

# CONNECTING places people

**A network of public spaces as a backbone for social cohesion in South Rotterdam**

**Charalampos Spanos**

TU Delft

26 June 2023

**Mentors**

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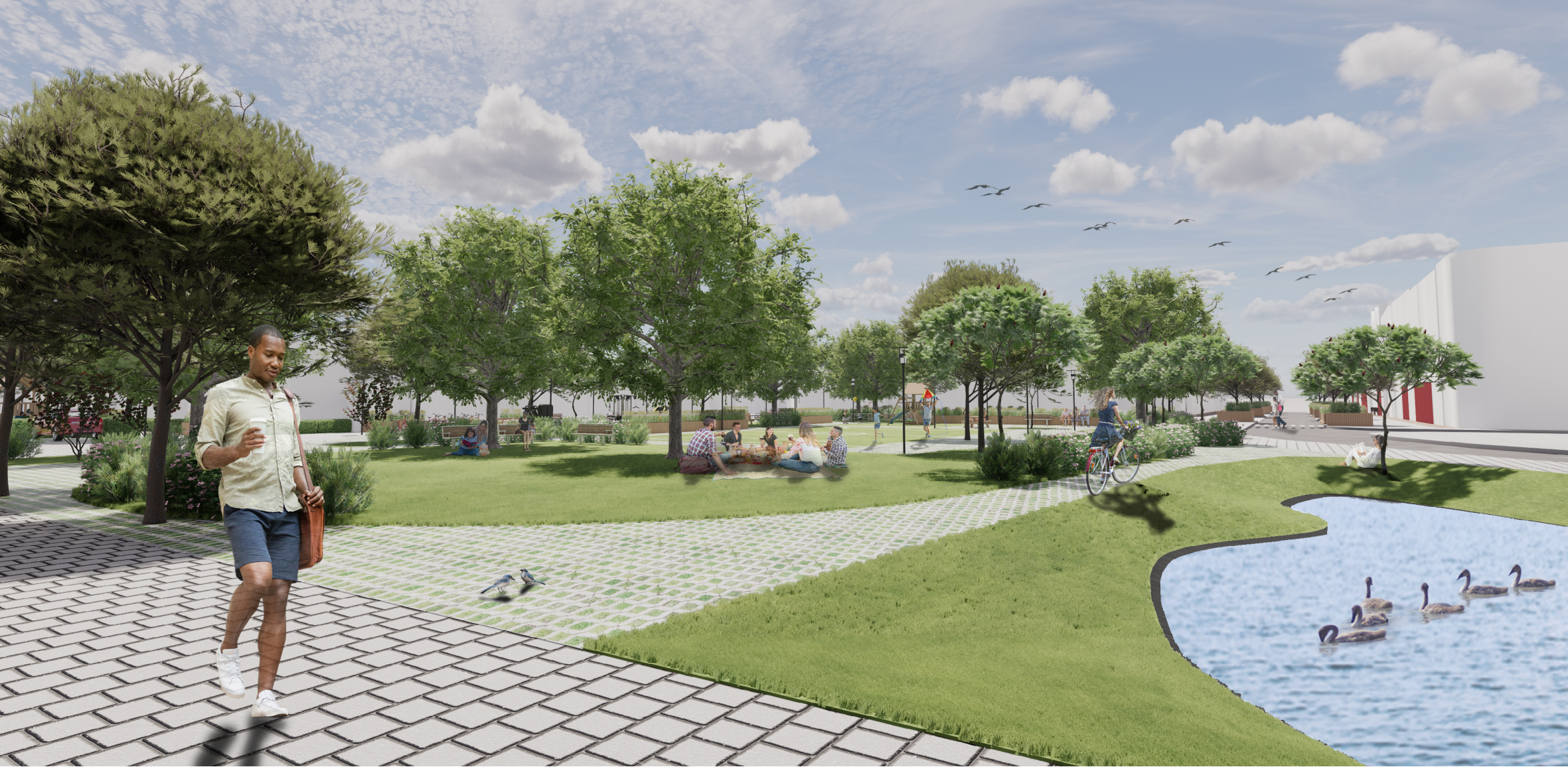
Vasileios Miliats

**Research Studio**

City of the Future



What do you think of this park?



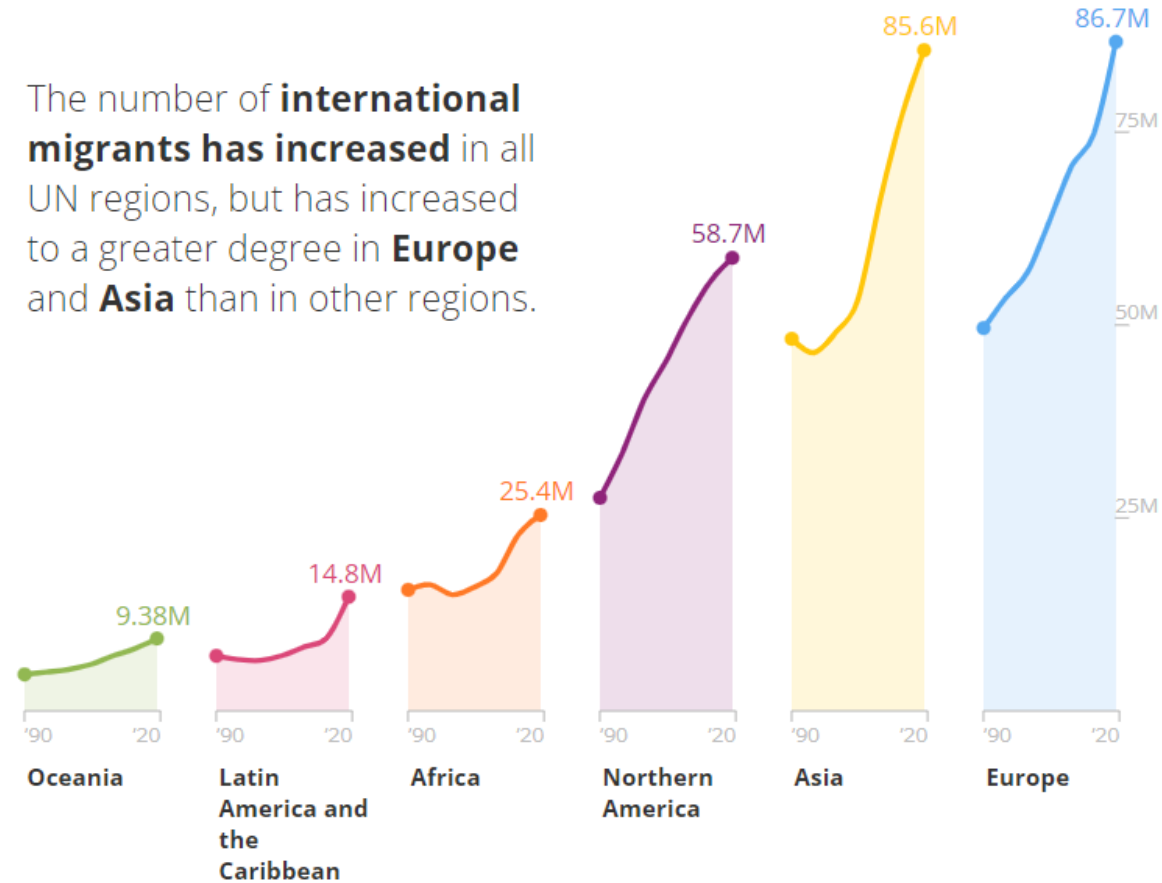


## Would you take a trip through this street?



Source: Google Maps

The number of **international migrants has increased** in all UN regions, but has increased to a greater degree in **Europe** and **Asia** than in other regions.



UN DESA 2021.

**Figure 1:** Increase of migrant population (McAuliffe & Triandafyllidou, 2021)



Migrants in The Netherlands

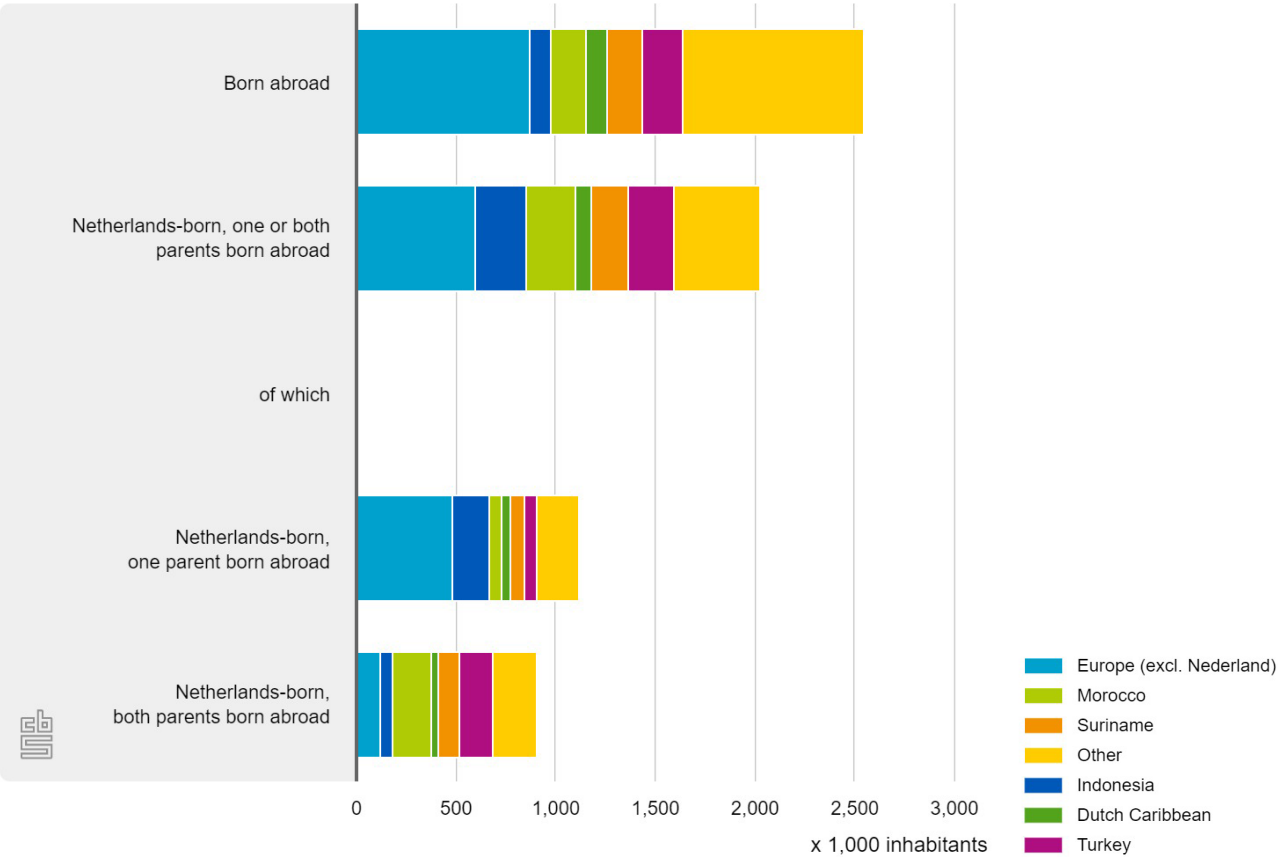
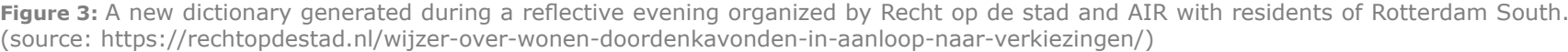


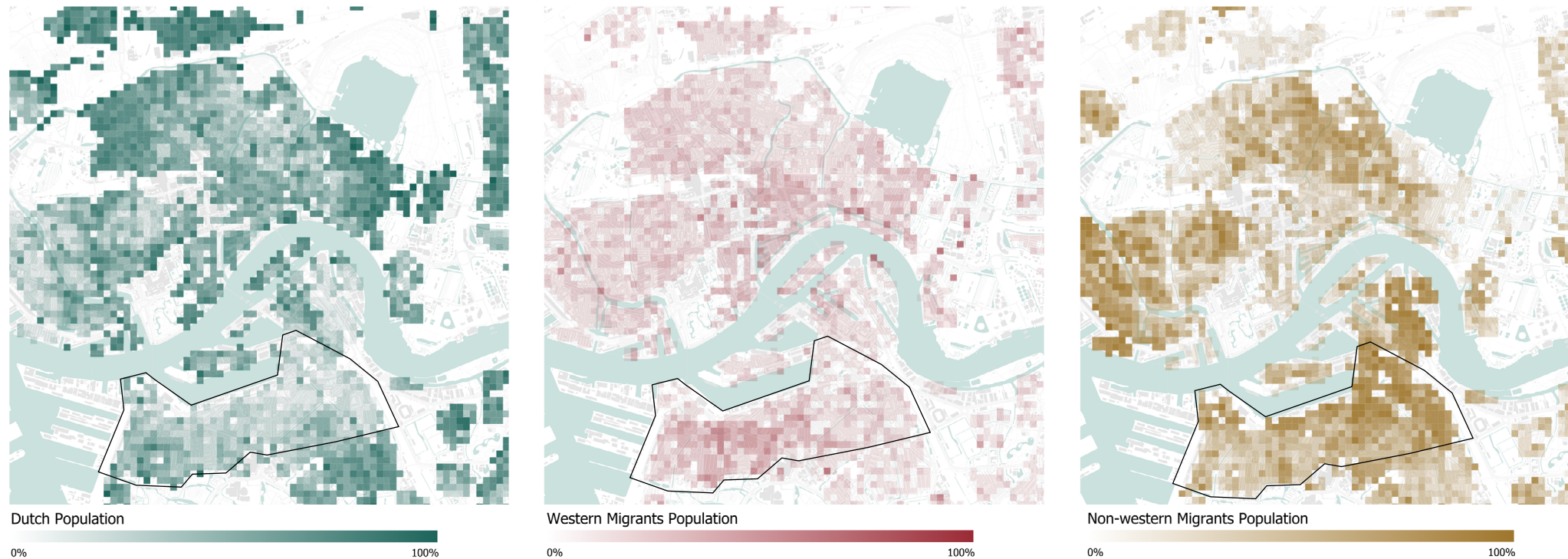
Figure 2: Demographics of non-Dutch population in the Netherlands (CBS,2021)

## Segregation



## PROBLEM FIELD

### Ethnic Residential Segregation



**Figure 4:** Distribution of Ethnicities in South Rotterdam (data source: CBS, OSM)



Demographic of South Rotterdam

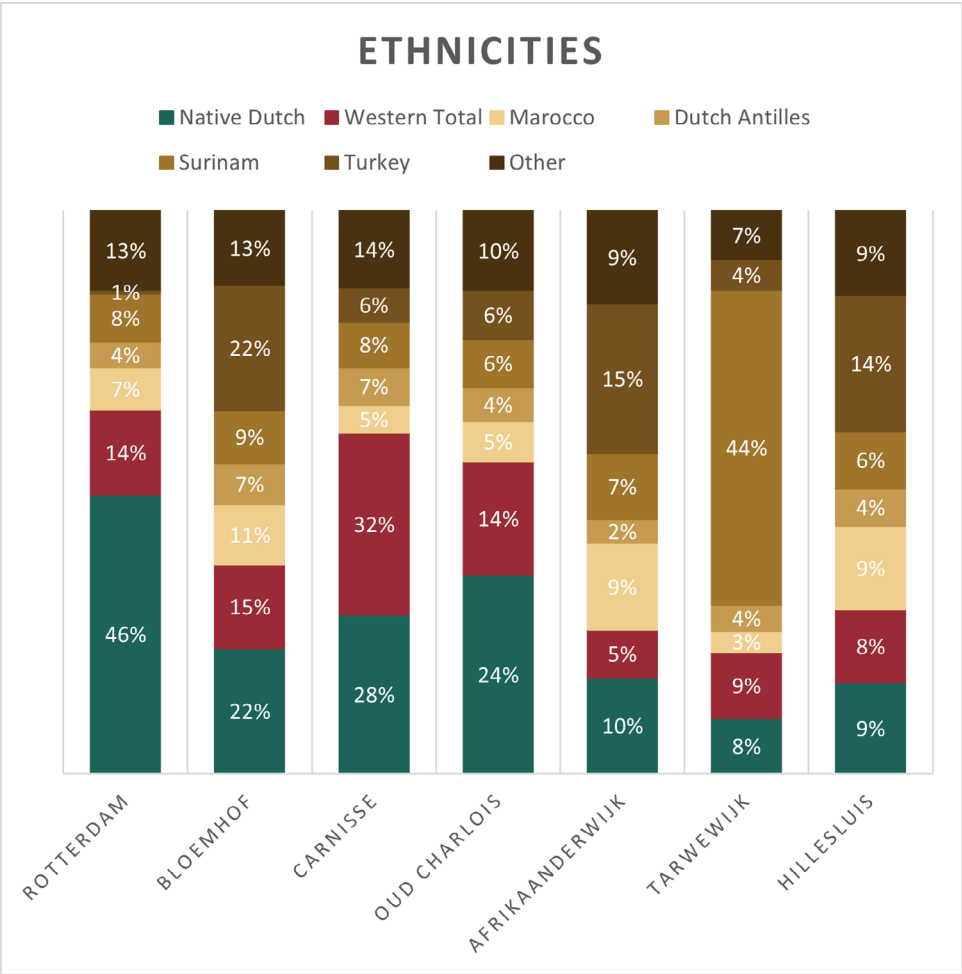
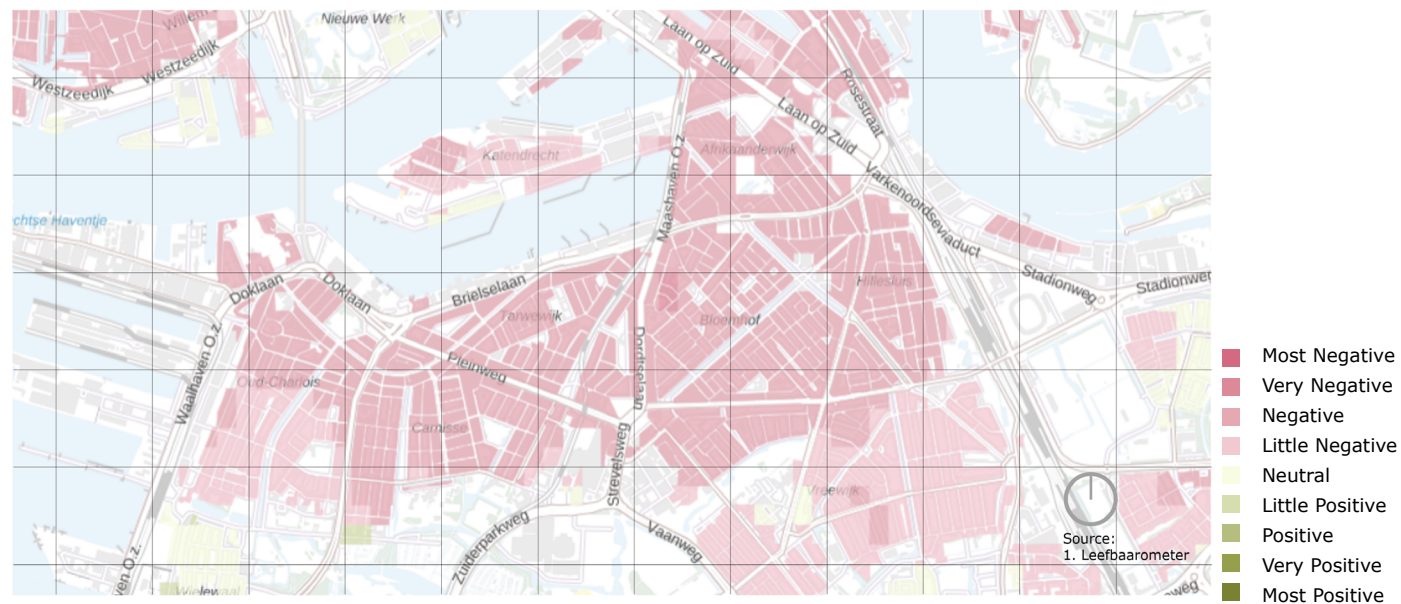


Figure 5: Statistical data on ethnic backgrounds compared to Rotterdam (data source: allcharts.info)

