



**Politecnico
di Torino**

PLANNING FOR ENVIRONMENT

DISTRICT 16

Madonna di Campagna

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PART I

Land Cover (LC) And Imperviousness Degree (IMD) Calculations

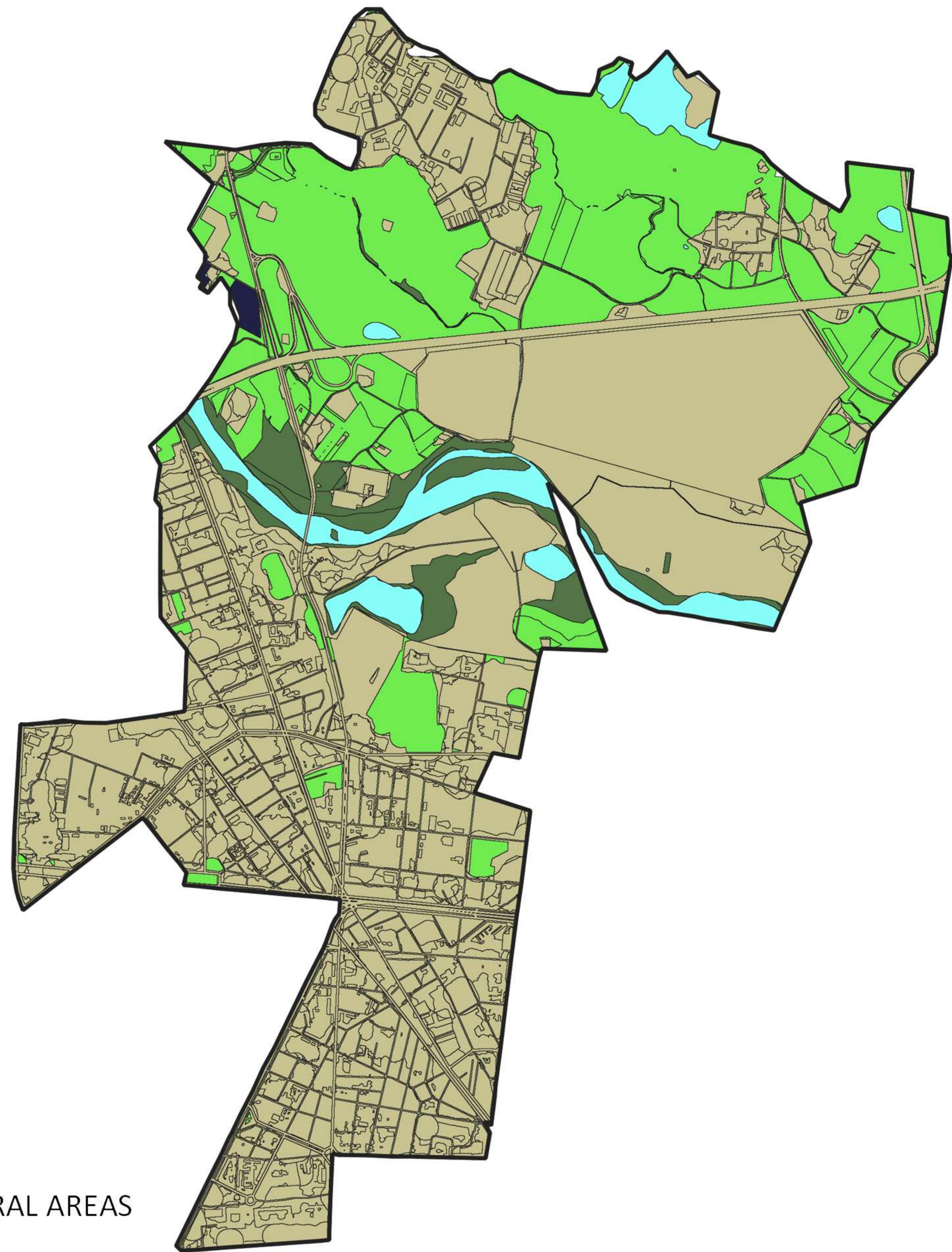


District 16
Madonna di Campagna

Land Use Level I

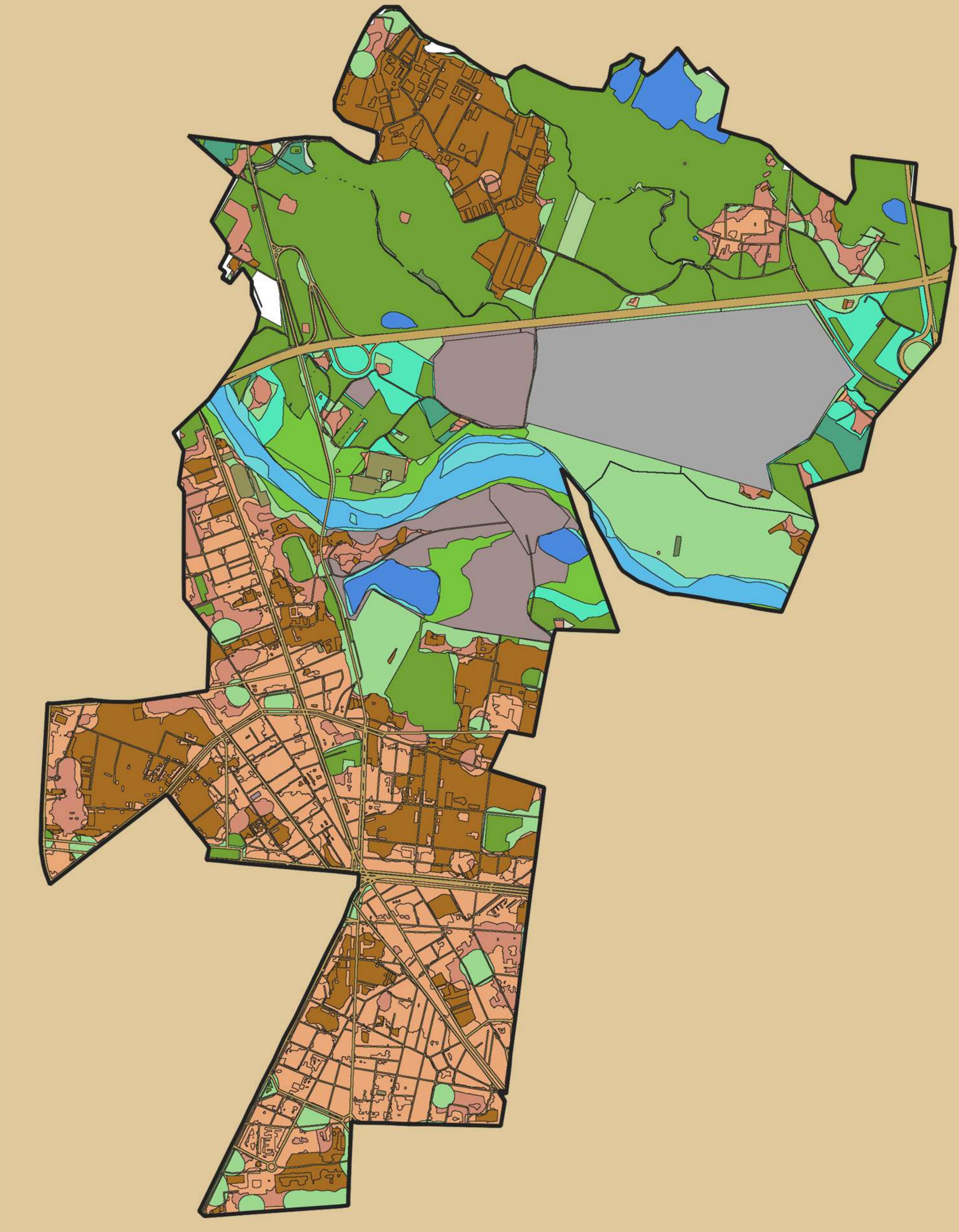
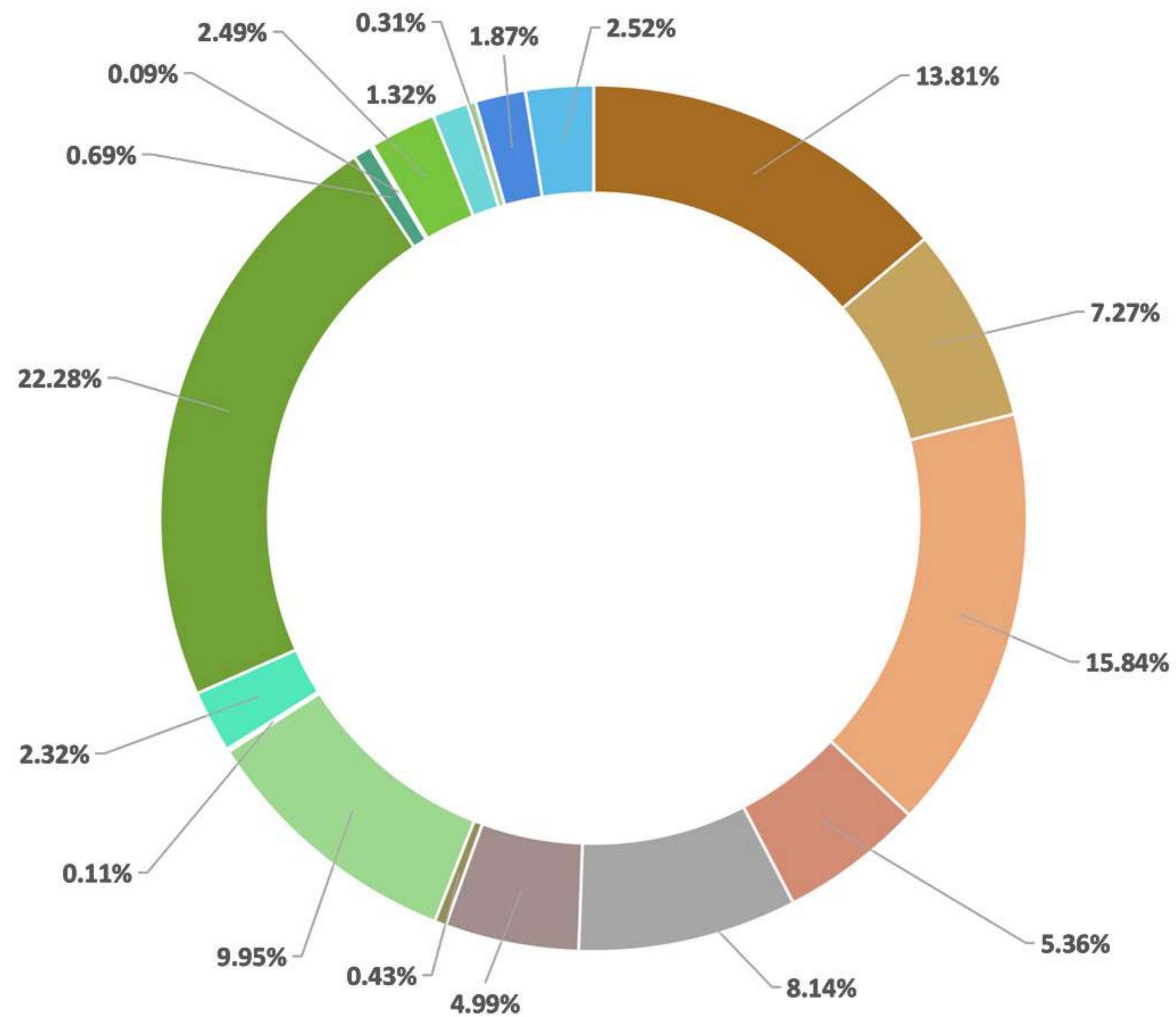
- AGRICULTURAL AREAS
- ARTIFICIAL SURFACES
- FOREST AND SEMI NATURAL AREAS
- WATER BODIES
- NULL

