City of Amsterdam

Amsterdam Green Infrastructure Vision 2050

A liveable city for people, plants, and animals

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Foreword

For many of Amsterdam's residents, green spaces are of great value. Some people value being close to nature, while others simply love to relax in a park or have the opportunity to exercise and play outside. In some neighbourhoods, green areas are places for gathering and collective food production. At the same time, these spaces are home to the wildlife of the city. Green infrastructure is important for a pleasant and healthy living environment and it is essential to protect the city against increasing droughts, heat waves, and extreme rainfall. Green space is of vital importance for the city of Amsterdam. In a growing and densifying city where housing is in high demand and public space serves as our backyard, the creation, preservation, and maintenance of green spaces deserves our attention in order to guarantee that we can all continue to enjoy them.

In this Green Infrastructure Vision there is increased focus on making green spaces more accessible. Green spaces contribute to a happy, healthy life and everybody should be able to enjoy green areas close to their home. Small parks, nature strips, trees around houses – places where on hot days everyone can take a break in the shade and benefit from the cooling effects of plants and trees. A short bike ride away, every resident should be able to reach one of the many city parks, an urban forest, or the surrounding landscape. We also envision a new urban forest to significantly increase the number of trees and wildlife habitats in Amsterdam. We also must not forget to include vegetation on and around buildings. A concrete city is an unliveable city. There are so many opportunities on roofs and façades, as well as in private gardens and yards. With more plants and trees, we can create a more beautiful, healthier, and cooler city with lots of opportunities for wildlife to thrive, thus ensuring greater biodiversity.

With this vision for Amsterdam's green infrastructure, I want to ensure a good balance between plants and bricks, nature and leisure, people and animals. I hope that business owners, schools, developers, and Amsterdam citizens will be inspired to partake in the greening of the city. May all our efforts lead to a city in 2050 where all Amsterdam citizens – people, plants, and animals – can lead a good life.

Laurens Ivens
Deputy Mayor responsible for Green and Public Space

What is the Amsterdam Green Infrastructure Vision 2050?

This is the vision of the City of Amsterdam on the role of urban green and nature in the city, now and in the future. Many residents and organisations were consulted during the process of developing this vision. The City is responsible for this vision and its realisation. To achieve this, we will use the principles formulated in Chapter 2 whenever we execute projects, make policies, plan maintenance, prioritise resources, or collaborate with residents, community organisations, businesses, and institutions. The Green Infrastructure Vision is also an impetus to organise and allocate funds for new green spaces and the improvement of existing green spaces. Furthermore, this vision is intended to encourage and inspire residents, businesses, community organisations, and institutions to work together with the municipality towards a green city. Sometimes the principles proposed are not immediately applicable in every situation. Often a major shift in methods or mentalities is required. Step by step we are working toward this transformation. To be able to take the necessary steps, an implementation programme will be developed every 5 years, based on this Green Infrastructure Vision.

The Amsterdam Green Infrastructure Vision 2050 is one of the building blocks for the *Amsterdam Strategy on Spatial Planning and the Environment* (Amsterdamse Omgevingsvisie). It also serves as input for the regional Urbanisation Strategy of the Metropolitan Region Amsterdam. The *Amsterdam Strategy on Spatial Planning and the Environment* will present a vision of Amsterdam in the year 2050 and explain how that vision can be achieved. Issues such as green infrastructure, mobility, sustainable energy systems, affordable housing, and social safety will be considered in conjunction with one another.

Amsterdam and Weesp

The Green Infrastructure Vision is focused on the current territory of the City of Amsterdam. In 2022 the administrative merger with the City of Weesp is planned. At that time, the strategies and policies of both cities will be merged into a single *Strategy on Spatial Planning and the Environment* (Omgevingsvisie) and a single *Zoning Plan* (Omgevingsplan). Due to the bureaucratic merger that has already taken place, civil servants from both cities are already collaborating extensively on green infrastructure policy. It has already been agreed that the green structure of Weesp will be integrated into the *Main Green Structure* of Amsterdam (see Chapter 4).

Development of the vision

Green space is a subject that many Amsterdam citizens care about, especially the preservation of parks, trees, and allotments spark the engagement of residents and community organisations. Besides the people who use the city's green space, there are people responsible for maintaining it – gardeners, different organisations and private owners. What do all of these different people think of green space and infrastructure in Amsterdam, and what opportunities for improvement do they see? These have been leading questions during the development of this vision. On top of that, we also wanted to get a better understanding of the needs and wishes of people who do not yet enjoy or engage with green space in the city. To get answers, we organised open conversations with the city at large – from residents to bureaucrats, schools to community organisations, the invitation was open.

In addition to these participatory events, this document includes the results of a green survey, responses from members of several green organisations and the evaluation of the municipal subsidy scheme for community gardens. Also, several sessions were organised on ecology, climate adaptation and health.

The Amsterdam Green Infrastructure Vision 2050 demonstrates how important nature and green areas are for life in the city, and how we will continue to improve green infrastructure and liveability for people, plants, and animals.

Summary

The Green Infrastructure Vision imagines how Amsterdam, as a green and biodiverse city, will develop from now until 2050. Amsterdam is a beautiful city full of green areas and it will only become more beautiful. We imagine a city for living, working, and leisure. Public spaces will be shared among increasing numbers of residents and visitors yet remain pleasant and inviting. We see ample opportunities for animals and plants to thrive, and for people to enjoy them. Due to the urban challenges of densification, new housing projects, changing mobility, and sustainable energy, public space is getting crowded with more functions and people. At the same time, the desire to have access to quality green spaces close to home is increasing among Amsterdam citizens. Considering the many benefits of urban green, we must not let urban development take its toll on green spaces and their qualities. The aim is to increase the amount of green infrastructure wherever possible and to make better use of existing green areas.

The value of urban green space

Green space offers crucial benefits for the health and social well-being of the people of Amsterdam. Furthermore, it offers relief during heat waves, counters the urban heat island effect, and buffers rainwater during cloudbursts – essential aspects of a climate resilient city. Plus, urban green spaces contribute to higher biodiversity. Simply put, green spaces make a city better – happier and healthier living environments, socially and ecologically stronger neighbourhoods, and generally a more sustainable city. For this reason, we are creating a city where more natural elements can be experienced – a city with enough green space for everyone, and a city with as much diverse green infrastructure as possible.

Our vision for a green city

We will do this by investing in a strong urban green structure. With each development, we will evaluate if the urban design matches our green policy goals and if maintenance and management will be feasible. Thus, more plants and trees will meet the eye in places where it is needed, both in public space and on private property. It will also improve the quality of public spaces in areas that already have some greenery. The experience of Amsterdam as a green city will be even stronger by 2050, starting with vegetation on or against buildings and extending into the surrounding metropolitan landscape. We will continue to develop this green infrastructure in both public and private outdoor spaces, building upon existing value and extending wherever possible, while ensuring the green quality of Amsterdam.

The green infrastructure permeating the city is a major contributor to its liveability. Green areas are connected to each other, both in public space and on private property.

We will indicate the steps we need to take throughout the city for each different type of green space. We will be adding green space to the city on roofs and façades, along streets and on squares, and we will create new urban parks and an urban forest. Existing green infrastructure will be improved to be more attractive for people and animals by increasing its value for nature, health, social well-being, and climate adaptation. Ways we are doing this include removing pavements in residential courtyards, increasing the distinct character of different urban parks, and developing landscape parks in the metropolitan landscape surrounding the city.

Community engagement: collaborating with Amsterdam citizens

We invest in citizens that want to help increase green areas in the city by, for example, co-managing green public space or creating a community vegetable garden. Clear contact points will be provided for interested and engaged Amsterdam citizens, such as park caretakers in urban parks. We create and maintain green spaces in the city together with residents, community organisations, businesses, institutions, and other governmental bodies.

Amsterdam 2050: A liveable city for people, plants, and animals

Greenways from your front door to the landscapes around the city

In 10 minutes, you can walk to a park. In 15 minutes, you can bike into the landscape surrounding the city

Collective effort

The construction, planting, and maintenance of green spaces will be done in collaboration with residents, community organisations, businesses, and institutions.

Green by default

Wherever possible we will replace pavements with vegetation to create a pleasant, healthy, and natural living environment with the opportunity for social interaction

Publicly accessible green areas

Allotments, sports parks, and school gardens will become accessible and inviting to a wider public

Healthy trees on streets and squares

We plant trees that can grow old and grow large

Green space is important for social well-being, leisure, climate adaptation, health, and biodiversity

More biodiversity

Enhancing biodiversity and employing nature-based solutions will form the basis for all urban design, construction, management, and maintenance that takes place in the city

Park caretakers

Every park will have its own caretaker who will attend to the questions of residents and visitors

Landscape parks

In the landscape directly surrounding the city, we will create more wild nature, food forests, and more facilities for movement and exercise

A diversity of green spaces

The city's green spaces will cater to a great variety of needs, tastes, and desires. For example, every urban park will have its own particular character

New forest and parks

A new urban forest and new urban parks will be added to the city

Note to readers

Chapter 1 discusses why the City of Amsterdam considers green infrastructure to be vital for urban life. Four main reasons are explained – health, nature, climate adaptation, and social well-being. Both for people and animals in Amsterdam, these emerged as the most important topics from conversations with professionals, community organisations, institutions, and residents.

Chapter 2 formulates the guiding principles to help us achieve the green city we imagine in 2050. These principles will be applied whenever we execute projects, make policies, plan maintenance, prioritise resources, or collaborate with residents, community organisations, businesses, and institutions.

Chapter 3 links our guiding principles to our ambitions for 2050. The intention is to create a robust green infrastructure that starts at the scale of buildings in the city and extends into the metropolitan landscape surrounding it. Each type of green element is discussed in relation to the envisioned green structure, determining what needs to be done. These directions for action will be further developed and detailed in the upcoming green infrastructure implementation programme.

Finally, Chapter 4 addresses what is necessary to realise our green infrastructure vision in terms of organisational structure, finance, knowledge, communication, collaboration, research, and evaluation.

The appendix includes background information on biodiversity and the cultural history of green infrastructure in Amsterdam.

A glossary is included with explanations of technical terms.

Contents

Chapter 1

The importance of a green city

The importance of a green city

Green spaces are essential for city life, especially now that the city is changing and growing, affecting the use of public space. Green space ensures that Amsterdam remains a pleasant place for people and animals as it effects our health, social well-being, climate adaptation, and nature. These four topics also emerged from our discussions with professionals, organisations, and residents.

What are the issues?

Amsterdam is an attractive city with beautiful architecture and a rich history. Over the centuries, Amsterdam has developed its green spaces to structure the city and give it a new identity, such as the world-famous canals lined with elm trees. Green spaces
have also played an important role in national heritage neighbourhoods, and several parks are so beautifully designed and planted that they have been designated as monuments. In short, Amsterdam has a rich, progressive history of green urban design. Attention to the quality and character of specific locations in their urban design, contributes to the spatial quality of a beautiful Amsterdam (appendix 2).

In this new flourishing period of Amsterdam in which the city is growing, green spaces are receiving more attention than ever with the design of new neighbourhoods. Existing green space will remain vital and future-proof, while less attractive green areas will be given an update.

Amsterdam is entering a new phase of its existence and is facing major changes. The housing challenge is greater than ever. We have chosen to develop all new housing within the existing city so that the surrounding landscape remains green, meaning that there will be a great deal of pressure on the available urban space. At the same time, we are transitioning toward renewable energy systems that require space both above and below ground. We also want to change the transport system to focus less on the car and will require further investments in public transport, which will also impact how the city is used. The result of these changes can still be a pleasant city in which people, plants, and animals can live a good, healthy life. Green infrastructure is essential for this as it determines the physical and mental health and social well-being of city dwellers and visitors. It is a good way to reduce the effect of high temperatures on hot days, and to retain more rainwater, plus many plants and animals in the city depend on green areas for their livelihood.

It is a challenge to ensure a qualitative and quantitative increase of green infrastructure in a densifying city, but it needs to happen – more city dwellers and visitors mean a greater demand for green space. Amsterdam citizens appreciate existing green areas enormously. They want more green space and they want it closer to their living and working environments. Urban densification without expanding green infrastructure is not an option.