## PROBLEM FIELD

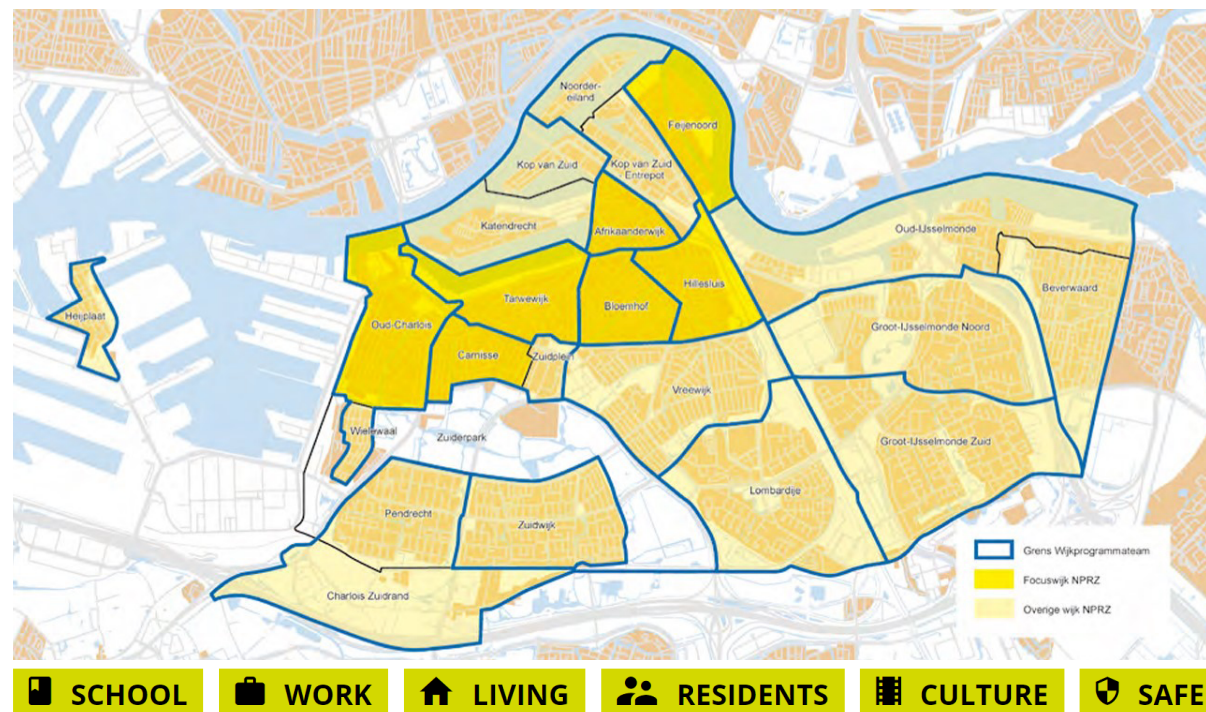
### Social Cohesion in South Rotterdam



**Figure 6:** Map of social cohesion in Rotterdam South (data source: Leefbaarometer)

## PROBLEM FIELD

## Nationaal Programma Rotterdam Zuid



**Figure 7:** NPRZ map with the six focus neighborhoods of Rotterdam South and the action pillars (NPRZ,n.d.)



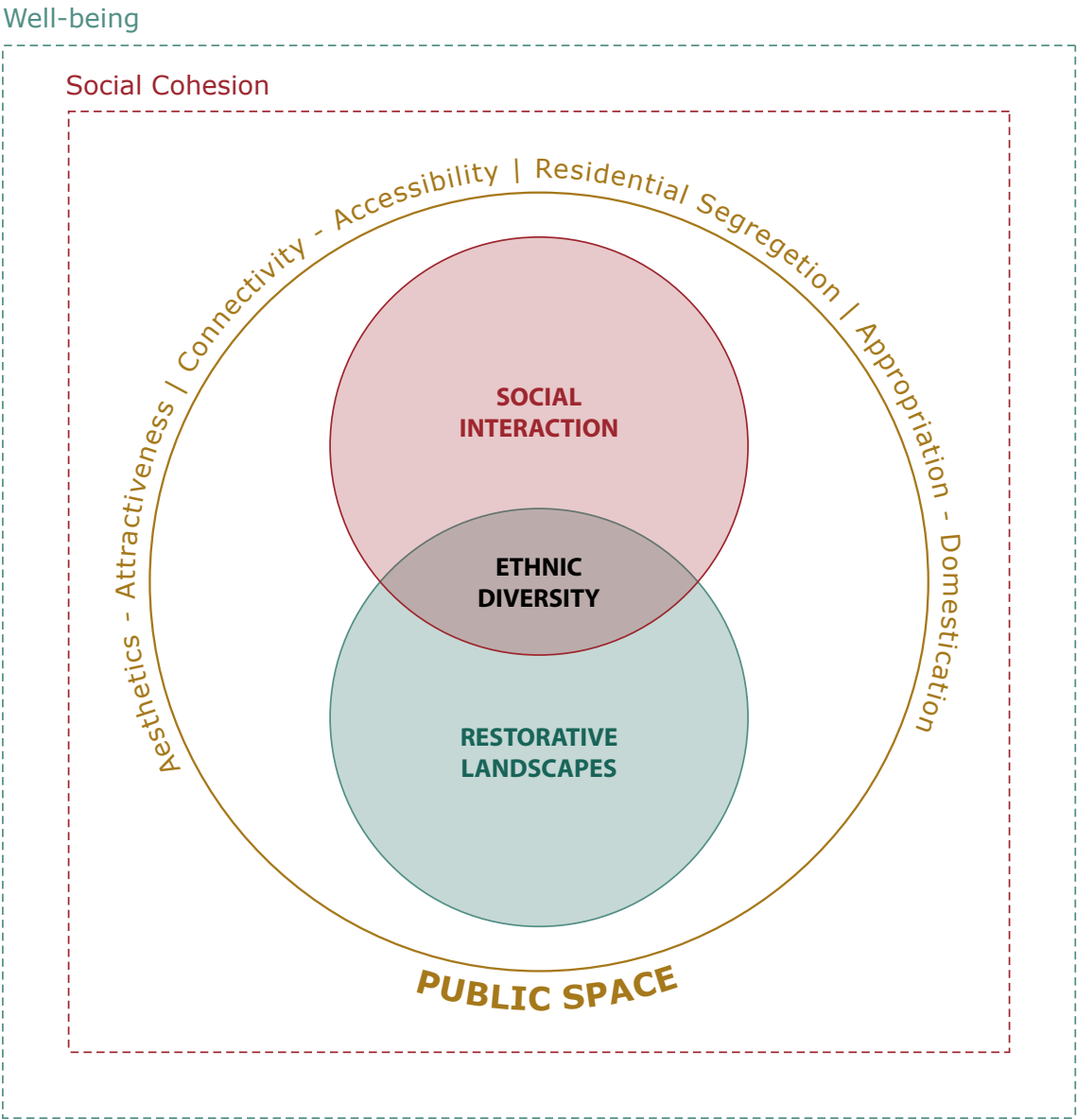
## PROBLEM FIELD

### Well-being

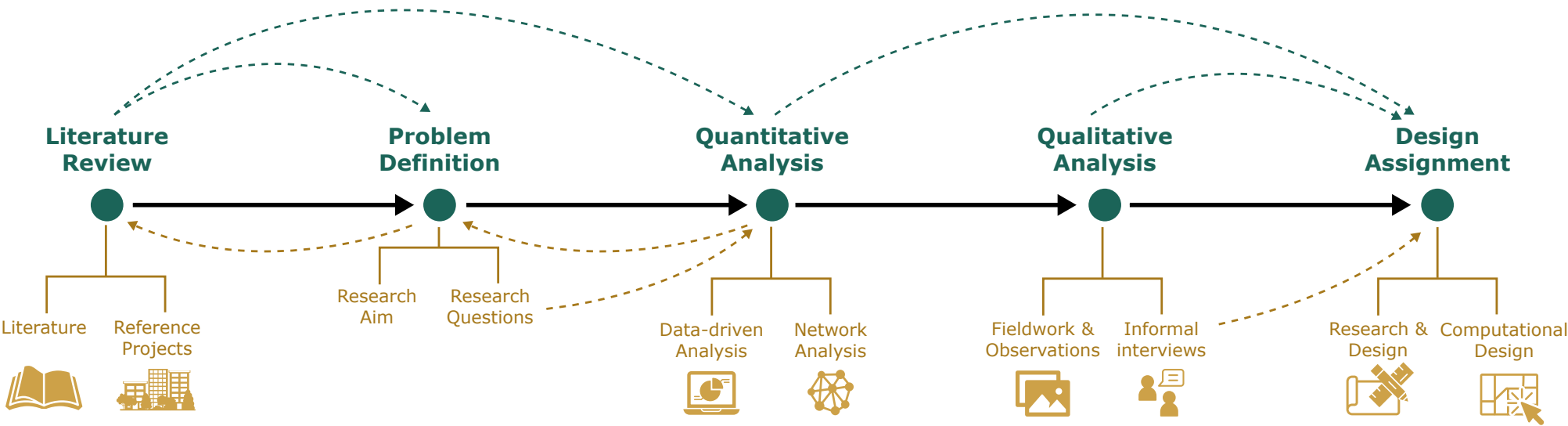


**Figure 8:** Indicators of well-being by CBS, created by the author

**“ Rotterdam South is facing a transformation of both the physical environment and the social structure of neighborhoods. Public space can be a catalyst of connectedness between residents and the formation of a supportive social network. ”**







How to design a network of **public spaces**  
to foster **inter-ethnic social interaction**  
in South Rotterdam?

## RESEARCH QUESTION

### Sub-questions

#### Urban Design:

- RQ1 What is the relation between the **urban environment** and **neighborhood experience**?
- RQ2 What design principles contribute to encouraging **participation in public life**?

#### Landscape Architecture:

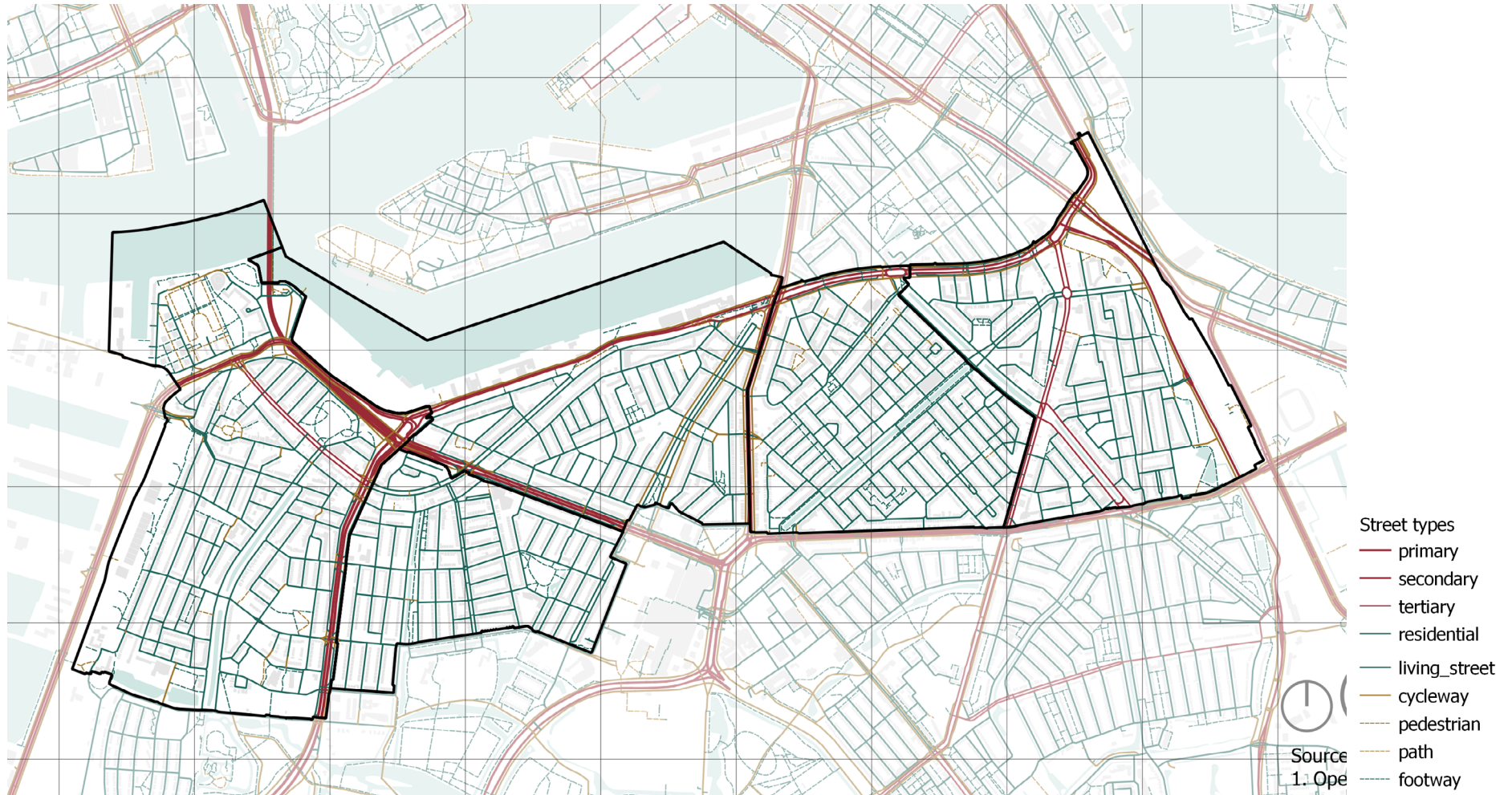
- RQ3 How to implement **nature-inclusive designs** to promote **well-being**?
- RQ4 How **restorative environments** can contribute to increasing **social interaction**?

How to design a network of **public spaces** to foster **inter-ethnic social interaction** in South Rotterdam?

#### Urban Analytics:

- RQ5 How to improve **accessibility to public spaces** to enhance **ethnic diversity**?
- RQ6 How to identify places that **foster interaction** in the urban fabric?

[illegible]



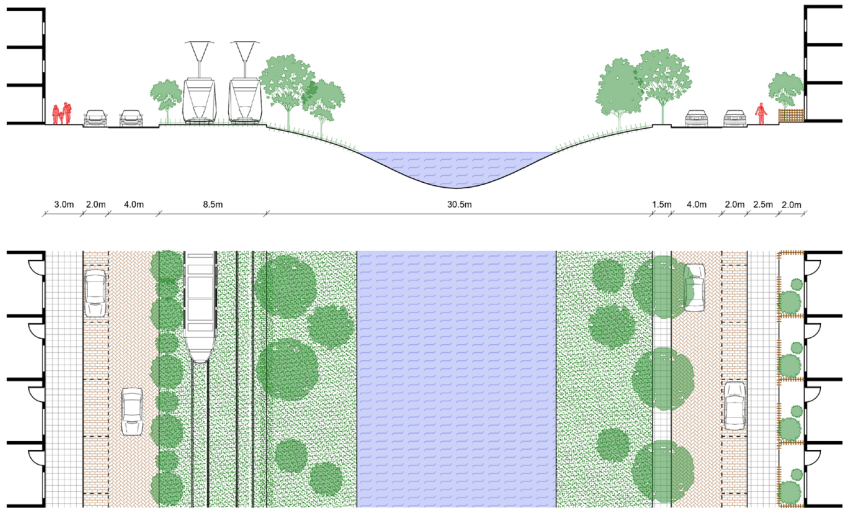
**Figure 9:** Map of street types in Rotterdam South (data source: OSM)



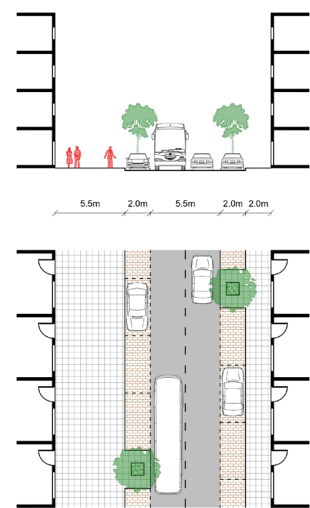
# CONNECTIVITY - ACCESSIBILITY

## Street Network

Singel



Tertiary Streets

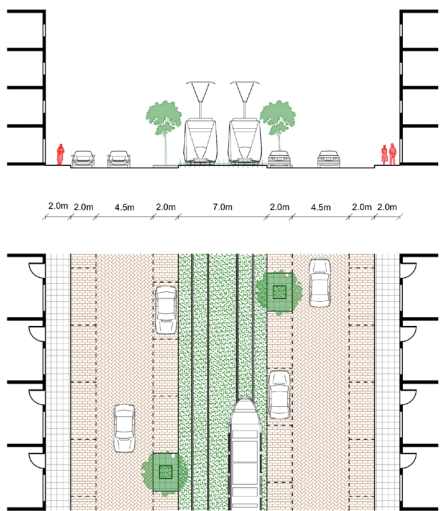


- Car dominance in public space (traffic and parking lots)

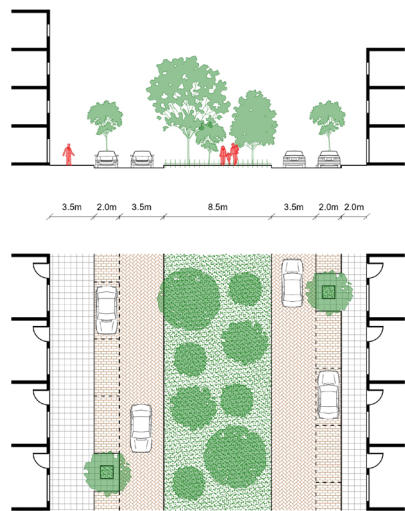
- Greenery is restricted on street trees

- Minimum available sidewalks

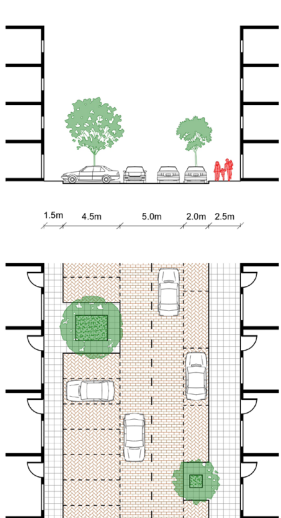
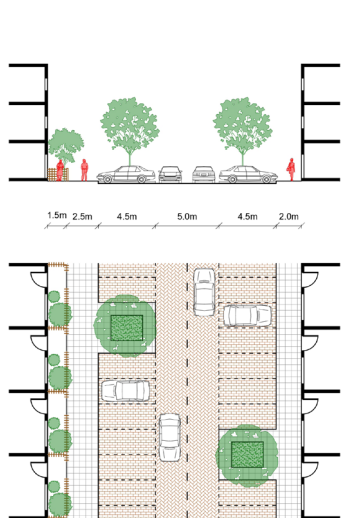
Primary Streets



Secondary Streets



Residential Streets



Public Transport



Figure 10: Map of transport network in Rotterdam South (data source: OSM)