0.5 0 0.5 1 1.5 2 km



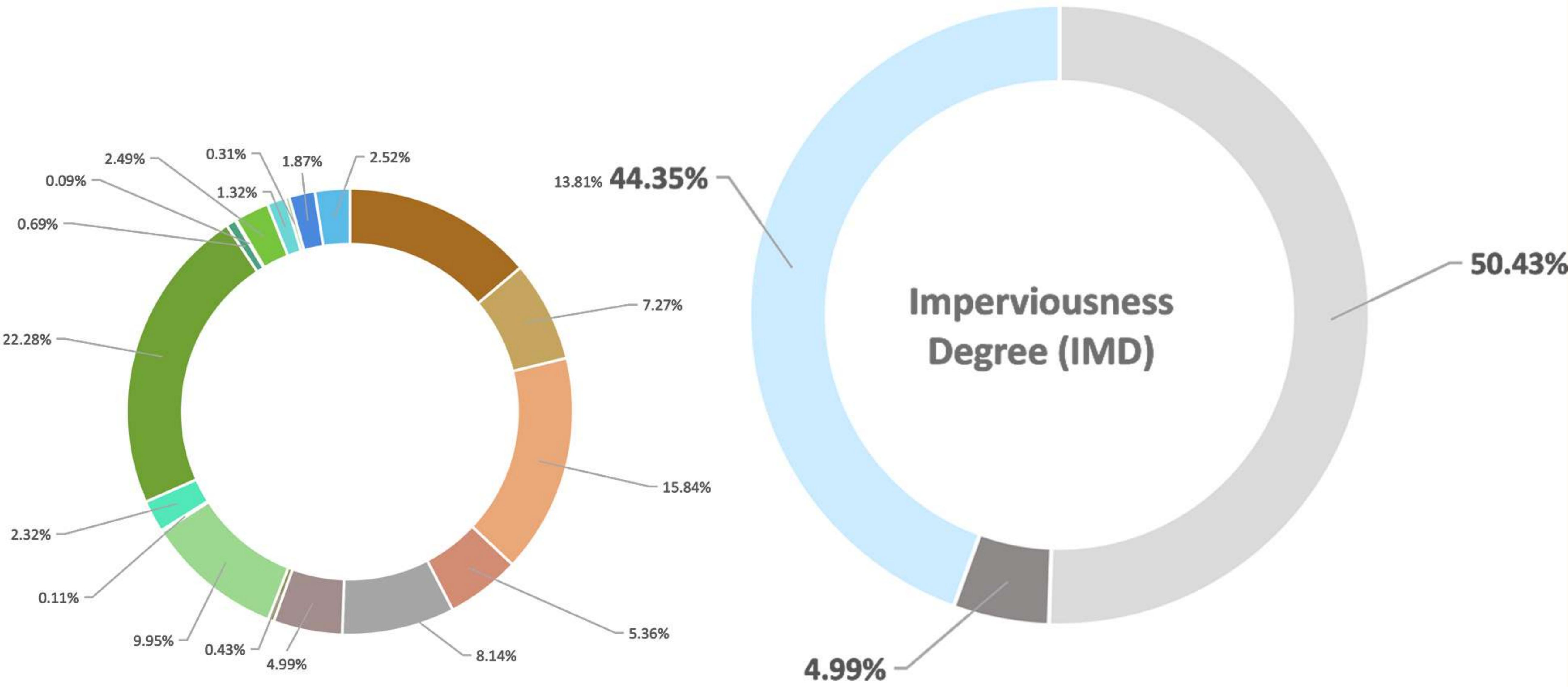
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LEVEL III_LAND COVER

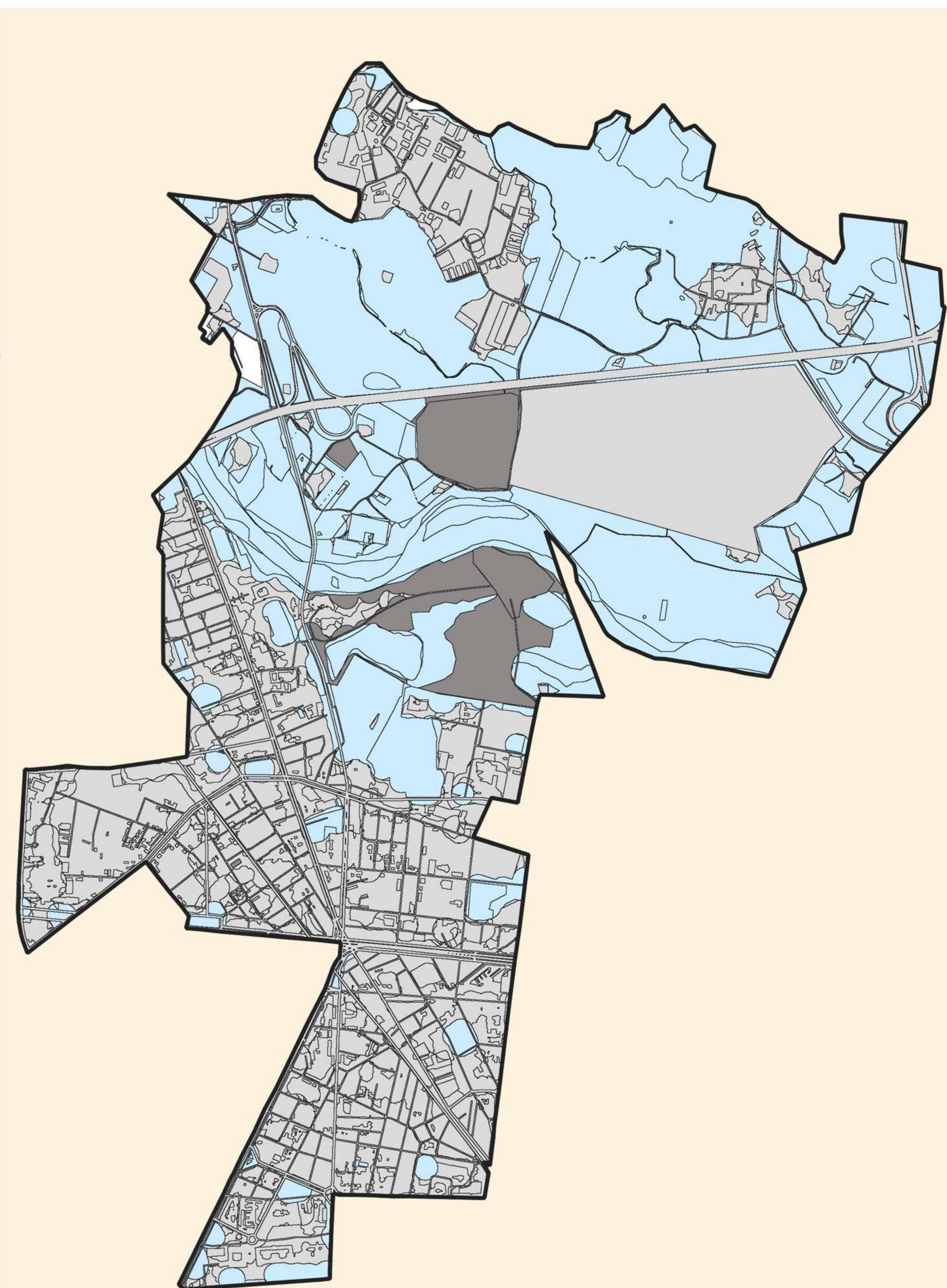


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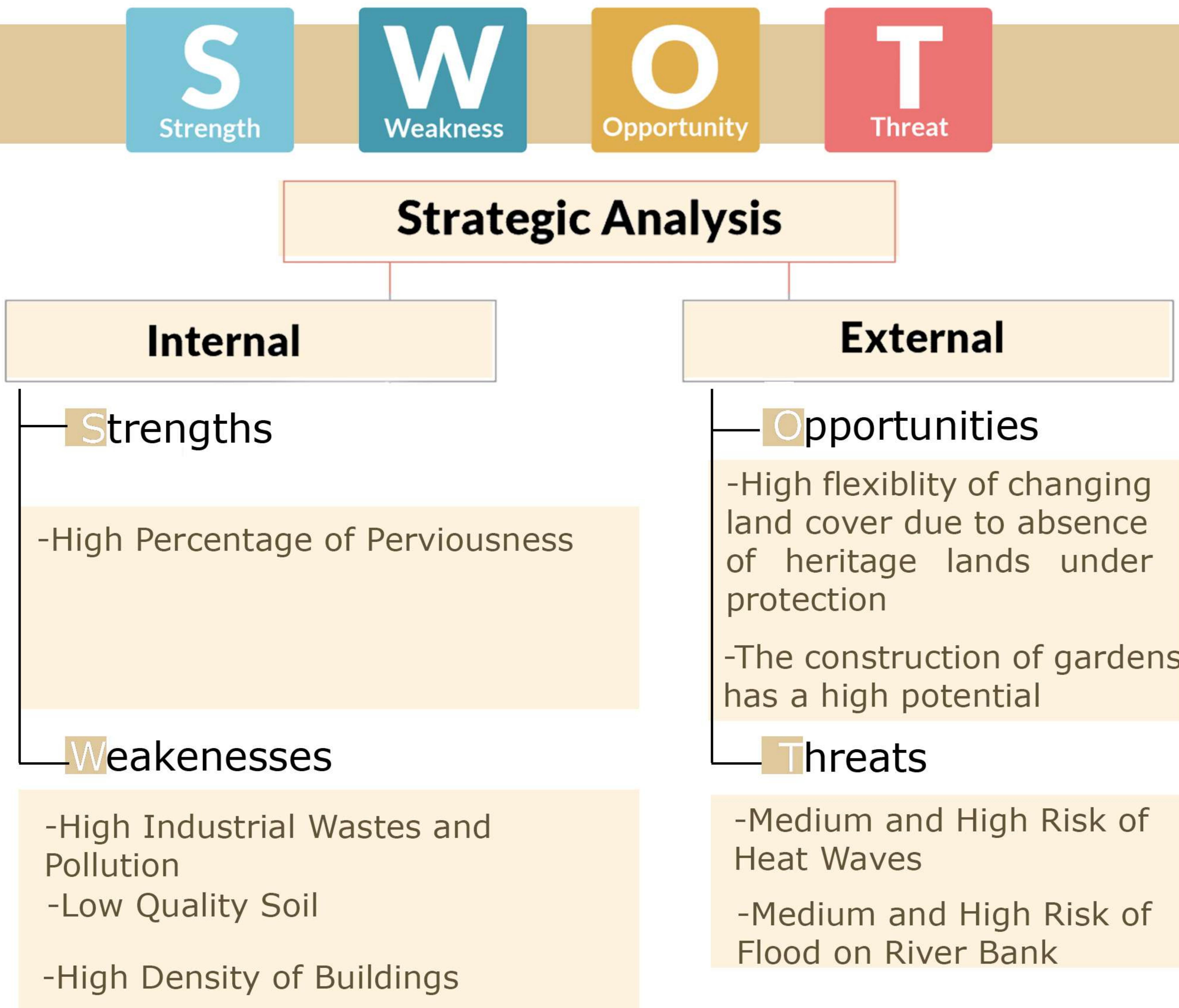
Imperviousness Degree (IMD)



LEVEL 3	AREA	PERCENT	Imperviousness degree (IMD)
Industrial or commercial units	1,413,243.48	13.81%	
Road and rail networks and associated land	744,321.87	7.27%	
Continuous urban fabric	1,621,081.52	15.84%	Sealed 50.43%
Discontinuous urban fabric	548,414.23	5.36%	
Dump sites	833,098.19	8.14%	
Mineral extraction sites	510,358.89	4.99%	Untouchable 4.99 %
Sport and leisure facilities	43,743.06	0.43%	
Green urban areas	1,017,778.38	9.95%	
Land principally occupied by agriculture, with significant areas of natural vegetation	10,927.76	0.11%	
Permanently irrigated land	236,400.97	2.32%	
Arable land	2,279,496.36	22.28%	
Pastures	70,421.42	0.69%	
Mixed forest	9,635.62	0.09%	
Broad-leaved forest	254,497.58	2.49%	
Beaches, dunes, sands	135,049.21	1.32%	
Permanent crops	31,248.66	0.31%	
Water bodies	191,082.06	1.87%	
Water courses	257,402.56	2.52%	



PART II SWOT Analysis



Policy Coherence

- Sustainable and Resilient Turin in 2030
- Policy for the Protection of EU waters
- The SMILE Master Plan

Policies and Goals

Sustainable and Resilient Turin in 2030

PARTICIPATORY

Actively engaged residents and neighborhoods



DYNAMIC

Rich with **culture, innovation, opportunities and talent**



LIVEABLE

Connected, clean, healthy and green



JUST

Respectful of each person's rights



Goals

Macro Goals

- Green Infrastructure
- Improve the quality of green space
- Enhance the resident's quality of life and public space

Policy for the Protection of EU waters

The Management Plan of the river basin district is the operational tool envisaged by Directive 2000/60/EC, transposed at national level by Legislative Decree 152/06 and subsequent amendments and additions, to implement a coherent and sustainable policy for the protection of EU waters , through an integrated approach of the various management and ecological aspects at the hydrographic district scale.

