



# Creating a Green legacy in the City of Amsterdam

Green Infrastructure challenges in rapidly growing cities

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# **Summary**

**Context:** facts, challenges and trends

**Policies:** → research

→ results

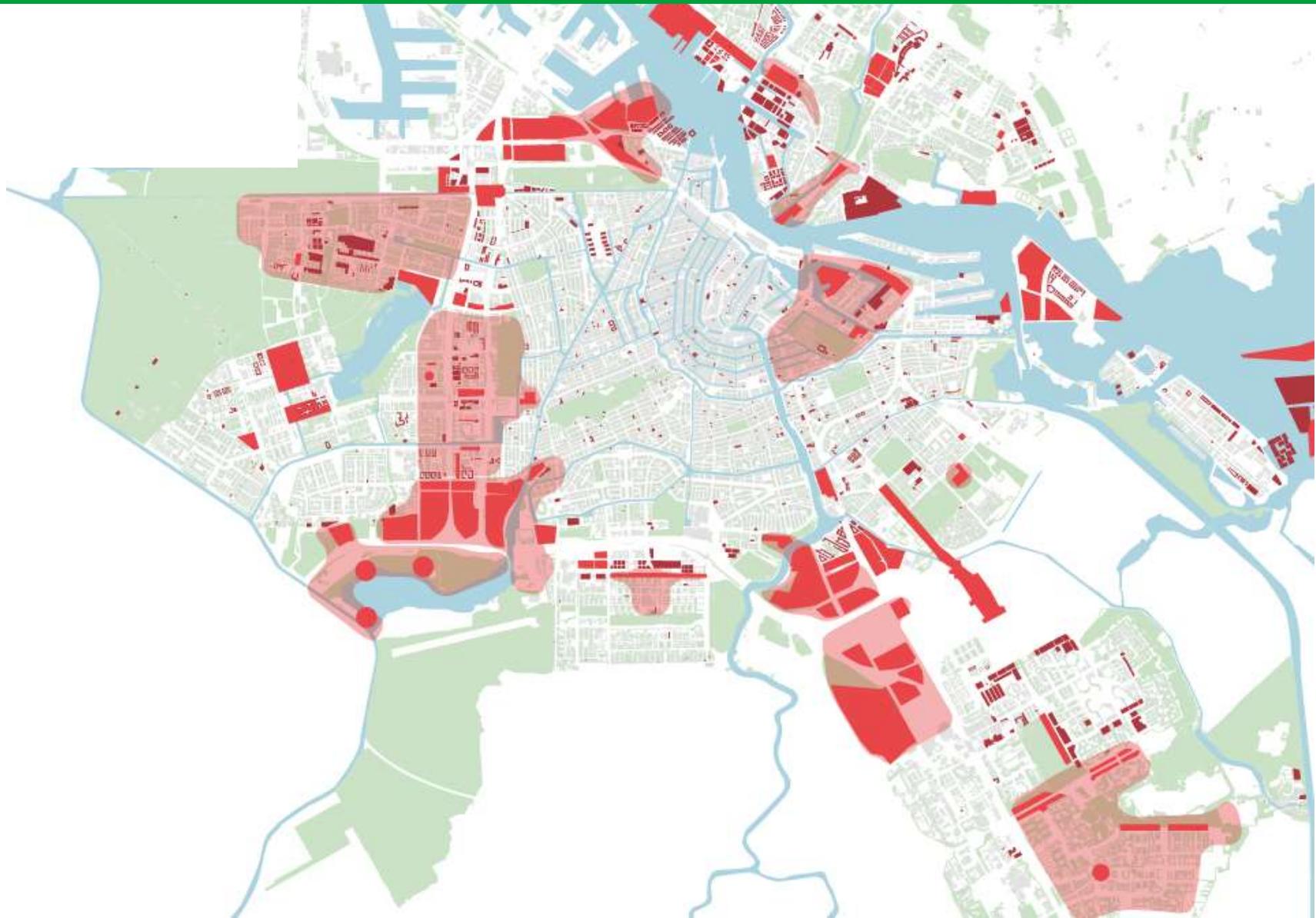
→ Green Strategy 2050

**Zoom in:** Rainproof and RESILIO

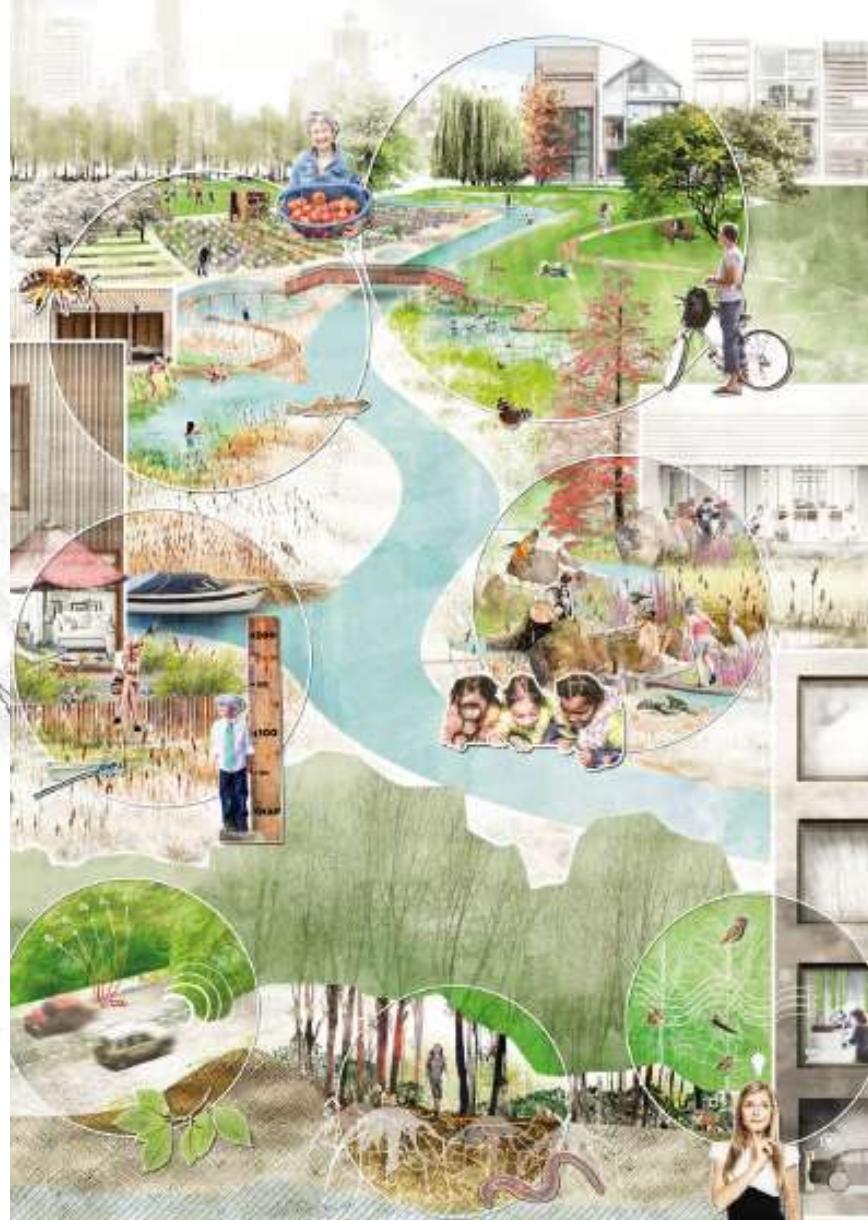
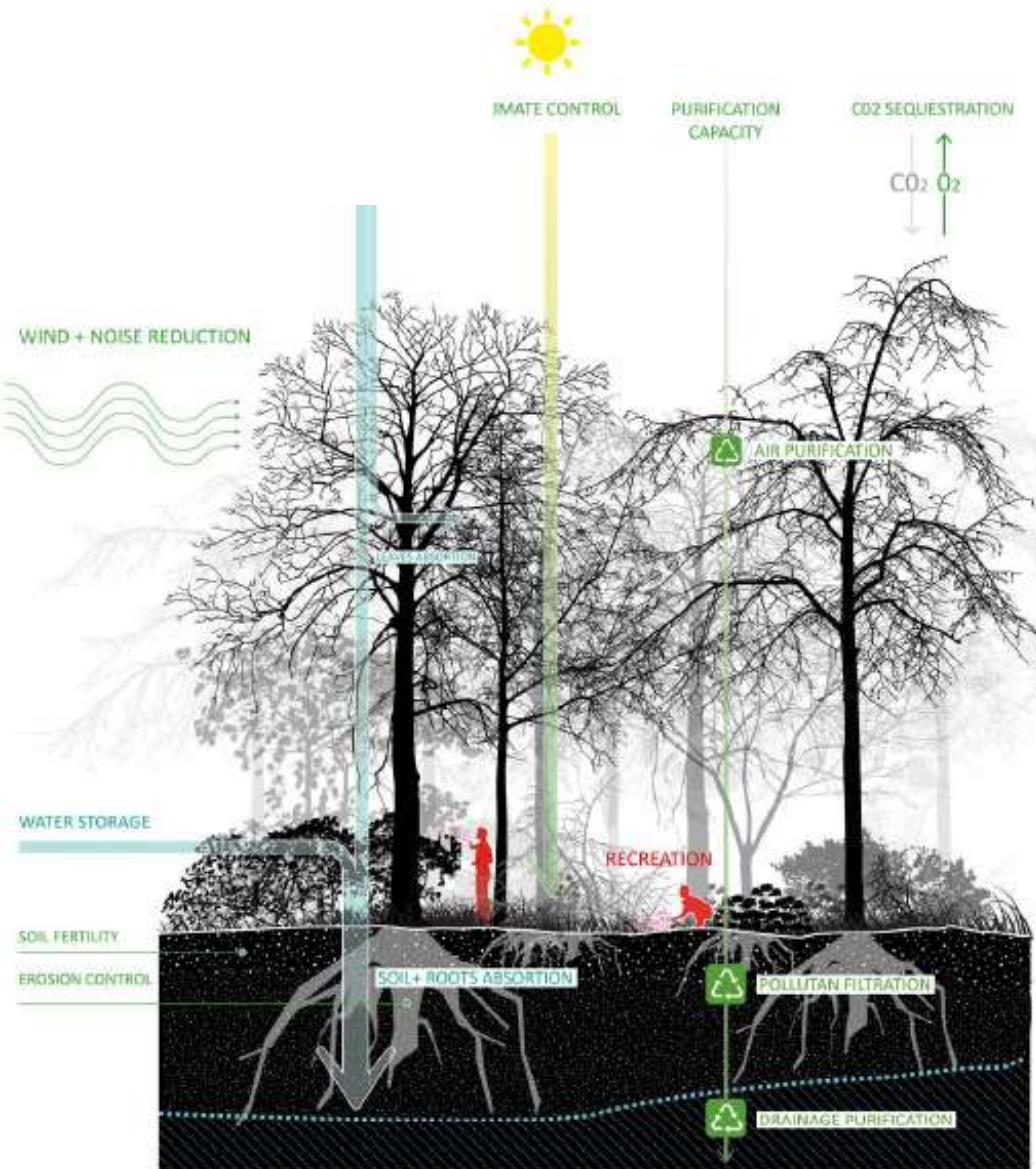
# Amsterdam has a human scale and high standard of living