**Figure 11:** Photos of Maashaven subway station, by Google Maps

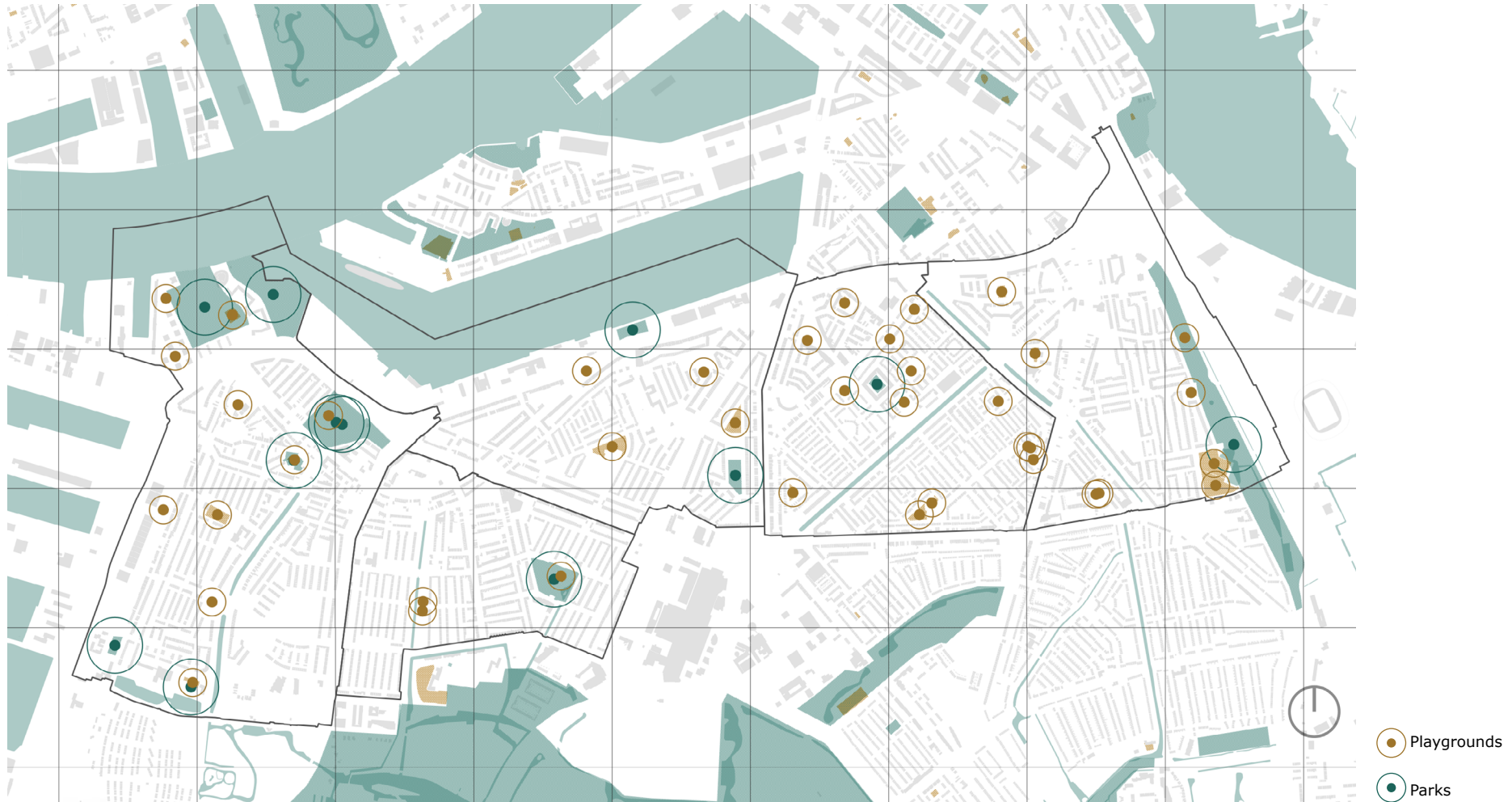


**Figure 12:** Photos of elevated subway infrastructure, by Google Maps



## RESTORATIVE ENVIRONMENTS

### Parks and playgrounds



**Figure 13:** Map of parks and playgrounds in Rotterdam South (data source: OSM)

# RESTORATIVE ENVIRONMENTS

## Parks and playgrounds



1. Amelandseplein park | Carnisse



2. Playground at Texelsestraat | Carnisse

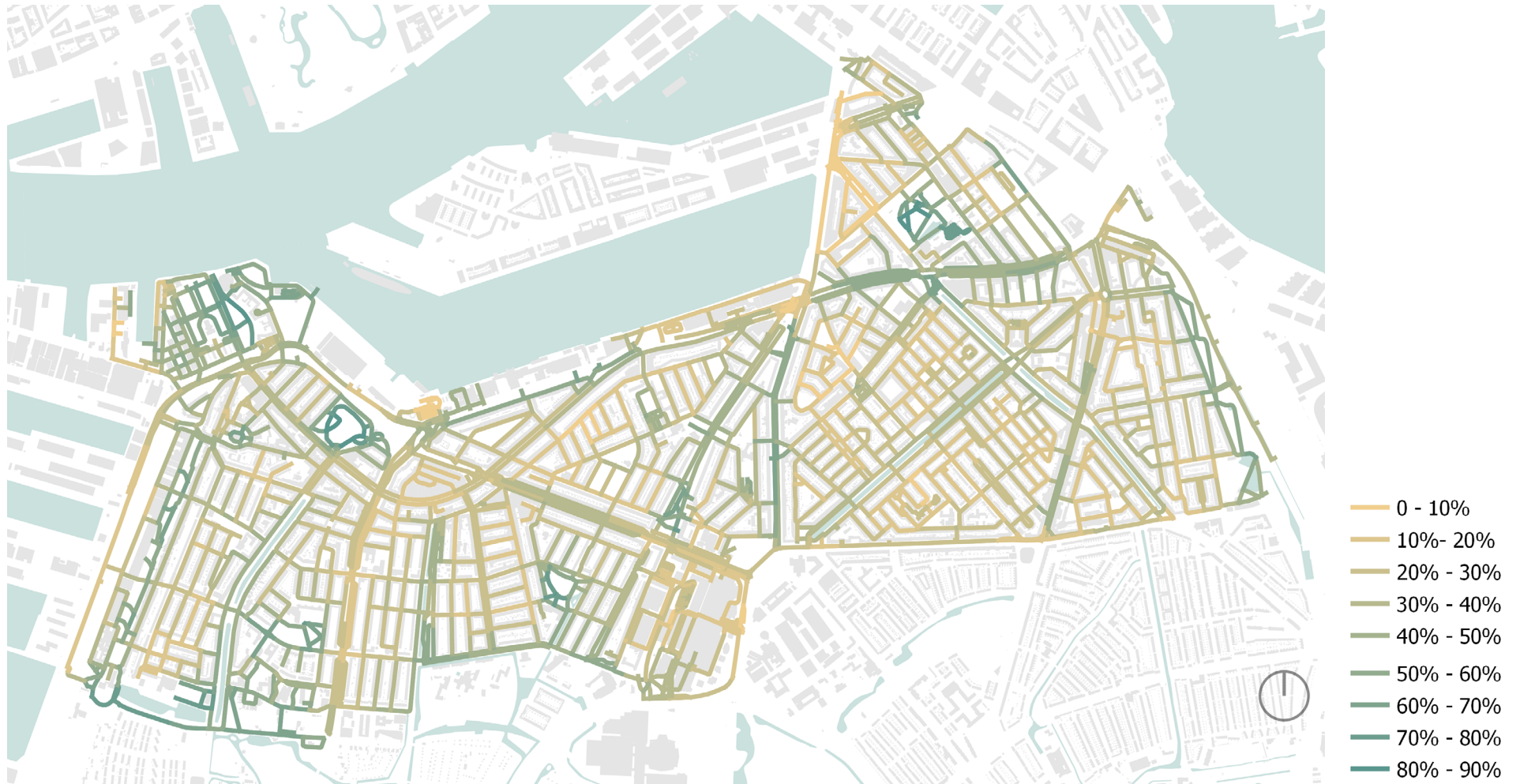


3. Nachtegaalplein park | Oud Charlois



## RESTORATIVE ENVIRONMENTS

### Street greenery



**Figure 14:** Map of street greenery in Rotterdam South (data source: Human-Kind)

# RESTORATIVE ENVIRONMENTS

## Street greenery



1. High street greenery | Dordtselaan



2. Medium street greenery | Wolphaertsbocht

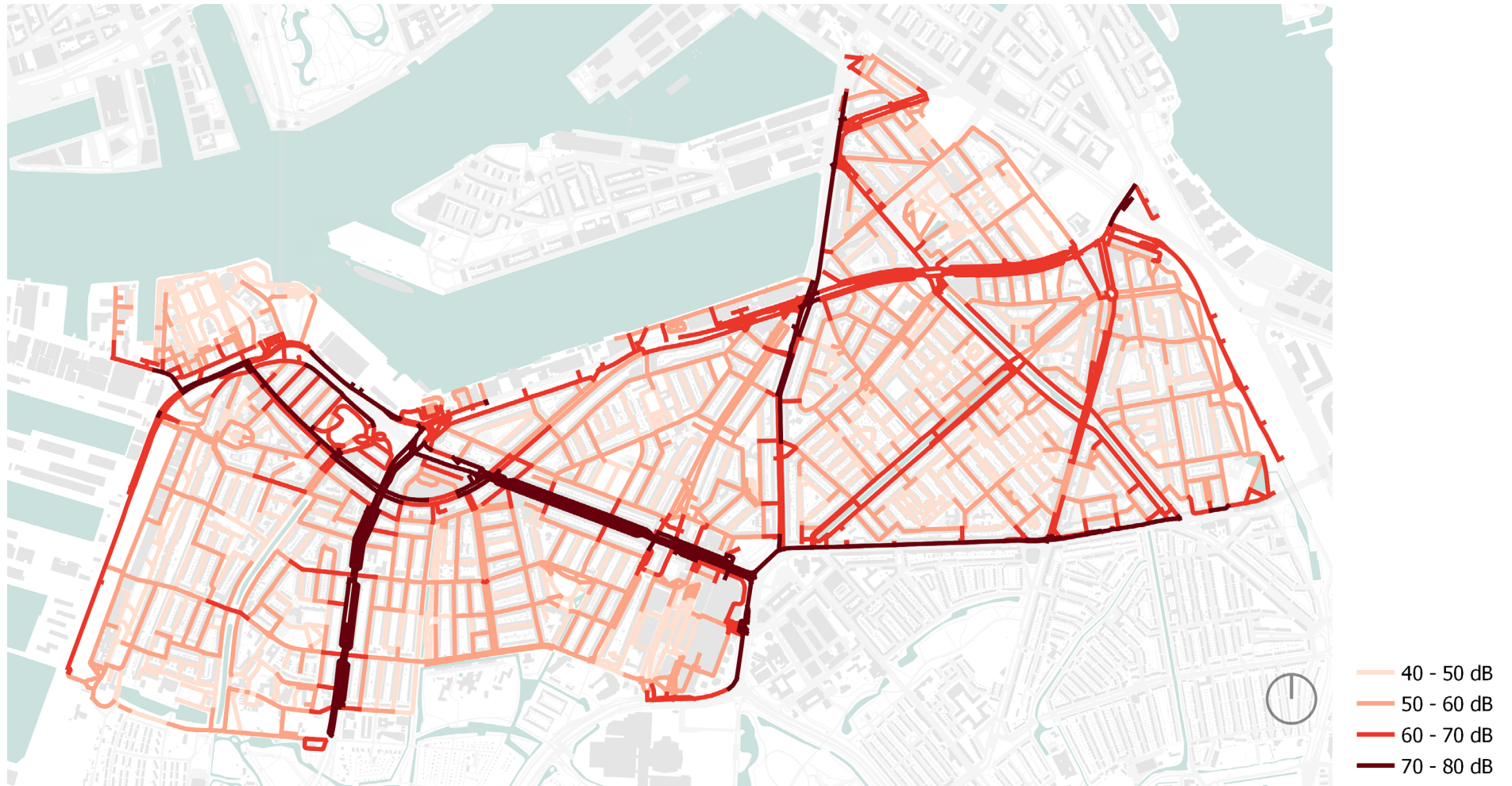


3. Low street greenery | Carnisselaan



## URBAN STRESSORS

### Sound Pollution



**Figure 15:** Map of Sound Pollution in Rotterdam South (data source: RIVM, OSM)

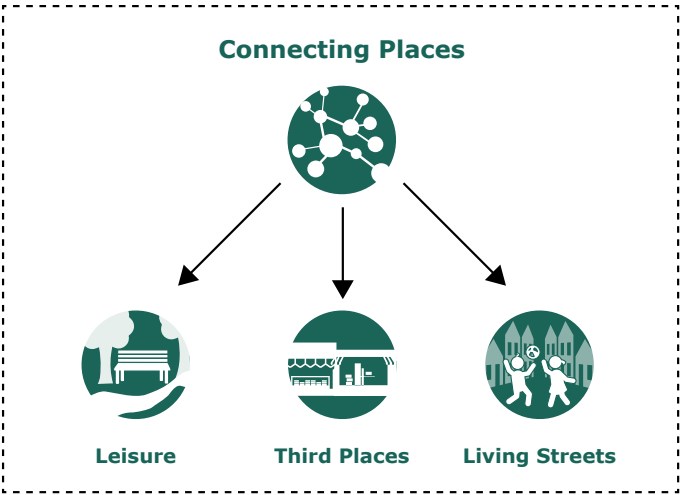
# The network of public spaces



Theoretical Concepts



Design Strategies

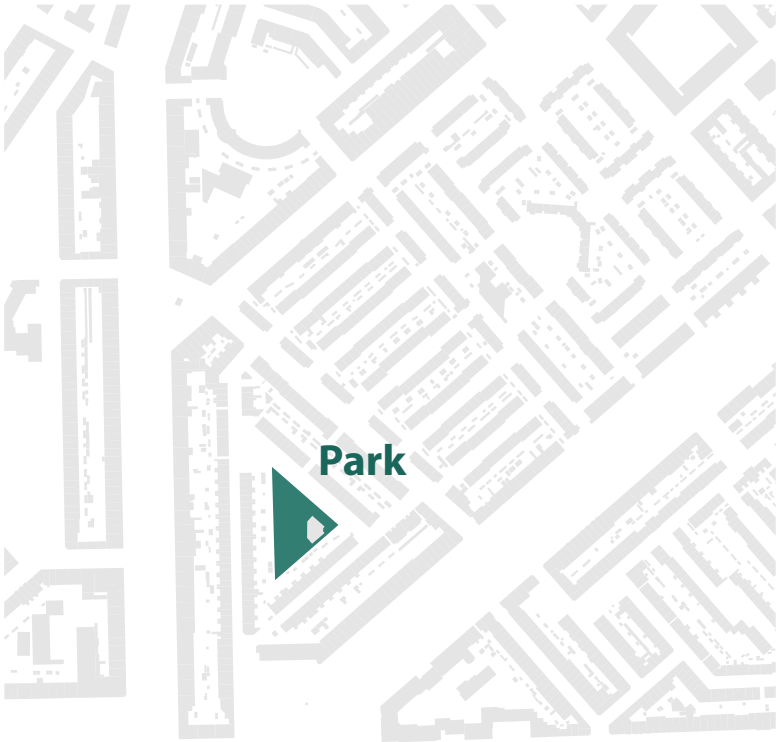


NETWORK OF  
PUBLIC SPACES

Ethnic Co-accessibility



Leisure

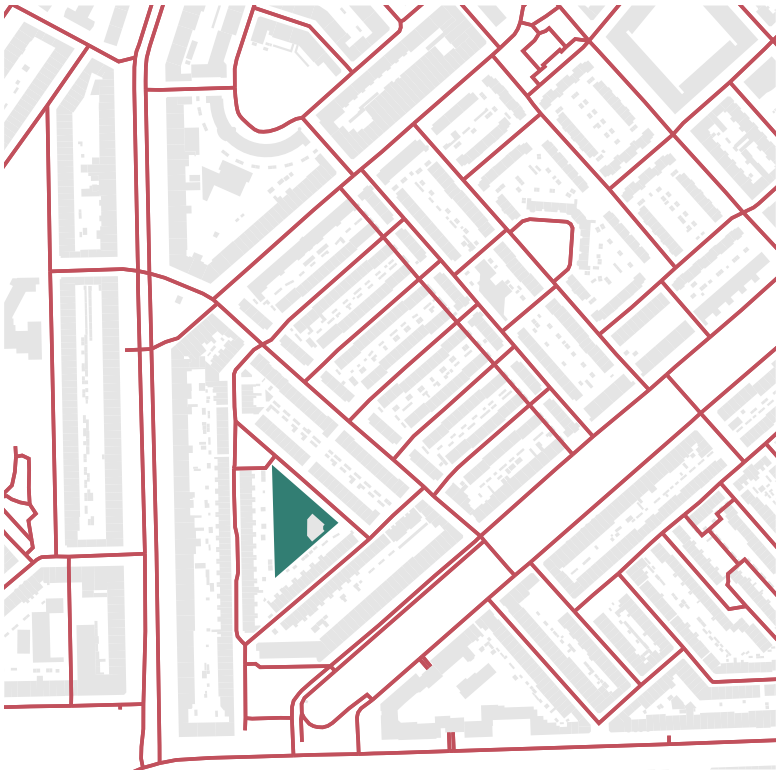


Selection of leisure  
public space

Ethnic Co-accessibility



Leisure



Walkable street network

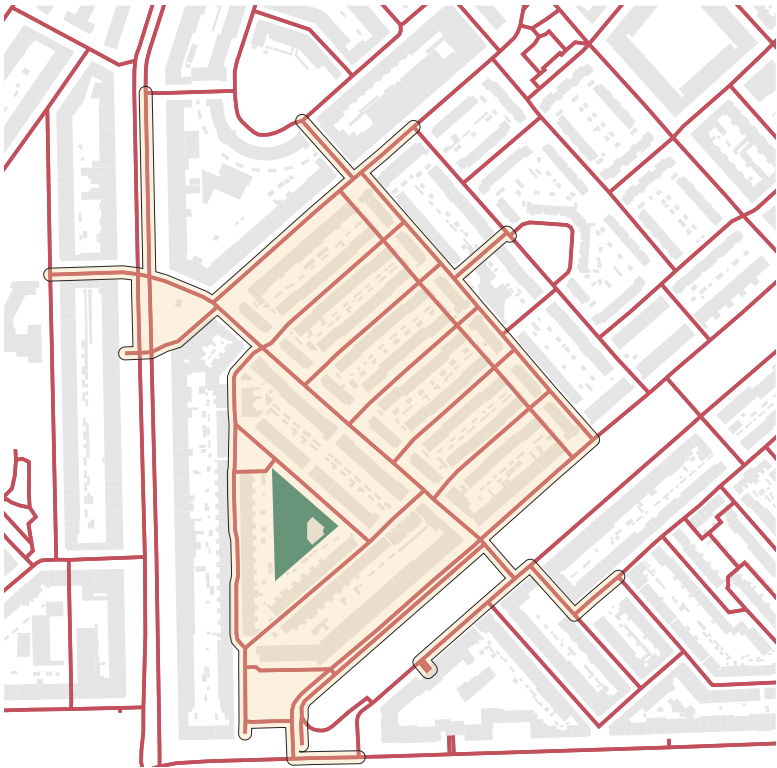


Street Pedestrian  
Network Data  
from OSM

Ethnic Co-accessibility



Leisure



Proximity in 10min walk

## Ethnic Co-accessibility



Leisure



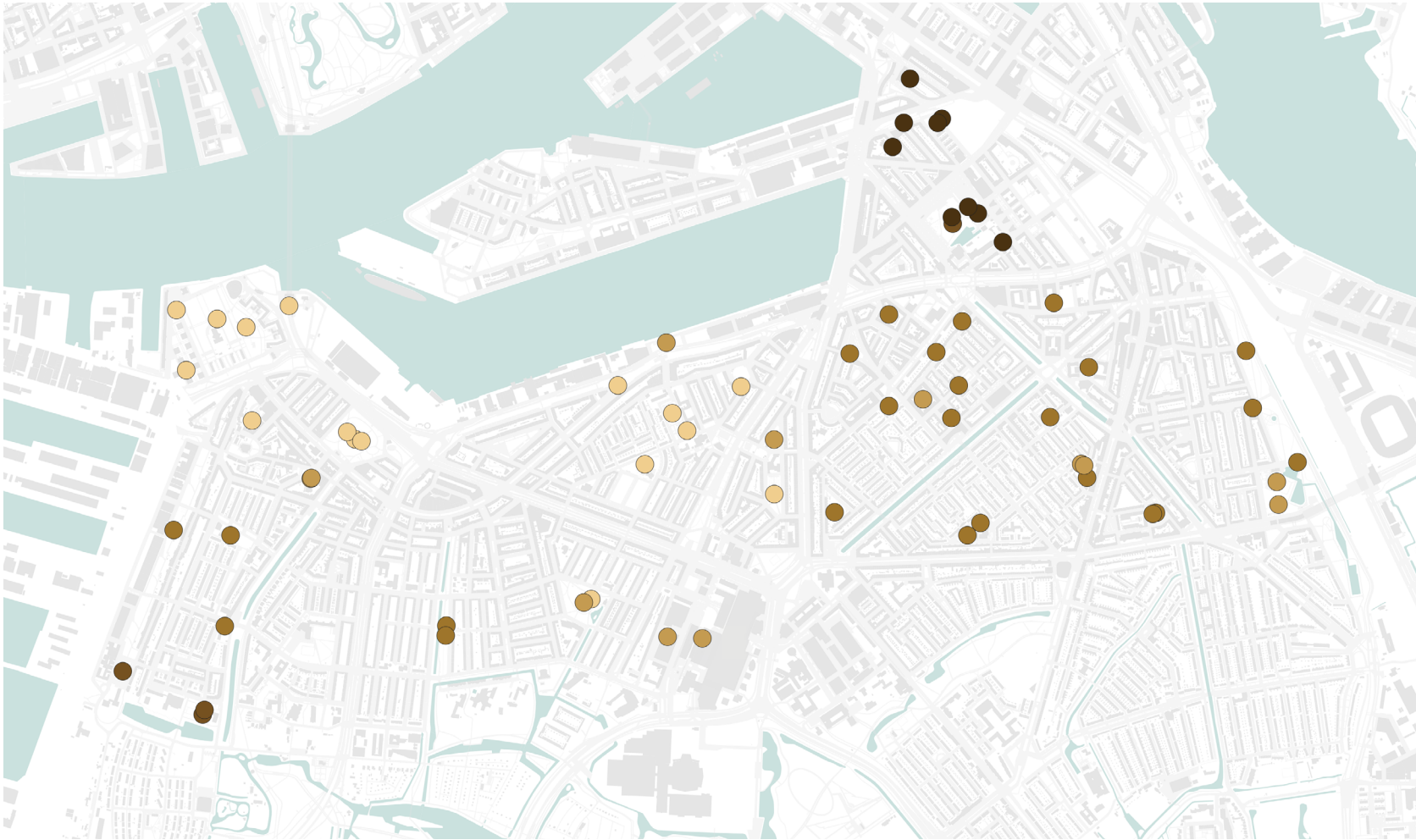
**Integrate demographic data**

Demographic  
Data from CBS  
(grid 100x100m)