<https://pianoacque.adbpo.it/>

The SMILE Master Plan



SMART
MOBILITY
INCLUSION
LIFE & HEALTH
ENERGY

<https://piemonteinnova.it/portfolio-articoli/smile/>

Micro Goals

- Increase Green Spaces
- Improve the quality of public space and improve the living quality of residents
- Surface Water and Flood Management


PART III

Proposal of environmental solutions

PROBLEMS	SOLUTIONS	POLICIES
Medium and High Risk of Heat Waves	1 Recreation of Green and Socialized Neighborhood Parks	● Torino 2030
Medium and High Risk of Flood on River Bank	2 Transforming Parking Lots	● The Water Protection Plan (PTA)
High Industrial Wastes and Pollution	3 Sustainable Green Buildings (Roof Gardens)	● The "SMILE" Master Plan
Low Quality Soil	4 Walk Streets	
High density of building	5 Full Depth Permeable Pavement Shoulder Design	

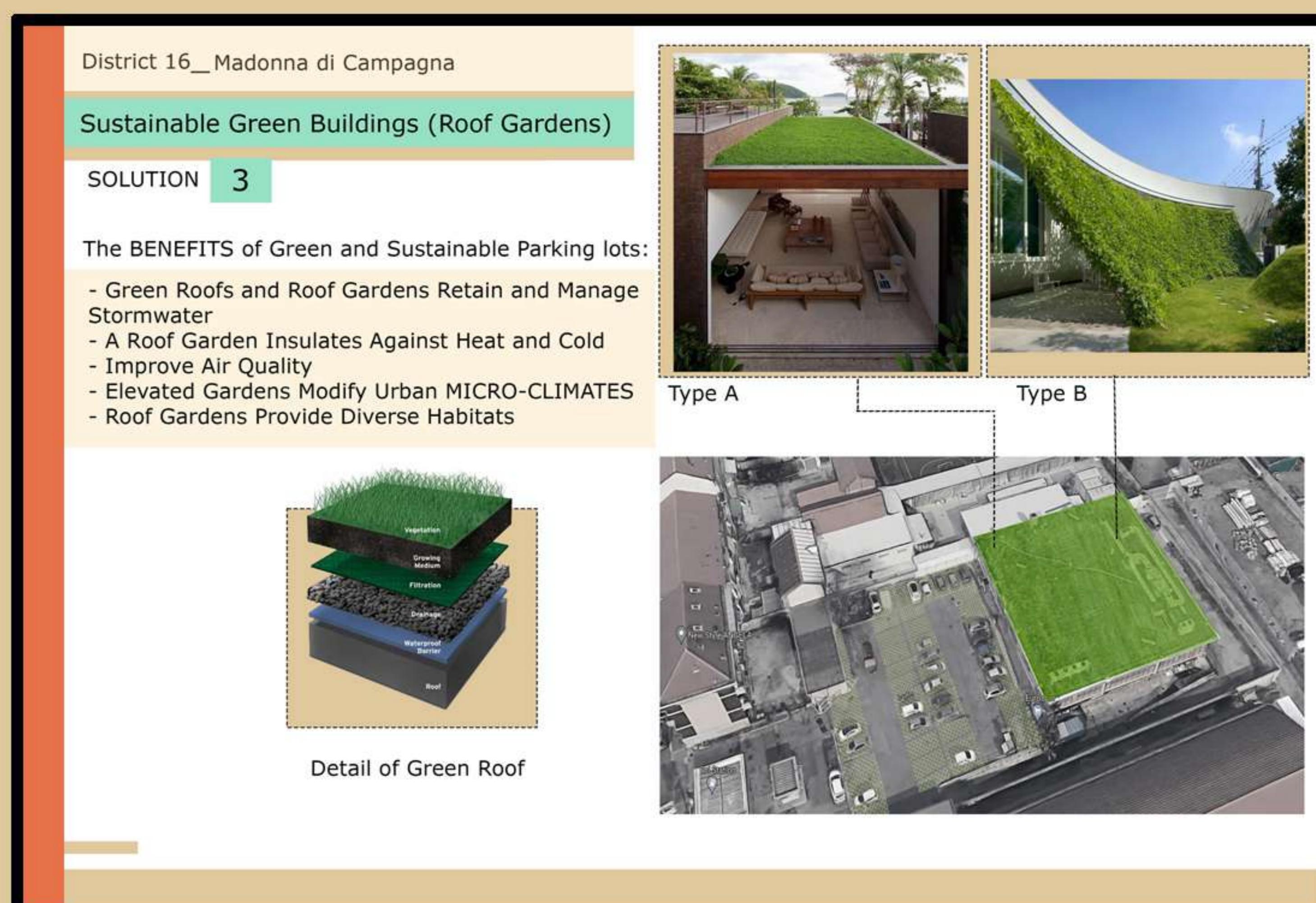
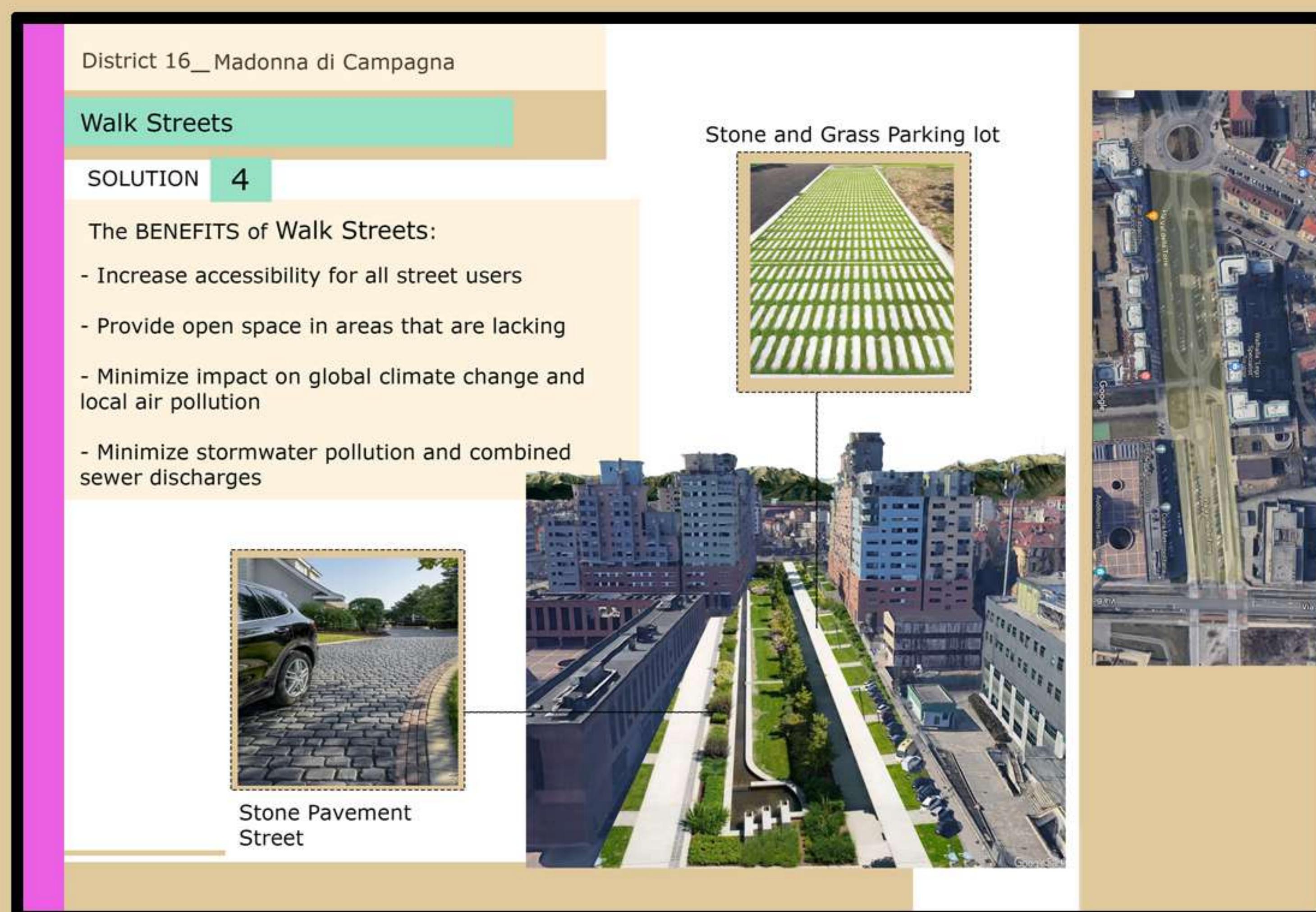
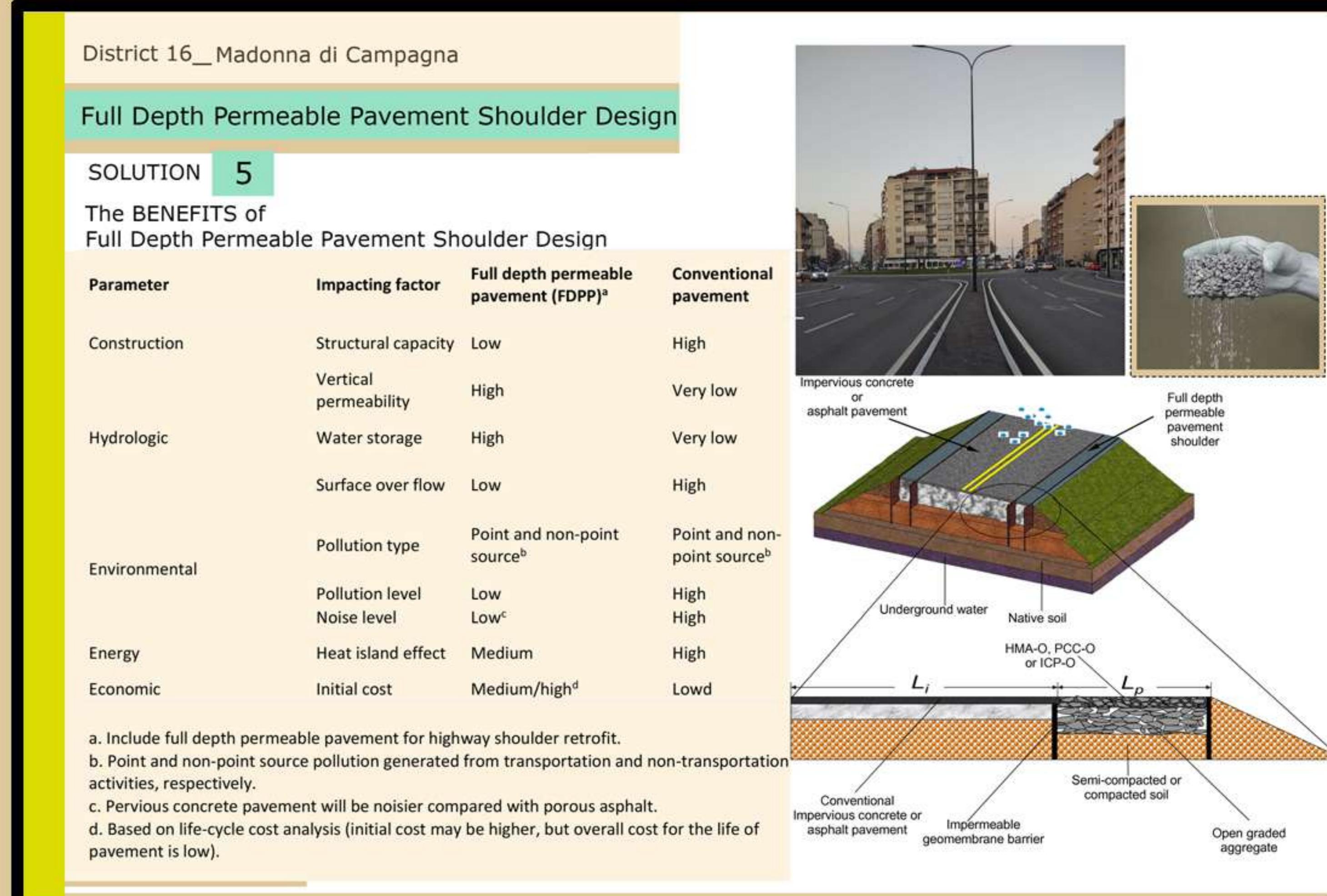
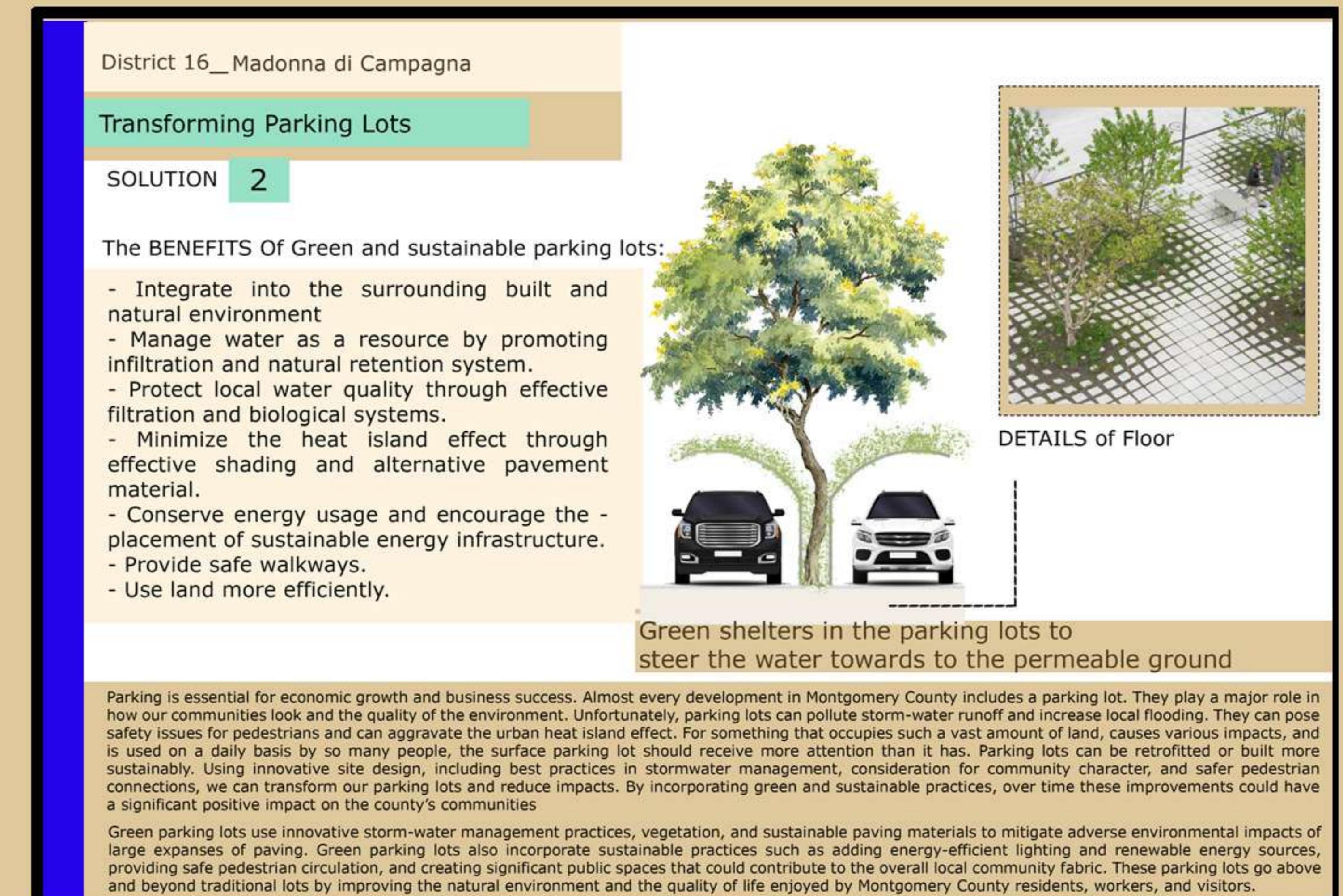
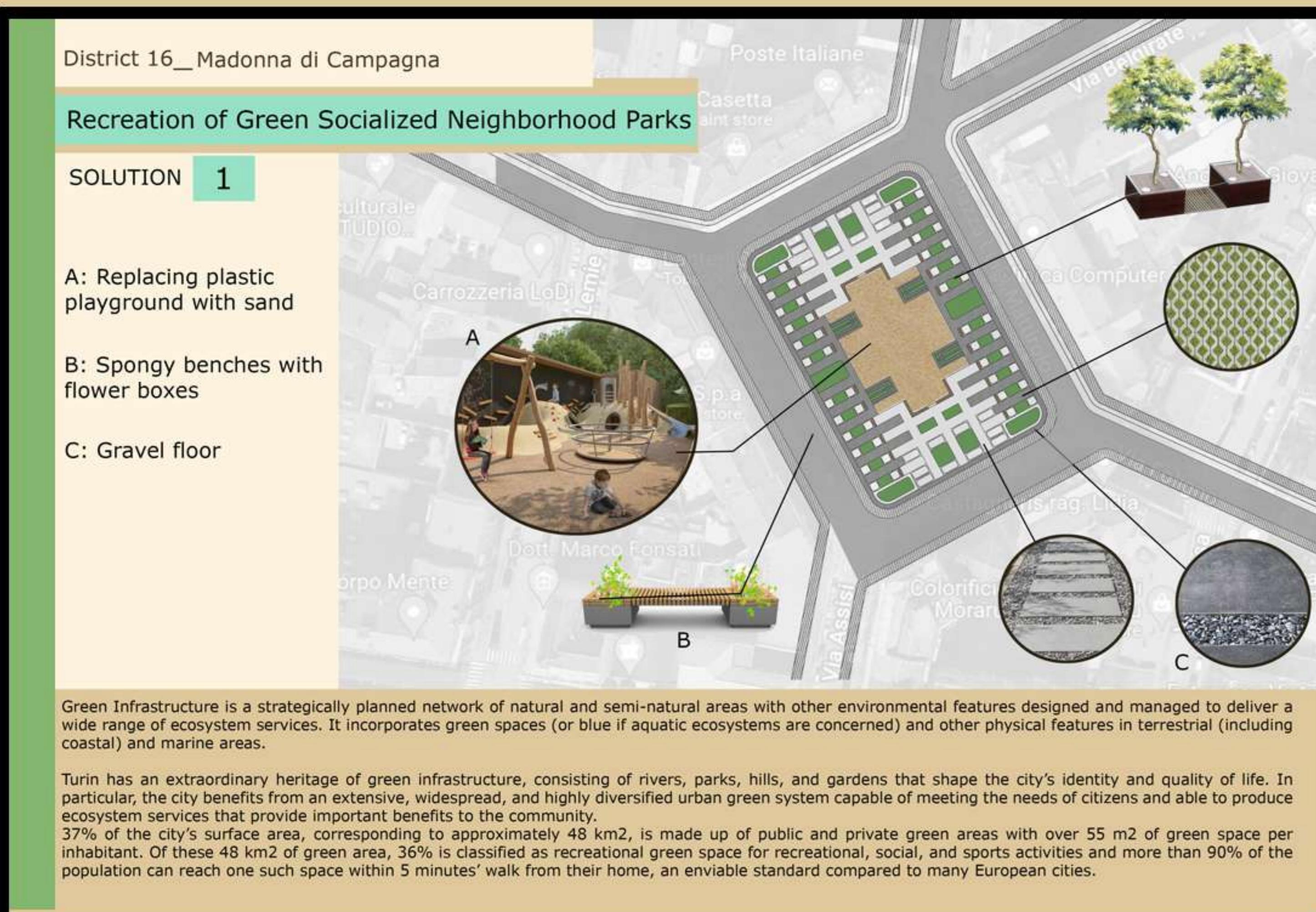
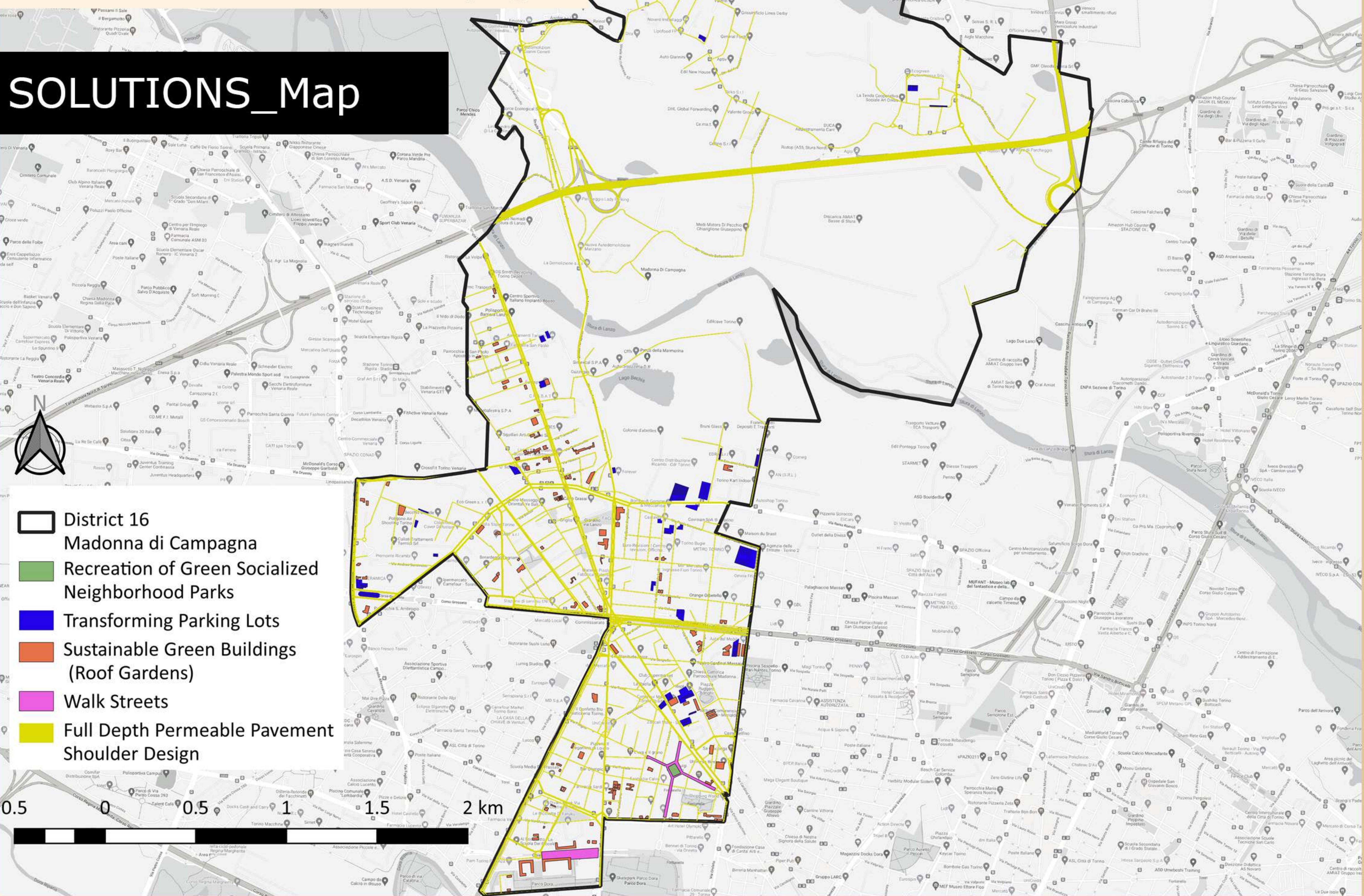
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PROBLEMS