Densification of neighbourhoods outside of the ring road will bring the surrounding landscape ever closer to the city. The advent of the electric bicycle also means that large green areas can be reached more quickly for recreation and experiencing nature. It is therefore important to develop the green infrastructure in and around the city as a coherent whole.

There are four main reasons to make the city greener: health, social welfare, climate adaptation, and nature.

Health

A green environment is essential for mental and physical health and contributes to a healthy lifestyle.

Social well-being

A pleasant, green living environment by and for everyone means more interaction and community organisation.

Climate adaptation

Amsterdam wants to be well prepared for the changing climate.

Nature

Nature and biodiversity form the basis of all life, even in the city.

Health

Rest, exercise, happiness, and relaxation

A green environment is essential for mental and physical health and contributes to a healthy lifestyle.

Much research has been done into the effects of green space on humans. An environment with trees and plants appears to have a positive impact on people's resilience, and a green environment makes life feel meaningful, which is essential for physical and mental health.

Green spaces stimulate exercise in neighbourhoods – walking becomes more attractive, and a street with trees is more pleasant to cycle through. Green spaces can be used for sports and games, walking, running, tree-climbing, or fitness boot camps in parks and along greenways. Playing in a stimulating, well-designed green environment has a positive effect on children's development and creativity, helping them to discover the natural environment and learn to use all their senses and play together. Green spaces also ensure that we suffer less from intense summer heat. Research shows that green spaces in the city do not directly provide cleaner air, but that placing vegetation in the space used by polluting cars creates a positive effect on air quality.

Places that Amsterdam citizens perceive as quiet are usually green or by the waterfront. Green spaces can reduce noise stress – as a result, parks and green spaces in the city are often experienced as quiet environments to unwind, relax, and feel free.

Moreover, we can concentrate better with vegetation around us, recover faster from illnesses, and suffer less from anger, depression, stress, and anxiety.

This applies not only to the living but also to the working environment. Thirty percent of working people spend most of their time at the office, and greenery nearby the office or business park invites you to take a lunchtime stroll, meet outside, or even play sports during breaks. In short, green spaces contribute to happiness and a healthy lifestyle.

You can concentrate better with greenery around you, and it contributes to happiness and a healthy lifestyle.

Social well-being

Meeting and working together

A pleasant, green living environment by and for everyone means more interaction and community organisation.

Everybody likes to come to parks and green spaces. Rich and poor, old and young, people of all backgrounds – everyone visits and makes use of these spaces with each other. It is free to do your own activities – whether sitting, sunbathing, picnicking, walking the dog, or playing sports and games. These are important for our leisure experience, which is all the more true in neighbourhoods where people do not have their own garden. Residents can set up initiatives to manage a piece of green space together to create a school garden or allotment, community plant or food garden, or manage greenery in a local park or public square. New pocket parks, a community-managed flower belt, and vegetable gardens are also created together, sometimes just around the tree in front of the house or against a communal wall. This is not only important for social interaction, but it also helps people learn more about nature.

Shared or publicly accessible courtyards or rooftops can also contribute to the social well-being of Amsterdam citizens, especially when they are maintained together.

Parents often make use of green playgrounds to meet one another and let children play together. Pet owners can meet each other at dog parks in the city, and other residents can organise a walking club or meet on park benches.

People are more likely to go outside in an inviting environment, so green space can contribute to social interaction and bonding, in turn reducing loneliness.

More and more residents are managing a piece of green space in their neighbourhood, such as making a square greener together or creating a vegetable patch or façade garden.

Climate adaptation

A living environment sustainable for the future

Amsterdam wants to be well prepared for the changing climate, and well designed and maintained green spaces in the city contribute to this.

Climate change makes the weather more extreme – warmer and drier, but also wetter at times. In a built-up city, this can cause extra problems and the consequences are becoming more noticeable.

When it rains heavily, water cannot drain away properly through asphalt or other paving, and cellars, tunnels, or sewer systems flooding causes enormous damage.

Summer heat waves are also no longer an exception. Heat is absorbed by asphalt, concrete, and bricks which impacts animals, plants, and people – especially the elderly and young children. Today's green spaces, which cool down during the heat, can perish in long dry periods leading to a negative effect on the city's biodiversity. Prolonged drought also lowers the groundwater level, affecting the solidity of the soil and the wooden foundations underneath buildings.

Well planned and maintained greenery can ease the effects of extreme weather, for example by collecting and temporarily storing rainwater so that it can gradually drain away and sink into the groundwater. This acts as a buffer, reducing the influence of climate change on humans and animals. Green space is also extremely important for reducing the impact of intense heat – trees on streets and squares provide shade, and larger green areas are significantly cooler in the heat than built-up areas, creating a refuge for city dwellers. Vegetation on and around buildings also contributes to a better urban climate; green roofs and walls help cool the immediate surroundings both indoors and outdoors.

Green roofs, green walls, and courtyards also contribute to making the city climate-proof.

Nature

United for biodiversity

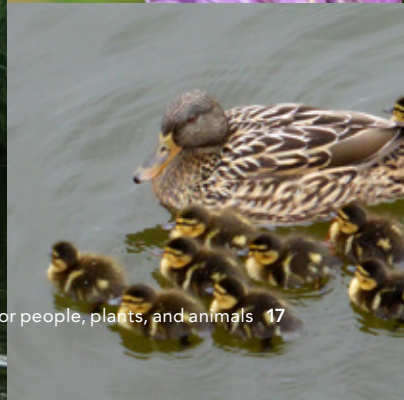
Nature and biodiversity form the basis of all life, even in the city.

Green spaces in and around the city are the basis for urban life, providing a home (habitat) for many species of animals and plants. In Landelijk Noord and Amstelscheg there are important meadow areas for birds, while the Diemerpark near IJburg accommodates a large number of grass snakes. The Amsterdamse Bos is a mature forest that accommodates the rich plant and animal world, including extensive reed beds in the Brettenzone and IJdoornpolder. Nevertheless, the city itself also offers space for an incredible amount of life.

The number of different animal species in Amsterdam has increased in recent decades despite a trend of national and global decline. This applies, for example, to wild bees and butterflies, for whom there are also important places in the middle of the city. This is the result of initiatives by residents, investments by the municipality, and careful ecologic management. Research by Naturalis in 2019 showed that rare insects also occur in the middle of the Vondelpark, including a newly discovered wasp. Amsterdam is not only important for people, but also for animals and plants. The increase of biodiversity in recent decades does not mean that we do not have to do anything now. Due to a worldwide decline of biodiversity alongside a growth in built-up areas, cities can no longer point to their surrounding natural environments when it comes to monitoring and increasing their biodiversity. As a city, we want to take our responsibility here too (see appendix 2 on biodiversity).

Increased biodiversity improves the health of vegetation, soil, and water. This can save a lot of money that would otherwise be needed for overdue maintenance, reorganisation, or pest control, and in addition to the importance for the animals and plants themselves (their intrinsic value), biodiversity is also important for humans. Many people appreciate plants and animals and have more respect for nature when they can experience it directly. They might also be more willing to contribute to greening their own environment or participating in co-management of existing green spaces.

Amsterdam has 10,000 species of animals and plants, and many ecologically valuable areas.



Amsterdam citizens on the importance of a green city

With fewer pavements, more vegetation, trees, and soil in your garden that retain water, you can really cool things down. This has an impact on the city climate and therefore also the world!

Casper Kraima (53)
Amsterdam Nieuw-west

My 15-year-old brother has autism. Sitting still too long isn't good for him – it helps him to be in green spaces to calm down.

Felix (13)
Amsterdam Oost

My doctor was right – thanks to the walking club in Noorderpark, I was able to reduce my diabetes medication, and my weight went down as well.

Anja Huisman (70)
Amsterdam Noord

I like to run in the park because it's free. The trip to get to there is short, so you just put on your trainers and go. It's very accessible.

Martina Hoever (30)
Amsterdam West

The carrot cake my mother made with the carrots I brought home from the school garden really tasted much better than if you buy them in the shop.

Johnathan Timisela (11)
Amsterdam Oost

The growth of the city shouldn't be at the expense of green areas. Even more green space is needed because more and more people are joining in! There can never be enough green spaces.

Johanne Beem (72)
Amsterdam Noord

I like it when residents adopt tree pits. When I cleared a plant away, a resident told me that her mother enjoyed looking at it every day, so I planted a new one for her.

Marinus van Ommeren (58)
Medewerker Pantar
Amsterdam Oost

As part of ecologic management, we want fewer water edges with wooden fencing. Instead we want to plant flowers on the water's edge, for example. Just like it used to be.

Nicole de Rop (60)
Groenbeheerder gemeente
Amsterdam Zuid

Chapter 2

What do we want to accomplish?

What do we want to accomplish?

In our vision of a green city in 2050, Amsterdam will be an even more liveable and attractive city. This requires a robust green structure throughout the city. We will build this by working according to four green principles that will help us to continually increase and improve urban green spaces. The principles will guide us in completing municipal tasks such as project realisation, policy making, planning maintenance, and collaborating with various urban actors.

Vision of a green city

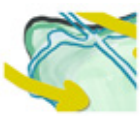
In the Amsterdam Green Infrastructure Vision 2050, our efforts are focussed on the connection and improvement of green areas in the city, with the goal of creating a robust green structure. This structure needs a diverse palette of vegetation and green infrastructure ranging from flowers to trees, from quiet areas to busy centres, from ecological zones to green playgrounds. By connecting green areas with greenways, habitats for plants and wildlife are improved and people can enjoy their presence more. Gradually, a coherent green network across public and private space will emerge. A network of greenways and green spaces to commute, travel, or wander through provide ample opportunity for encountering other people, animals, and plants. The envisioned green structure will be achieved by keeping all high quality existing green spaces and adding new ones wherever possible in a way that maximizes value and benefit for people and animals (see Principles for a green city, page 24). We will develop the city's green space with a focus on health, nature, climate adaptation, and social well-being. The essence of our vision has been depicted on the vision map, showing the goals for 2050.

We will create more green areas, connect existing green spaces, and ensure that urban green infrastructure is of greater value to humans, plants, and animals.

The green city

This map is a future vision for city-wide green infrastructure in Amsterdam – a building block for the Strategy on Spatial Planning and the Environment *and the revised* Main Green Structure. *It also provides a framework for detailing urban green space at the neighbourhood level.*

Greenways and green-blue connections



'Green gems'

Parks

Connected landscapes

Green elements

A robust green structure has great value and provides multiple benefits for both humans and animals. It is built up of different green elements:

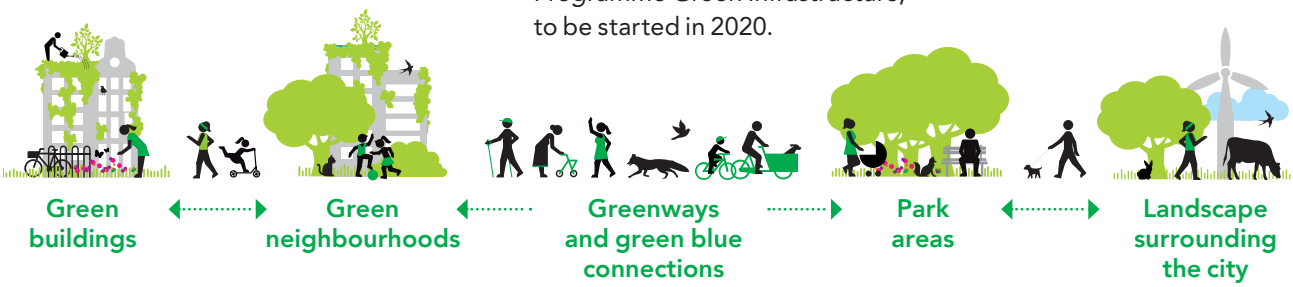
- A green building (green façade, green roof, green courtyard and/or garden)
- Community green spaces (in streets, on squares, along the water, in neighbourhood parks)
- Park areas (including city parks, sports parks, and allotments)
- The landscape at the edge of the city, including the 'green gems'.
- Greenways and 'green-blue connections' (such as green streets, watersides and greenways)

We will create greenways – green routes that start at buildings and, via streets, squares, roads, and parks, lead to 'green gems' surrounding the city. These are areas where the surrounding landscape reaches far into the urban fabric, wedged between suburbs and urban sprawl. These greenways will be made in collaboration with residents, businesses, community organisations, and institutions.