Ethnic Co-accessibility



Leisure



Ethnic  
Co-accessibility

- 60 - 80 %
- 80 - 85 %
- 85 - 90 %
- 90 - 95 %
- 95 - 100 %



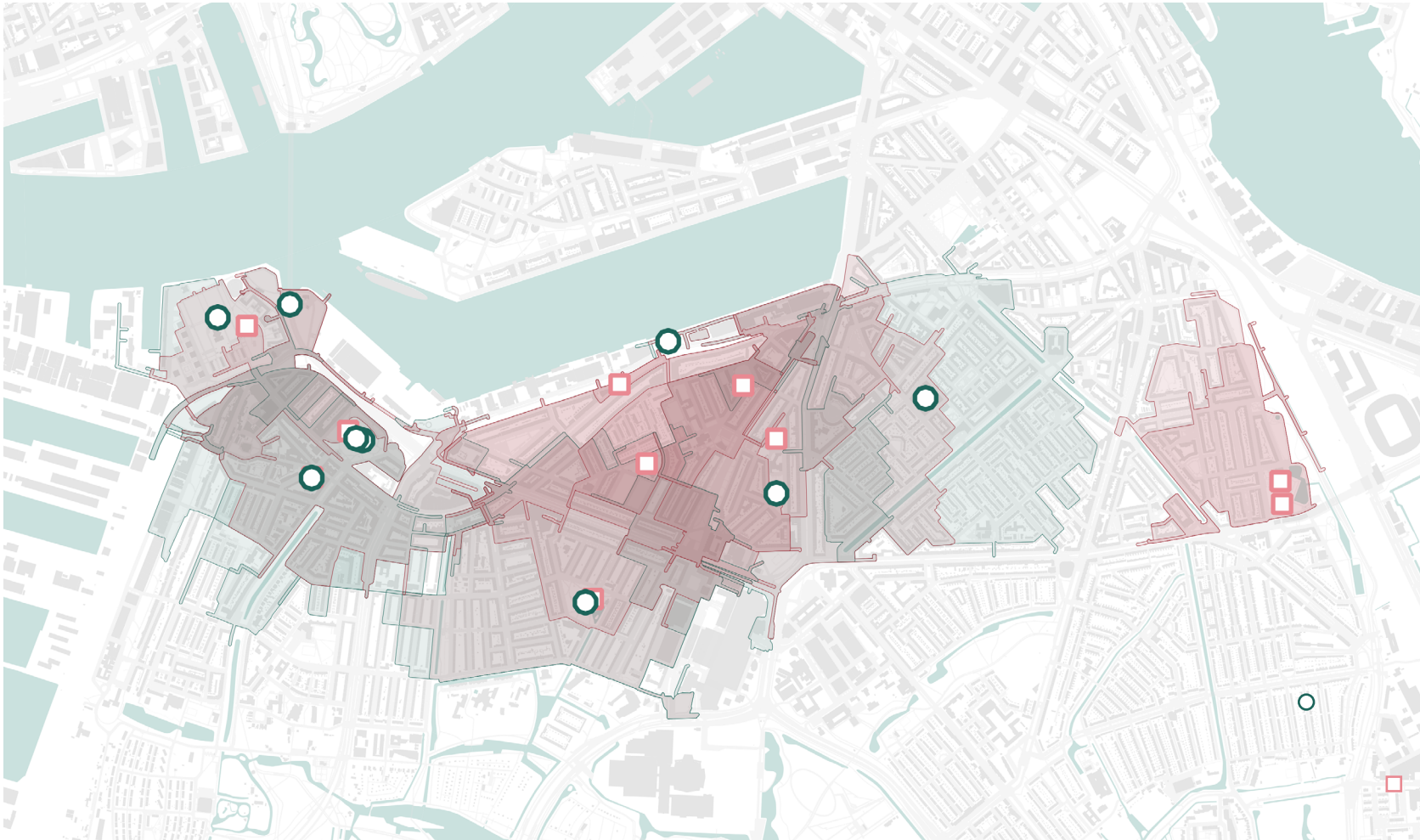
Sources:  
1. OpenStreetMap  
2. CBS



Ethnic Co-accessibility



Leisure



10min isochrones  
PARKS



10min isochrones  
PLAYGROUNDS

**Parks**

- | Co-accessibility > 90%
- | 10 Largest in the area

**Playgrounds**

- | Co-accessibility > 90%
- | 10 Largest in the area



Clustering Amenities



Third Places



**Shops & Sustenance**  
**Culture & Public Building**



Selection of amenities category

## Clustering Amenities



Third Places



### Shops & Sustenance

| Min. Distance = 100m

| Min. Number = 10

### Culture & Public Buildings

| Min. Distance = 200m

| Min. Number = 3



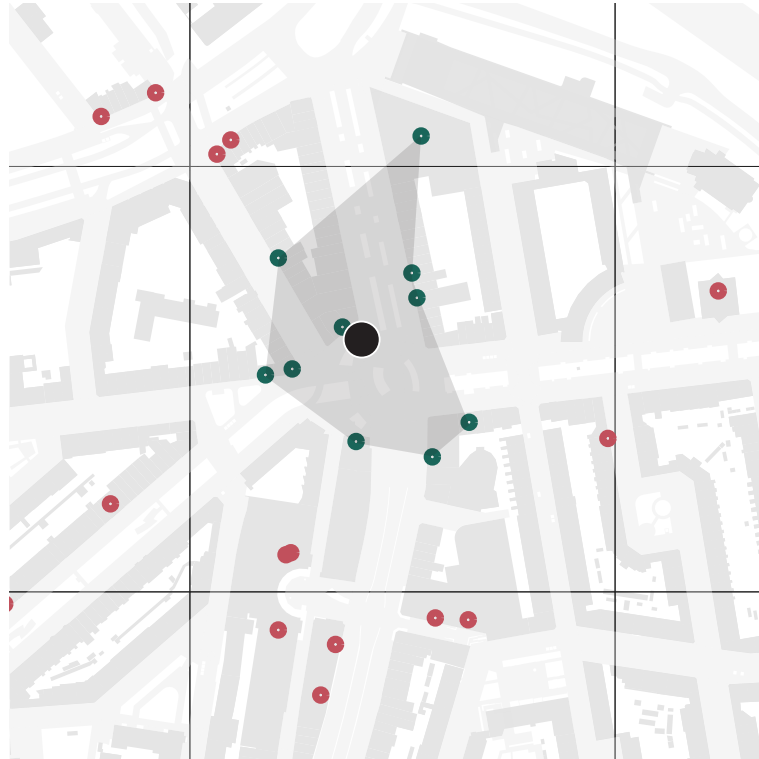
Define clustering criteria



## Clustering Amenities



Third Places

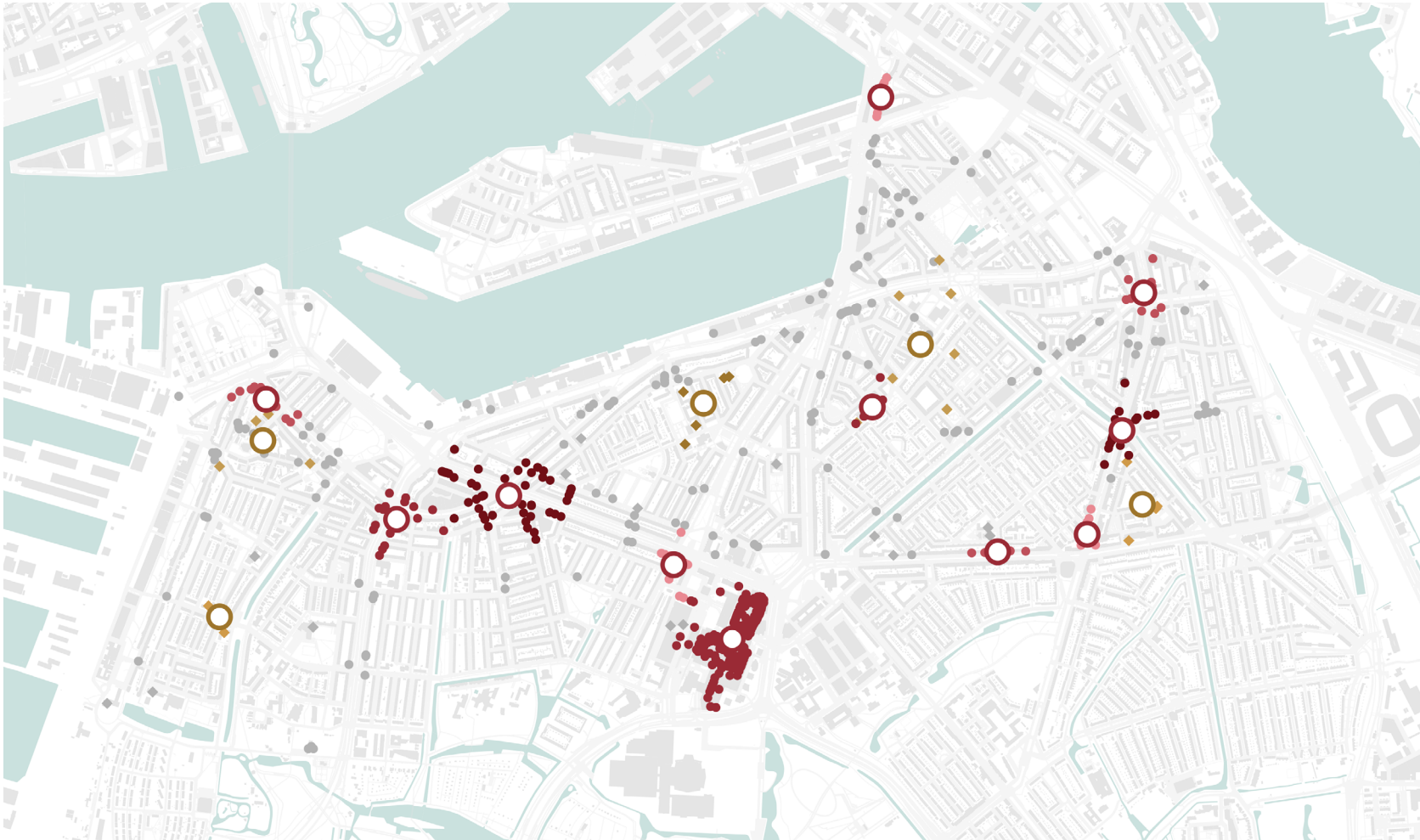


Find centroids

Clustering Amenities



Third Places



**Shops & Sustenance**  
| Min. Distance = 100m  
| Min. Number = 10  
**Culture & Public Buildings**  
| Min. Distance = 200m  
| Min. Number = 3

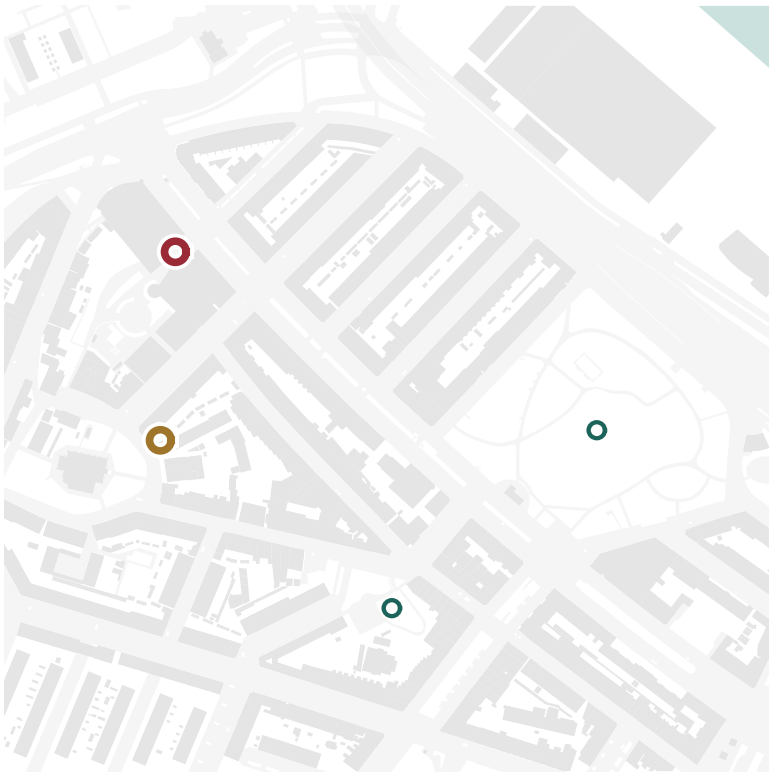
**Clusters**  
Shop - Sustenance  
Culture - Public Buildings  
**Centroids**

Sources:  
1. OpenStreetMap

Generating Shortest Paths



Living Streets

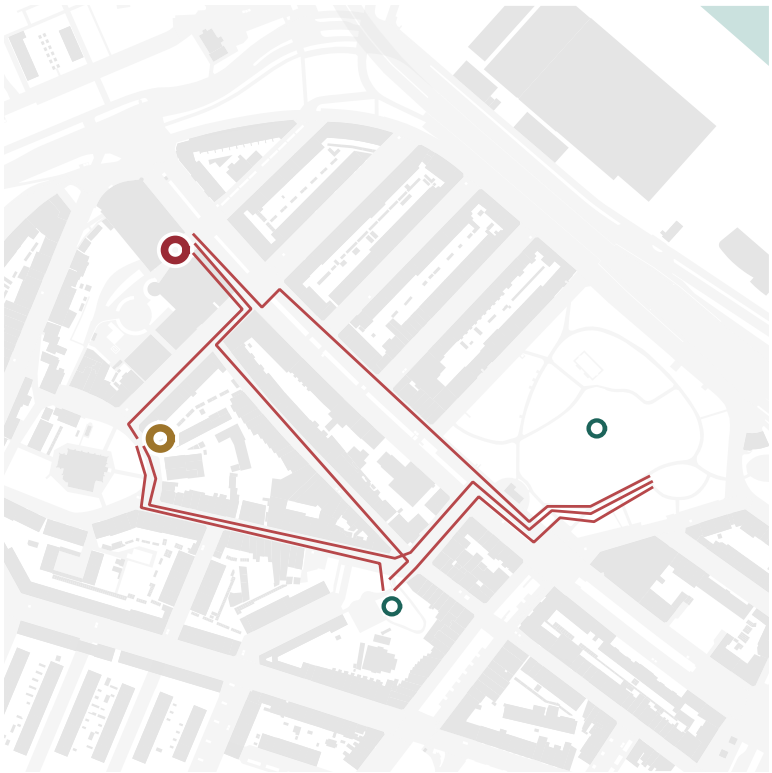


Selection of origins and destinations

Generating Shortest Paths



Living Streets



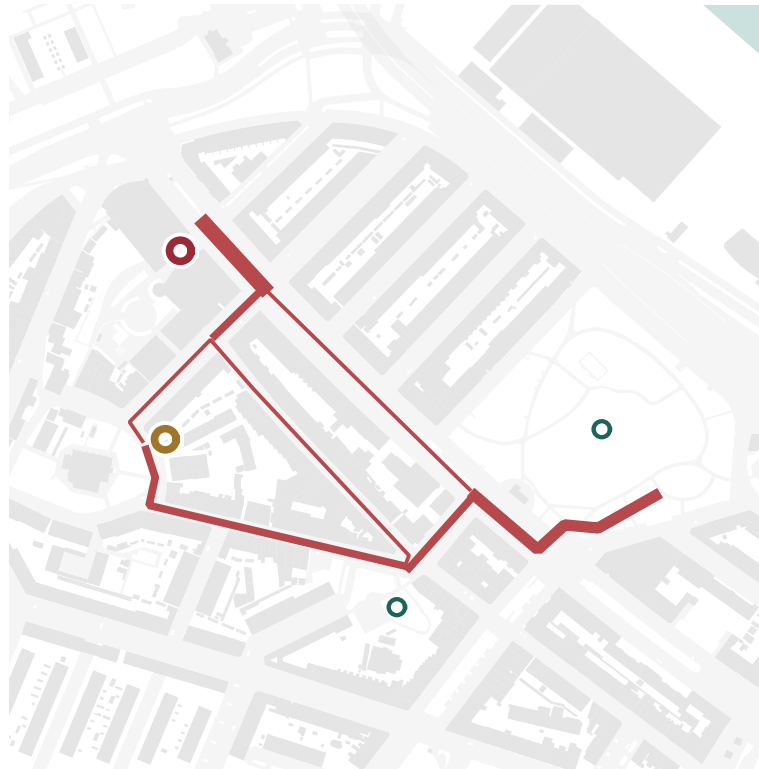
Generate shortest paths on walkable network



## Generating Shortest Paths



Living Streets



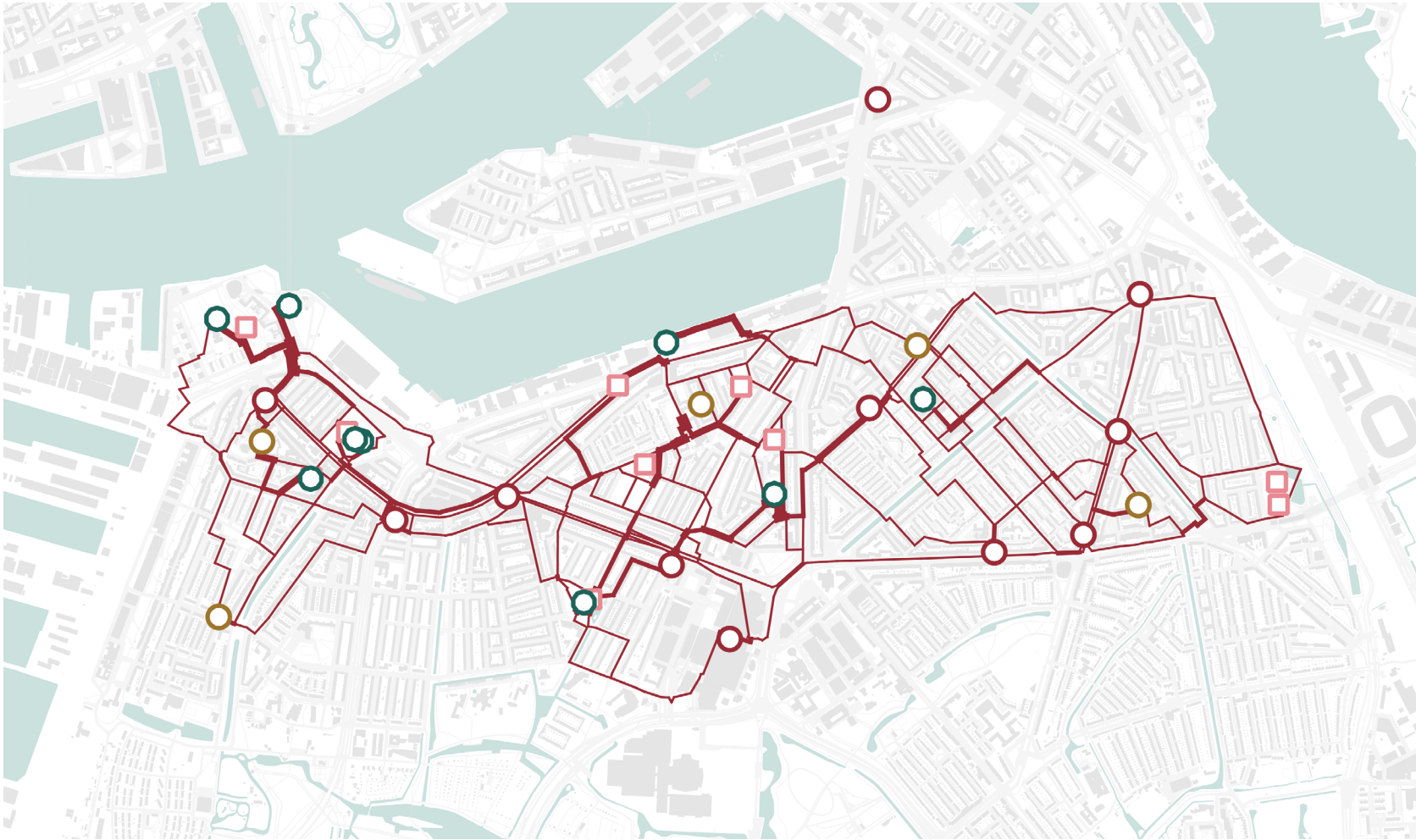
**Differentiate street segments repetition**

Generating Shortest Paths



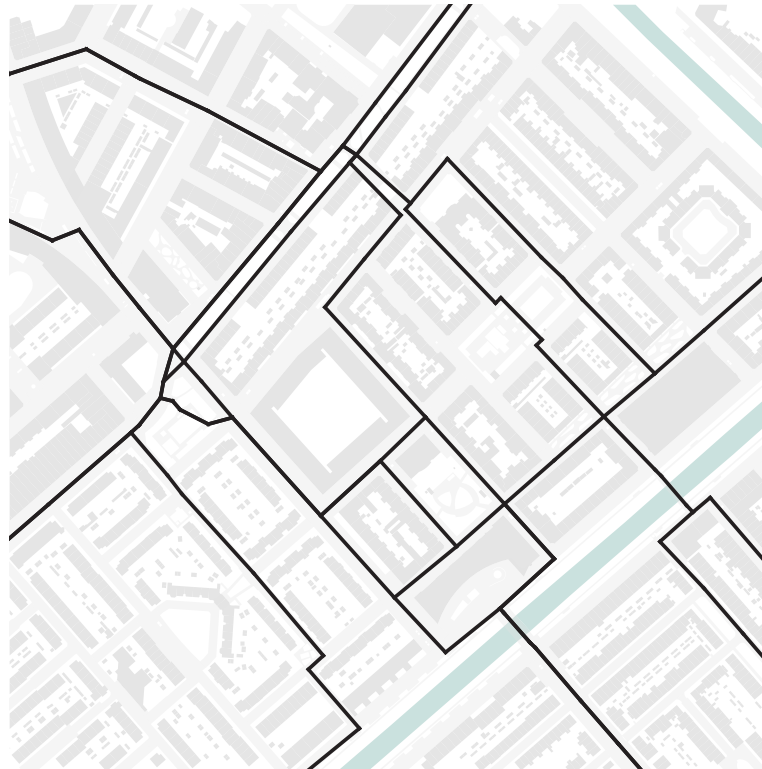
Living Streets

Identify streets with potential to be most vibrant





### Living Streets



### Selection of shortest paths



### Living Streets



### Identify amenities along the paths

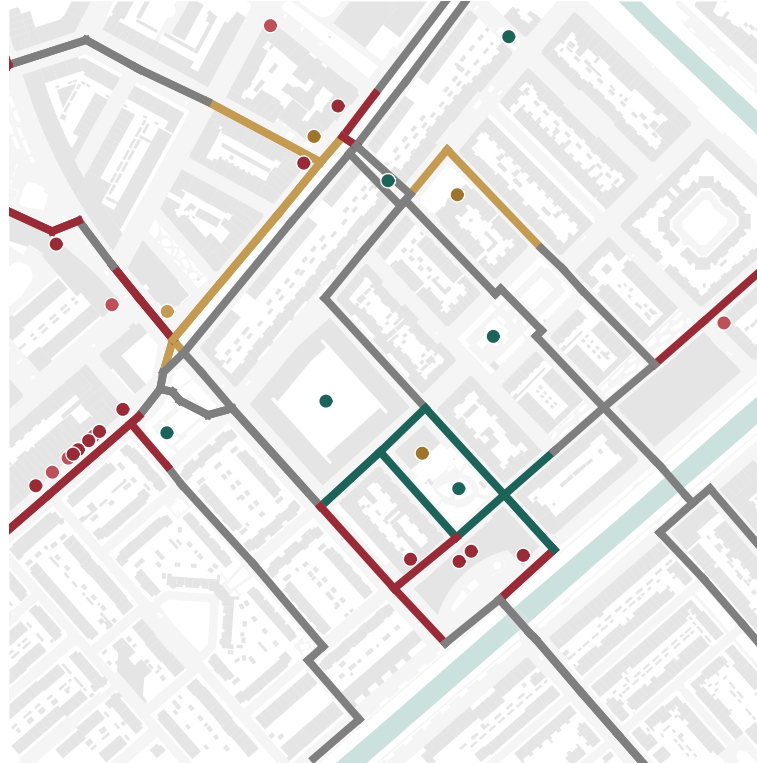


# CONNECTING PLACES

## Street Characterization



Living Streets



**Extend the activities of the amenities  
on the street**

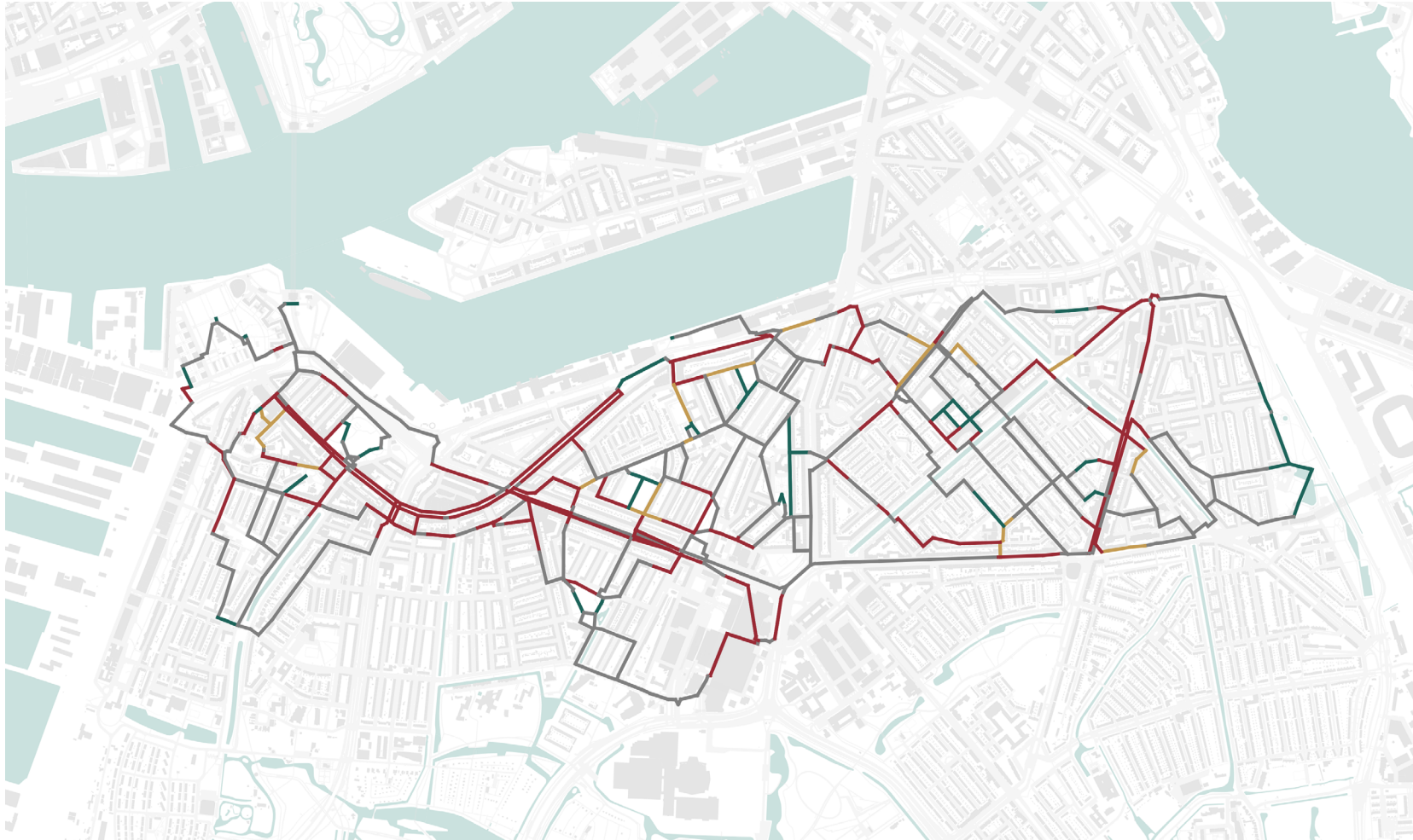
# CONNECTING PLACES

## Street Characterization



### Living Streets

Identify streets that  
change qualities along  
the path to become  
more attractive