# Amsterdam is growing rapidly ...



# Evidence of the multiple benefits and value of green infrastructure is growing



**Challenge:** Do we have enough attractive green space for more than 1 mio people living in Amsterdam in 2034?



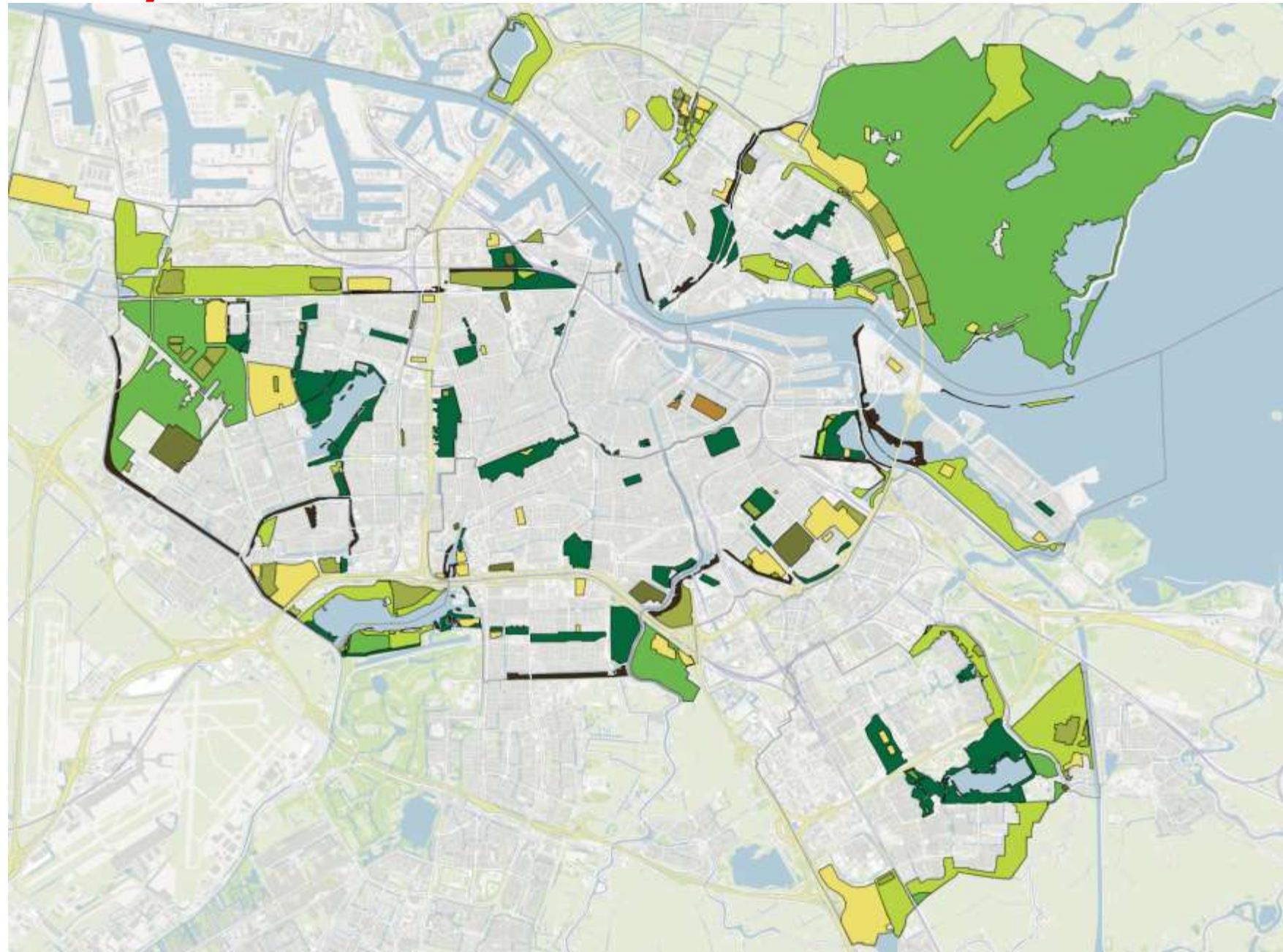
# **Challenge:** Do we have enough green space to be a healthy and climate-resilient city?



# Policy: Amsterdam Structural Vision



# ✗ Policy: Protected Main Green Infrastructure





# Policy: Ecological Vision



Gemeente Amsterdam  
XXX

**Ecologische Visie**  
Ecologie, biodiversiteit en groene  
verbindingen in Amsterdam

4 juli 2012

# **Policy: Targets have been set for green infrastructure in new developing areas in January 2018**

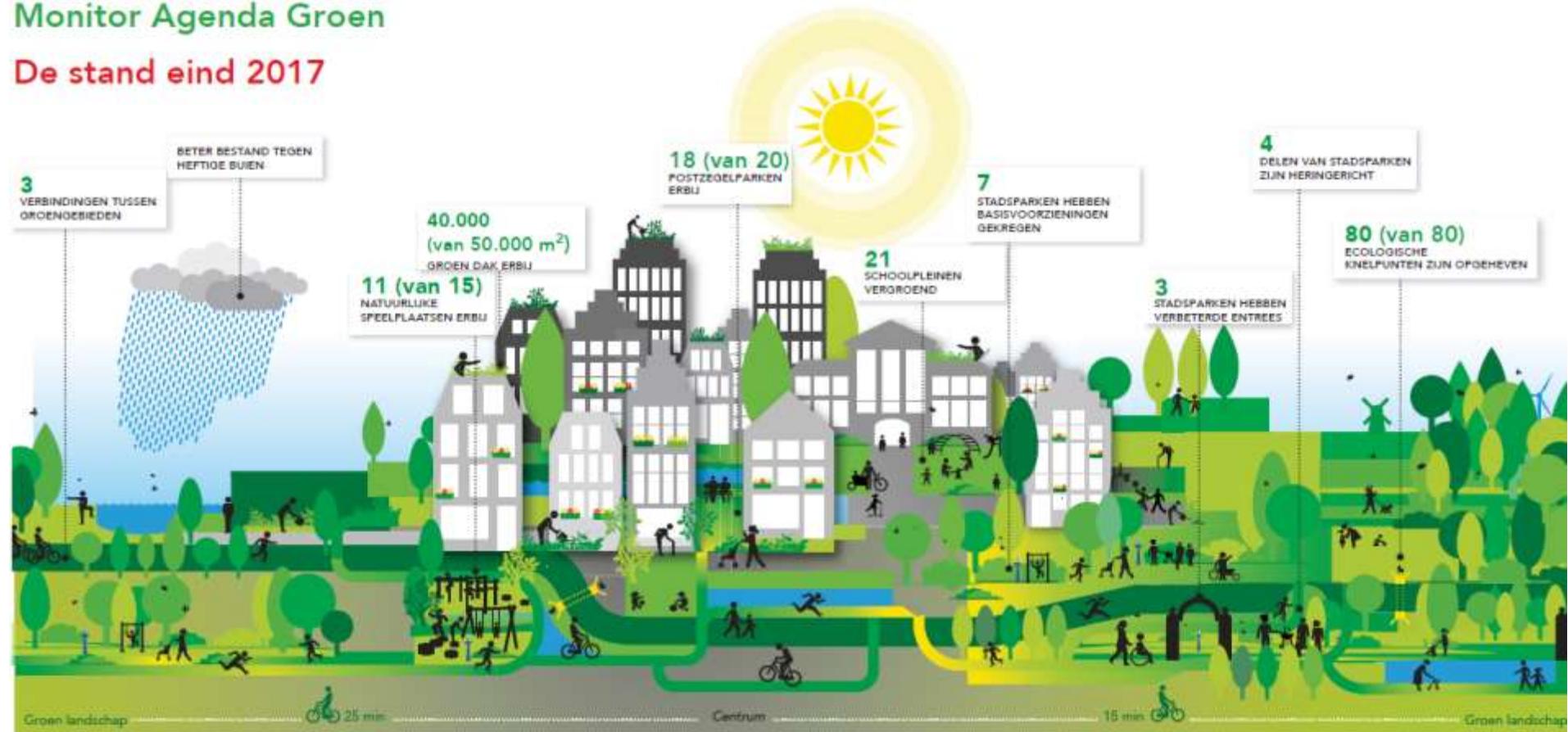
	Central living areas	Mixed living areas	Green-blue living areas
Public green space	8 m <sup>2</sup> per dwelling	16 m <sup>2</sup> per dwelling	24 m <sup>2</sup> per dwelling
Ecosystem green space	8 m <sup>2</sup> per dwelling	6 m <sup>2</sup> per dwelling	4 m <sup>2</sup> per dwelling