The design and detailing of these elements per neighbourhood will depend on the local needs and possibilities of different areas of the city. One street might need extra green space, while another might need improvement of existing green space.

Project realisation will only be a success if we plan for management requirements and collaboration with other urban actors. The green space design per neighbourhood will be included in the *Implementation Programme Green Infrastructure*, to be started in 2020.

How we will apply the green elements in the city will be different from place to place depending on the needs, desires, and possibilities of each neighbourhood.



Principles for a green city

A robust green structure is composed of many green elements. Some elements already exist but can be improved, and other elements we will add. Whenever we add, improve, manage, or design green space, we will act according to a set of principles that form the foundation for this Green Infrastructure Vision. All 4 principles aim to create a liveable city for people, plants, and animals.

Principle 1
We will ensure there is enough and diverse green space for everyone

Principle 2
We will ensure that green infrastructure is multifunctional

Principle 3
Biodiversity will be integrated into urban planning, construction, and management

Principle 4
Working together on green spaces

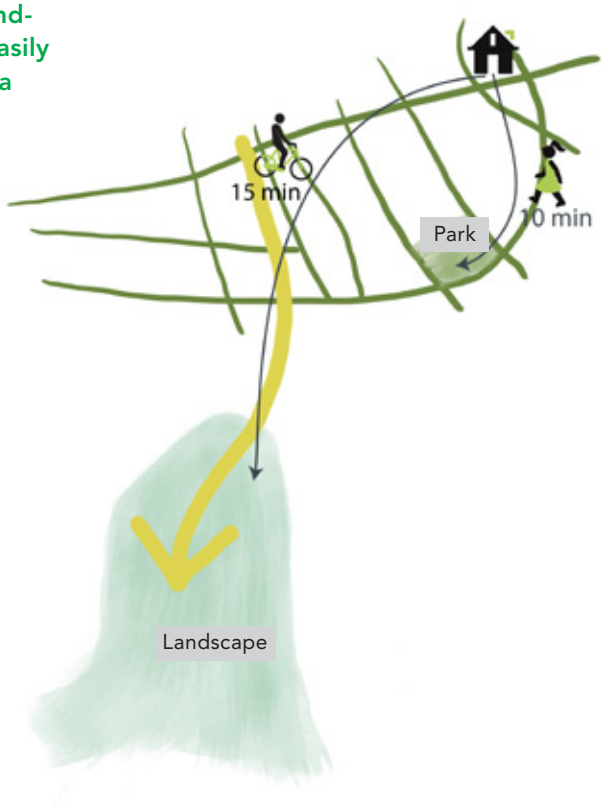
Principle 1

We will ensure there is enough and diverse green space for everyone

Every Amsterdammer has sufficient opportunity to enjoy green space in and around the city. We guarantee access to a certain amount of green space per inhabitant. The amount depends on the type of green infrastructure.

- When you step out of your house in your own neighbourhood, you will immediately notice plants and trees against buildings, in streets and squares, and along canals and watersides. ('Green by default – plants and trees are planted everywhere in the city unless other functions, such as traffic, make growing conditions or maintenance impossible.')
- Within 10 minutes, you can walk from your house to a park-like public space.
- Within 15 minutes you can cycle to a large green area at the edge of the city.
- A network of greenways and 'green-blue connections' of pedestrian and cycle paths interconnects different green elements.
- The city's green space is publicly accessible, and can be created and maintained by the municipality as well as by residents or businesses.

Parks and landscapes are easily accessible via greenways.

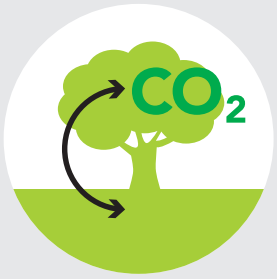


Biodiversity and pest control

Wind and noise reduction

Climate resilience

Food production



Carbon sequestration

Social

Emotional

Health

Economic (job opportunities)

Leisure

Soil fertility

Education

Green space in and around the city provides many functions and services for people, plants, and animals

Principle 2

We will ensure that green infrastructure is multifunctional

We will choose design and management strategies that preserve, increase, or strengthen as many of the values of green infrastructure as possible. The contribution of green space to solving different urban and environmental issues will thus be maximized.

Green infrastructure can fulfil many different functions in the city (see page 26) such as water retention, heat reduction, increasing biodiversity, and offering space for movement, play, recreation, gardening, meeting, and relaxation. We value these functions because they contribute to a liveable city for people, plants, and animals. An important urban issue is good urban design and green space maintenance that can support these functions and even increase their value. Therefore, when we design and manage green space, we make sure that:

- Green space of low quality will be improved in order to increase its value and its multifunctionality. For example, a well-designed park can host a million visitors a year while remaining valuable for plants and animals. As such, it contributes to health, social well-being, and biodiversity.
- New green infrastructure will offer functions and services in locations where they are most needed, while also taking the context into consideration. The design and management strategy depend on the location and the needs of local people, plants, and animals. In highly paved areas, green space can offer the greatest benefit through water retention and heat reduction. In other places, the need for sports areas and playgrounds is more pressing.
- Good quality green spaces are preserved.

A well-designed and well-maintained park remains pleasant for high numbers of visitors, and at the same time offers a valuable environment for nature and wildlife.

Principle 3

Biodiversity will be integrated into urban planning, construction, and management

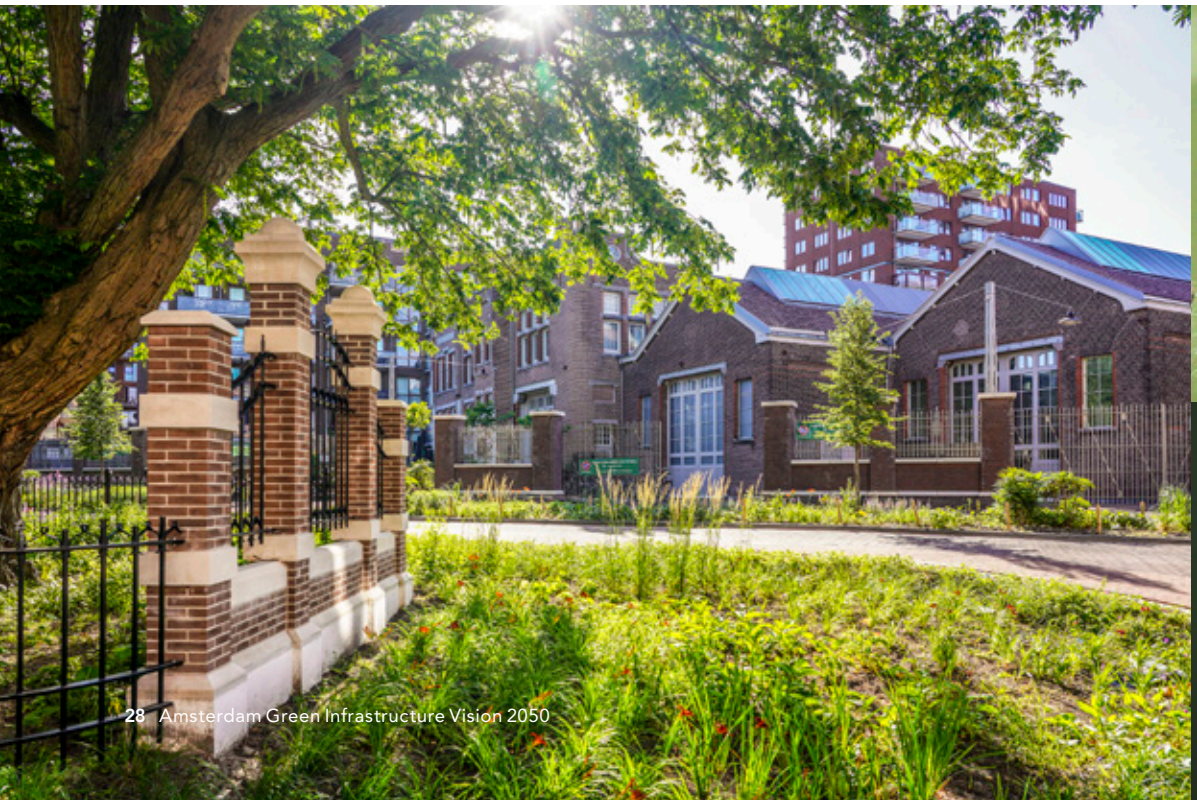
Amsterdam will attract an even greater diversity of plants and animals. We are a city which is designed, built, managed, and maintained with respect for nature.

Cities can host a wealth of wild plants and animals. It is crucial to increase biodiversity in urban areas because increasingly large parts of our country are becoming urbanised. On the other hand, some plants and animals actually depend on urban environments to survive. The biodiversity of Amsterdam has been increasing in recent years and we want this to continue. We want to give plants and animals ample opportunity to enjoy and inhabit Amsterdam as a natural area. We care for the well-being of animals in the city.

The city will be designed and maintained as ecologically and environmentally friendly as possible. This means:

- When making new – or refurbishing existing – green, blue, or built-up areas, we choose biodiversity enhancing designs for watersides, quay walls, road verges, parks, forests, grasslands, gardens, streets, and/or squares. Wherever this is technically possible and appropriate, we will create green quays walls and ecologically friendly banks with gradual land-to-water transitions and indigenous vegetation. Application will always depend on the context.
- Integrating biodiversity in the construction, renovation, and transformation of buildings will be a building regulation.
- Ecologic maintenance of public space and watersides will become the norm by 2030 at the latest. It is important that the maintenance strategy is appropriate for the use and function of the public space and water in question.
- Extending the existing ecological structure of the city and not causing any new ecological barriers as the city densifies.

Amsterdam as a nature reserve will increase the amount of wild plants and animals in the city.



Principle 4

Working together on green spaces

We will work together with residents, community organisations, businesses, housing corporations, knowledge institutions, and other organisations in the city and the metropolitan region, in order to strengthen the urban green structure.

A green and liveable city is built by many hands. The City of Amsterdam works with residents, community organisations, businesses, housing corporations, knowledge institutions, and other organisations, including governmental bodies. We encourage them to green their outdoors spaces like courtyards, building façades and rooftops. We will add more plants to the real estate owned or used by the City, focussing on adding vegetation to roofs and outdoor areas.

Civil servants, citizens, businesses, knowledge institutions, and housing corporations collaborate and learn from each other in the process of planning and planting a greener city. For green public space, the municipality will provide a clear framework for design, construction, management, and maintenance. Knowledge produced and shared in this process will be made accessible to everyone.

Residents, businesses, community organisations, and institutions are encouraged to plant gardens on façades, in courtyards, and on roofs, and to manage them in an environmentally friendly way.

Chapter 3

What will we be doing?

What will we be doing?

In 2050 we want to be a city where everyone can surround themselves in greenery, whether at home or at work. This starts with buildings and runs through green streets, green squares, parks, and walking or cycling routes, out to the landscape around the city. Sometimes we are going to focus on a particular green element, and sometimes on all the green infrastructure throughout the city.

Green throughout the city

For all the green infrastructure around the city we will do the following:

Principle 1
We will ensure there is enough and diverse green space for everyone

- We will add new green infrastructure by assessing the possibilities of replacing paved surfaces with vegetation as part of each project or initiative. We will then work from the principle of 'Green by default', taking into account the available space below ground and how to innovatively make use of it.
- We will apply an urban green space standard (see Glossary) to new and existing neighbourhoods. We will work on new and/or better green infrastructure in the existing city, and new areas will be designed by this standard from the moment of construction.
- We will increase the accessibility of existing green spaces by making more parts publicly accessible, extending opening hours, and by creating more recreational functionality. Opportunities abound in commercial green spaces, allotments, sports parks, swimming pools, community and school gardens, public squares, and municipal land.

Principle 2
We will ensure that green infrastructure is multifunctional

- We will add green infrastructure where necessary, increasing resilience to heavy rainfall in parks and gardens, on roofs, and along streets (in lower-lying areas). Water retention is a way to ensure enough water is available for plants to grow even during droughts. Water availability is also crucial for evaporation that cools the urban environment during heat waves. Good soil structure and composition is a key factor in retaining water in green spaces.