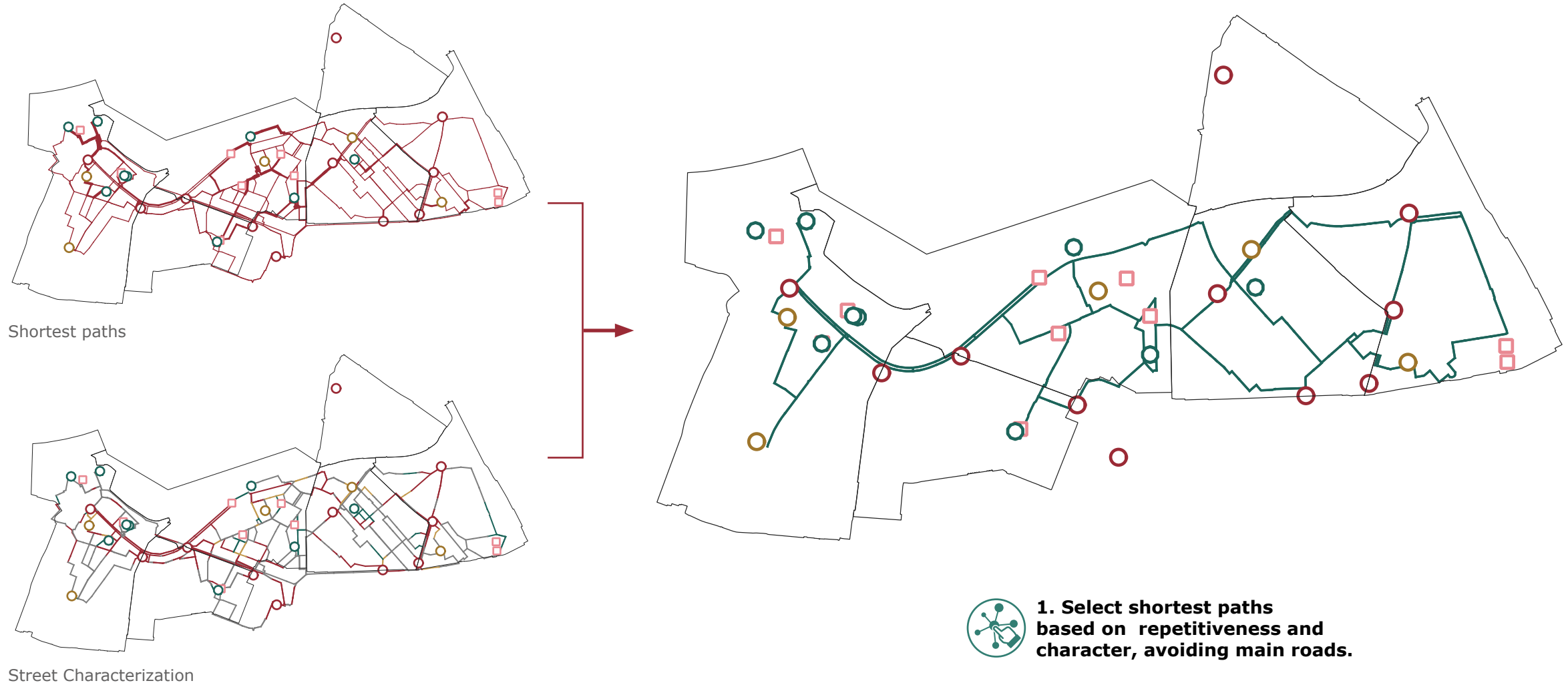


- Shopping Streets
- Leisure Streets
- Residential Street
- Public Streets

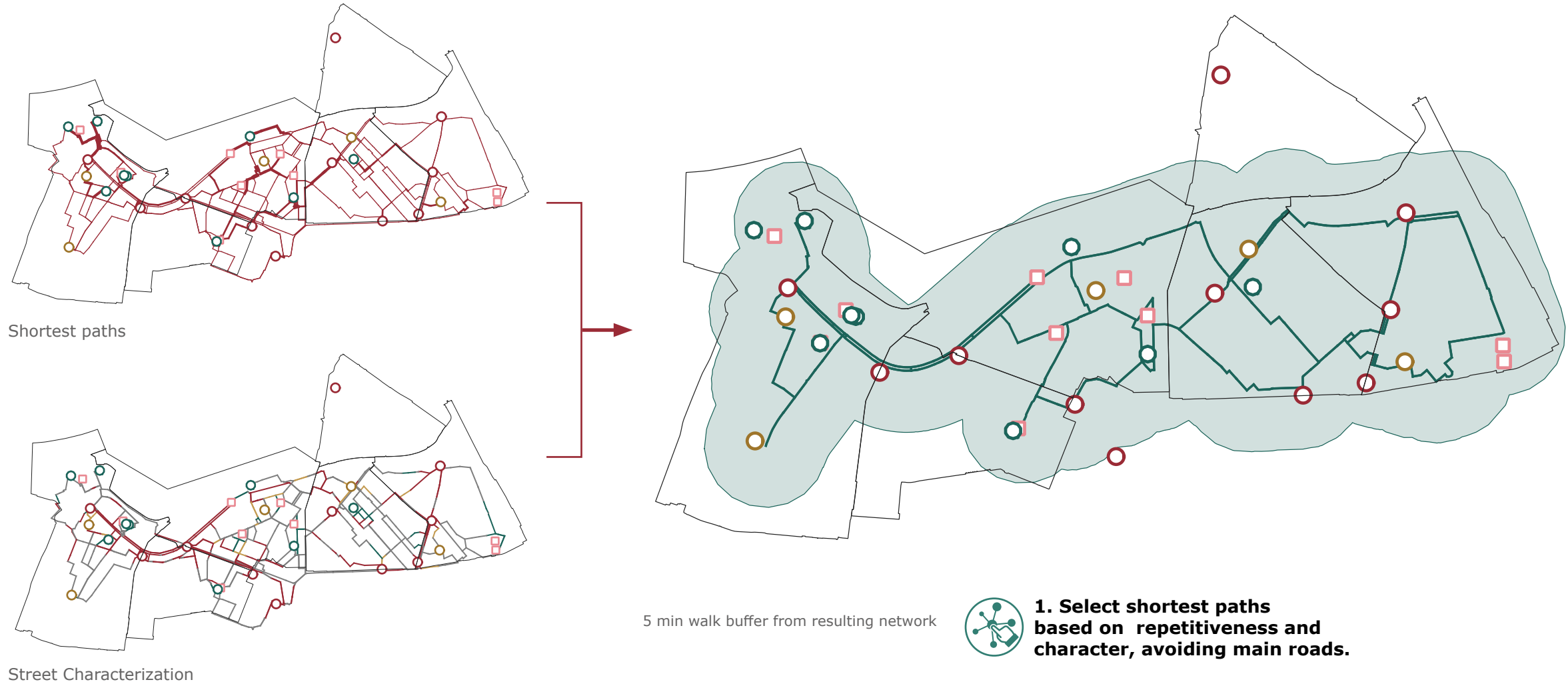


Sources:  
1. OpenStreetMap

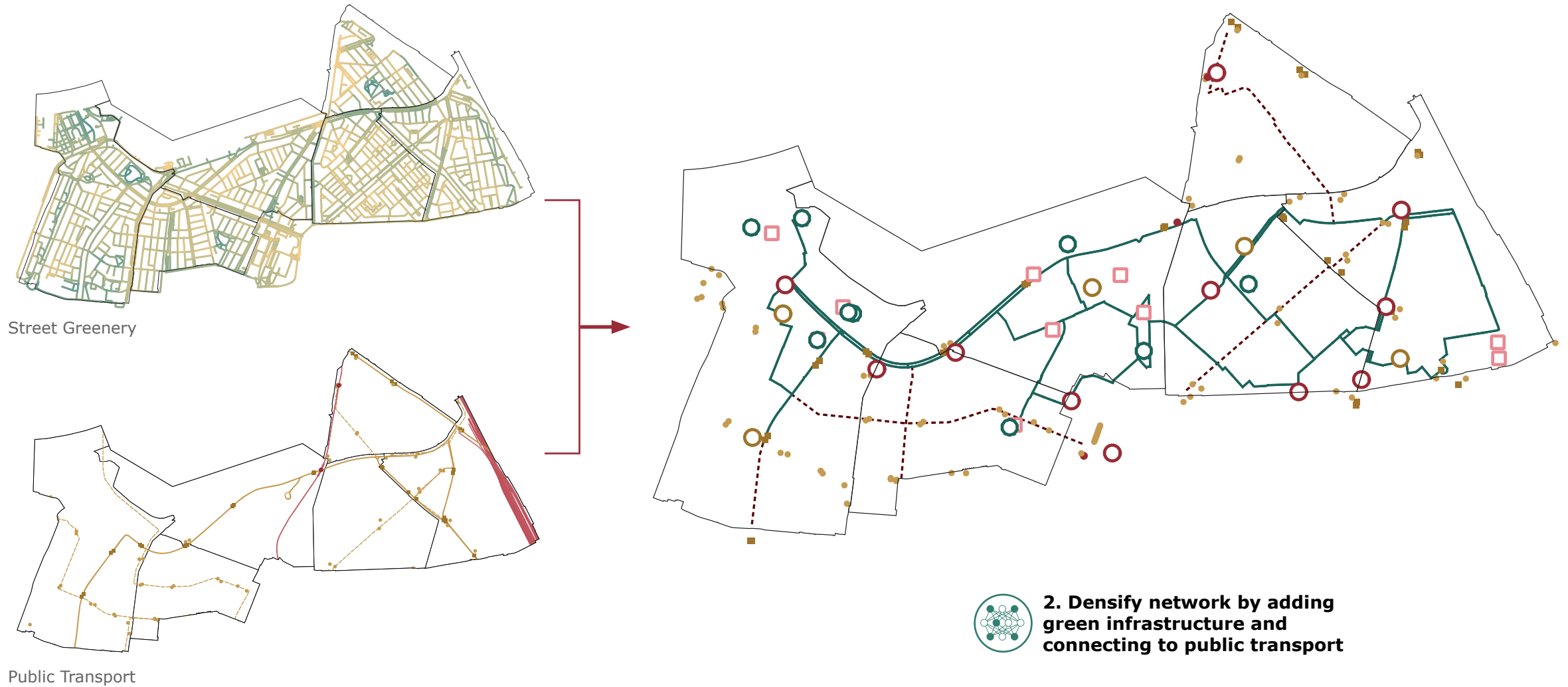
## Adjustments and Optimization

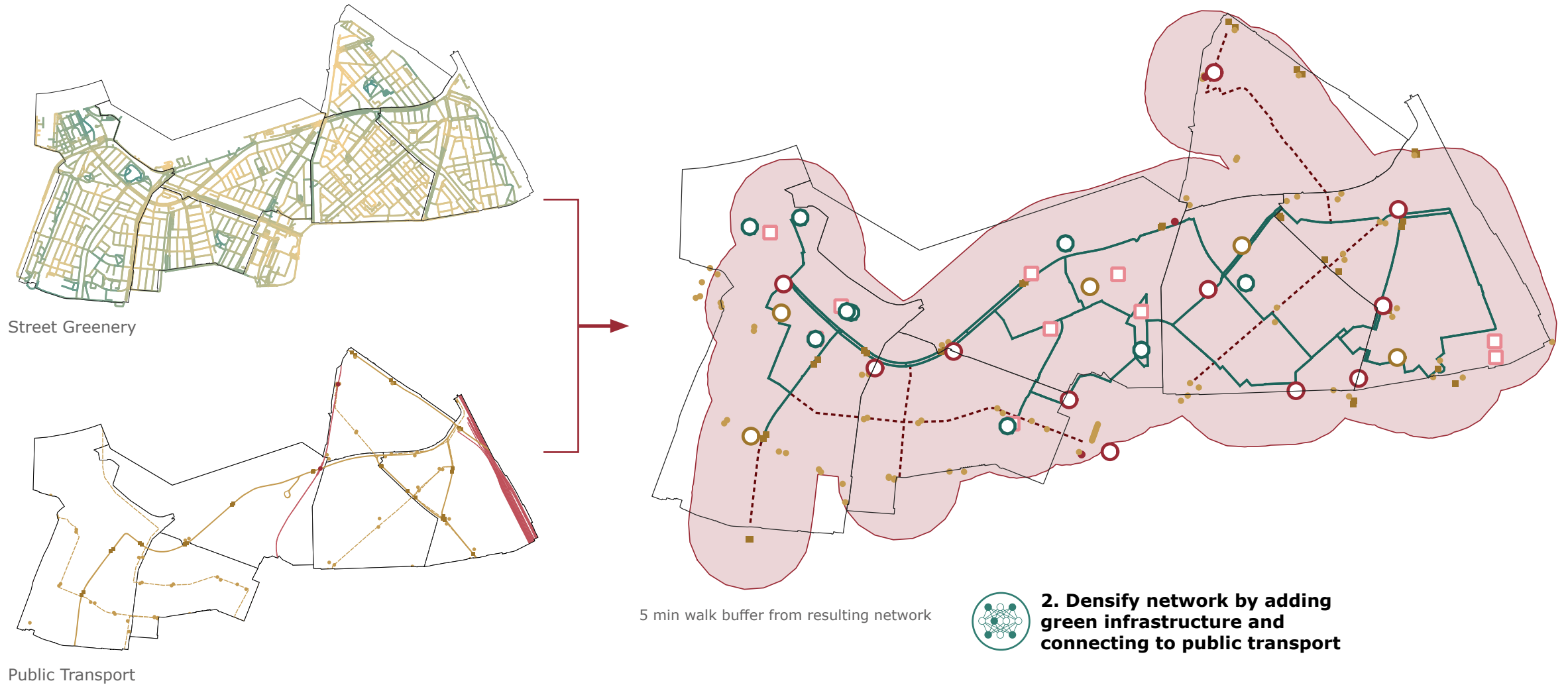


## Adjustments and Optimization

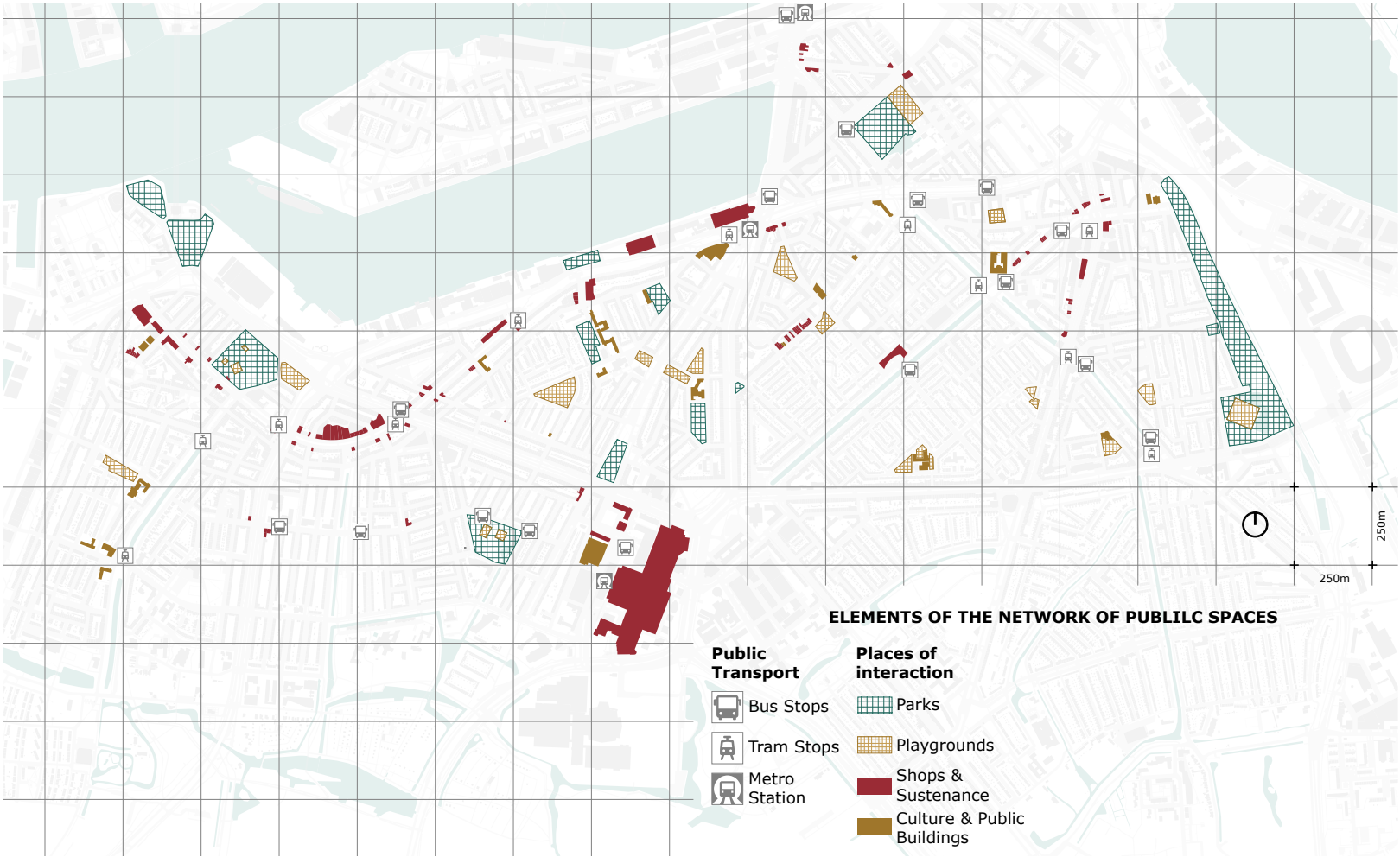




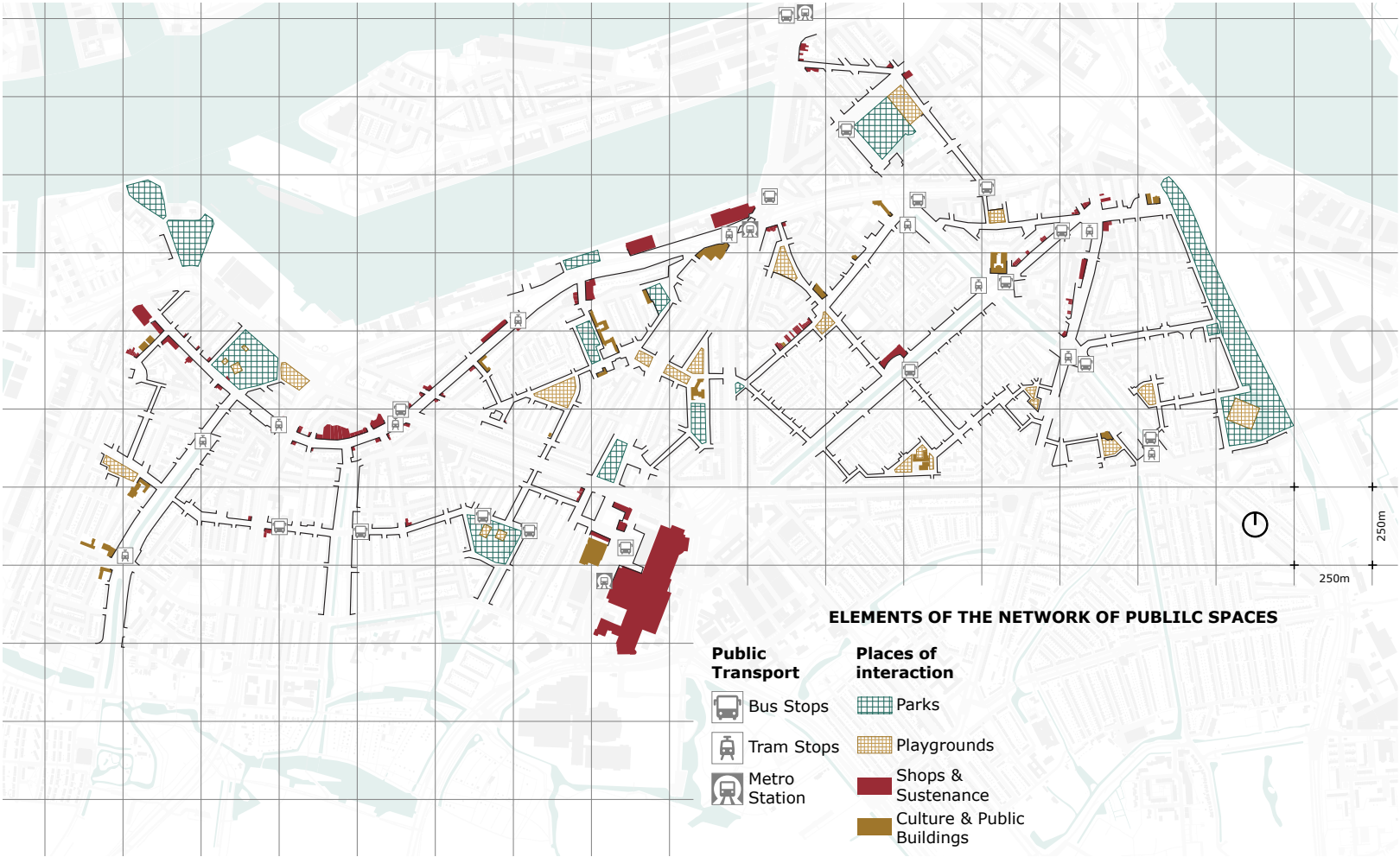




Network of public spaces

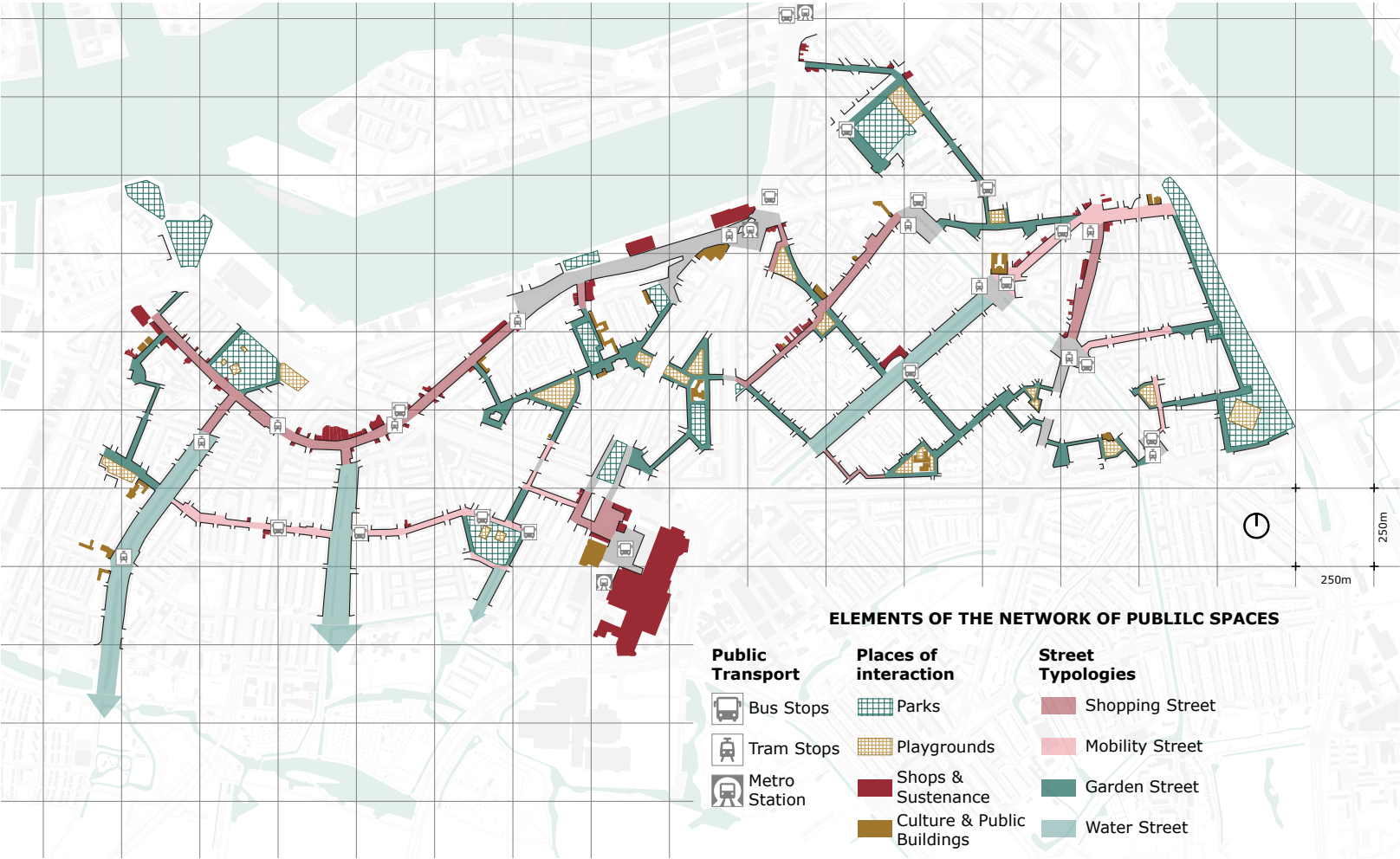


Network of public spaces



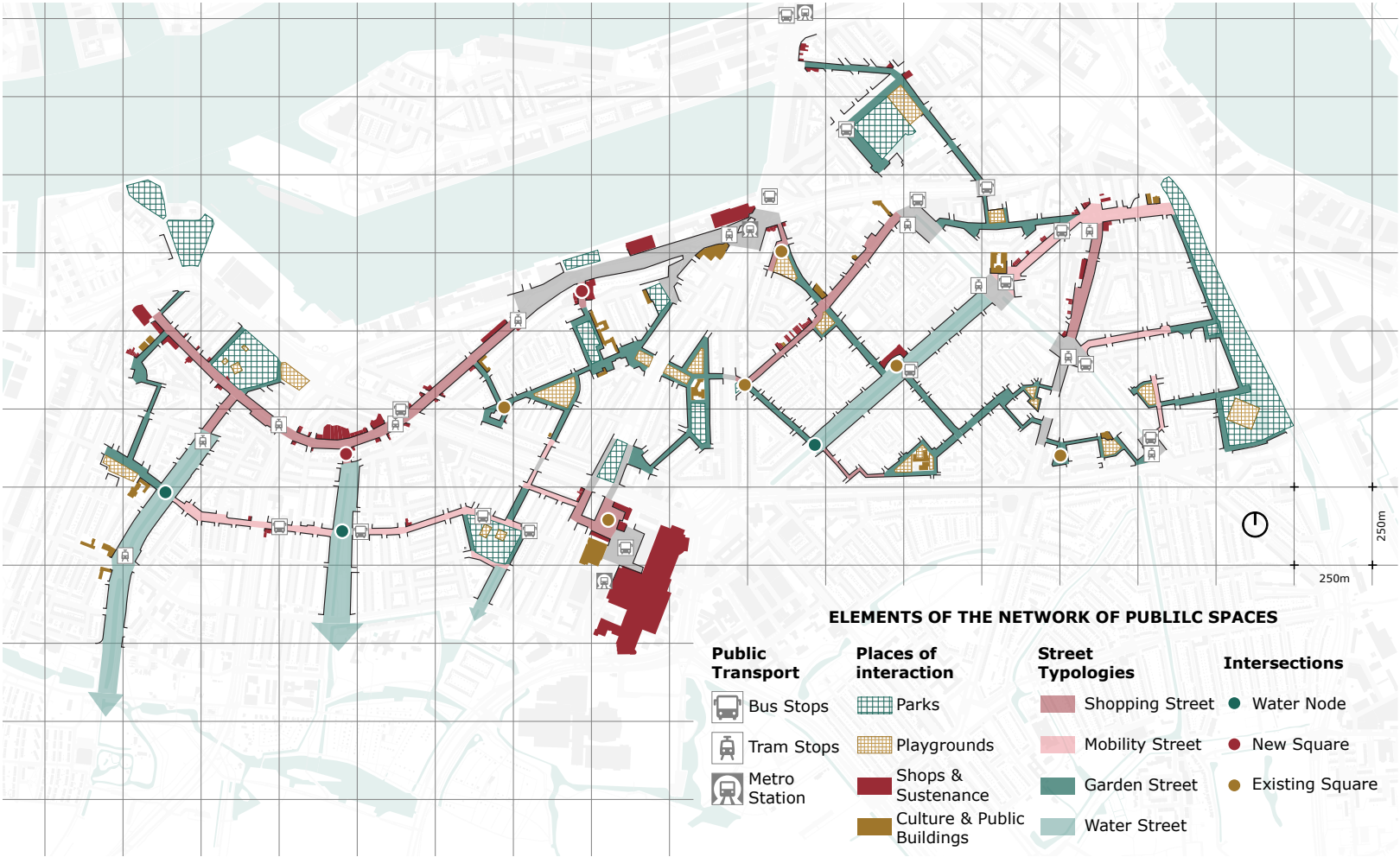



Network of public spaces





## Network of public spaces





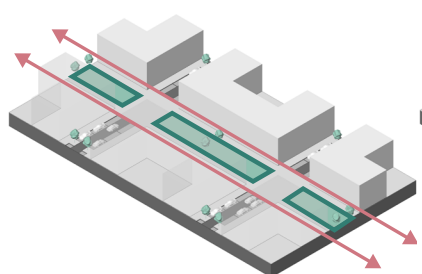
# DESIGN STRATEGIES


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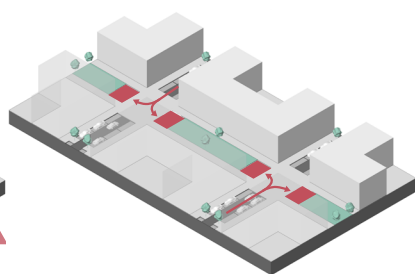
## Street Typologies

# STREET TYPOLOGIES

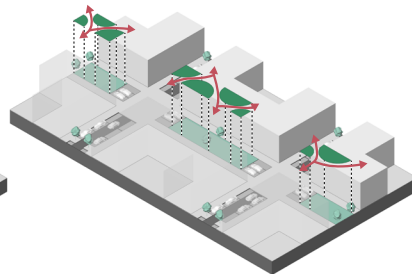
## Garden Street




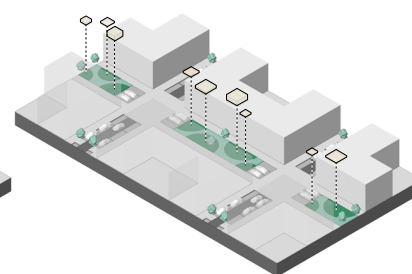
-  1. Define distinct zones of continuous pathways and shared gardens