# **Green Agenda 2014-2018: investment in green infrastructure**



# Monitor Agenda Groen

## De stand eind 2017



## Prognose behaalde doelen eind 2018

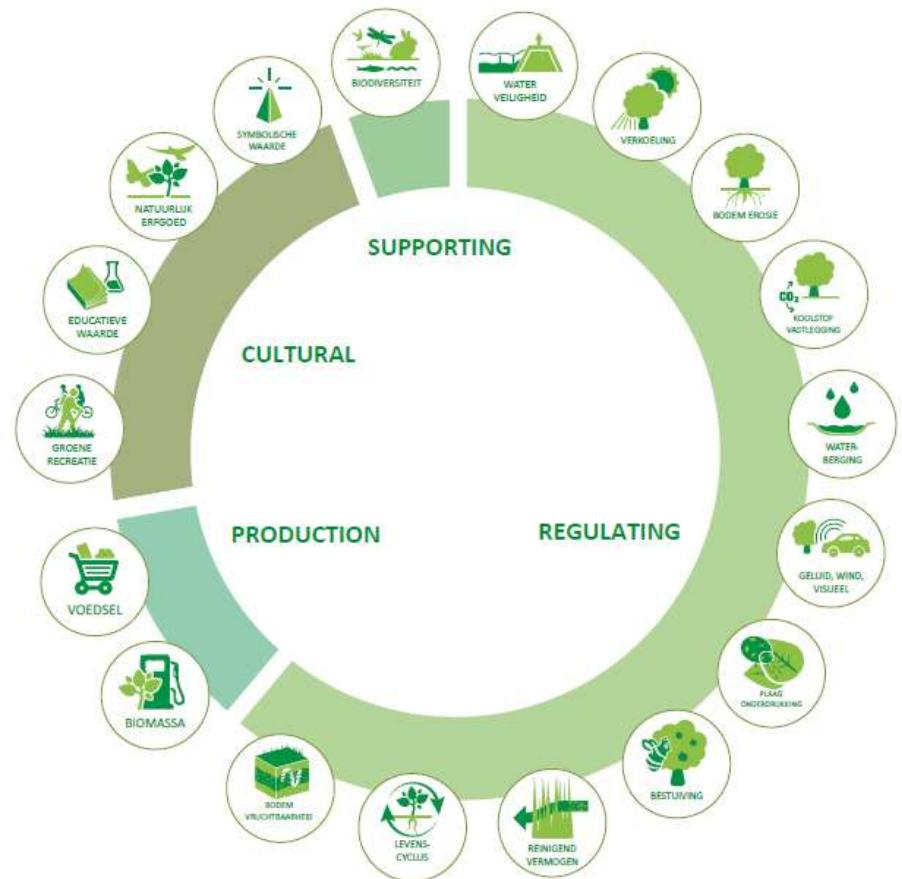




# The Green Vision 2050

Creating a green legacy for the city of the future

# Context: a survey on services and values of GI is conducted for Amsterdam in 2018

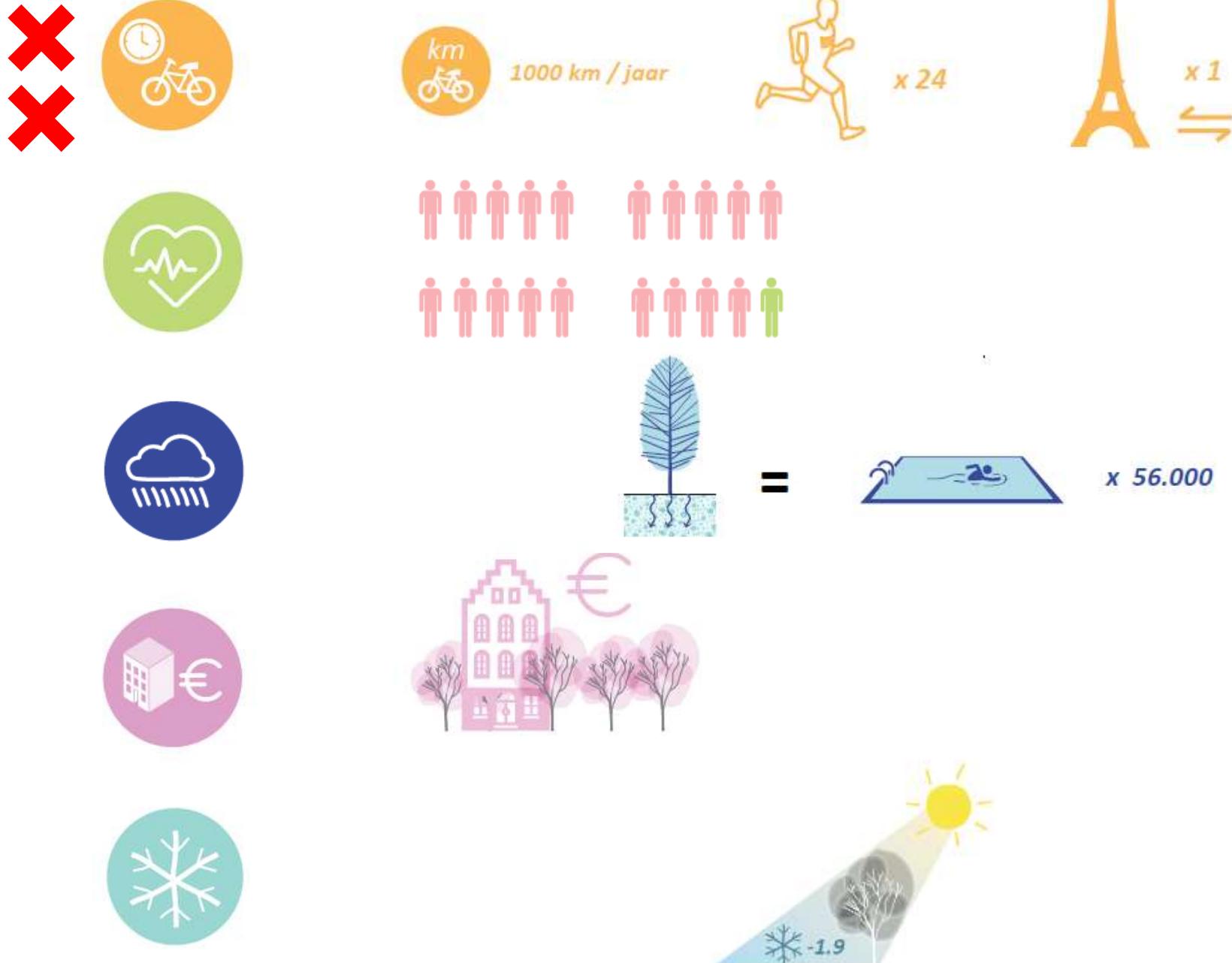


Ecosystem services



User values

# ✗ Value of our existing green infrastructure



**Not enough space for new green proportional to the growth of inhabitants.**



# 4 strategies for green infrastructure



# A large diversity in green spaces for all Amsterdam people



# Shifting away from private ownership towards a more public way of urban gardening



# Development of accessible parks outside the built-up areas in the green wedges



# A continuous green network for biodiversity and active recreation by the principle of “green unless”



# Optimal greening of existing and new neighbourhoods on all levels



# Looking at innovation to add new GI of the 21st century...



# Building a green and livable city together with NGO's, citizens and entrepreneurs





# Rainproof and RESILIO:

## Preventing pluvial flooding by intelligent nature based solutions

# Amsterdam Rainproof

**It's raining harder and harder, and our city can't handle it**

Together we can catch those raindrops and make Amsterdam Rainproof

**Make Amsterdam Rainproof.**  
Visit [rainproof.nl](http://rainproof.nl) to see what you can do.

**Amsterdam Rainproof**  
every drop counts

**What's wrong?**  
We increasingly have to deal with extreme rainstorms. They make our city vulnerable. As the city fills up with buildings and paved surfaces, there's nowhere left for the rainwater to go. The result: increasing flooding and damage, after emerge.

**Copenhagen**  
2 July 2011  
Extreme downpour  
100 mm of rain fell in just 2 hours that day.  
The result: 15 million euros in damage.

**Amsterdam**  
28 July 2014  