The 4 principles from Chapter 2 are central to everything that we do:

Principle 1
We will ensure there is enough and diverse green space for everyone

Principle 2
We will ensure that green infrastructure is multifunctional

Principle 3
Biodiversity will be integrated into urban planning, construction, and management

Principle 4
Working together on green spaces

We assess each project to see if more green space can be created.

- We provide lots of opportunities to exercise in green space both for young and old. Nature nearby invites you to be active, play, and discover more, whether in a nature playground or a vegetable garden. Children can also use trees, bushes, and branches for playing, so we maintain climbing trees in consultation with residents, only pruning them so that they remain suitable for playing.
- We plant trees wherever possible and desirable:
  - On streets where they are missing or were cut down
  - In new areas, creating avenues lined with trees.
  - In a newly developed city forest.
  - In the design of new and existing parks.

Healthy trees play an important role in city life for people, plants, and animals. They provide shade and shelter, and are beautiful to look at or even climb up.

- Trees are only ever planted in places where they can grow healthy and mature, allowing people to enjoy them for a long time. Trees have high natural value as they capture a lot of CO_2 and contribute to climate adaptation by providing shade and absorbing rainwater. To make trees less vulnerable to diseases and pests, it is important to plant different species and, if possible, choose indigenous trees that originate in the Netherlands and naturally survive in our climate.
- When planting trees and shrubs, we first look at the places where there is little public green infrastructure. We then choose trees with a large crown size to provide larger shaded areas for heat relief, taking into account the current layout and use of public spaces to create a balance between shady and sunny spots.
- At noisier locations in the city (such as busy parks or school grounds) we plant trees and hedges to reduce noise and promote quiet green places within the city.

Nature in the city often requires very little space. Whether along canals or streets, on squares or buildings, in parks or gardens, there is an opportunity for increased biodiversity everywhere.

Principle 3
Biodiversity will be integrated into urban planning, construction, and management

- We will use green infrastructure in the city to connect parks and larger ecological areas, ensuring that they contribute biodiversity. For new areas, green space will be included in the urban plan and we will ensure that, among other potential problems, no new ecological barriers arise.
- The ecological potential of parks and larger ecological areas such as the IJmeer, Waterland, De Oeverlanden, and Noorder IJplas will be better exploited. This will often include the development of leisure facilities both for the need of peace and quiet, and also for more active recreation and exercise.
- We will include greenery in the design and construction of public spaces like canal-sides by creating wildlife corridors on bridges and roads. With biodiversity enhancing construction, we will include nesting boxes or other facilities for birds and bats. A successful example of this is the peregrine falcon nesting boxes on buildings in Westelijk Havengebied, around Amstel station, and in Zuidas.
- Ecologic management is the norm for public space when possible, ensuring good biodiversity. Ecologic management helps to develop various types of green space with a high quality of species diversity, such as those in:
  - Floral grassland with a wide variety of insects.
  - Natural watersides, quay walls, pools, and waterways with space for different species of animals and plants.
  - Woodland and forests whose varied composition includes different species.
- We ecologically manage forests and woodland areas:
  - Leaving dead wood to create habitats for insects and feed the soil.
  - Incorporating fallen or pruned branches into living hedgerows or woodchips when safe and appropriate
  - Providing more flower beds with native herbaceous plants.

By providing space in the city for gardening, we promote the cultivation of food on buildings, in neighbourhoods, in school gardens, and in parks.

- For greater biodiversity, we manage recreational lawns to make sure that at least 25% of the surface area is flowering plants such as dandelions, clovers, and yarrow. These lawns are mowed in two parts at different moments, to benefit insect life.
- Our ecologic management reduces pests and invasive species. An important part of this is healthy organic soil with a good structure and composition.
- We create dog walking areas where possible, while ensuring that ecologically valuable areas are not disturbed.

The basis for healthy trees and plants is the right soil mix that is rich in soil organisms.

Principle 4
Working together on green spaces

- We promote the cultivation of food in the city by providing space for communal gardening around neighbourhoods – on buildings and streets, and in school gardens, city parks, greenways, and allotments. It cannot be done everywhere, so context-specific solutions need to be found for each location – even if it is only temporary – and are designed in conversation with residents, users, and local organisations. In allotments, we are aiming for more collective areas and smaller gardens with greater diversity.
- We work together with residents, businesses, schools, and housing corporations to make the city greener. In public space, the City provides a clear framework for construction, maintenance, and management of green areas.

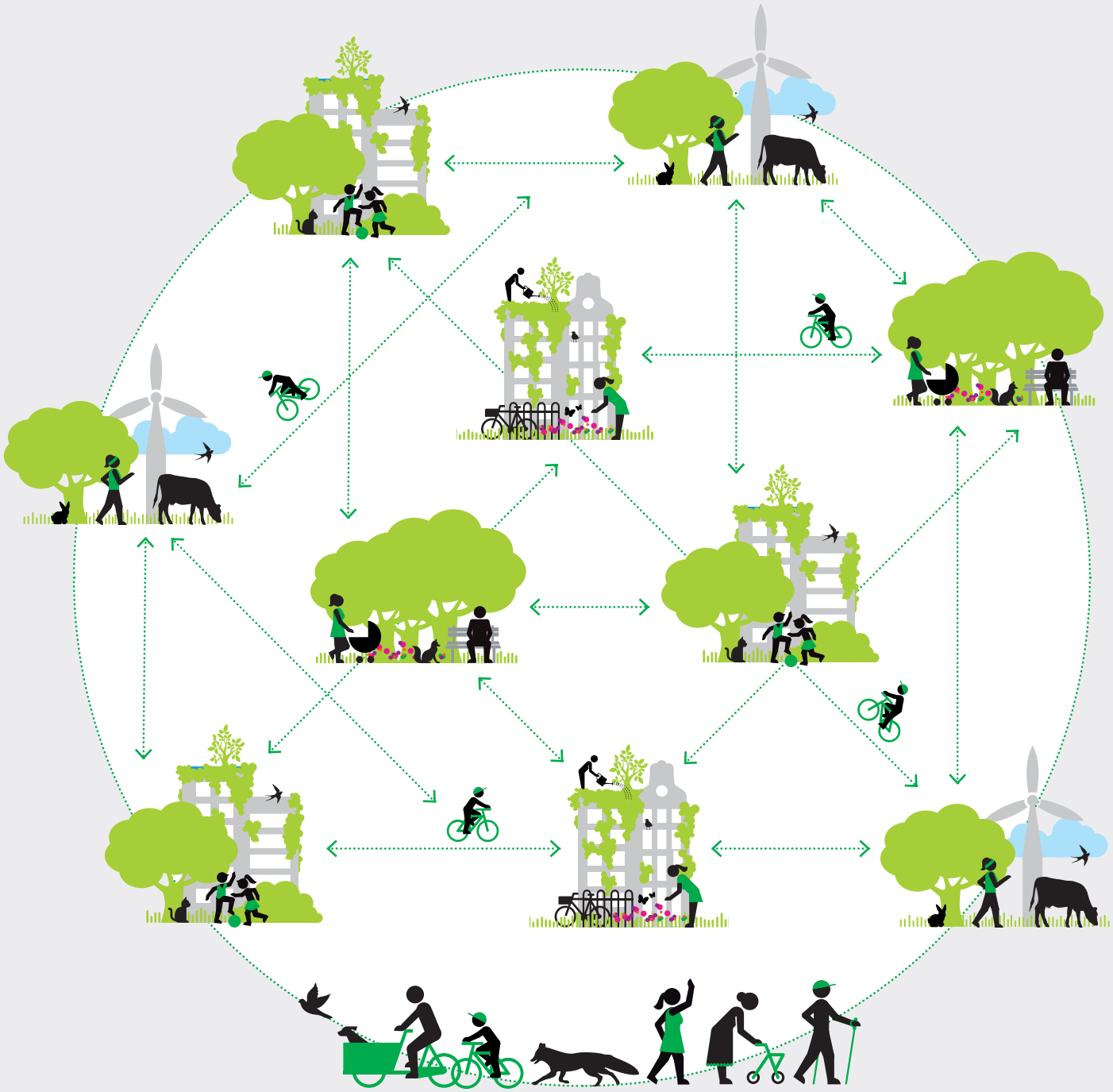
Green by default

'Green by default' means that we see public areas in Amsterdam primarily as green space. In current urban design practices, public space is generally considered paved except for the occasional bit of vegetation that is 'added' to the design. As a result, many parts of Amsterdam have an excess of wide pavements with low social and spatial qualities, or wide asphalt surfaces that are not necessary for traffic purposes.

'Green by default' creates a new vision of public space – streets and squares become green unless other functions such as pavements, cycle paths, public transport, or underground infrastructure make it impossible. We are therefore gradually making the city healthier by creating more biodiverse and pleasant places to live. This can also be done in narrow streets, for example by planting green façades on buildings or by looking at whether existing gardens can become public.

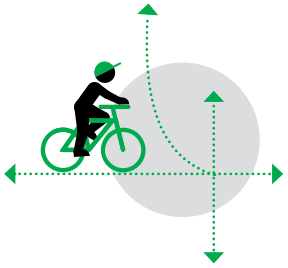
We also use 'Green by default' the other way around. In areas where there is enough greenery, any more will not necessarily mean higher quality. Sometimes there is even an excess of greenery with insufficient natural value, use, or spatial quality. In these areas, our policy focuses on making better use of existing green spaces rather than just making the environment even greener.

Where it is necessary and desirable for use and/or management, pavement is applied – roads, streets, squares, cycle paths, pavements, tram tracks, or parking spaces. From a spatial, cultural, and historical point of view, a conscious choice can be made for the laying or preservation of pavement, such as in the city's beautiful squares and alleys in the city centre, and along canals.



Green and green-blue connections

Green and green-blue connections



The green network is being expanded. Neighbourhoods, parks, and larger landscapes will be interconnected by greener pathways, streets, and watersides.

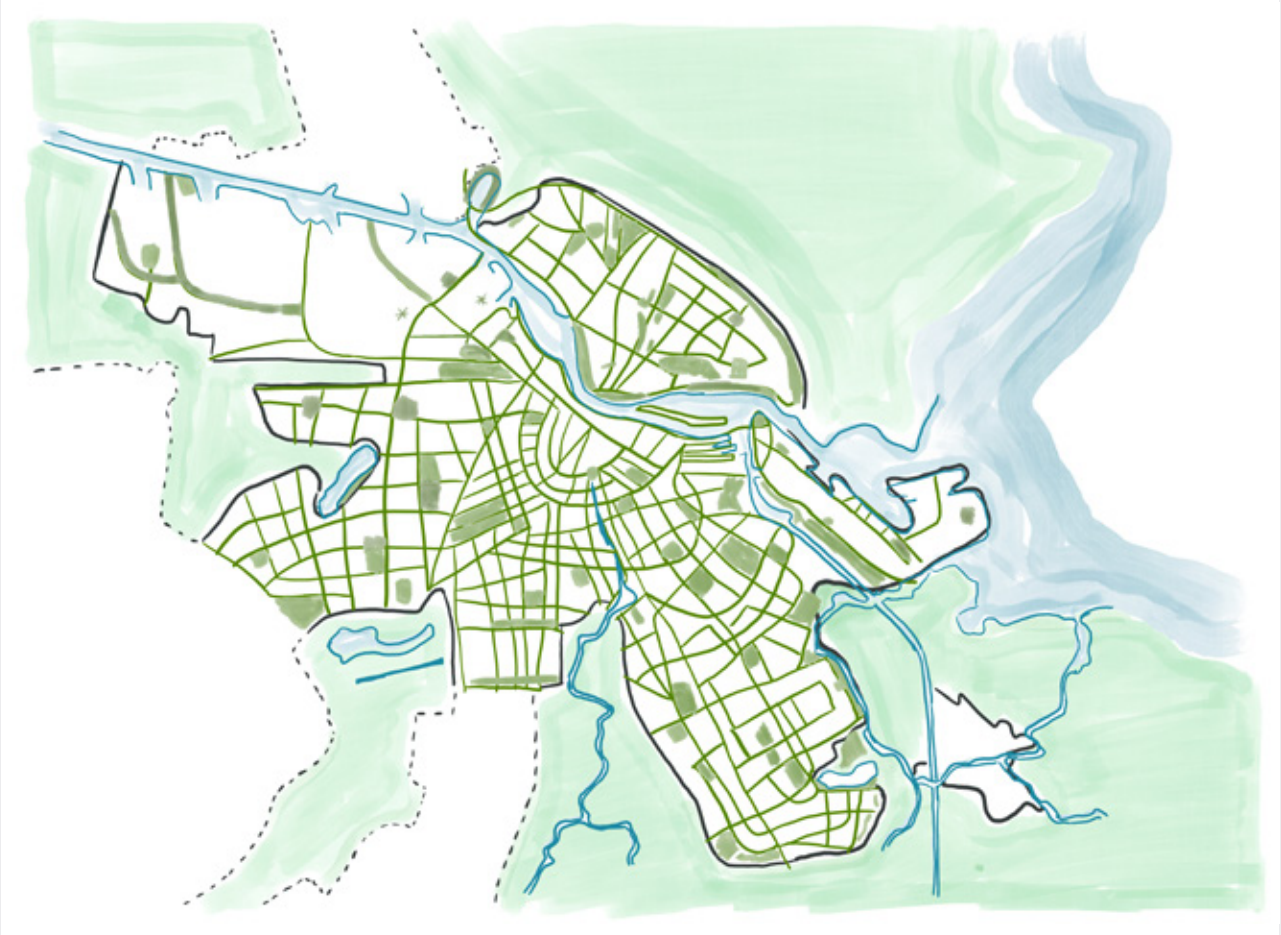
By 2050 we will have the *Main Green Structure* – a network of green and green-blue connections throughout the city that link green spaces to waterways, together forming the urban green structure. These connections go beyond the district level – they are important for all the people, plants, and animals in the city because of their value to ecology, climate adaptation, visual appeal, exercise and relaxation. This can include tree-lined avenues, greener car-free streets, green quay walls, greener walking and cycling routes, and biodiverse watersides accessible for swimmers. This structure will be developed along with necessary sports and play facilities such as sports parks, running and cycling routes, nature playgrounds, petting zoos, swimming spots, and places for urban sports.