District 16_ Madonna di Campagna

SOLUTIONS_Map

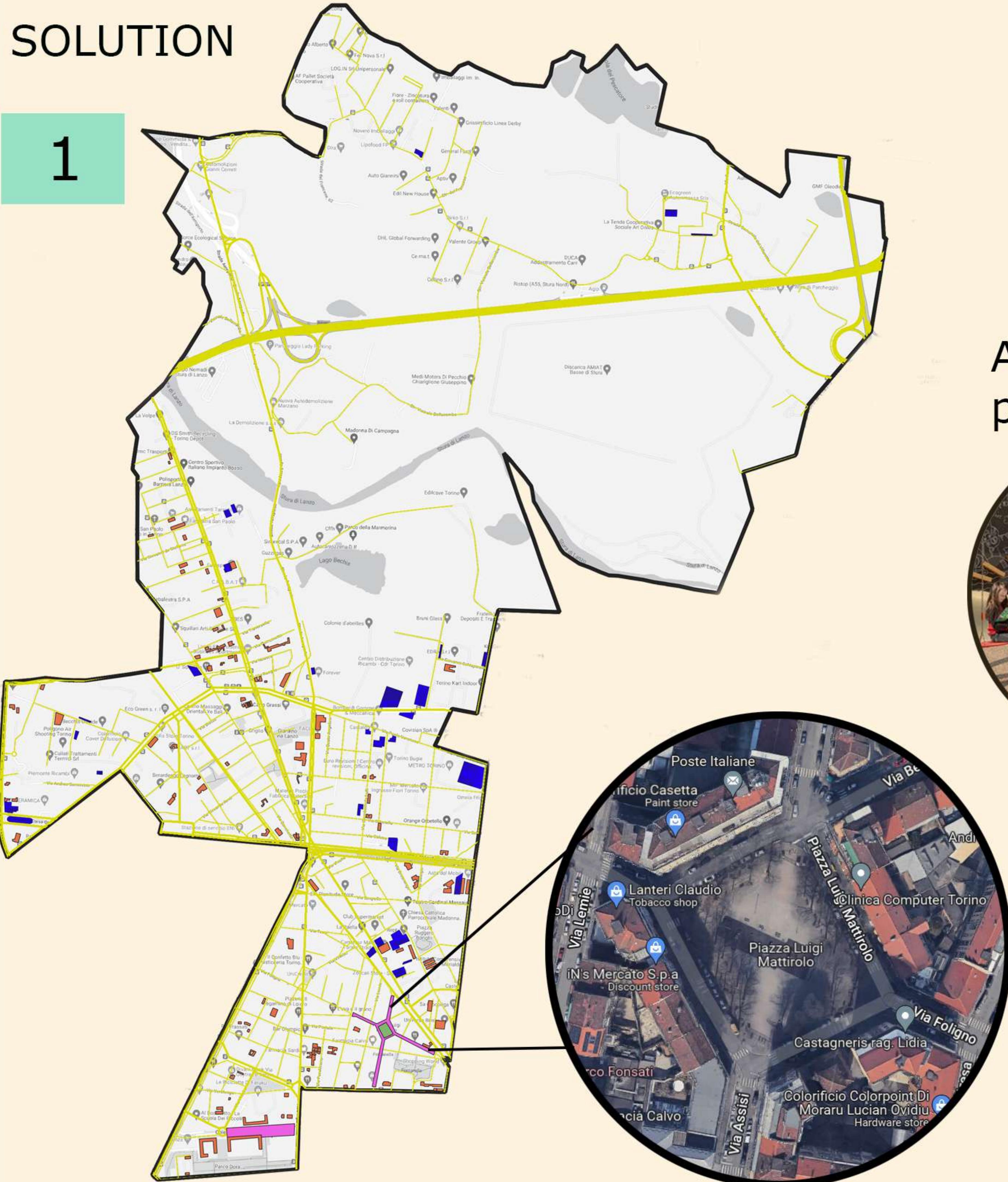


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Recreation of Green Socialized Neighborhood Parks

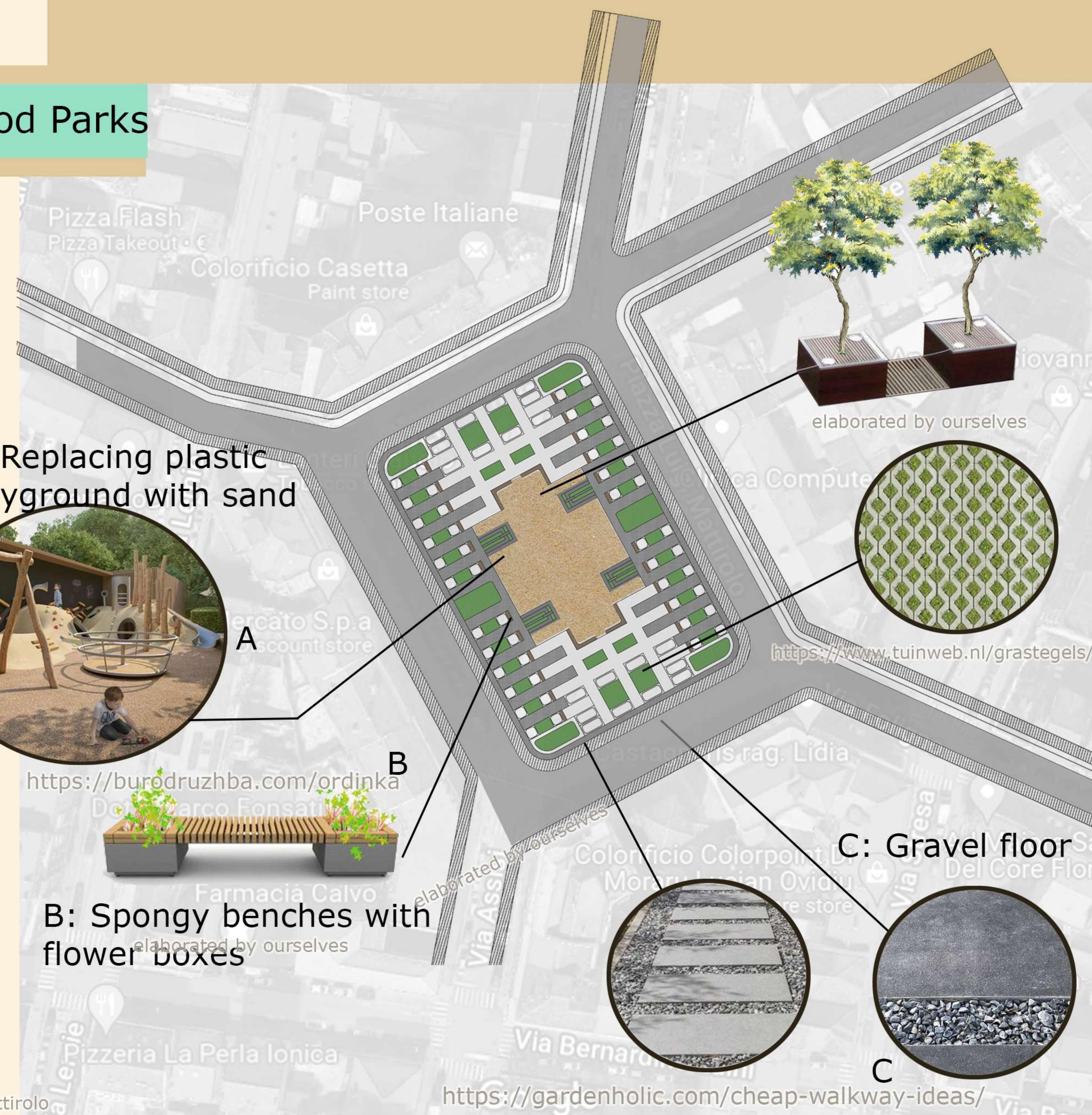
SOLUTION

1



<https://www.google.com/maps/place/Giardino+di+Piazza+Mattiolo>

2

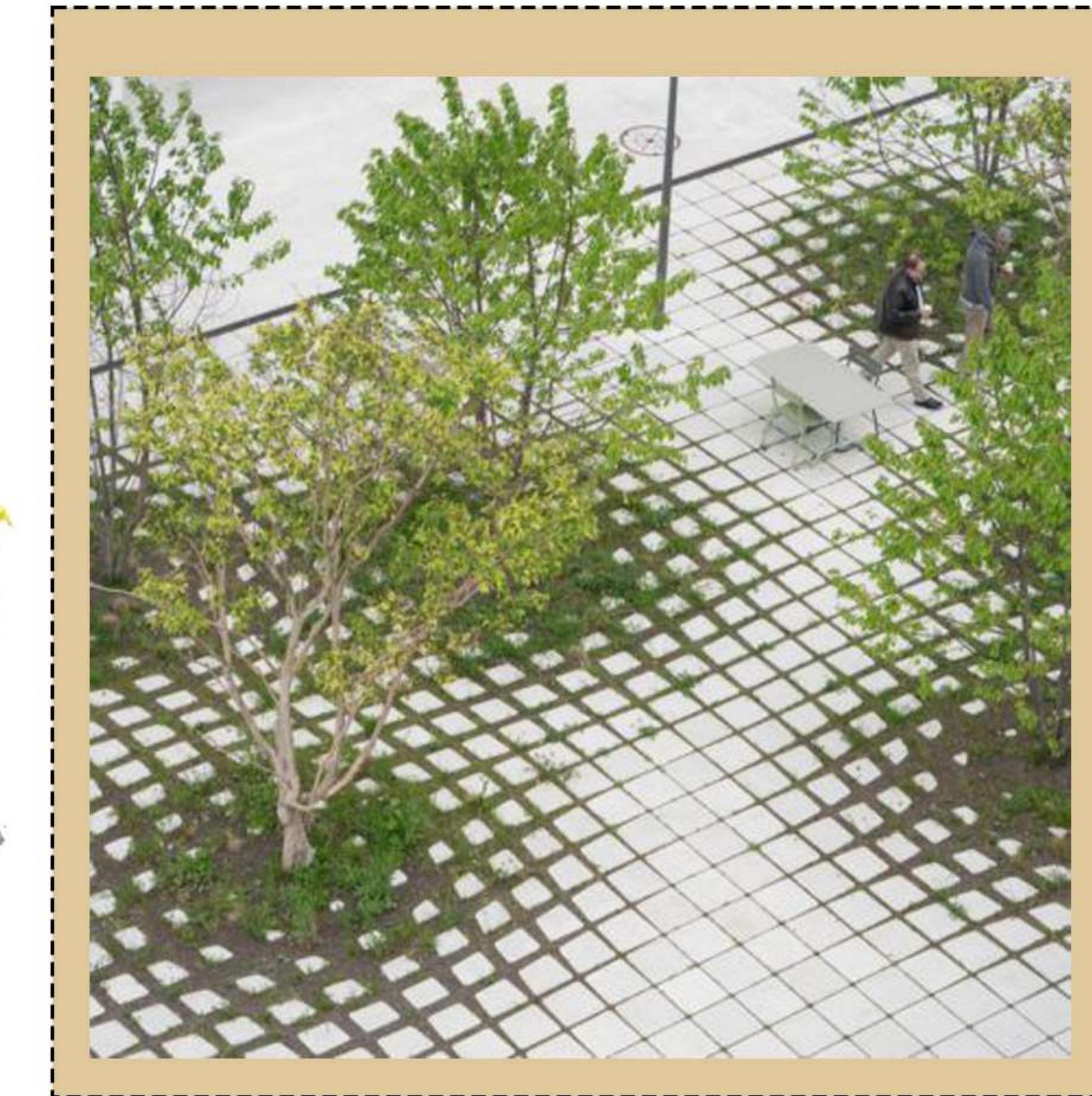
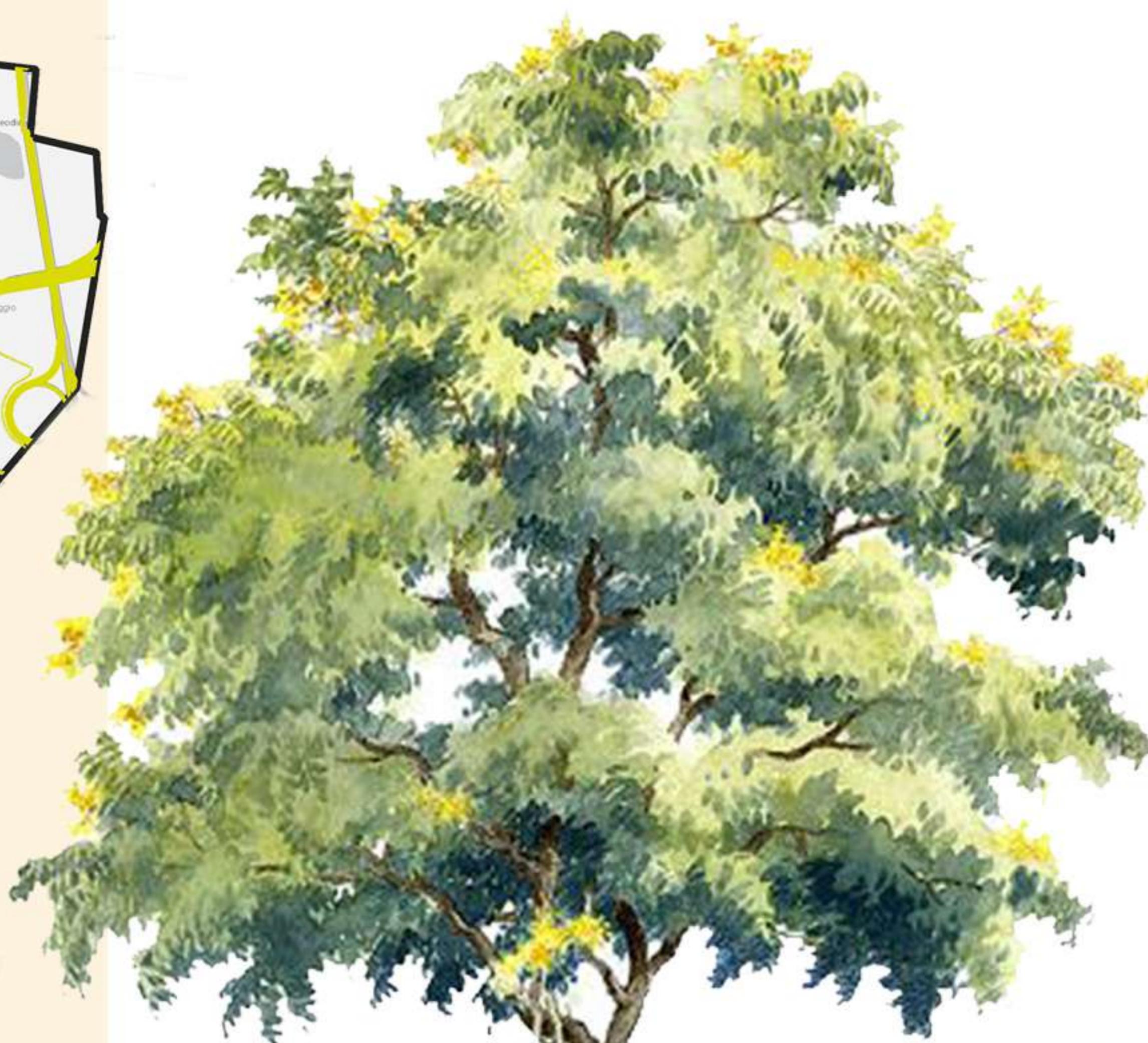
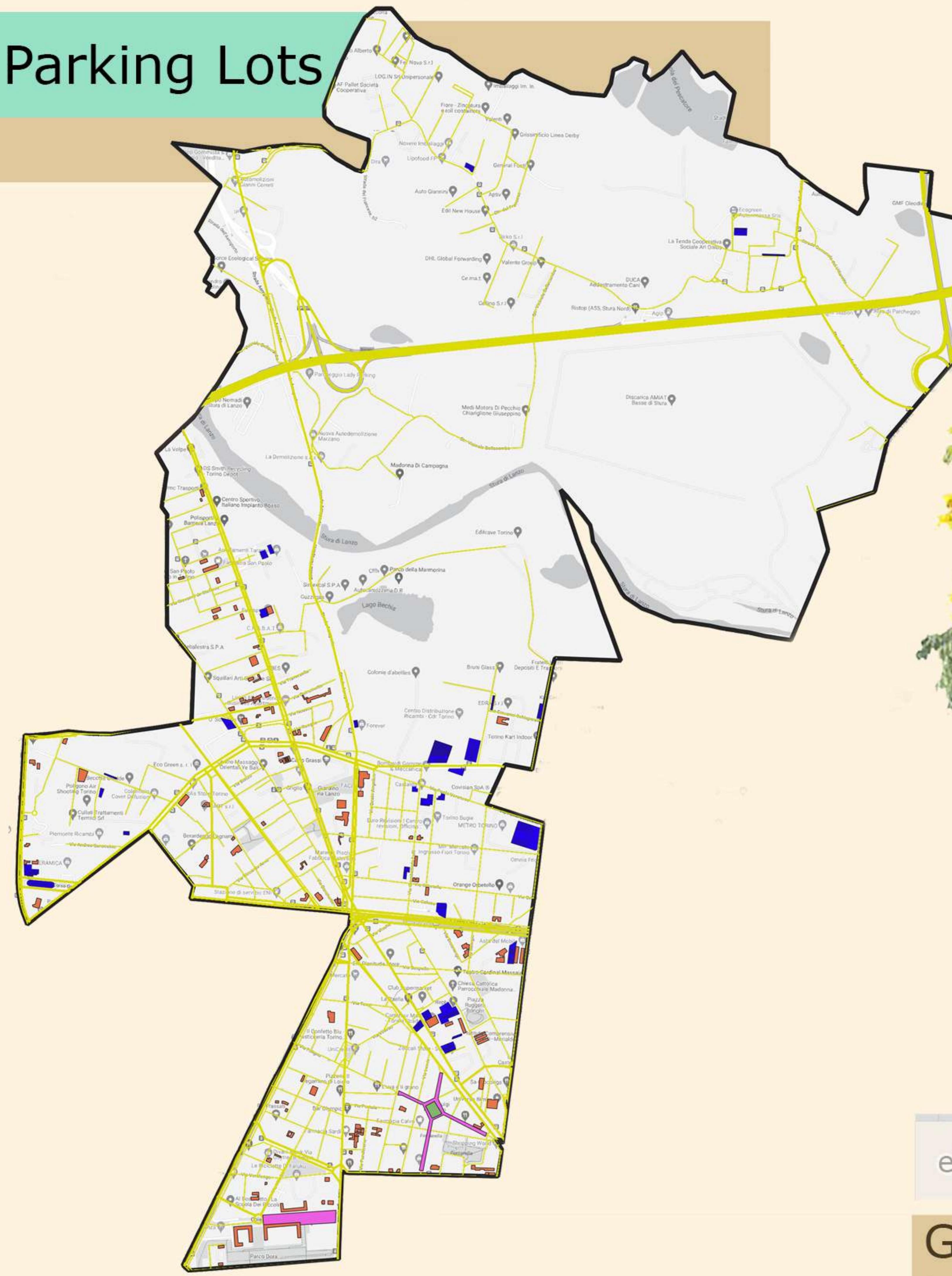