**Highest downpour**  
80 mm fell from the sky within 15 minutes. Streets were flooded, houses flooded, and traffic came to a standstill as tunnels filled with floodwater.

Rainwater seeps into houses across town, and basements and cellars fill with dirty water.

Rain falling on asphalt causes major traffic disruptions. Streets are submerged and moving vehicles become impossible to drive safely due to flooding.

**Heavy rainfall**  
20 mm an hour in the volume of rainwater that our sewers can process. When it rains harder the winter feels a different route.

**Drizzle**  
From a single day of drizzle, but even that represents 3.6 million litres of water falling in Amsterdam - enough to fill 33 swimming pools!

**mm.**

160  
150  
140  
130  
120  
110  
100  
90  
80  
70  
60  
50  
40  
30  
20  
10  
1

**What you can do**

**Roof**  
A green roof helps hold more rainwater. It also lessens the load on drains and reduces the chance of flooding. If you add an extra water storage tank, your roof will be better for storing rainwater.

**Building**  
Rainwater can soak up into a grass or blue roof, higher roofs made by the French drain and rainwater. Rainwater is the best way to keep your house more雨proof.

**Neighbourhood**  
Use measures and more green spaces, little gardens along the building fence, and small-scale planters that collect rainwater and soak it back into the soil. Greening holes in lots of water and creates a better microclimate.

**Garden**  
If you have a garden, balcony or roof terrace, use rain barrels to collect rainwater so you can water your plants for free. Remove some pavements from your garden and replace it with a planter or paving. If you're not growing anything, you can still use your garden to park.

**Street**  
Replacing a paved surface with a permeable road and higher kerbs. Like infiltration pits, swales and open gutters bring rainwater drinking out into the open and make the city more beautiful.

**Space**  
Rainwater harvesting, open spaces and more green roofs can help us plan for the water we'll need in the future - and make a better place to live.