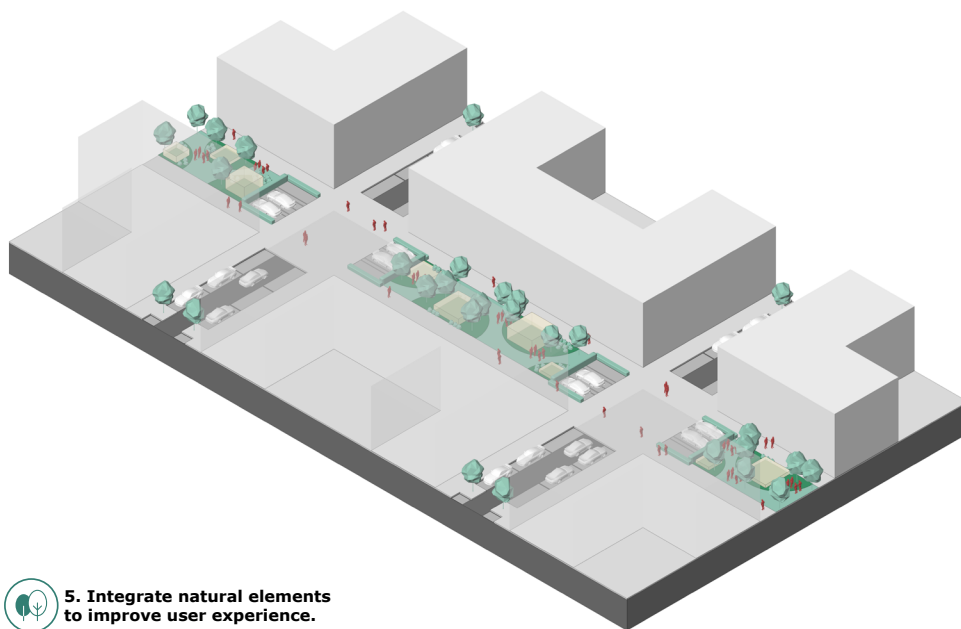
-  2. Provide parking at the edge of the street.



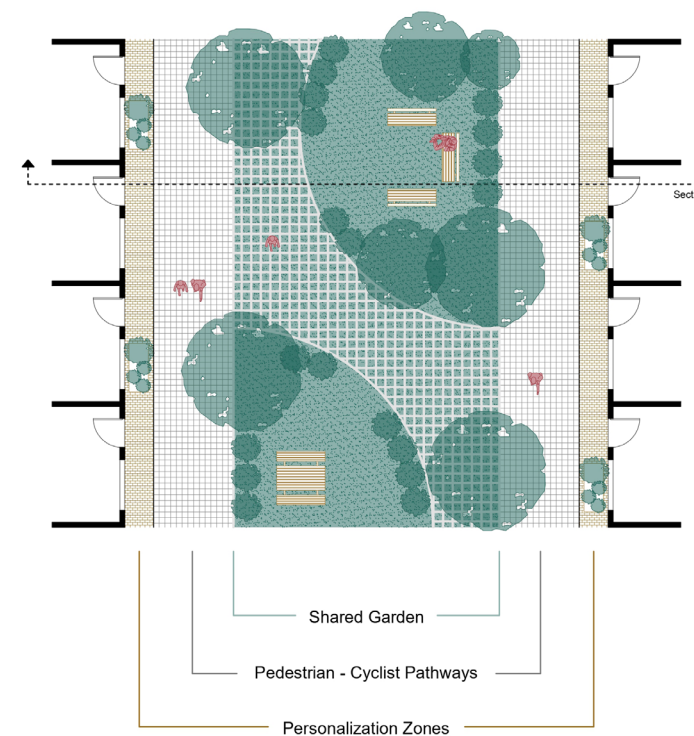
-  3. Create subdivisions in the garden using organic pathways.



-  4. Introduce street's program through co-creation processes with the residents.



-  5. Integrate natural elements to improve user experience.





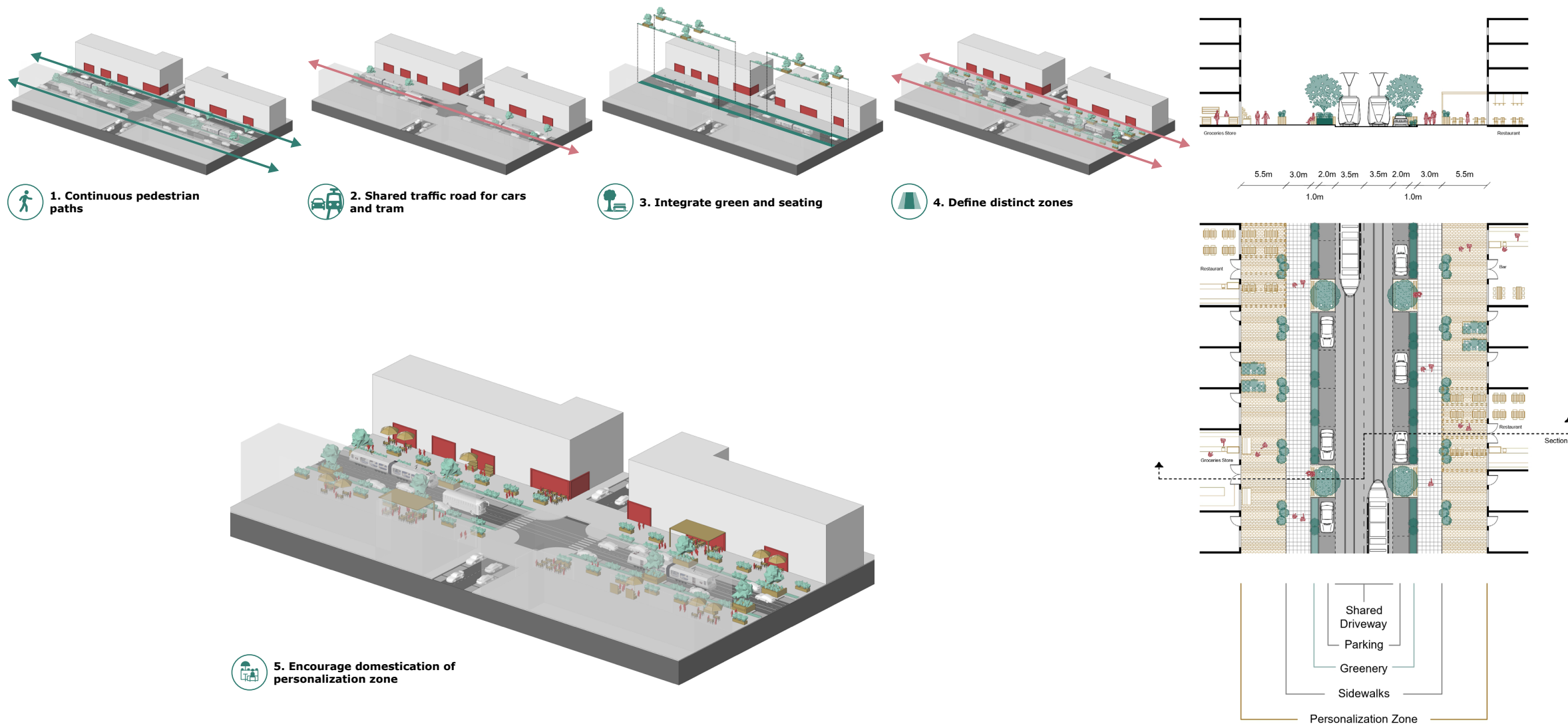
## STREET TYPOLOGIES

### Garden Street



# STREET TYPOLOGIES

## Shopping Street





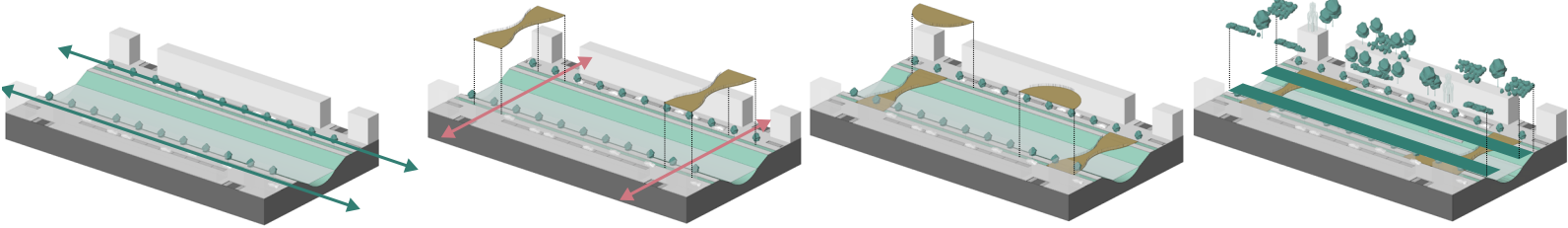
## STREET TYPOLOGIES

### Shopping Street

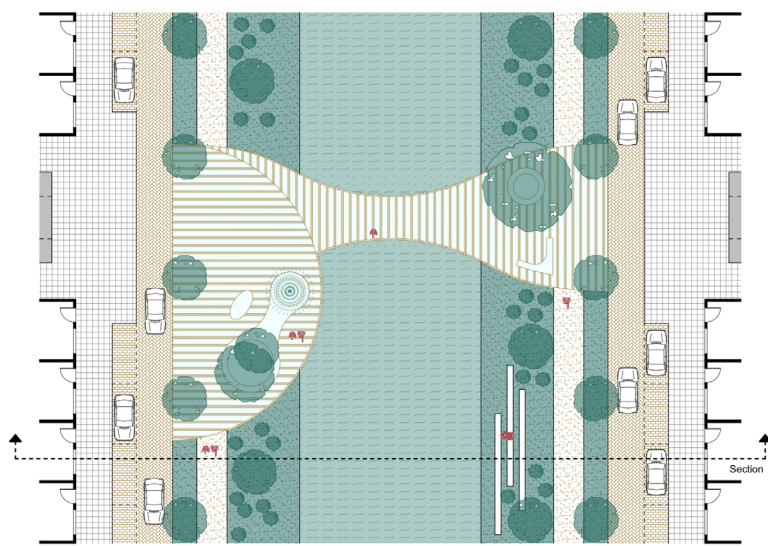
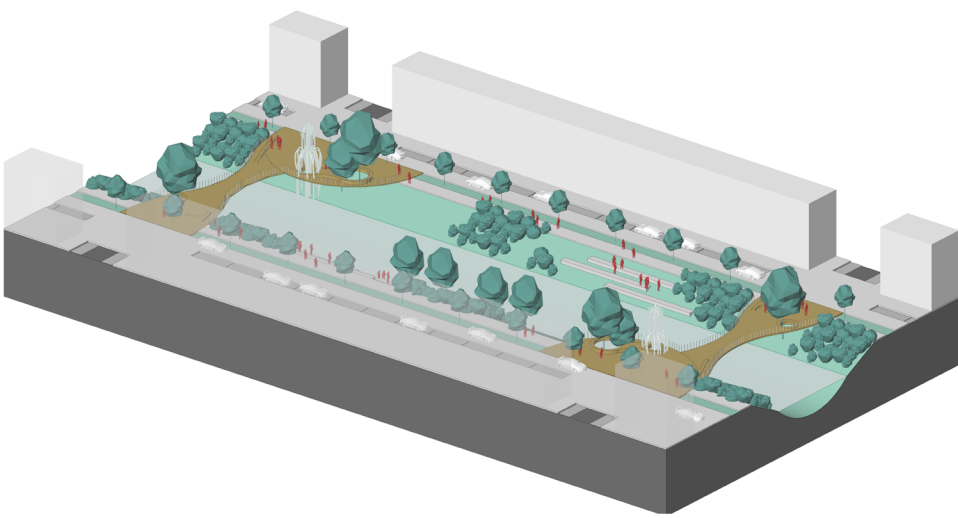
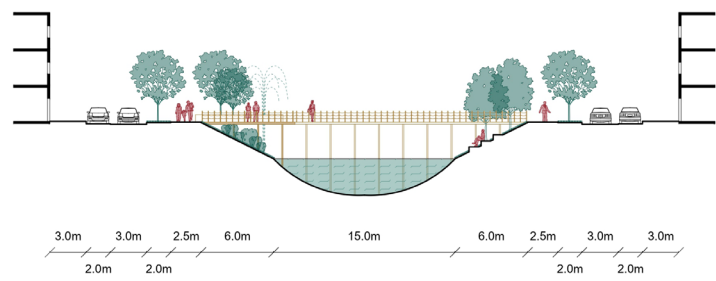


# STREET TYPOLOGIES

## Water Street



-  1. Continuous pedestrian paths
-  2. Dense pedestrian crossings
-  3. Create places for meeting
-  4. Integrate green - water elements and seating



- Singel
- Pedestrian Pathways
- Shared street (car + bike)
- Parking Zones
- Sidewalks