District 16_Madonna di Campagna

Transforming Parking Lots

SOLUTION

2



DETAILS of Floor

<https://landezine-award.com/roche-campus-kaiseraugst/>



The BENEFITS Of Green and sustainable parking lots:

Green shelters in the parking lots to steer the water towards to the permeable ground

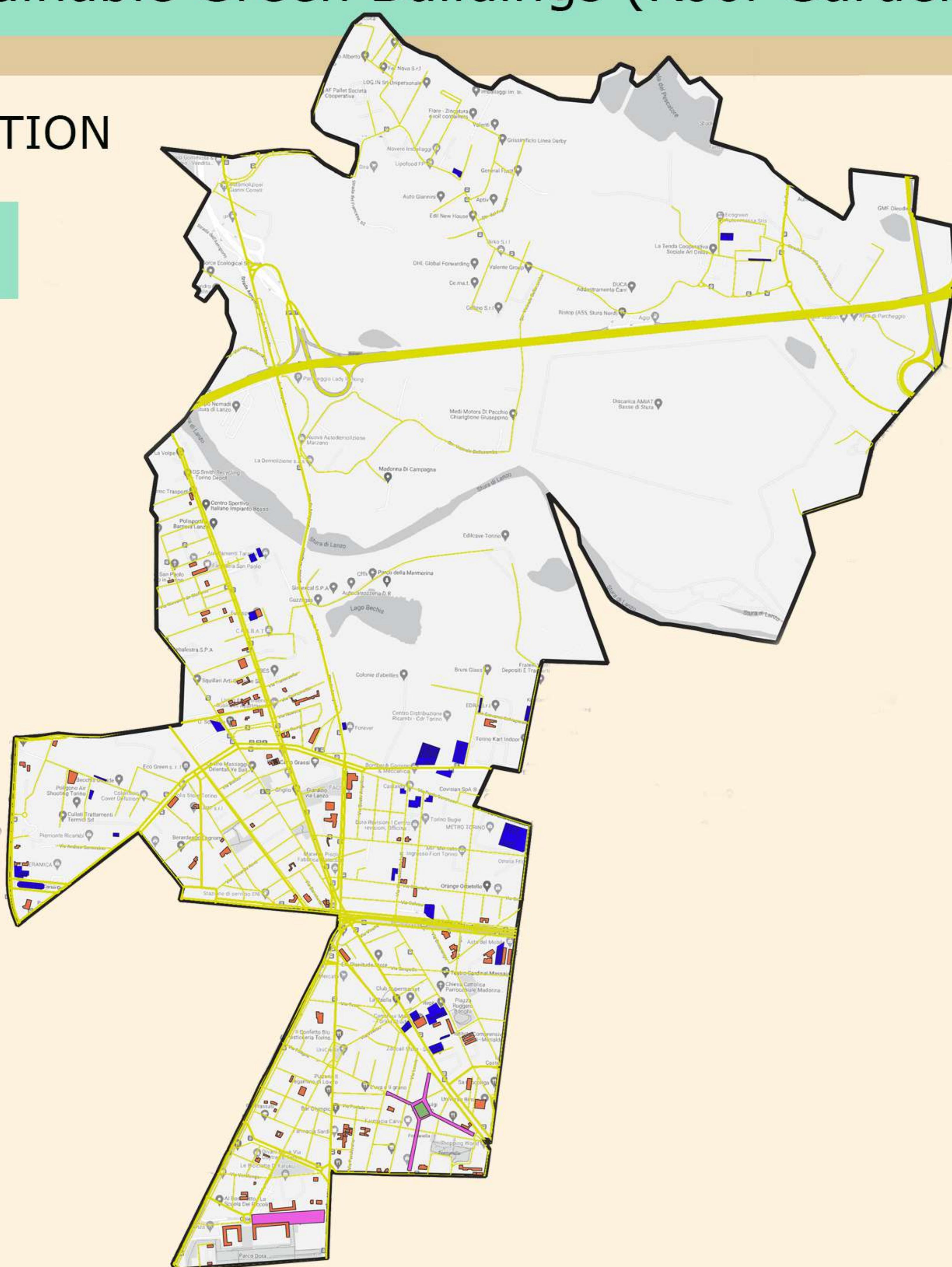
- Integrate into the surrounding built and natural environment
- Manage water as a resource by promoting infiltration and natural retention system.
- Protect local water quality through effective filtration and biological systems.
- Minimize the heat island effect through effective shading and alternative pavement material.
- Conserve energy usage and encourage the placement of sustainable energy infrastructure.
- Provide safe walkways.
- Use land more efficiently.

District 16_ Madonna di Campagna

Sustainable Green Buildings (Roof Gardens)

SOLUTION

3

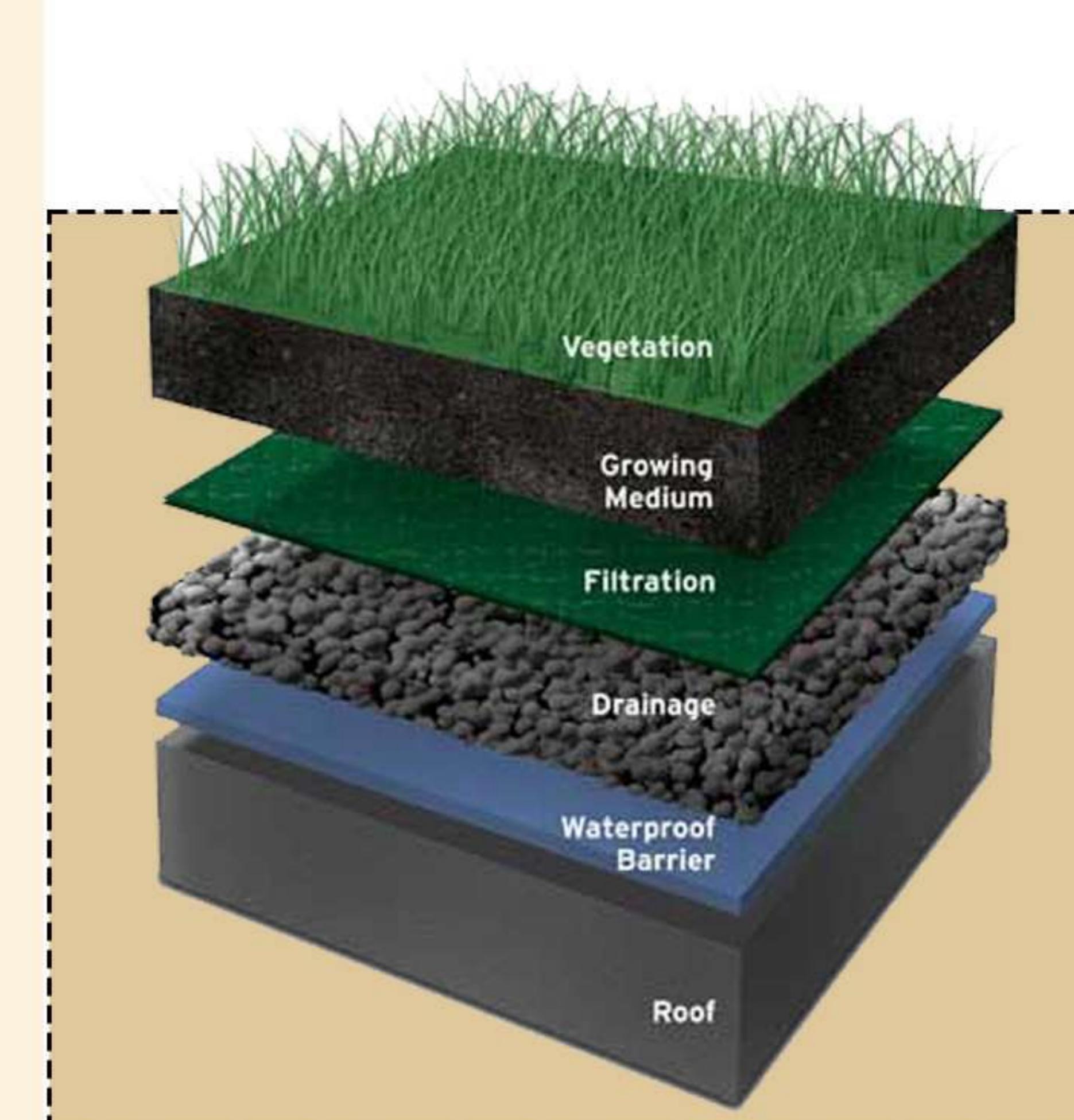


Type A

<https://www.architectureartdesigns.com/30-incredible-green-roof-designs/>

Type B

<https://www.archdaily.com/421607/green-screen-house-hideo-kumaki-architect-office>



