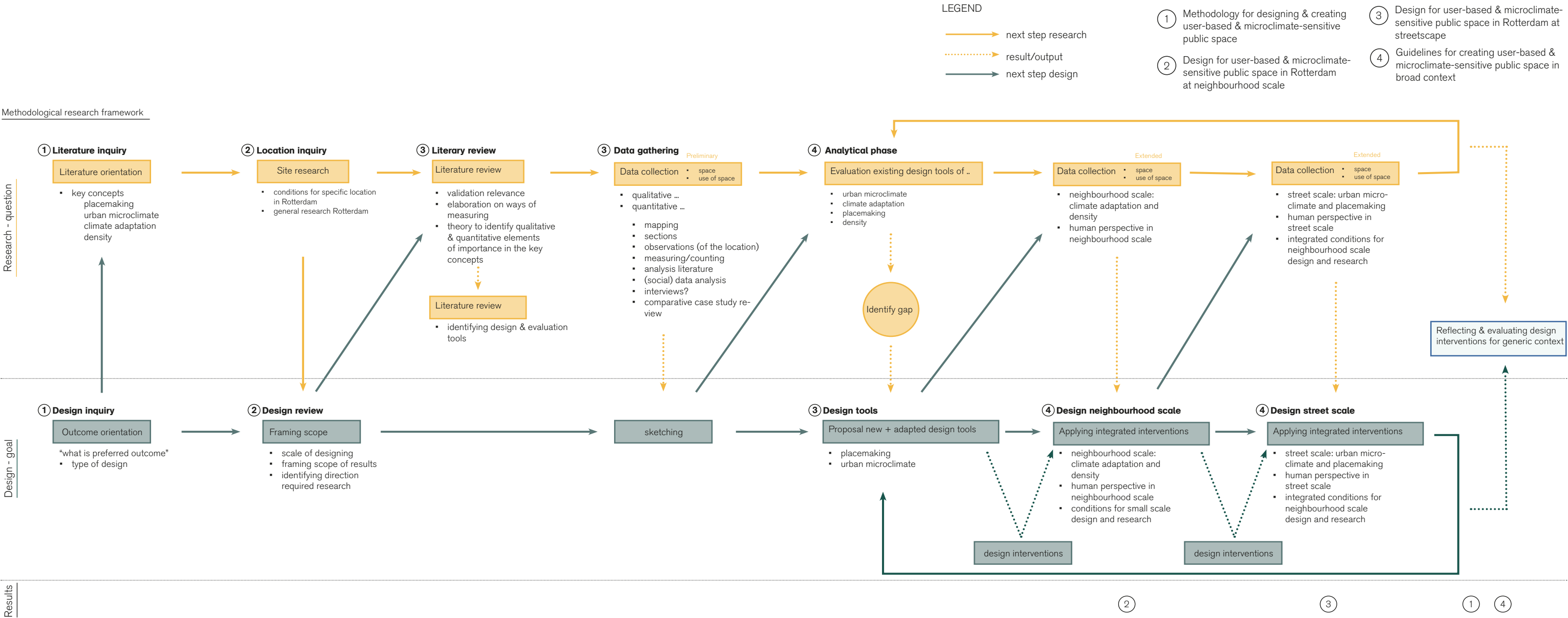
Facilitate access to cool spots

Guidelines for creating heat stress resilient cities
Source: Hogeschool van Amsterdam & Kuiper compagnons, 2020

- 1. Commercial playground
- 2. Public playground, connected to primary school
- 3. Wijkpark (public) + Wijk tuin (community initiative)
- 4. Matternesselaan, busy (city) artery

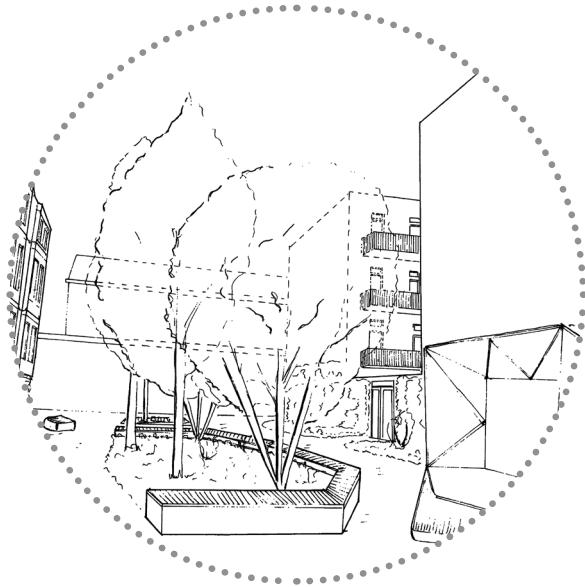


Research approach



Design locations

Coolsestraat



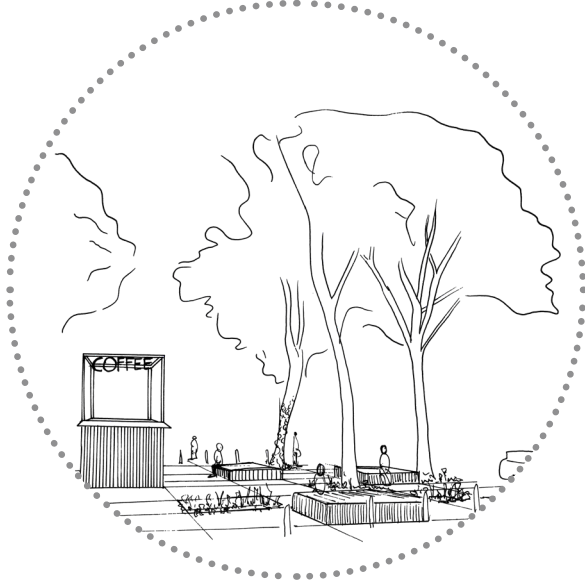
Coolsestraat
- heatstress
- water nuisance
= opportunity public function

Gouvernestraat



Gouvernestraat
- heatstress
- water nuisance
- noise

Rijnhoutplein



Rijnhoutplein
- formal setting
- grid + route

Gerritstekmanplein
- heatstress
- water nuisance
- playing
- meeting

Gerrit Sterkmanplein