To make more green and green-blue connections, we will:

- Link streets, pathways, watersides, and canals to larger green areas in the city, such as parks with as much vegetation as possible ('Green by default').
- Connect larger green areas in and around the city through green walking and cycling routes with clear and inviting entrances.
- Create parks on top of tunnels where possible, such as the Spaarndammer and Gaasperdammer tunnels.
- Increase green tramways where possible.
- Transform grass verges to include a rich array of flowers, except in places that need to be mowed frequently for reasons of traffic safety.
- Ensure that native plants grow on at least half of the city's canal walls and watersides.
- Encourage residents and businesses to start a green initiative or maintain a green space as part of the green and green-blue connections.

Green and green-blue connections create more spaces to relax, play sports, and enjoy nature.

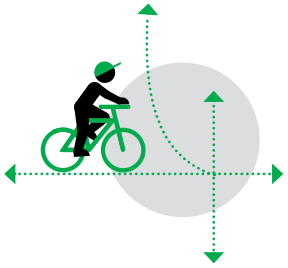
Water is important for green spaces and it therefore informs the *Green Infrastructure Vision*.



Green and green-blue connections

This map illustrates how green and green-blue connections (green spaces and waterways) how they can be developed in the future. It shows how they interconnect and how they link neighbourhoods with larger green areas in the city. These connections include green high streets, walking and cycling routes, tree-lined avenues, green watersides and green quay walls.

Green and green-blue connections



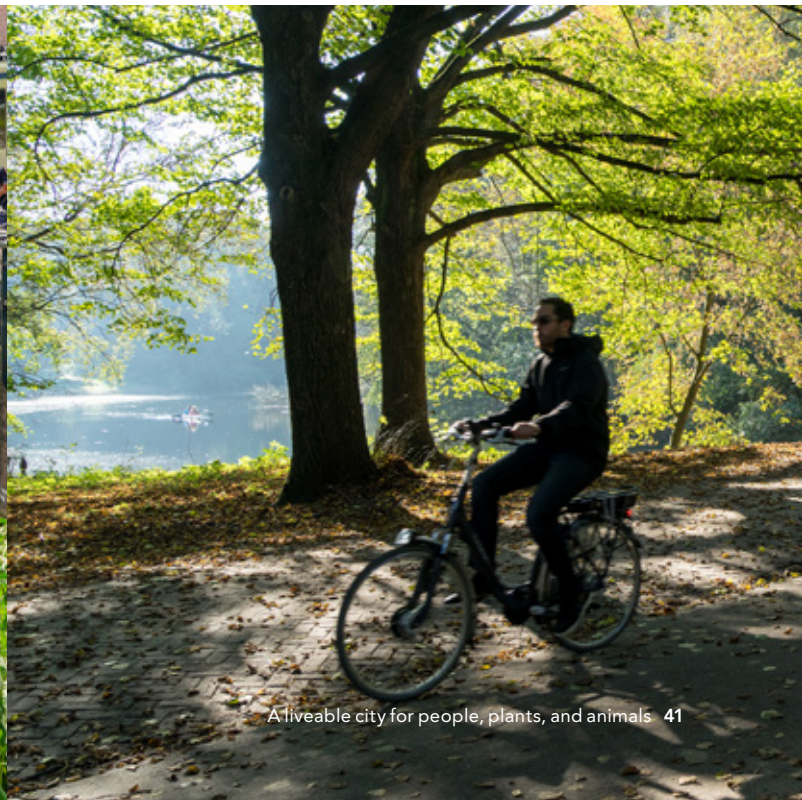
Green space and water

The Green Infrastructure Vision focuses on all forms of greenery in and around Amsterdam, from façade gardens to the landscape around the city. Water is not formally included as part of the vision, but vegetation and water are closely connected at all levels, from the small pond in the local park to bigger bodies of water like the Amstel, IJ, and IJmeer. Water is often a part of important green areas and vice versa – like the green areas around large lakes which are important parts of the city's *Main Green Structure*. The recreational value of water alongside green space is often closely linked – they are two sides of the same coin in terms of good biodiversity – and therefore water still plays a part in the Green Infrastructure Vision. *Amsterdam's Water Infrastructure Vision 2040*, published in 2016, provides a comprehensive vision for the city's water infrastructure and specifically addresses the relationship between water and the landscape.

It is important for nature and r ecreation in Amsterdam that the relationship between green space and water is seen as inseparable to the processes of urbanisation, and that both are integrated in revisions of the *Main Green Structure*. The relationship between the two is increasingly evident in daily practice, in planning, and in concrete projects.

For instance creating extra water retention areas in new urban development plans. The extremely dry summer of 2018 confronted the city with the flipside of urban water management. For example, vegetation alongside canals and contributes to cooling the city. Due to climate change, how plants and water are being designed, built, and managed, plays an increasingly important role in the city.

The EU Water Framework Directive sets out the principles for greater water quality to strengthen ecology, and we use this framework to create optimal living environments for plants and animals.



Green and green-blue connections

This image illustrates what a green connection could look like in 2050. By removing a parallel service road, there is more space for plants. This wide street, for example, connects neighbourhood greenery with parks and the landscape around the city.

Green buildings

Almost half of the city consists of buildings, gardens, and industrial areas, and these spaces become more important as the city expands. We see opportunities to make them greener.

By 2050, courtyards and (private) gardens will be even greener, each one a paradise for bees and butterflies. Buildings will have façade gardens, green façades with climbing plants, and living roofs attracting insects, bats, and birds. The greenery on lots of buildings will contribute to lowering temperatures in the city on hot days and reduce the strain on sewers during heavy rain. Roofs are spaces that are still only used to a limited extent in the city, but they are becoming more important as the city densifies, especially if rooftops can be made more accessible or even function as public green space.

To make buildings greener we will:

- Ensure that new and existing rooftops are put to good use with gardens or living roofs, terraces, sports or games facilities, or fitted with solar panels. A living roof can become even more meaningful for the city if it has a water storage function or enhances its natural value to become part of the ecological structure. Roofs of institutions, for example, could also be made accessible to the public.
- Stimulate the planting of gardens, façades, and roofs, particularly where there is little shade or a lot of pavement, creating cool areas in a natural way. In façade gardens, front gardens, and courtyards, rainwater can be collected and used for gardening.
- Set a good example by focussing on biodiversity in the development, design, and management of new and existing municipal properties, such as constructing living roofs, green façades, or courtyards gardens, or by adapting buildings to benefit biodiversity.
- Ensure greater cooperation between owners and users of courtyards, offering the opportunity to develop greener and more climate-proof gardens.

A rooftop garden or living roof can be combined with solar panels, a terrace, or a place for activities.

Green neighbourhoods

Amsterdam citizens get a lot of use out of the greenery in their neighbourhood, but there are still many possibilities to make it even greener.

In 2050 there will be more green streets with space for trees, flower in tree pits, and plant beds. People will be able to enjoy green squares, small and large parks, green playgrounds, vegetable gardens, façade gardens, flower belts, trees, and bioswales for collecting rainwater. These green spaces give neighbourhoods their own unique identity, and shared ownership creates social connections with residents working together on green designs.

To make neighbourhoods greener we will:

- Plant more trees and create more pocket parks, façade gardens, plant beds, nature-friendly watersides, bioswales, and vegetable gardens. This will be based on the urban design and the space available in streets (including parking lots and sidewalks), squares and lawns. New methods are used for designing underground space, combining space for tree roots and urban infrastructure like piping and cables.
- Listen to residents' different uses for green space and offer a varied assortment. In consultation with residents and businesses, choices will be made from edible gardens, green playgrounds, flowers, perennial plants, and trees. Existing neighbourhood parks (such as Buiksloterbreekpark) will also be improved to be more accessible and meet the needs of residents.
- Continue to add plants and trees to school playgrounds and make them more publicly accessible in order to create greener and more stimulating play areas in the city.
- Create sensible agreements for the ways in which green spaces can be co-managed by local residents.

Green infrastructure gives a neighbourhood or district its own unique style, and social contact is increased by meeting each other or taking care of plants together.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Green buildings and neighbourhoods

By 2050, buildings and streets will have more green infrastructure where possible. This image shows how a street with wide pavements could be made more attractive.

Green neighbourhoods

Even in a narrow street it is often possible to add more plants. This image shows what that could look like in 2050, with a more enjoyable living climate and more room for interaction.

We are developing green spaces in new residential areas, including city parks and school gardens.

Park areas

This map illustrates new and existing public city parks and forests, as well as green spaces that are not fully public such as allotments, school gardens, cemeteries, and sports parks. It is important that these areas are well distributed across the city.

Park areas

Park areas

Large green areas in the city can be an oasis – places to seek tranquillity or to socialise.

By 2050 there will be a good balance between busy and quiet areas in Amsterdam's larger green spaces such as city parks and forests. There will be room to sit in the sun or shade, meet each other on a lawn or terrace, play sports, or work together. Park areas are easily accessible on foot or by bike, and there is room for biodiversity, water management, and edible plants (food forests). The City of Amsterdam manages these spaces alongside volunteers who maintain sections of the park.

Green sports parks will also be developed across the city for a wide range of physical activities, and green public cemeteries will become even more special for their silence and natural beauty. Allotments will be modernised and accessible to all Amsterdam citizens, with better connections to surrounding neighbourhoods. There will also be lots of school gardens with room for nature and environmental education.

Park areas are managed by the City, but volunteers can help maintain parts of a park.

City parks

New parks and higher quality and caracter in existing parks

For Amsterdam's city parks we will:

- Create new green spaces in areas where parks are currently lacking. This can be done by merging parks (such as the Eerste and Tweede Weteringplantsoen), and by creating new ones in developing areas such as Haven-Stad and Buiteneiland on IJburg. We can also redesign existing green infrastructure to function as park areas, such as Noorderijplas and Spoorpark Zuid.
- Expand existing parks if there is room in the immediate vicinity, such as we did with Plantage Middenlaan near Wertheimpark.
- Maintain and improve the quality of existing city parks (such as Rembrandtpark and Martin Luther Kingpark) to ensure that they are recognisable for their own unique character, with space for picnics, activities, and biodiversity.