Detail of Green Roof



elaborated by ourselves

The BENEFITS of Green and Sustainable Parking lots:

- Green Roofs and Roof Gardens Retain and Manage Stormwater
- A Roof Garden Insulates Against Heat and Cold
- Improve Air Quality
- Elevated Gardens Modify Urban MICRO-CLIMATES
- Roof Gardens Provide Diverse Habitats

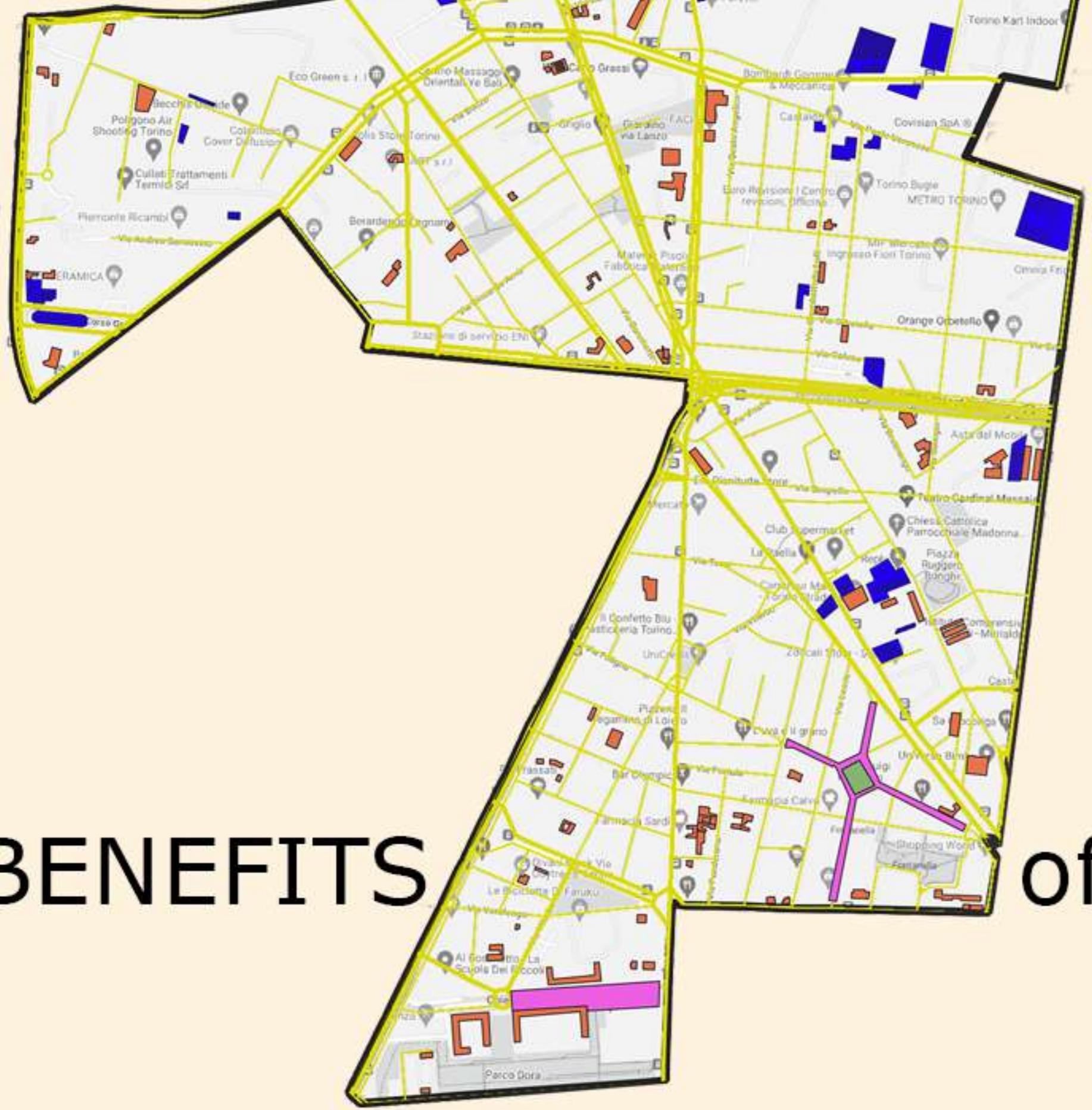
<https://www.birlaa1.com/urban-rooftop-garden.html>

District 16_Madonna di Campagna

Walk Streets

SOLUTION

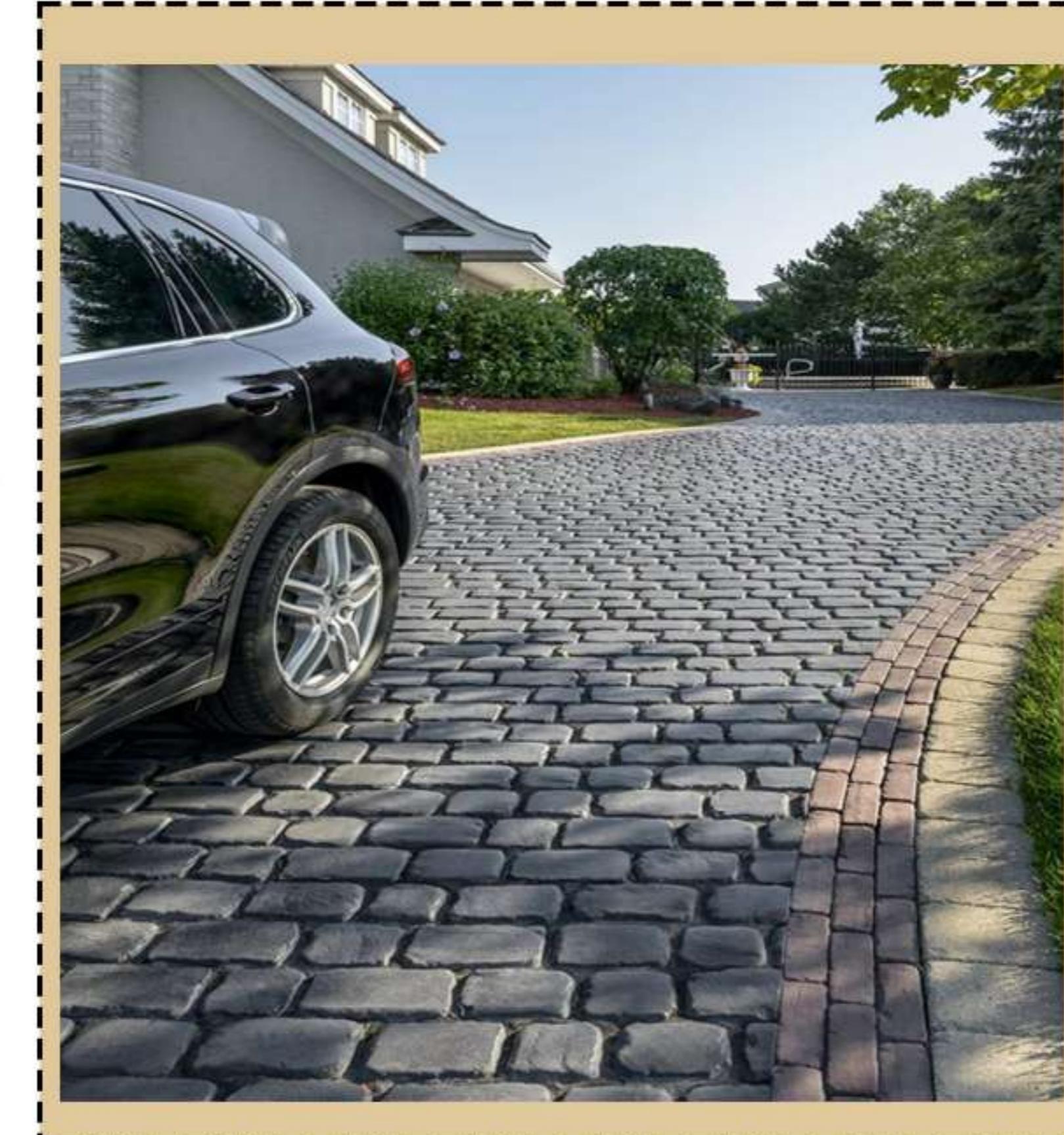
4



The BENEFITS of Walk Streets:

- Increase accessibility for all street users
- Provide open space in areas that are lacking
- Minimize impact on global climate change and local air pollution
- Minimize stormwater pollution and combined sewer discharges