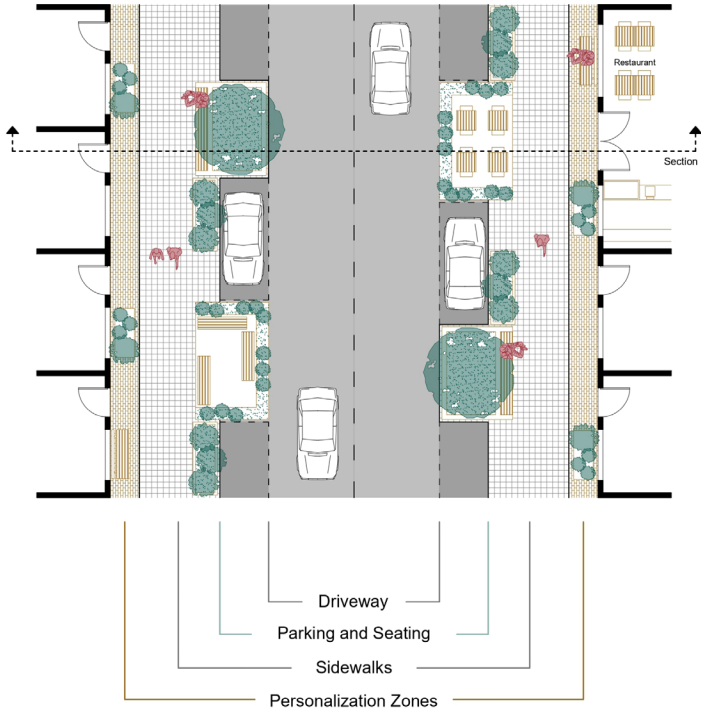
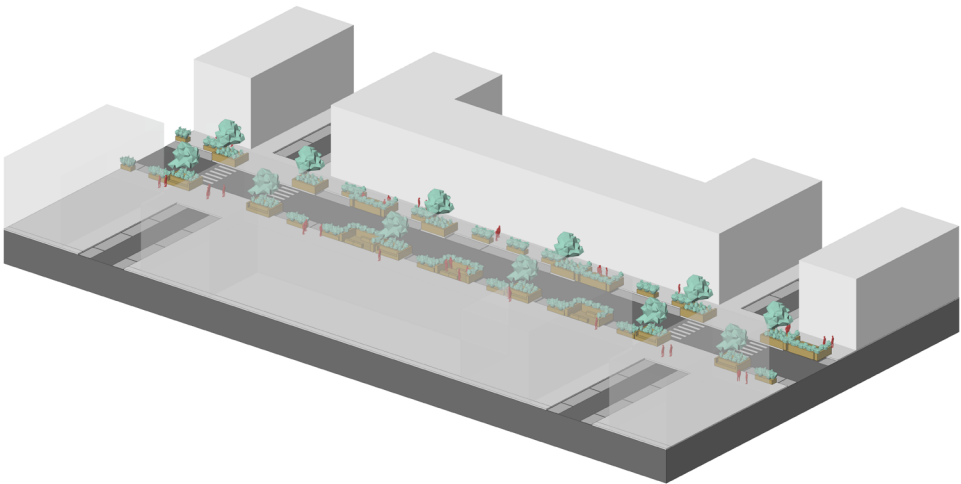
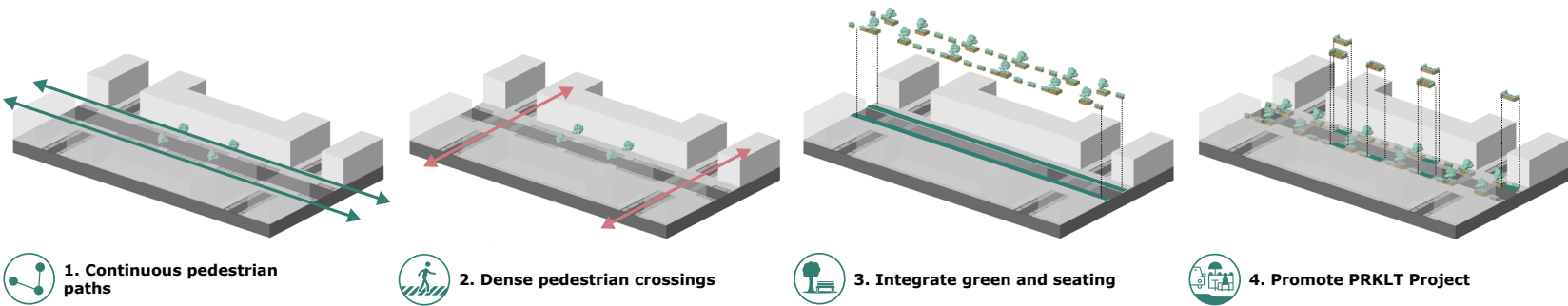
## STREET TYPOLOGIES

### Water Street



# STREET TYPOLOGIES

## Mobility Street






## STREET TYPOLOGIES

### Mobility Street



**Figure 16:** Parklet decking examples (source: <https://rotterdamsedromers.nl/2018/05/18/parklet-rotterdam-maken-staatbeeld-leuker/>)





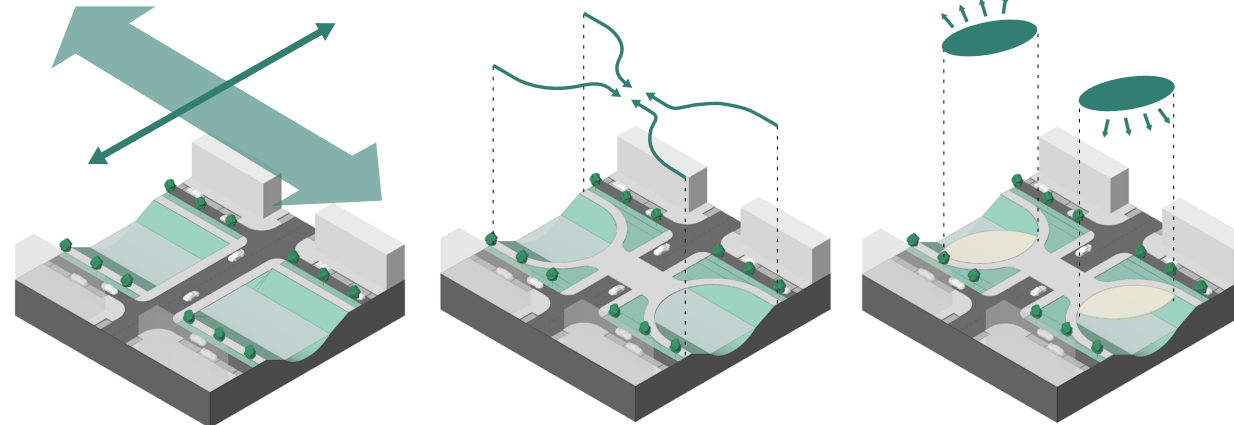
# DESIGN STRATEGIES

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## Intersections

# INTERSECTIONS

## Water Nodes



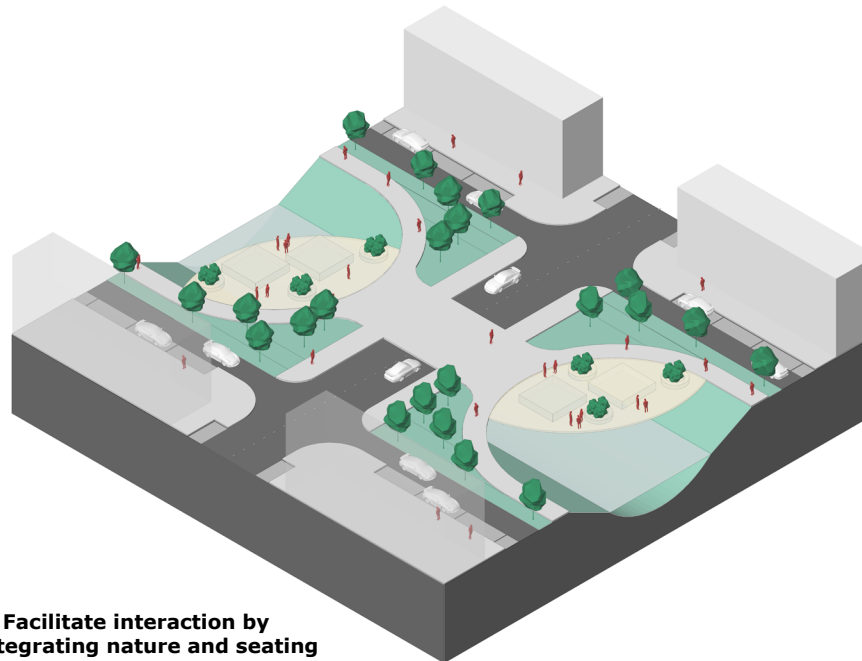
**1. Identify water nodes in the intersection of singel with network's streets**



**2. Connect paths with a safe pedestrian crossing**



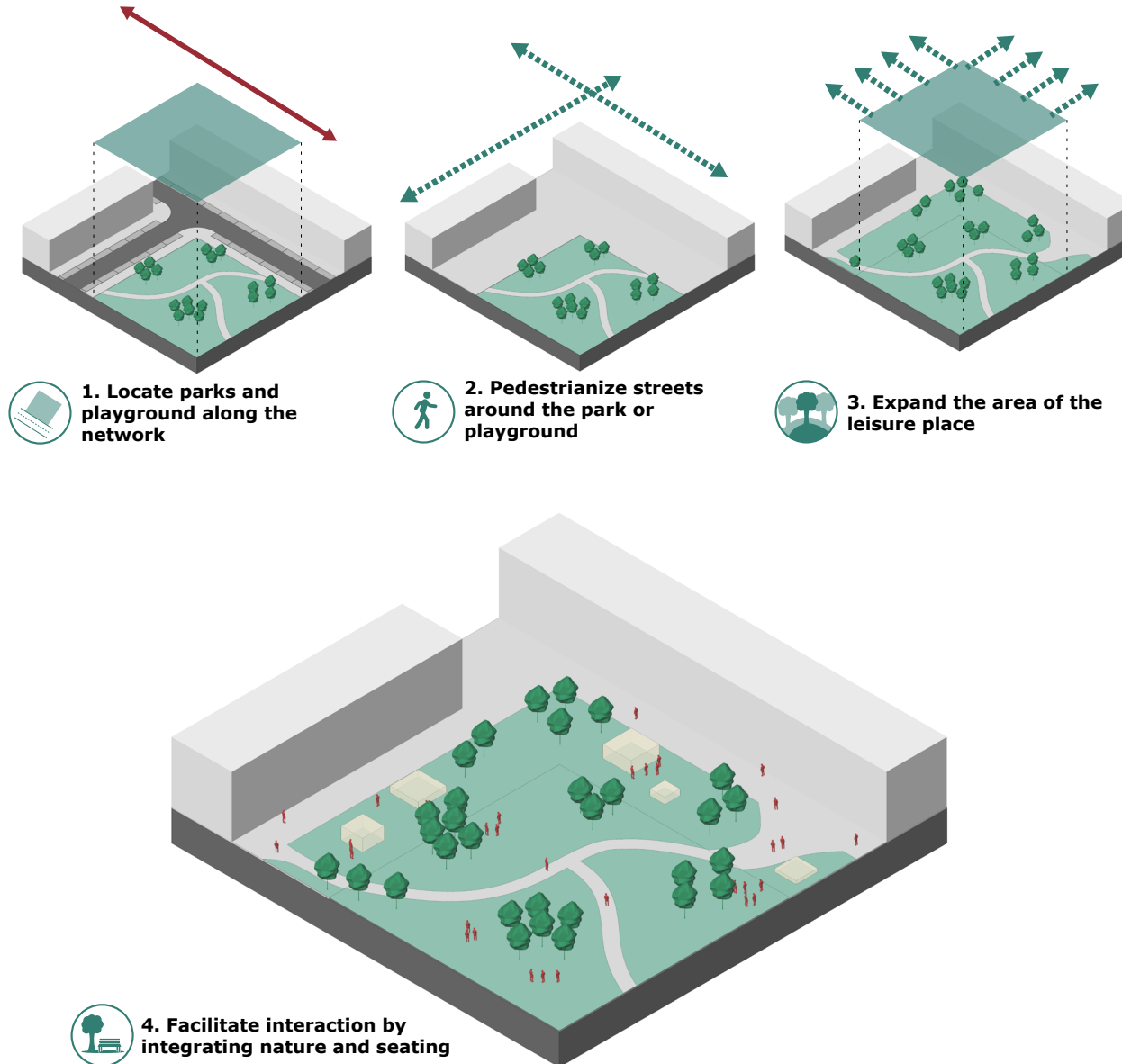
**3. Place platforms for activities beside the water**



**4. Facilitate interaction by integrating nature and seating**

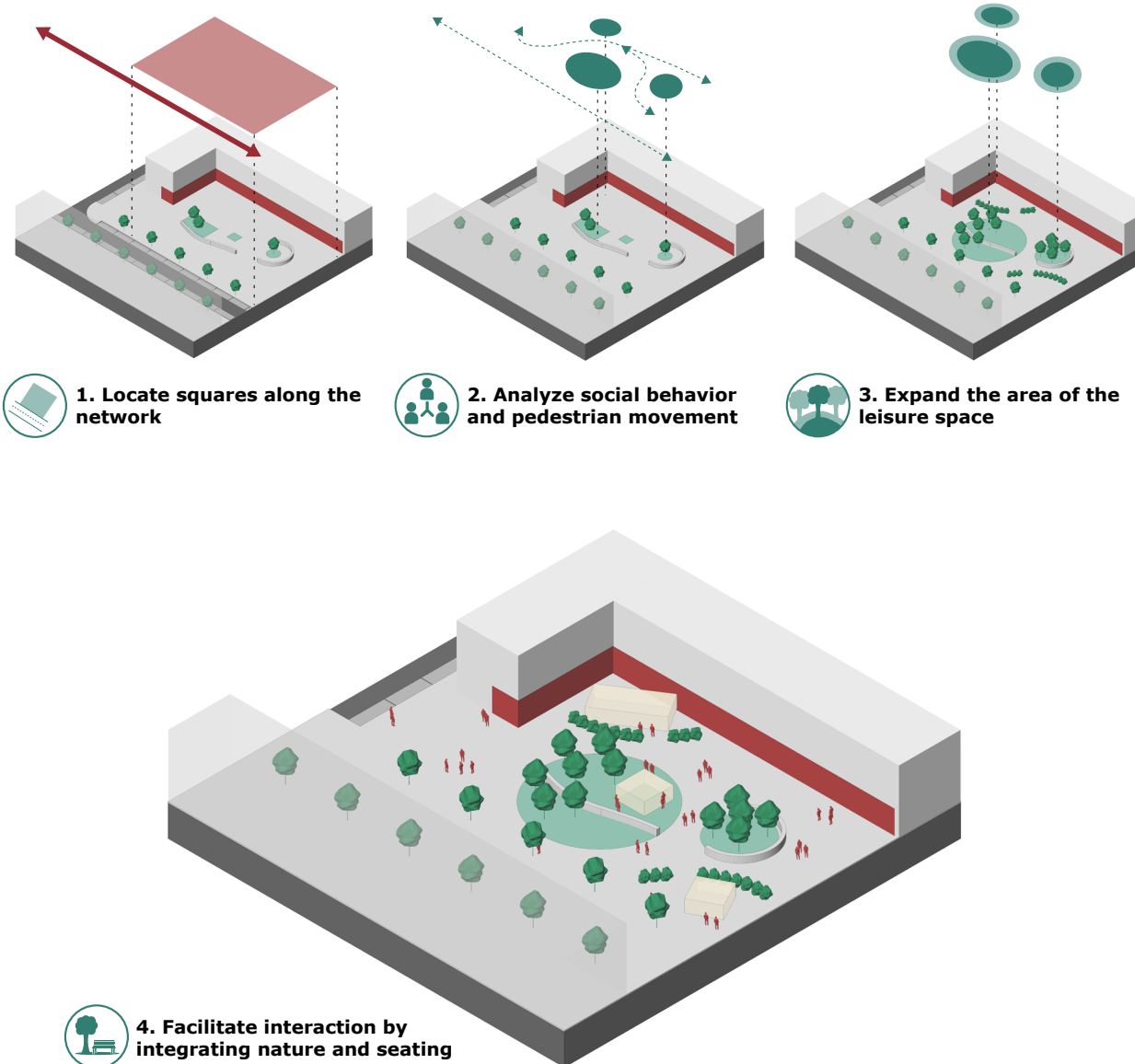
# INTERSECTIONS

## Parks and Playgrounds



# INTERSECTIONS

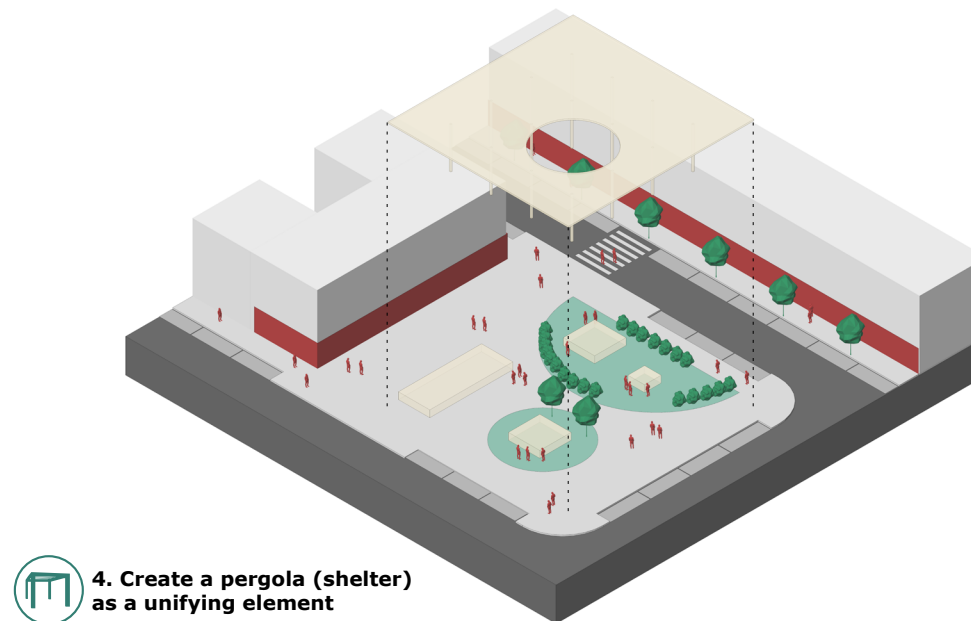
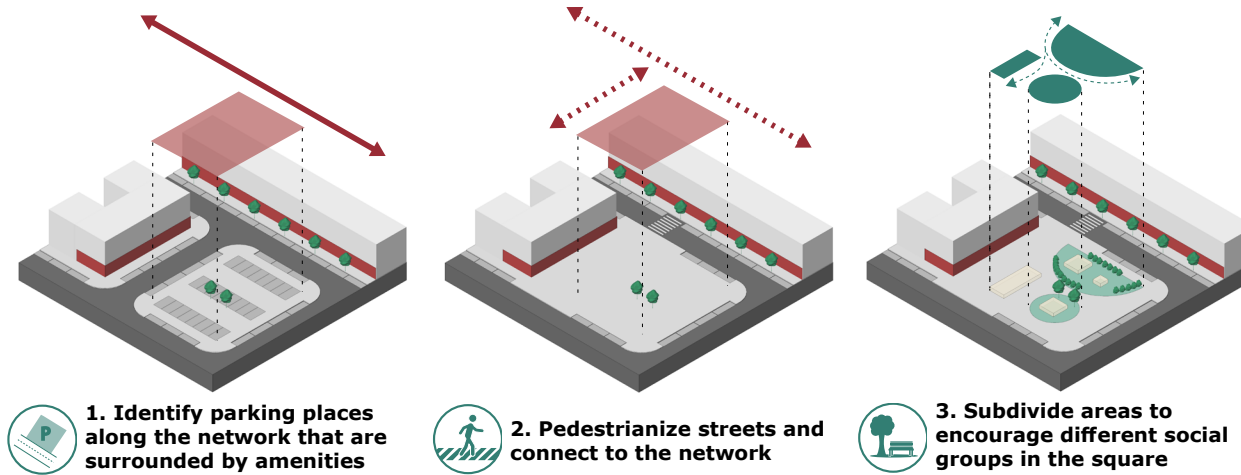
## Existing Squares





# INTERSECTIONS

## New Squares


























A dense word cloud in shades of teal and green serves as the background. The words are of various sizes and orientations, creating a textured effect. Key terms include 'neighborhood', 'space', 'environment', 'places', 'groups', 'opportunities', 'diversity', 'network', 'design', 'interventions', 'social interaction', 'community', 'residents', 'well-being', 'cities', 'population', 'urban', 'design', 'places', 'groups', 'opportunities', 'diversity', 'network', 'design', 'interventions', 'social interaction', 'community', 'residents', 'well-being', 'cities', 'population', 'urban'.

# DESIGN INTERVENTIONS

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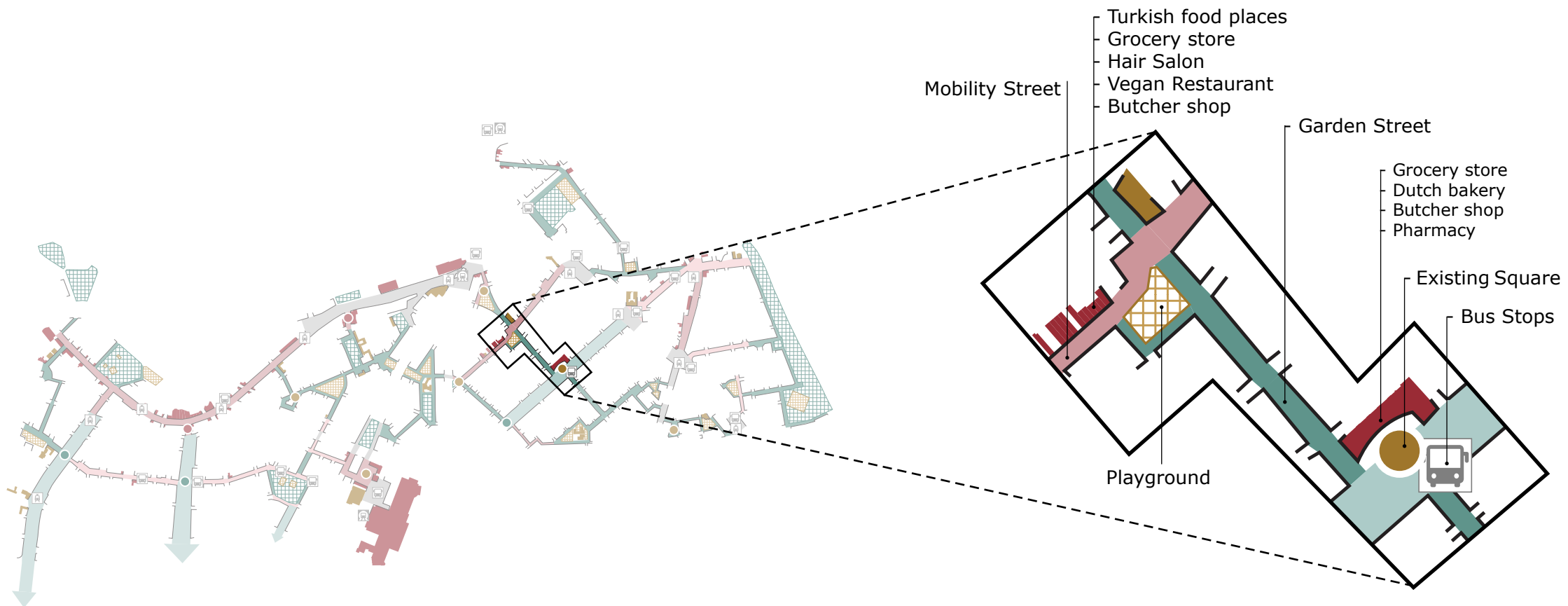
**Restorative paths for  
social interaction**