- Ensure a balance between busy and quiet areas within parks. There are quiet areas in both busy and less-visited parks, so some may become a little busier when they are more attractively designed, but always in line with the needs of residents.
- Preserve and expand green areas with a special function and character, such as school and community gardens, food forests and edible gardens, the Hortus, and Artis. This will be done together with residents, community groups, and schools, such as in Artsenijhof in Beatrixpark, which is maintained by local volunteers.
- Design parks to be accessible and attractive for visitors even after drought or heavy rain. We will create parks that collect water during heavy rainfall using lawns that absorb water without damaging surrounding trees and plant beds. The maintenance and use of the park must always relate to its soil quality and what the ground can absorb.

We will create new or larger city parks by combining existing smaller public gardens, extending existing parks or by redesigning the large green areas.

City forests

A new city forest

In and around Amsterdam there are a number of city forests with their own character – Amsterdamse Bos, Vliegenbos, Geuzenbos, and Diemerbos. The huge importance of trees for people, plants, and animals means even more trees and a new forest are required, so we are developing a new urban forest in or near Amsterdam.

It is often difficult to add more trees to existing streets and neighbourhoods due to the presence of cables and pipes, for example, but whenever trees are removed for safety, we plant a new one in the same place or within a 50-metre radius. In addition to more trees in existing built-up areas, we want a new urban forest to expand tree stock and offer new opportunities for recreation and biodiversity.

Sports parks

More ecology and shared use at sports parks

For sports parks we will:

- Integrate biodiversity in the design and construction. New sports parks will always include greenery of ecological value around perimeter and a wider range of activities incorporated into the city's green structure.
- Make better use of existing sports parks through the shared use of buildings, increasing their public character, more facilities for the local community, and greenery around the perimeter.
- Ecologically manage parks with residents and community organisations. Volunteers already maintain the kingfisher walls, butterfly sanctuaries, and bird nests at Sportpark Middenmeer.
- Ensure that artificial turf fields make a greater contribution to climate adaptation by collecting rainwater and emitting less heat on hot days.

We are developing a new urban forest in Amsterdam or its immediate surroundings because larger green infrastructure is important for people, plants, and animals.

Allotments

We will maintain and modernise allotments

Amsterdam's 40 allotment parks are important green spaces for the city, and an inseparable part of its green infrastructure. They are valuable for gardeners, residents, animals, and plants, and add a unique green character to the area. Allotments have been part of the city for over 100 years, and are of great ecological, social, cultural, and historical value. A number of large allotments are located in parts of the city with a lot of housing projects and urban development, so population density will increase. The pressure on public space is great, and it is therefore important that we modernise allotment parks and make them more public, increasing their accessibility and value for even more Amsterdam citizens.

For allotments we will:

- Preserve, protect, and improve existing gardens. We will not create any new allotments, but will offer a secure future for existing spaces alongside modernisation.

- Investigate whether we can extend the opening times of allotment parks.
- Aim to open up approximately 20% of each allotment park (depending on location and shape) to the public all year round. In this way, it is possible that many hectares will be 'opened up' to the city and its residents.
- Ensure that public spaces, parks, and pathways invite visitors to allotments on foot or by bike. Public routes through allotments will also ensure that adjacent neighbourhoods are interconnected and can be visited by walkers and cyclists. The need for additional connections and public services depends on the location in the city and may not be the same for every allotment area.
- Create inviting entrances to allotment areas, improving their borders both visually and ecologically for pedestrian use as well as bicycles, depending on the location and ecological importance.

Amsterdam's allotments have been of great ecological, social, cultural, and historical value to the city for over 100 years.

- Provide attractive walking routes accessible to all visitors, but which can be closed off when allotments shut in the evenings.
- Provide more diverse gardens alongh these routes by transforming 20% of rented allotments, and dividing larger community gardens into many smaller plots, for example, or by creating themed areas (flower, food, or herb gardens, etc). This offers a wider range of uses and experiences to create a garden with busier and quieter areas.
- Add recreational and social programmes to make allotments more attractive to different groups. In cooperation with the City and other partners, allotment associations will offer more functions, facilities, and activities in around sustainability, care and welfare, education and training, and culture, exercise and play. These could include new play facilities for children or new school gardens.

By creating themed gardens, more collective gardens and smaller plots, more Amsterdam citizens can make use of allotment parks.

- Provide an environmentally friendly layout and management system for allotment parks, learning from successful examples.
- Work together and share knowledge with the national allotment association (Bond van Volkstuinders), local allotment associations, and other relevant groups.

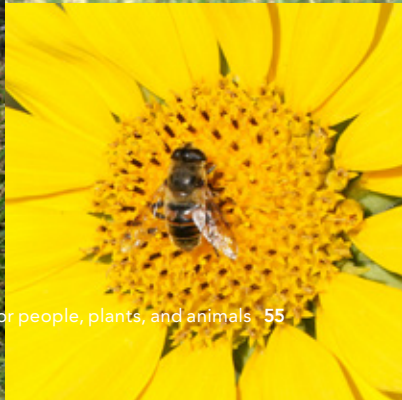
Cemeteries

A green oasis of peace

Cemeteries are quiet green places in the city, often with long histories. They are special places to visit and take care of graves alongside natural, cultural and historical monuments, significantly contributing to the spatial quality and liveability of the city.

For cemeteries we will:

- We waarderen en beschermen de begraafplaatsen als plekken met een belangrijke maatschappelijke functie en een hoge natuurwaarde.
- Maintain and protect them as places with important social functions and high natural value.
- Investigate how they can become slightly more accessible to visit, with an emphasis on greenery and tranquillity. A period of limited evening openings during the summer months has shown positive results at De Nieuwe Ooster.



- Increase understanding of cemeteries by organising lectures, informative meetings, and guided tours for schools, etc. We are also investigating where cemeteries can connect to existing walking and cycling routes.
- Maintain existing gravel pathways and, when renovating, install underground granular soakaway to store and drain water.
- Enhance biodiversity on and around buildings where possible, such as the living roof on the café of De Nieuwe Ooster.
- Ensure that trees, hedges, and shrubs are in good condition and have a suitable place to grow. If necessary, unhealthy trees, hedges, and shrubs will be replaced.
- Increasingly manage cemeteries in an ecological way, with green watersides around the perimeter where possible. Local residents and families will be included in co-management of the green part of cemeteries. We will switch to more ecological design and management styles with careful communication with local residents and families.

If cemeteries are a little bit more accessible, more people can enjoy walking there.

Landscape around the city

Around the city you can enter quiet green landscapes – Brettenzone, Tuinen van West, Waterland, Diemerscheg, Amstelscheg, or Amsterdamse Bos.

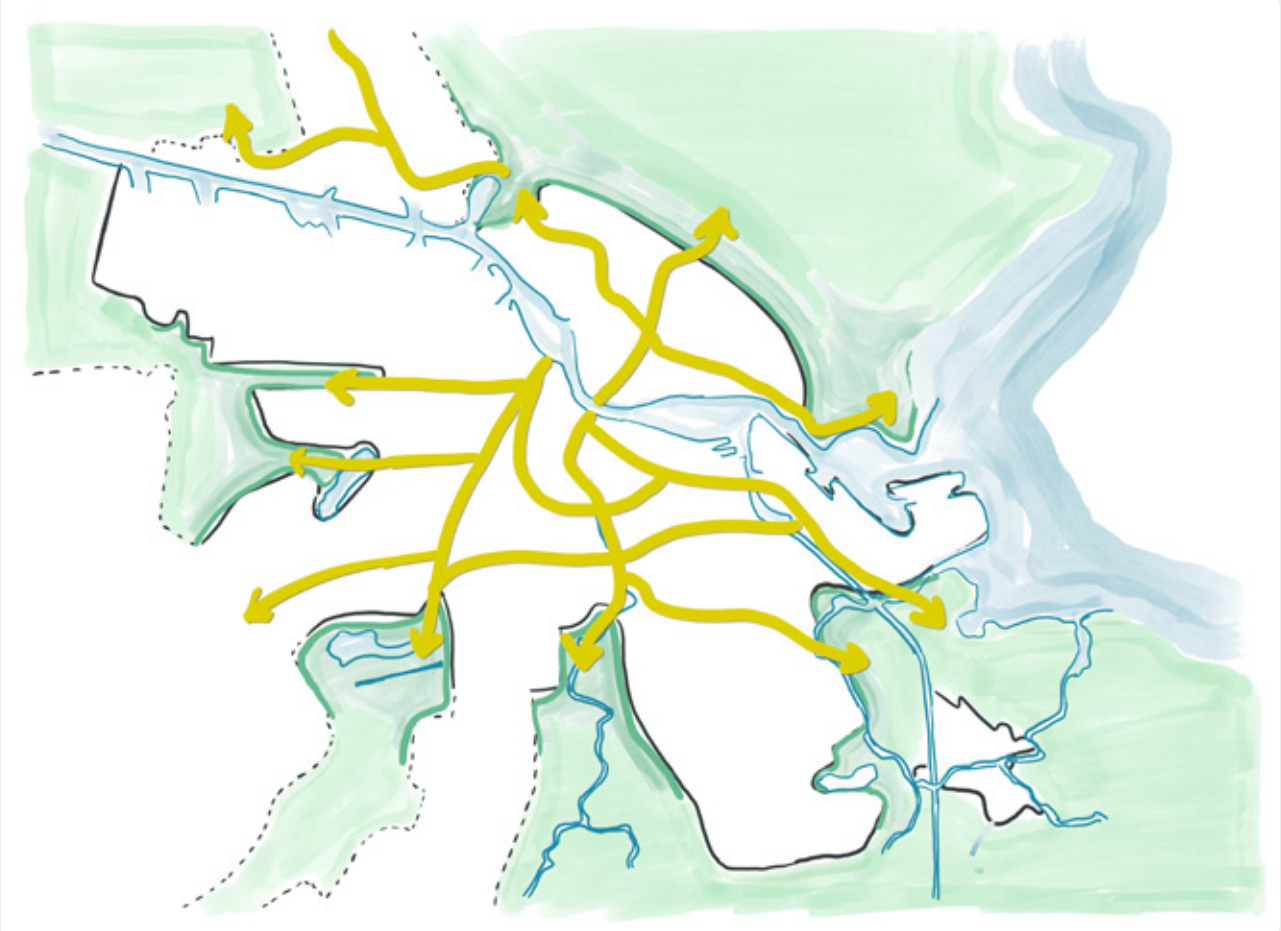
In 2050 you will easily be able to cycle from the city out into the surrounding landscape where you can be active while surrounded by nature, parks, public woodland, food forests, or other valuable green infrastructure. This landscape is never far away, with so-called 'green gems' of landscape reaching deep into Amsterdam. A green gem begins or ends at a 'crest' inside the municipal boundary, and is considered an extremely important connection between the city and its surrounding landscape.

For the landscape around the city we will:

- Keep spaces green and open, only building new houses, offices, and industrial areas in the existing city.
- Develop the crests of green gems into landscape parks, meaning more activities for a broader public in keeping with the character of the area. This will give green gems even more recreational significance for the city's growing population, with developments given priority where there is the greatest need for recreation.
- Provide better connections between the city and green gem landscapes. These can be walking, cycling, and ecological routes with space for exercise and nature education (see next page). We will also reinforce the green and green-blue connections.
- Work together with regional partners on the future-proof development and management of the green gems, alongside – and linked to – developments in the city.

We turn the crests of the green gems surrounding the city into landscape parks, with a design in line with their green character.

In Waterland we are going to raise the water level in order to stop peat oxidation and increase biodiversity.



Landscape around the city

This map shows the existing green landscape around Amsterdam and the green structures that are important for connecting with the city. The lines are often historic dikes, canals, or other waterways that have given shape to the development of the city.

Crest of a green gem

Landscape connections

- Ensure that biodiversity is preserved and strengthened in the landscape around the city. We will look at ways of increasing the quality of an area, for example by turning farmland into wetlands or woodland, or by making additional agreements with farmers about the green services they provide. In Waterland we are striving to raise the water level to stop peat oxidation and increase biodiversity.
- Strengthen the relationship between the city and its landscape, working with communities and businesses. For example, we will encourage products of the landscape to be on sale at local farms, or around the corner in the city.

We will keep the landscape around the city green and open, while also providing better cycling connections.