**Park**

Green parks, walls and corners can be key contributors to very concreter urban areas and allow them to be a bit more sustainable. Parks are great places to go for a walk, exercise and connect to a cooler neighbourhood.

**Green, blue roof**  
A green roof has water and plants, which soak up rainwater and reduce the load on drains. It also lessens the chance of flooding. If you add an extra water storage tank, your roof will be better for storing rainwater.

**Small front garden**  
One beautiful, tidy microclimate improves the quality of life for people living nearby. The owner can grow their vegetables and flowers. A small-scale garden can also be continued in a window box or a hanging basket. A window box doesn't need a lot of space, so it's perfect for windowsills or balconies. You can also grow herbs in flower boxes.

**Open gutter**  
An open gutter is a simple, above-ground drainage system. It's a good alternative to a drainpipe, closing the street, and the ground. It's a good way to collect rainwater and help it run away from the soil. It's also a good way to clean the street and the ground.

**Urban infiltration strips**  
In infiltration strips, rainwater percolates into the ground through a permeable surface. It's a good way to collect rainwater and help it run away from the soil. It's also a good way to clean the street and the ground.

**Infiltration zones**  
In infiltration zones, rainwater percolates into the ground through a permeable surface. It's a good way to collect rainwater and help it run away from the soil. It's also a good way to clean the street and the ground.

**Green between the tram rails**  
The space between the tram rails is perfect for infiltration zones. It's a good way to collect rainwater and help it run away from the soil. It's also a good way to clean the street and the ground.

**Water-permeable paving**  
Paving stones with open-pore paving stones, like permeable pavers, are a good way to collect rainwater and help it run away from the soil. It's also a good way to clean the street and the ground.

**Speed bumps**

The impact of flooding right after having a heavy rain is often much worse than the impact of a long period of steady rain. Speed bumps can help slow down traffic and help it run away from the soil. It's also a good way to clean the street and the ground.

**Grass concrete blocks**  
Like permeable paving stones, grass concrete blocks are a good way to collect rainwater and help it run away from the soil. They're made of concrete and grass, so they're good for the environment and can be used for other functions, like playing and sports.

**Water square**  
An area where rainwater is collected for reuse. It's a good way to collect rainwater and help it run away from the soil. It's also a good way to clean the street and the ground.

**Infiltration craters**  
Infiltration craters are designed for infiltration. They're a good way to collect rainwater and help it run away from the soil. They're also a good way to clean the street and the ground.

**Rainwater pond**  
Rainwater ponds are a good way to collect rainwater and help it run away from the soil. They're also a good way to clean the street and the ground.

**Detached downspout**

By detaching the downspout from the building, rainwater can be directed to a permeable surface, like permeable paving stones, or a grassy area. This way, the rainwater can be collected and used for other purposes, like irrigation or for a water feature.

## Make your neighbourhood rainproof.

How? Use these tips!



### Amsterdam Rainproof

Amsterdam Rainproof is a movement in which you and all the people of Amsterdam work together. We share a common goal: to help Amsterdam handle the increasingly frequent downpours. Even better: we want to make better use of the free rainwater that currently flows directly into the drains. The extreme weather patterns caused by climate change mean our city is increasingly prone to flooding, asphalt and paved gardens... no raindrops can seep through

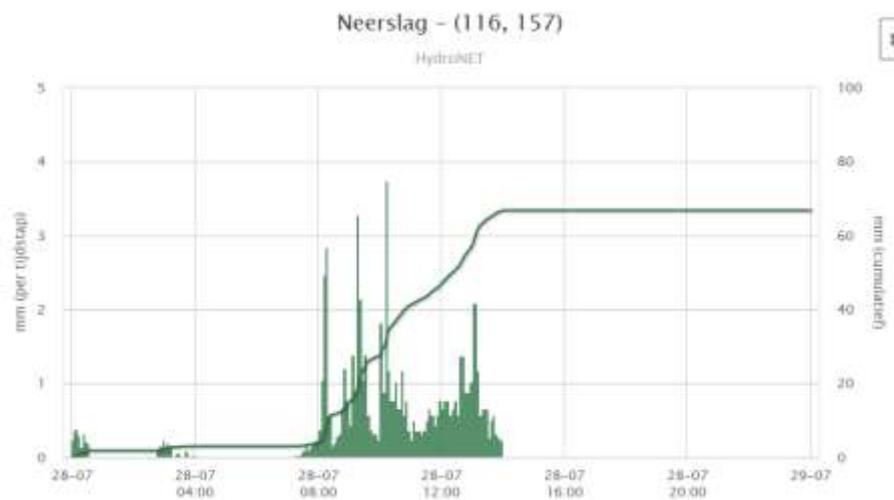
**Introducing Rainproof initiatives together.**  
The following suggestions offer tangible tips for what you do – as a local resident or a professional – visit [rainproof.nl](http://rainproof.nl) for a complete overview. If you have an idea, story or other contribution for rainproofing your city, let us know! We'd be happy to link you to other Rainproof locals.

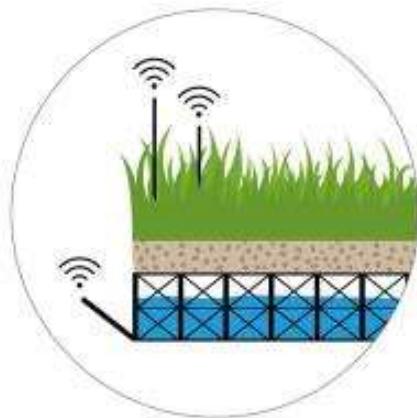
Together, we are Amsterdam Rainproof.

Make your neighbourhood rainproof. Visit [rainproof.nl](http://rainproof.nl) to see what you can do.

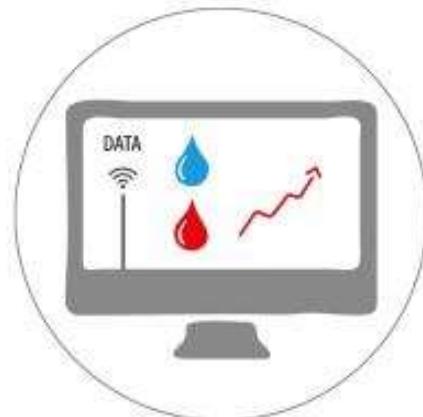
Make Amsterdam Rainproof. Visit [rainproof.nl](http://rainproof.nl) to see what you can do.