DESIGN PRINCIPLES

Design Elements		Singular Elements											Spatial Setting												
																									
Design Principles	Landscape Experience	Being Away <small>(Kaplan et al., 1998)</small>	●	●	●	●	●			●		●	●	●	●	●			●		●	●		●	
		Extent <small>(Kaplan et al., 1998)</small>	●	●		●	●					●				●									
		Fascination <small>(Kaplan et al., 1998)</small>			●		●				●		●	●	●				●		●	●	●	●	
		Compatibility <small>(Kaplan et al., 1998)</small>	●	●	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
		Aesthetics <small>(Meyer, 2008)</small>	●	●	●	●	●	●				●	●	●	●			●	●			●	●	●	●
		Performance <small>(Meyer, 2008)</small>					●				●		●	●	●	●		●	●						
		Awareness <small>(Meyer, 2008)</small>			●	●	●	●		●	●	●	●	●	●	●	●					●	●	●	●
	Improved Well-being	Green <small>(Roe &amp; McCay, 2021)</small>	●	●	●		●					●	●	●			●								
		Blue <small>(Roe &amp; McCay, 2021)</small>				●	●								●	●									
		Sensory <small>(Roe &amp; McCay, 2021) (Meyer, 2008)</small>	●	●	●	●	●				●	●	●	●	●					●		●	●		
		Neighborhoodly <small>(Roe &amp; McCay, 2021)</small>			●					●		●	●	●	●	●	●	●	●	●	●	●		●	
		Active <small>(Roe &amp; McCay, 2021)</small>			●		●	●	●	●	●	●	●		●	●	●	●	●	●		●	●	●	●
		Playable <small>(Roe &amp; McCay, 2021)</small>			●	●				●		●			●							●	●	●	●
		Inclusive <small>(Roe &amp; McCay, 2021)</small>			●		●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Social Interaction	Shelter <small>(Mehta &amp; Bosson, 2010)</small>	●									●						●		●	●				
		Seating <small>(Mehta &amp; Bosson, 2010) (Gehl, 2011)</small>					●			●	●						●		●	●	●				●
		Permeability <small>(Mehta &amp; Bosson, 2010)</small>									●									●	●				
		Personalization <small>(Mehta &amp; Bosson, 2010) (Harteveld, 2020)</small>			●						●		●					●		●	●	●	●		

# Testbed 1: Living Street

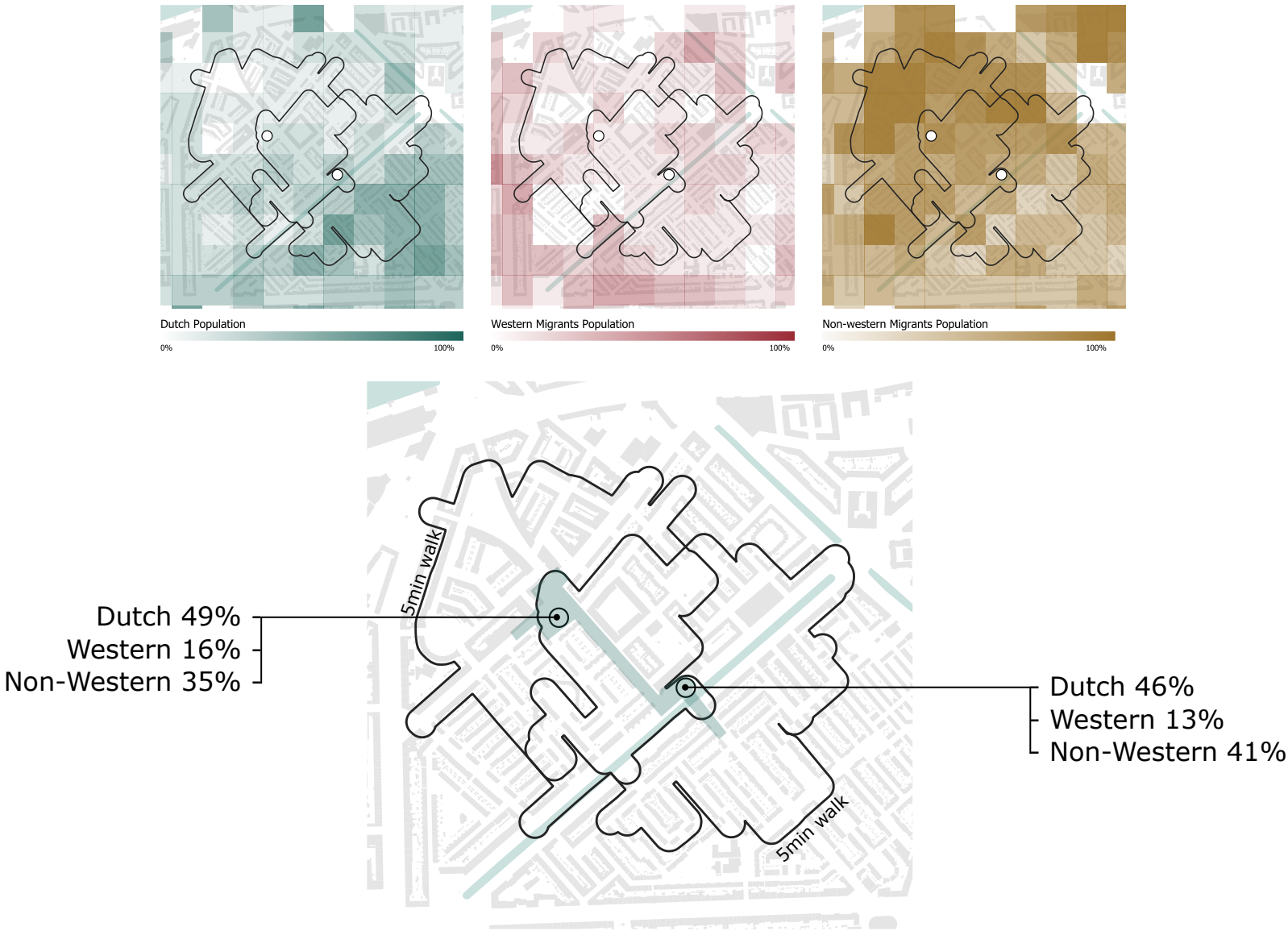
## Site Analysis





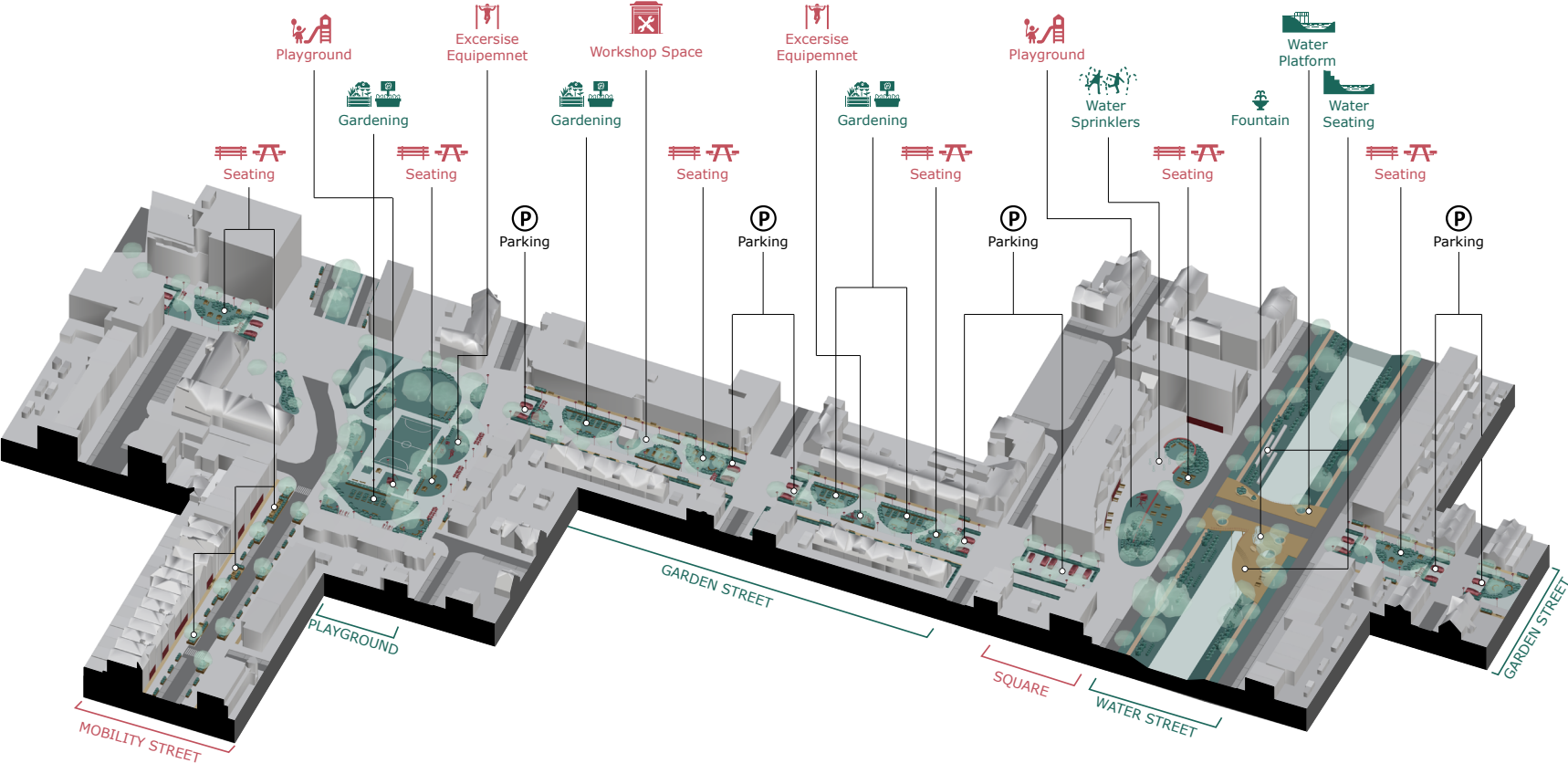
# Testbed 1: Living Street

## Accessibility Analysis



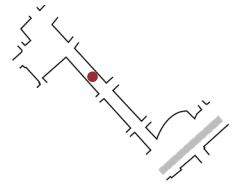
# Testbed 1: Living Street

## Program



## Testbed 1: Living Street

### Spatial Qualities

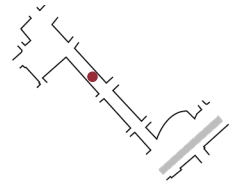


Source: Google Maps



## Testbed 1: Living Street

### Spatial Qualities

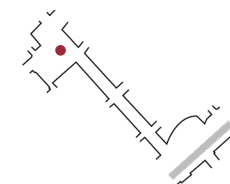


Place of meeting



## Testbed 1: Living Street

### Spatial Qualities

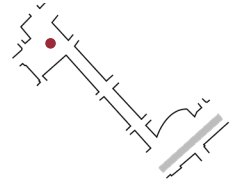


Source: Google Maps



## Testbed 1: Living Street

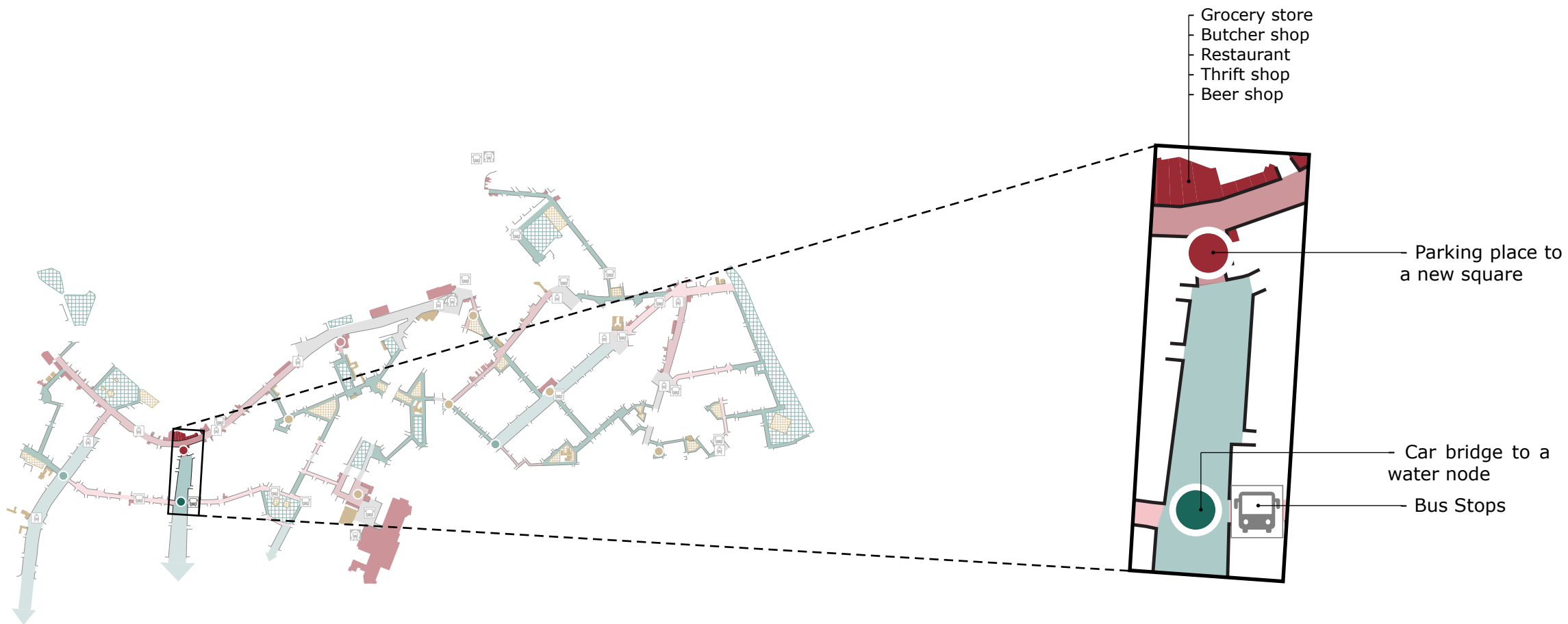
### Spatial Qualities



**A restorative park**

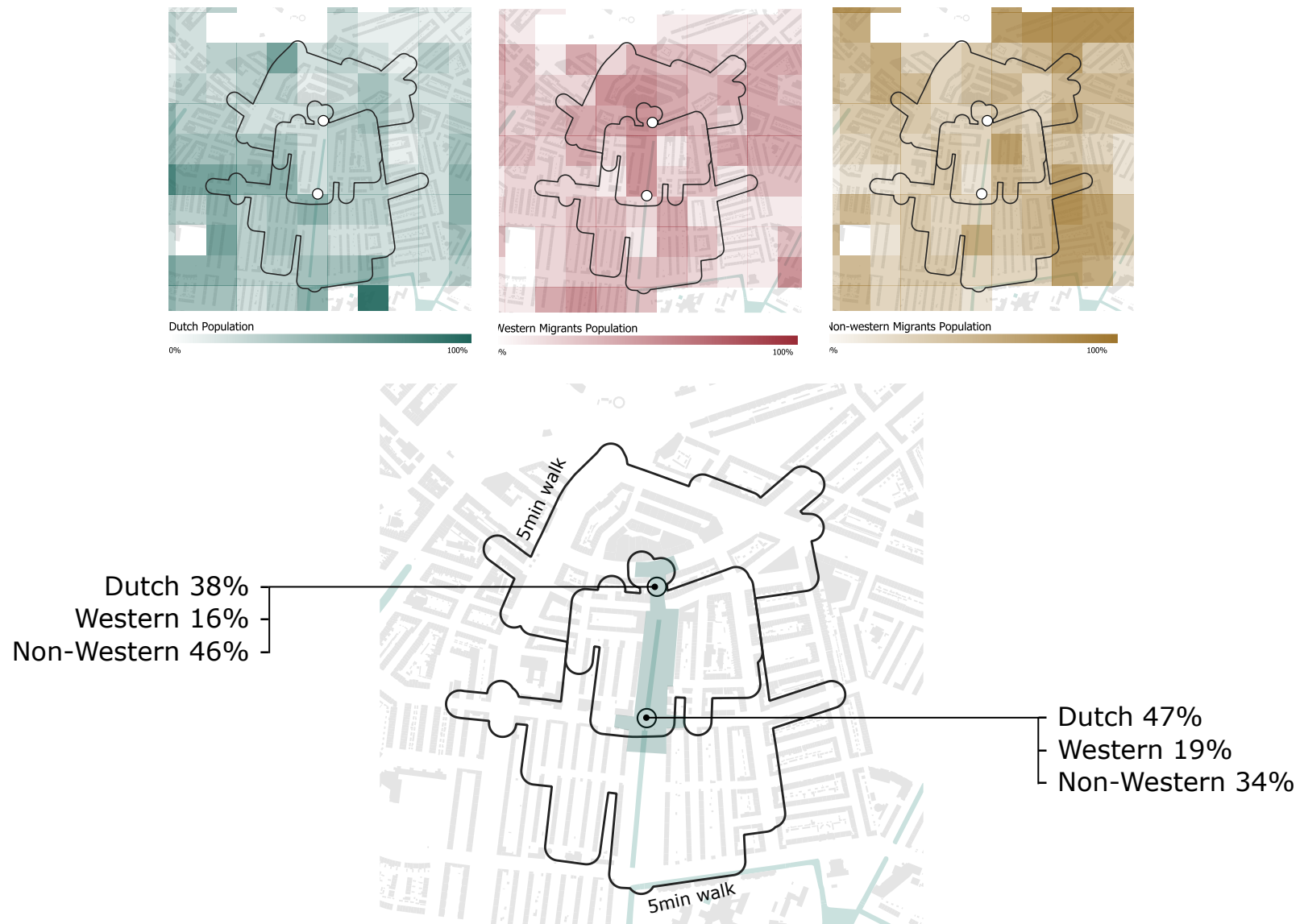
## Testbed 2: Enhancing Interaction

### Site Analysis



## Testbed 2: Enhancing Interaction

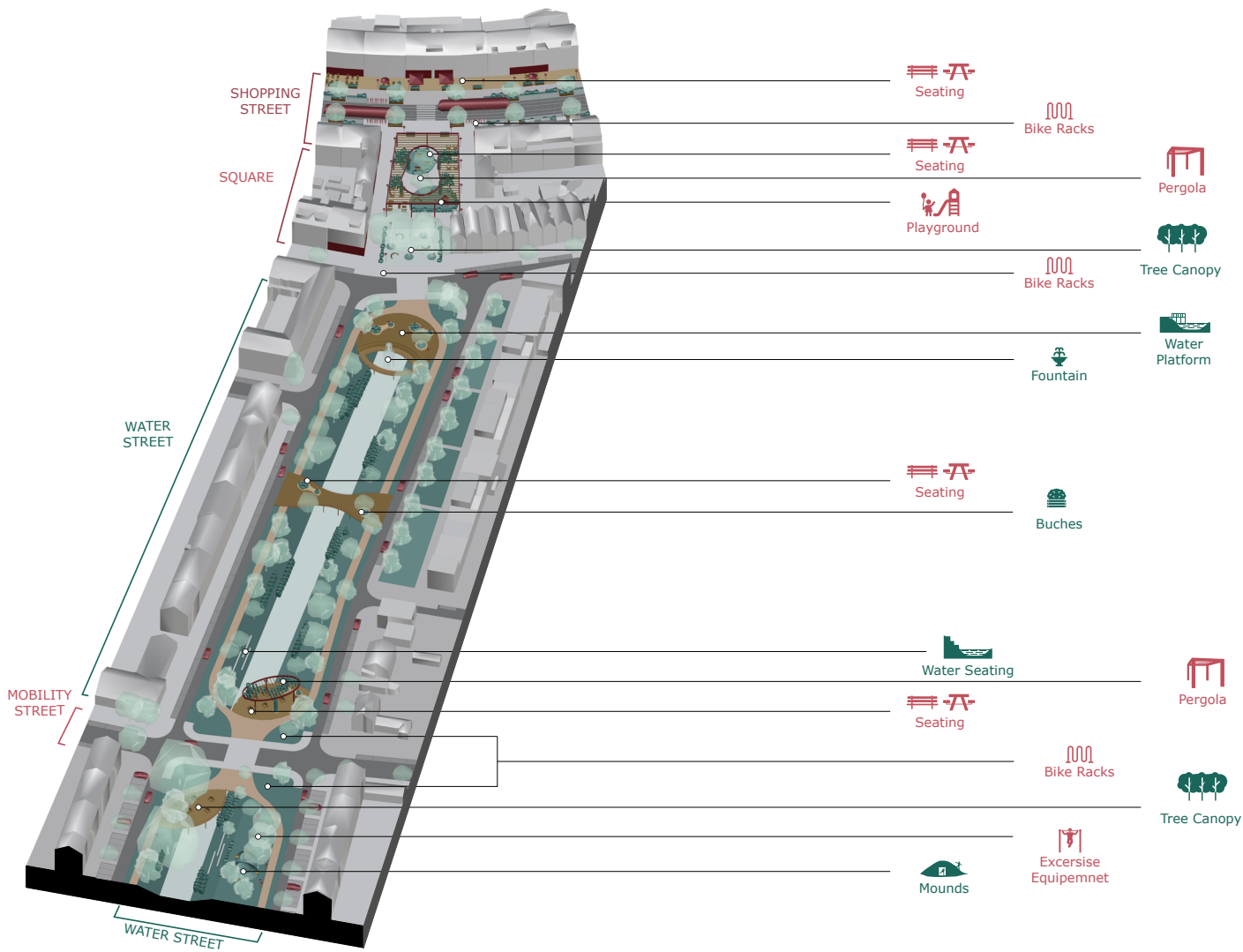
### Accessibility Analysis





# Testbed 2: Enhancing Interaction

## Program



## Testbed 2: Enhancing Interaction

### Spatial Qualities





## Testbed 2: Enhancing Interaction

### Spatial Qualities



**Multifunctional platform**



## Testbed 2: Enhancing Interaction

### Spatial Qualities



Source: Google Maps



## Testbed 2: Enhancing Interaction

### Spatial Qualities



**Transitional space**



## Testbed 2: Enhancing Interaction

### Spatial Qualities



Source: Google Maps



## Testbed 2: Enhancing Interaction

### Spatial Qualities



**Green canopy**



## Testbed 2: Enhancing Interaction

### Spatial Qualities



Source: Google Maps



## Testbed 2: Enhancing Interaction

### Spatial Qualities



Meeting square





## Conclusions

### Public Space

- By **reducing car space occupation** in dense urbanized environments and **redefining the street scape**, public space has great potential to **accommodate restorative environments and foster social interaction**
- Creating room for **appropriation** of public space and promoting the **diverse activities**, public space can **stimulate ethnic diversity** in multi-ethnic cities
- **Improved connectivity and accessibility** to restorative environment can increase opportunities for diverse population to **participate in public life**

## Conclusions

### Methods

- **Data-driven** analysis and **computation approaches** in urban design can reveal **significant insight and opportunities** for designing public space.
- **Network analysis** and the availability of **demographic data** informed the project from a **different perspective that enriched the methodology** of the design assignment
- **Traditional methods**, such as observations, interviews, and fieldwork are still very **critical for the success** of such a project



# Thank you!

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TU Delft  
2023