A green Amsterdam in 2050

Amsterdam, July 2050. It's a summer's morning, still early. You step out of the house to hear the birds chirping as you close the door behind you. The sun is shining – it's getting warmer, but it still feels humid. Last night there was a lot of wind and rain, which happens more often now. There are still raindrops dangling from the tree leaves around the corner, without which the square would have flooded. They catch so much water and provide the perfect cool, shady spot in the neighbourhood when the heat of the sun is too intense.

The street is so much greener than it used to be – the butterflies and bees are doing very well, attracted by the small but beautiful façade gardens, the flower belt running through the city, and the living roofs. These green roofs cool down the top floor of the local buildings in summertime and collect rainwater so that the plants can be watered even during dry spells. Locals also grow their vegetables and meet each other on a big rooftop garden terrace overlooked by their apartments.

The blackberries are ripening in the food forest over the road. In autumn there are walnuts and the whole neighbourhood comes to grow food – sometimes even cooking together. There are runners jogging through the park past a group of older men sitting on a bench, chatting with each other and quietly enjoying their old age.

The park is bigger than it used to be and there is so much more life. Under the piles of branches and in-between the wildflowers there are more insects which, in turn, feed the birds and bats. They also eat caterpillars which is good for the people growing vegetables nearby, making the whole city a complete biotope in itself, with everything keeping everything else alive. This is all part of Amsterdam's larger green landscape where there are all kinds of beautiful interconnected greenways only a 15-minute cycle from the busy centre, like the one heading out of the city through Noord to Waterland, then back again through Westzaan, Spaarnwoude, and the Tuinen van West. There are more than a million people calling Amsterdam their home, but if you counted all the living things, there must be billions of biodiverse residents living here together.

Chapter 4

What do we need to get there?

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Amsterdam in 2050 is still far away, but to make the ambitions of this vision a reality we must get started right away. There are many indispensable aspects we cannot ignore such as funding, organisational structure, and implementation planning. In the short term, we also need a implementation programme for green infrastructure development and maintenance, which will be updated every 5 years. This chapter will discuss all the prerequisite steps on this road towards the green, attractive city we envision by 2050.

Policy and framework

The goals and principles of this Green Infrastructure Vision will be translated into frameworks and detailed policies to enable the execution of this vision. We differentiate the following steps:

- The Green Infrastructure Vision will be translated into the daily practice of the city districts and neighbourhoods. Each of the 7 city districts will get a map showing the opportunities for adding or improving green infrastructure. Projects that can make a major contribution to the goals set out in this vision will be prioritised, but planning depends on the available budgets for the construction and management of green infrastructure. Large scale green projects will be included in the *Strategic placement plan for city-wide green infrastructure* which was drafted for the first time in 2020.
- Current standards for green space in new urban developments will be updated to be aligned with the goals of the Green Infrastructure Vision.
- The current *Main Green Structure*, part of the *Structure Vision 2040*, will be updated in order to be included in the *Strategy on Spatial Planning and the Environment* (Omgevingsvisie). In the *Zoning Plan* (Omgevingsplan), more details will be included about the *Main Green Structure*. We aim for a new *Main Green Structure* with a continuous network of green areas, and wherever possible we will integrate the *Ecological Structure*, the *Main Tree Structure*, the *Green Network*, and the greenways map into the *Main Green Structure*.
- Procurement processes will include guidelines for how to include natural elements and wildlife into urban plans and architecture, and a point system has been developed to evaluate how well different bids integrate biodiversity into their designs. This stimulates the private sector to make an effort to include nature-based solutions in their proposals.
- The main goals for Amsterdam's allotment parks are included in this vision. The Implementation Strategy Allotments will subsequently indicate what is necessary to achieve these goals, including spatial design principles and information about the process. Starting in 2020, every allotment park will enter a transformation process, developing an action plan with concrete actions for the upcoming 10 years, adhering to the goals set by the municipality. The municipality will describe these goals and conditions for each allotment park in a so-called 'developmental perspective' (ontwikkelperspectief), which will form a basis for the action plan.

Wherever possible we integrate the *Ecological Structure*, the *Main Tree Structure*, the *Green Network*, and the greenways map into the new *Main Green Structure*.

Organisational structure and methods

Good organisational structures and methods for policy development, realisation, and maintenance of green infrastructure are important to be able to put the ambitions and principles of the Green Infrastructure Vision into practice. For this, we will focus on:

- Strengthening the collaboration between all parties involved in policymaking, implementation, and maintenance – inside, between, and outside municipal departments.
- Integrating the goals and principles for green infrastructure in the early stages of urban planning and public space development.
- Ensuring that the maintenance of green spaces is in line with the ambitions and principles of this Green Infrastructure Vision, including the recreation areas just beyond the borders of the city and the possibility of centralised park management.
- A good collaboration with other programmes and authorities such as the water company, province, recreational area administrations, and partners within the Metropolitan Region Amsterdam (MRA).
- Planting roofs, façades, and surrounding grounds of municipal buildings to be greener and more inviting for wildlife. It makes sense to do this at the moment of renovation or structural maintenance, and by stimulating nature-based solutions during the procurement processes.
- A clear policy cycle in which agenda setting, implemented projects and results, and new challenges and opportunities, are constantly monitored and adjusted.
- Involving – and, if necessary, supporting – citizens, businesses, and community organisations with implementing green projects and with the maintenance of green spaces.
- Offering gardening opportunities via social workingplaces (Pantar, werkbrigade, Cordaan) and youth without a diploma, to learn, participate, re-integrate, or have a protected work environment.

We will ensure that the maintenance of green space is in line with the ambitions and principles of the Green Infrastructure Vision.

Funding

The ambitions set out in this vision require new investments in green infrastructure. The enormous growth and urban densification currently taking place cannot happen without strengthening the city's green infrastructure. The creation, design, and management of green spaces is financed from different sources, including the general city budget, land development tax, urban mobility fund, and various occasional funds. In order to align available resources and funding systems with the ambitions and principles of this Green Infrastructure Vision, we need to:

- Calculate the long-term funding necessary for planning, design, execution, asset management, maintenance and incentives for private actors.
- Indicate which projects and processes deserve to be prioritised for funding, and which projects can be financed later. The implementation of the Green Infrastructure Vision will take place in phases and each phase will have its own budget.
- Set up a city-wide investment programme for the development and maintenance of green infrastructure. A first step has been made with the *Strategic Placement Plan for City-wide Green Infrastructure* for green infrastructure with an importance for multiple neighbourhoods.
- Find new structural funding for part of the overall goal, at least for maintenance and management, but also for the development of new green space in the city. Additionally, this funding needs to be able to grow in parallel with the growth of the city and its changing needs. If funding remains the same, it is simply not possible to achieve all the goals set out in this vision.
- Explore possibilities for financing projects through European and national funds. The EU is planning to significantly increase the amount of forest area in Europe and to invest in more green space in European cities.
- Explore possibilities to let the private sector (or residents) financially contribute to the green infrastructure of the city. Notable examples to be looked into include:
  - CO_2 forest: an urban forest created with the contribution of companies or residents that want to compensate their CO_2 emissions by planting trees.
  - Baby tree forest: an urban forest created with the contribution of parents that want to plant a tree for their child.
- Secure more financial expertise around nature-based solutions in order to find more funding opportunities.

We strive for a city-wide investment programme for the development and maintenance of green infrastructure.

Knowledge, communication and collaboration

The ambitions of this green vision will be achieved sooner by collecting existing knowledge within the city and collaborating well to achieve greater results and also increase the sense of ownership of green spaces. In addition to existing knowledge, new urban challenges require new knowledge and innovation. Therefore, it is important that we:

- Ensure that all gardeners, designers, green policy officers, Pantar employees, managers, and supervisors have sufficient knowledge regarding the design and maintenance of green infrastructure. This includes skills in communication, consulting on public space design / execution / maintenance, finance and funding, management, construction, infrastructure, education, social issues, procurement, participation / democracy, and co-management of green spaces by citizens.
- Make conscious choices both in green infrastructure projects that we execute ourselves and in projects that we put up for tender, of which the former provides us with valuable knowledge and experience.
- Ensure that residents, businesses, community organisations, and institutions are able to take on the co-management or planting of roofs, existing buildings, neighbourhoods, and gardens.
- Ensure that existing and new knowledge is accessible for everyone. For residents and businesses, this comprises how to make façade gardens, green façades, green (and blue-green) roofs, courtyard gardens, and biodiversity-enhancing community green spaces. It also includes lessons learned from successful projects such as the 'network approach' of the Amsterdam Rainproof climate adaptation programme.
- Monitor the quantity of green infrastructure in Amsterdam as it develops.
- Ensure that specific information regarding co-management of green infrastructure, quality standards for designing green spaces, regulations for organic procurement, and nature-based solutions for design and construction is provided by the City. In parks, caretakers will be the contact point for residents with questions about co-management.
- Collaborate with other authorities and national networks to achieve the ambition of creating greener cities. An example of a national network that we actively participate in is the *National Roof Plan* (Nationaal Daken Plan) which focuses on creating a sustainable, multifunctional, attractive roof landscape in cities.

We ensure that existing and new knowledge about the creation and management of green infrastructure is accessible for everyone.

Evaluation and research

To achieve the ambitions of the Green Infrastructure Vision, we do not need to start from scratch. For many subjects, there is knowledge available or even captured in policy frameworks, maintenance plans, or on maps. By collecting and evaluating all this information we will get insight into the kind of monitoring that is necessary, which manuals or guidelines need to be written up or adjusted, and which aspects need more research. In doing this, we look at:

- What is necessary for increasing and strengthening biodiversity and ecology – new seed mixes, monitoring ecologic management, and research on the final type of vegetation desired, water quality, soil, and on mowing and sowing regimes.
- Researching what kind of innovation is possible in public and private spaces – urban agriculture on rooftops, physical-activity-enhancing landscapes, biodiverse production forests for forestry and capturing CO_2.
- Researching which requirements should be formulated for underground infrastructure in order to enable more urban trees to be planted in dense neighbourhoods. These requirements will be included in policy frameworks for underground infrastructure.
- What is necessary to make attractive and healthy green spaces that benefit many animals and plants, and can be applied in different places and neighbourhoods.
- Maintaining the balance between peace and noise in green areas. The goal is to ensure all parks have quiet areas.
- Researching the influence of invasive species to see how their negative impact can be minimised.
- Adjusting the map of ecological barriers. Urban development projects in areas with such barriers need to include solutions in their design brief and/or project budgets.
- Researching which streets and paths will provide added value for people, plants, and animals if they are redesigned to be greener. In turn, these streets and paths will be prioritised during implementation planning.

We will research which innovations are possible for combining the green functions of public and private space.

Appendix 1
Biodiversity

Biodiversity is determined by the number of plant and animal species that occur in a given area, and Amsterdam is already home to some 10,000 different species. Quite a good score for a city.

Large nature reserves

Amsterdam is surrounded by ecologically valuable nature reserves, some of which are even within the city boundary. Waterland, in Amsterdam's rural north, is still one of the most valuable areas in the Netherlands for meadow birds, including the discerning black-tailed godwit. In winter, tens of thousands of geese graze in Waterland and hundreds of lapwings, curlews, and golden plovers can be seen. IJmeer, including IJburg, is also an EU nature reserve because of its large number of wintering ducks such as the common pochard, the smew, and the tufted duck.

Amsterdamse Bos is now over 75 years old and has grown into a mature forest hosting woodpeckers, owls, and ravens, as well as other species such as the pine marten. Amsterdam is responsible for safeguarding and improving the biodiversity of these areas, as well as the parts outside municipal territory, together with other parties and provinces. The City of Amsterdam is also responsible for the management of Amsterdamse Waterleidingduinen near Zandvoort, an incomparably rich dune area of over 3,000 hectares with a wealth of insects and amphibians, as well as a considerable number of sand lizards.

Nature around the city

In addition to these 'official' nature reserves, many urban fringes are also very valuable, such as Brettenzone, the banks of Nieuwe Meer, Noorder IJplas, Diemerpark, and Bijlmerweide. These rugged areas alternating between swamps, forests, water, and open areas are where birds such as the bluethroat and nightingale breed. You can also find natter jack toads and, in Diemerpark and Diemerbos, grass snakes. It is precisely these areas that need maintaining and their biodiversity improved as they often have no official protection status.