# Rainstorm 28 juli 2014 (70 mm in 6 h)





**WP4** TECHNICAL ADAPTATION AND CUSTOMISATION



**WP5** DESIGN AND IMPLEMENTATION WATER MANAGEMENT PLATFORM



**WP6** GOVERNANCE FRAMEWORK AND IMPACT ASSESSMENT



**WP7** PARTICIPATION IN PILOT LOCATIONS  
**WP8** INVESTMENT IN BLUE GREEN ROOFTOPS



**RESILIO | LAAT JE DAK LEVEN**

# Consortium partners

Urban Planning & Water Management

 Gemeente  
 Amsterdam

 waternet

Roof Expertise & Innovation



 MetroPolder  
company



consolidated



 ROOFTOP  
REVOLUTION

Research Expertise

 VU  
VRIJE  
UNIVERSITEIT  
AMSTERDAM



Hogeschool van  
Amsterdam

Social Housing

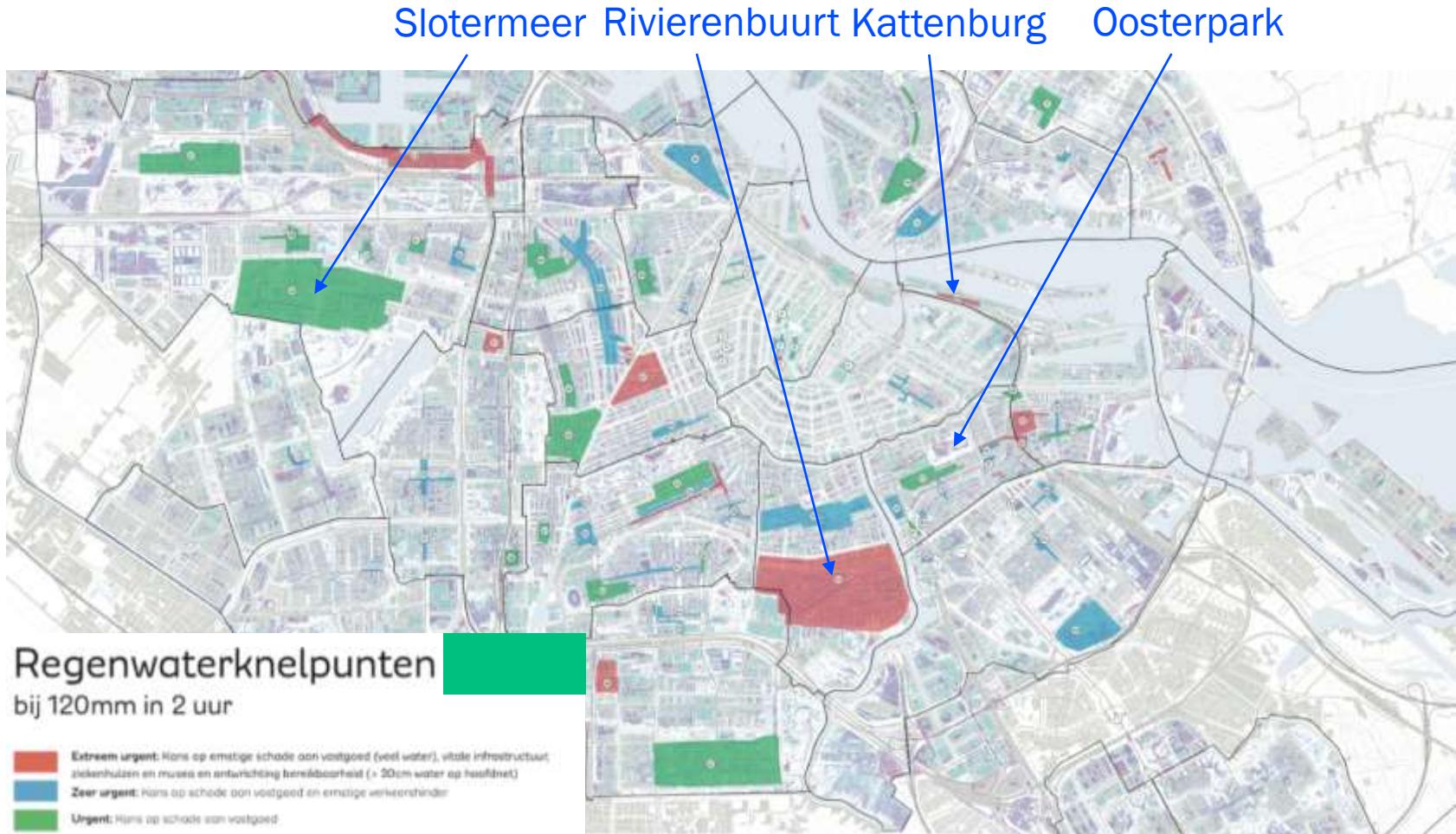
 Stadgenoot



 de Alliantie

 deKey

# Risk areas for pluvial flooding

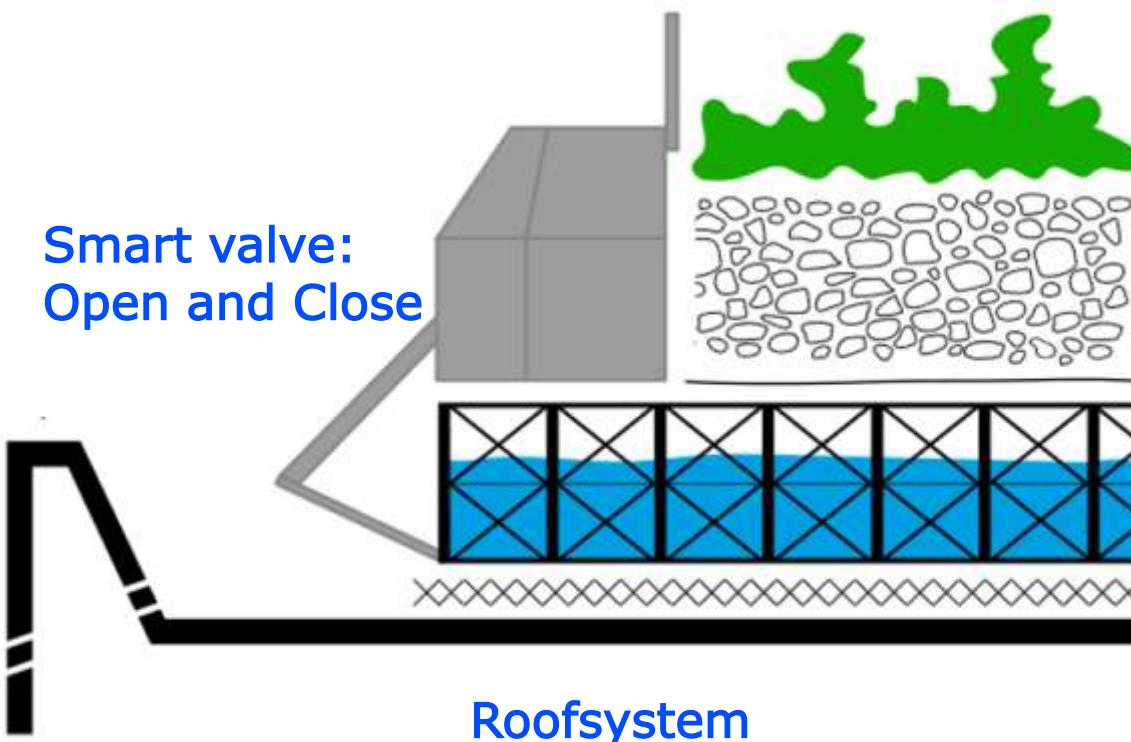


# Smartroof 2.0



# The RESILIO Rooftops

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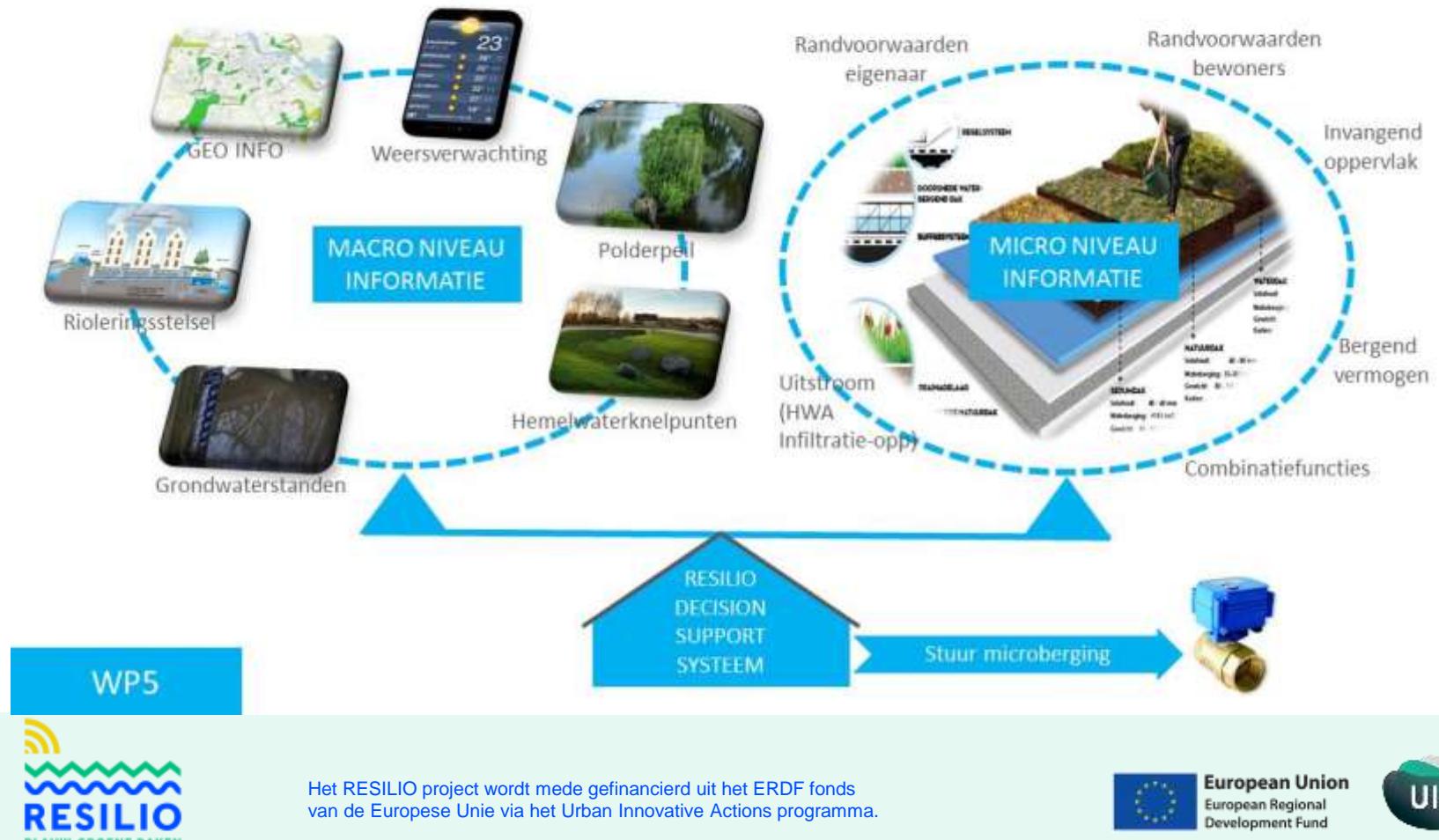


High quality  
greenery  
Substrate

Filter foil  
Water system  
(crates)  
Insulation

# Water Platform

## RESILIO Beslissingsondersteunend Systeem







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# Thank you!

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