Stone Pavement Street



<https://www.houzz.com.au/photos/unilock-driveway>

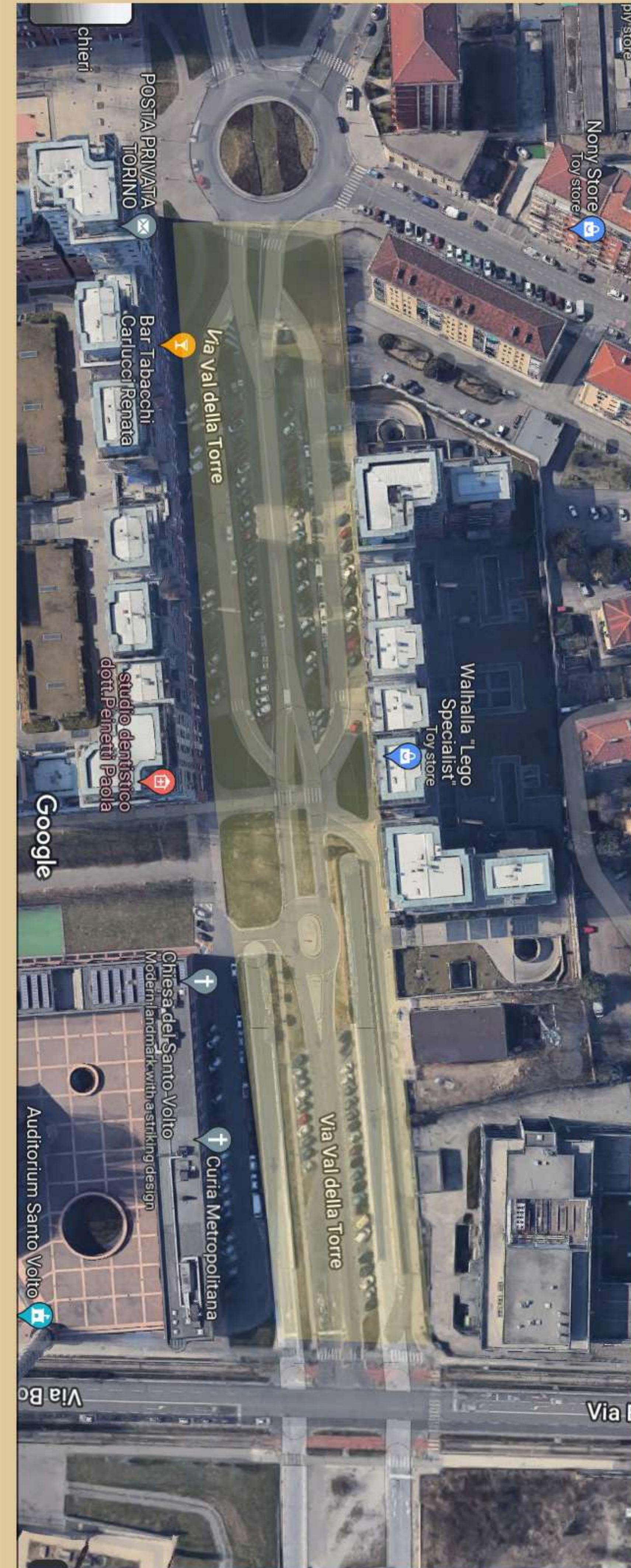
Stone and Grass Parking lot



<https://www.gardenista.com>



elaborated by ourselves

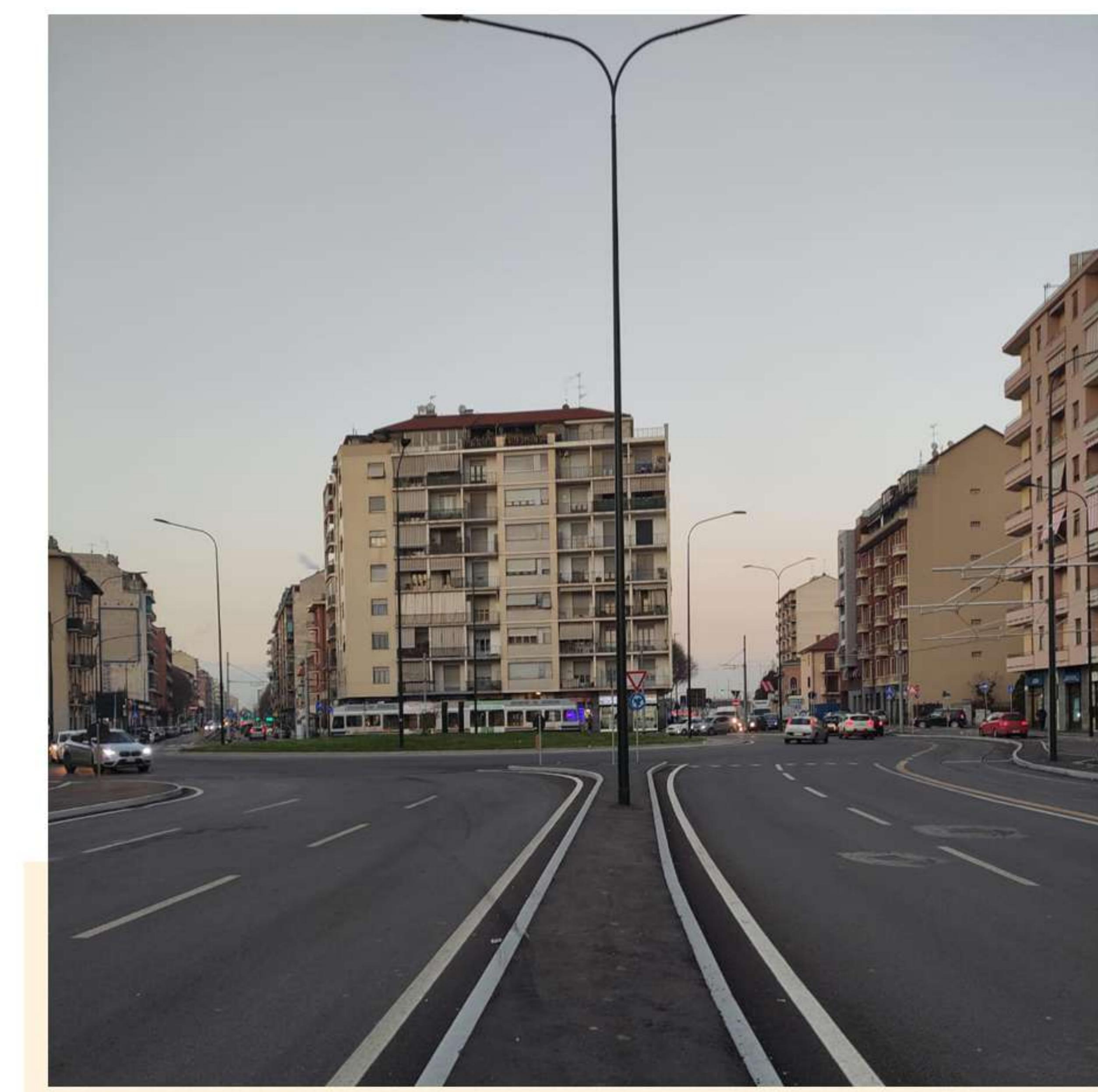
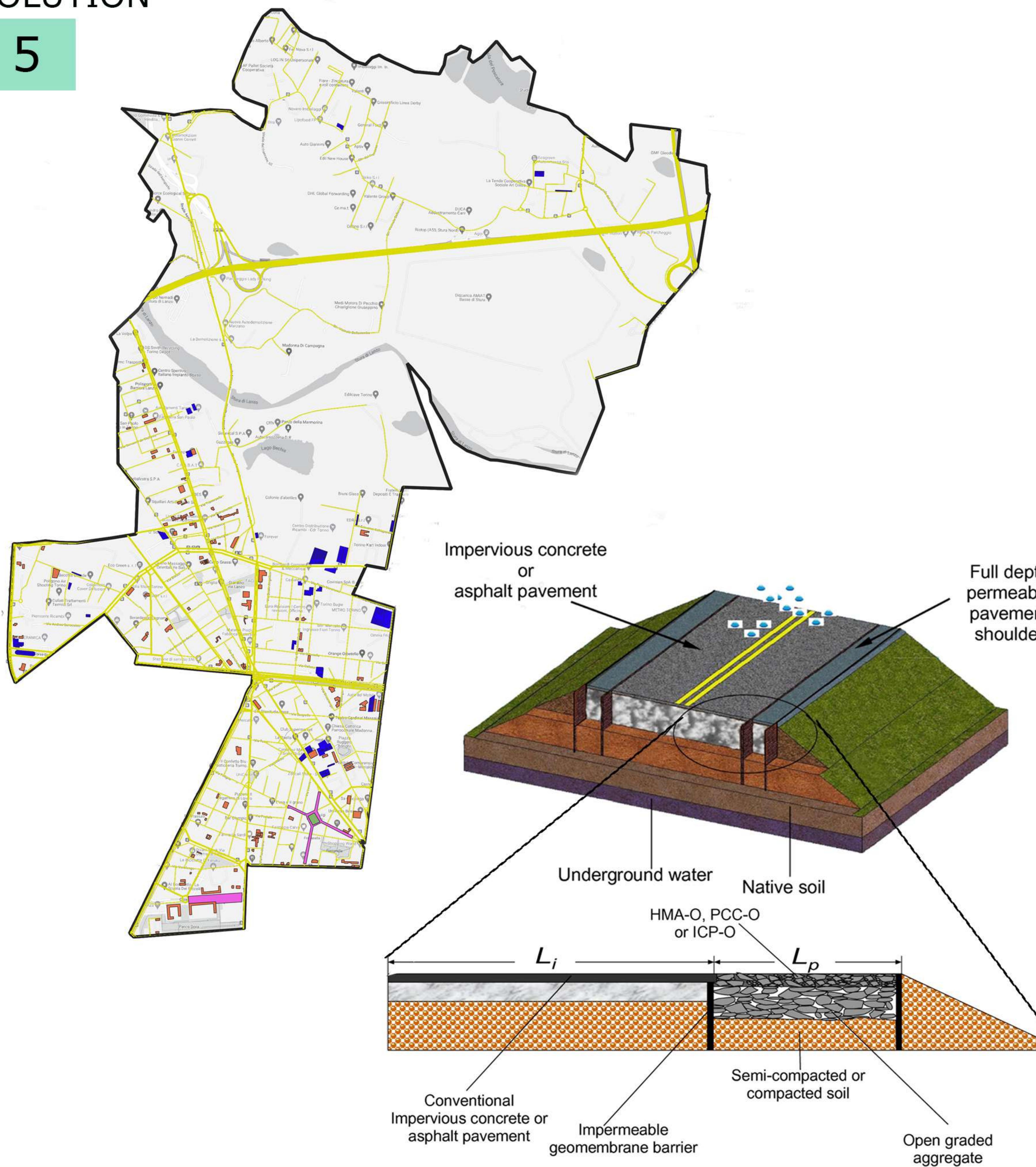


<https://www.google.com/maps/place/Walhalla+%22Lego+specialist%22>

Full Depth Permeable Pavement Shoulder Design

SOLUTION

5

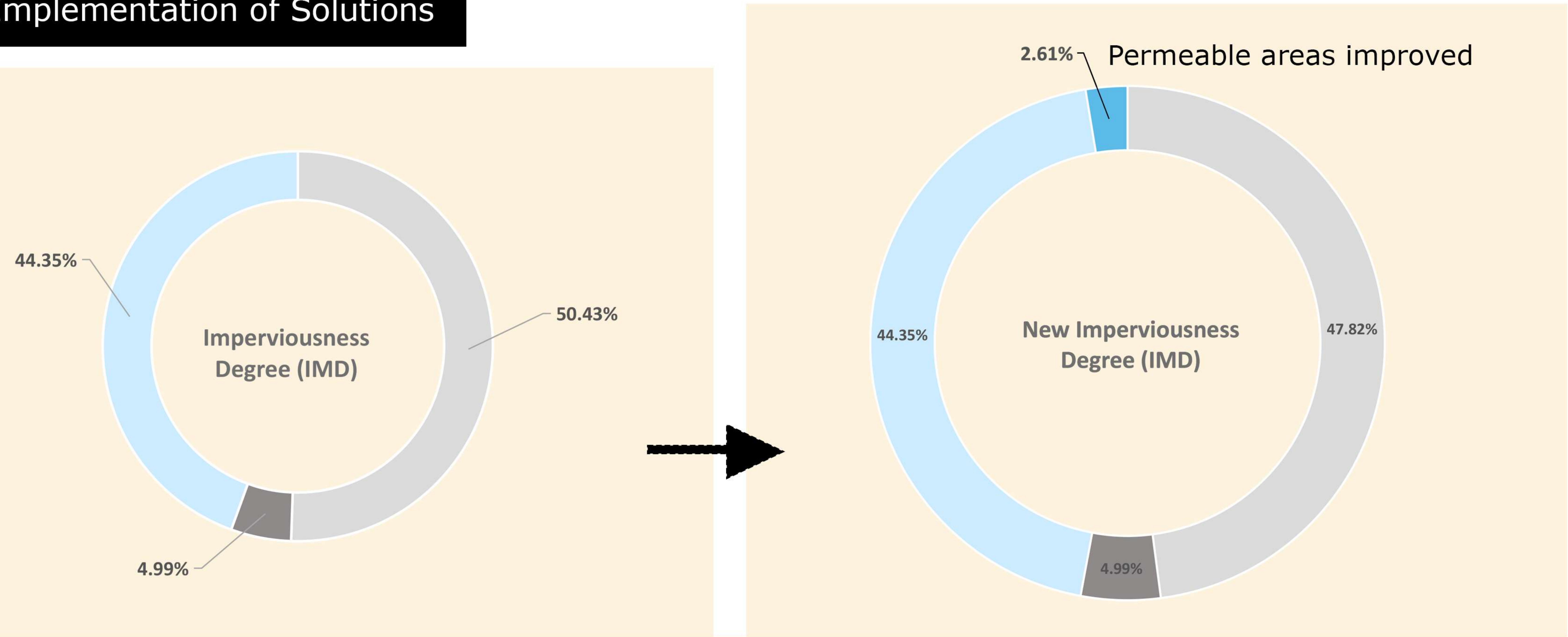


elaborated by ourselves

The BENEFITS of Full Depth Permeable Pavement Shoulder Design

Parameter	Impacting factor	Full depth permeable pavement (FDPP) ^a	Conventional pavement
Construction	Structural capacity	Low	High
	Vertical permeability	High	Very low
Hydrologic	Water storage	High	Very low
	Surface over flow	Low	High
Environmental	Pollution type	Point and non-point source ^b	Point and non-point source ^b
	Pollution level	Low	High
Energy	Noise level	Low ^c	High
	Heat island effect	Medium	High
Economic	Initial cost	Medium/high ^d	Lowd

Implementation of Solutions



Implementation of Solutions Calculation

Solutions Ordered by Possibility		Area (sqm)	Intervention Ratio (%)	Final Intervention Area (sqm)	Relative to Total Area (%)
Solution 1	Recreation of Green Socialized Neighborhood Parks	2,653.76	100	2,653.76	0.03%
Solution 2	Transforming Parking Lots	58,032.26	Variable	17,672.93	0.17%
Solution 3	Sustainable Green Buildings (Roof Gardens)	68,630.86	100	68,630.86	0.67%
Solution 4	Walk Streets	29,412.23	100	29,412.23	0.29%
Solution 5	Full Depth Permeable Pavement Shoulder Design	744,321.87	20	148,864.37	1.46%
Total New Permeable Areas				267,234.15	2.62%