The city biotope

The city is a refuge for some plant species, including those that usually live on cliffs or rocks, in caves or trees, such as bats, swifts, and peregrine falcons. In Amsterdam there are 100 species of wild bees, at least 6 species of bats in incredible numbers, and the city is the most valuable breeding spot for swifts in the Netherlands. Plants naturally found on stones and rocks can live on quay and canal walls, such as the rare ferns growing at the Stenen Hoofd, and Mauritskade is the only place in the country where hawkweed grows. Vondelpark is also the habitat for two species of insects only discovered in 2019 – an ichneumon wasp and a beetle.

Integrating biodiversity in construction

Integrating biodiversity in construction means adding vegetation where possible, including on roofs and façades. This is important to help different species thrive, especially plants and insects such as butterflies and wild bees. Nesting boxes for swifts, house sparrows, peregrine falcons, and starlings can be attached to buildings, and small enclosures can create sleeping places for bats. Renovating canal and quay walls can also help to introduce wall plants, among other things, by using calcium-rich mortar.

Water quality

Waterways in Amsterdam are usually bordered by hard banks of stone or wood, considerably limiting their natural potential. Nevertheless, dozens of species of fish live in the canals, partly due to Amsterdam's unique location between the sea and IJmeer. As a result, both freshwater and saltwater fish can be found, with species such as eels and sticklebacks migrating through Amsterdam's waterways. Increasing biodiversity means that more water plants can grow on gradually sloping banks, significantly improving the natural value of the city's waterways.

Ecological structure and tree network

The ecological structure is a network of green verges and embankments connecting green areas allowing flightless animals to expand their habitats. This is evidenced in the hedgehogs and moles found in most of the city's parks, and in the natural redevelopment near IJburg and on Zee-Burgereiland that allows grass snakes from Diemerpark to reach neighbouring populations in Waterland. Larger populations of animals are less vulnerable than smaller groups far away from each other, and this ecological structure can be further strengthened by increasing green watersides.

The network of trees in Amsterdam is also very important for all kinds of animals in the city to find food and protection. There are more than 1 million trees in Amsterdam, of which about 300,000 are in avenues and streets.

Ecologic management

In addition to the design of green infrastructure, ecologic management is integral for improving biodiversity. Should nature be left alone, as in Vijfhoekpark? Should ecologic management promote biodiversity within the ecological structure of city parks and parts of Amsterdamse Bos? Should we regularly mow lawns in parks where people play and sunbathe?

Practice shows that ecologic management can lead to quick results, as seen in Amsterdam's increasing number of wild bee species, contrary to the national trend. Cities like Amsterdam cannot save global biodiversity, but they can make an important contribution. Amsterdam could become a sanctuary for animals – an urban nature reserve – and the right policies can help reintroduce species that can no longer be found in the city.

Appendix 2
The cultural history of green infrastructure

The cultural history of Amsterdam is closed intertwined with its green infrastructure, and almost all of the its green areas were created as part of the city's urban development. The landscape surrounding the city was also largely made by human hands with reclaimed land, polders, elite countryside estates, forests, and other types of development. Over time, other typologies of green infrastructure appeared such as parks, allotments, and decorative gardens, the shape and construction of which entirely depended on the time period in which they were designed. How these green areas are used, and their background context, can vary greatly – for example, 19th century parks are isolated from the built environment as an imaginary ideal of nature, such as Vondelpark, while parks in post-war neighbourhoods are integrated into a continuum of public space.

Throughout history, nature in the city is associated with different values. In some cases, aesthetics dominate, such as with the trees lining the canals of Amsterdam. 'Often, it is a combination of different objectives that drives the creation of green space, whether for recreation or education, or for aesthetic, economic, or social value'. More recently, values relating to ecology, climate adaptation, and social resilience are getting more attention.

Historic growth of the city and urban green infrastructure

In each period of the city's growth we can observe the following developments of green space and infrastructure.

17th century Urban layout (1585-1860)

The famous 17th century concentric canals were built for and by the bourgeoisie governing the city at the time. The design shows a commitment to creating an optimal living environment of terraced residential blocks with large enclosed courtyards that were not allowed to be built on. In the canal district, the green aspect is particularly manifested in the large-scale planting of trees for 'sweet air, ornament, and pleasantry'. Amsterdam was probably the first city in Europe to plant trees in a large-scale and structural fashion along its main roads and canals, and the City council was responsible for their management as well as other green areas. In 1682 the City designated Plantage as a green zone (instead of housing) comprising medicinal and recreational gardens with opportunities for entertainment. In 1812, Wertheimpark, the first park in the city, was built in part of Plantage as a gift from Napoleon. The Artis zoo was built nearby in 1839, and Tolhuis was created as a pleasure garden. Other private venues included Oude Doolhof and the tea gardens along the Slatuinenpad, built for well-to-do citizens. The City council is not interested in gardens and facilities for the working class, but nonetheless the 'kleine man' (little man) enjoys them when he can.

19th century Ring (1860-1910)

In the 19th century, urban challenges of rapid population growth, urbanisation, hygiene, and public health played an important role. Greenery in public space consisted of the occasional tree planted in working class neighbourhoods and structural adornment along main roads such as Ceintuurbaan and Weesperzijde. The increased greenery of the high-class Vondelpark neighbourhood formed an exception as a private initiative with abundant gardens, tree-lined lanes, and park-

land. The importance of providing green space and parks for walking to all members of society was recognised as an essential part of new neighbourhoods as the city expanded. Around 1900, it became an official duty of the City to provide green space for all, however in practice it proved difficult owing to land purchases and exploitation costs. Vondelpark and Sarphatipark were for the upper classes, but in 1857 Westerplanstoen became the first publicly accessible park to take a short stroll in. Westerpark and Oosterpark were built in 1890-91 and, as a reaction to the run-down industrial city Amsterdam had become, the growing middle class 'discovered' nature and the romantic ideals of farm life, resulting in movement towards the countryside.

Interbellum Belt (1910-1945)

In the first half of the 20th century, the city expanded in all directions, mainly through continuous urbanisation with enclosed residential blocks in the form of garden cities. The scale of the blocks was larger than before, resulting in some courtyards being managed as collective gardens. The street profiles for the urban extensions of the early 20th century always included trees and plants, with many new neighbourhoods including squares, parks, and front gardens. American and German ideas about the metropolitan landscape and its connections between urban greenery and the landscape surrounding the city are embraced, as seen in the adoption of the American 'parkway'. Apollolaan, for example, is a long, broad avenue that functions as a park, and Plan Zuid becomes the first urban development strategy that included and fully integrated a green space structure. Larger green infrastructure started to be created, stimulated by publications by Heimans and Thijsse, 2 educators from Amsterdam that were largely responsible for the surge of interest in nature that took place at the end of the 19th century in the Netherlands. The 8-hour day meant free time for recreation, and the first urban forest for the working class, Vliegenbos, opened in 1922 as 'a little piece of untamed nature that the city is deeply needing'. Along Zuidelijke Wandelweg and at Mosplein, the first outdoor sports areas appeared, and the first allotments were opened in 1909, followed by the first school gardens in 1920 in Spaarndammerplantsoen. The construction of Amsterdamse Bos (the large urban forest to the southwest of the city) took place between 1934 and 1970, during which it received worldwide attention because it was an enormous and unique project for its time.

General Expansion Plan (1945-1970)

The General Expansion Plan (Algemeen Uitbreidingsplan) of 1934 included a city-wide green infrastructure system based on statistical research for the first time. Inspired by foreign green standards, exact calculations per inhabitant determined how much and at what distance different types of green spaces were needed – community gardens, parks, school gardens, allotments, and sports areas. This plan forms the basis for the current *Main Green Structure* with the surrounding landscape 'wedged' into the urban fabric of the city. In the residential planning a change took place – enclosed residential blocks were replaced by open strips of buildings with gradual transitions between the private gardens of homes and public green spaces like nature strips, lawns, and parks. The abundant neighbourhood green areas formed a coherent network and were directly connected to collective courtyard gardens and to public green spaces. This led to an explosive increase in green space in the city, with Bijlmermeer as a highlight.

Compact City (1970-1996)

In the '70s and '80s, interest in urban green infrastructure waned. The focus was on urban redevelopment and the 'compact city' – an urban planning trend that aimed to optimise urban space to minimise commuting distances. The emergence of ecology as a discipline nevertheless led to different management practices with a great emphasis on increasing biodiversity. The value of nature was recognised, and not only from the perspective of humans. Awareness of environmental issues stimulated the development of public transport and the use of bicycles, however a new vision for green space in the city was not formulated. In the urban developments of the '70s and '80s, there were child and pedestrian-friendly areas, as well as attention for green space at the neighbourhood scale – the 'woonerf', or 'living street' design, was an example of this. New neighbourhoods such as Nieuwe Sloten, Venserpolder, and KNSM-island reverted to traditional urban designs

The cultural history of green infrastructure

with public green space limited to street trees and public gardens. Many parks envisioned in the General Expansion Plan at the edge of the pre-war city were completed – Sloterpark, Rembrandtpark, Amstelpark, and Gaasperplaspark. Preservation of valuable nature reserves and agricultural land becomes a priority, and due to increased car ownership, Amsterdam citizens knew how to find their way to recreational areas 't Twiske, Spaarnwoude, and Amsterdamse Bos.

Densifying City (1996-2020)

The adoption of the *Main Green Structure* in 1996 signifies the recognition of the ecological and cultural value of green infrastructure. The Structural Vision Amsterdam developed in 2011 aims to preserve the 'green gems' and the landscape surrounding the city, however a city-wide vision on the meaning of green space, as a successor to the General Expansion Plan, is still missing. Increasing free market housing provision leads to public green space often has its funding cut. In the development of the Oostelijke Eilanden and Ijburg parks, green spaces are integrated into the fabric of enclosed and half-open residential blocks, while in some instances open water replaces greenery as open space. Green infrastructure takes many forms – gardens, verges, slopes, parks, and street-side planting areas. Also, green spaces are increasingly valued for their contribution to storm water management and heat reduction in summer.

In the densifying city, awareness is growing of the need to strengthen existing inner-city green areas. City parks are being refurbished and attention to community green spaces has increased, such as in pocket parks, façade gardens, community vegetable gardens, and green roofs. These demonstrate that input from residents on the city's green infrastructure is becoming more important. Green space in the densifying city is considered increasingly valuable for a good living environment, and for attracting businesses and residents. The use of parks is diversifying and intensifying, developing as a kind of green urban square as the pressure of festivals and events rises. The renovation of Westerpark is a good example of this. New green areas are being created as part of the city's *Main Ecological Structure* such as Diemerscheg. The green space of a neighbourhood is concentrated at its edge in the form of a park, such as the waterside parks by the IJ and Amstel. These are considered links to the ecological zones that connect the city with the peri-urban landscape.

Protected woodlands and monumental trees

Amsterdam has been planting trees for at least 400 years. However, storms, disease, and the dynamics of urban development mean that the oldest trees in the city are a 'mere' 250 years old. The layout of the historic city with tree-lined canals is unique in the world and protected as a UNESCO World Heritage site. To better protect and manage monumental trees and woodlands, the City has made lists of protected woodlands according to local legislation. The protected status means, in principle, that a tree cannot be cut down, but also that it receives more attention and careful management. The various lists of monumental trees and protected woodlands are accessible through an interactive map (see 'monumental trees and other valuable green' on maps.amsterdam.nl). A 'protected woodland' is a monumental tree or other woodland, such as woody climbing plants, memorial trees, and unusual shrubs. A monumental tree must be at least 50 years old and have at least one of the following characteristics – aesthetic value, historical value, ecosystem value, or be of a rare species. Other protected woodlands can be younger, such as memorial trees like 'the tree that saw everything' in Bijlmer.

School gardens

Amsterdam school gardens have existed since 1920. The gardens were originally intended to bring children into contact with healthy food and were considered a good way to minimise urban food shortages, similar to allotments. Nowadays, school garden education involves a more active way of giving a nature-based environmental education, touching upon a wide variety of aspects in nature and ecology beyond vegetables. Besides gardening and learning how vegetables and flowers grow, children are taught the preparation of healthy food. Sustainability is also an important sub-

ject and children learn about nutrients and seasonal cycles in nature, renewable energy, and the relationship between people, plants, and animals.

The goal of these classes is to increase students' knowledge of, and respect for, nature and the environment. Yearly, almost 7,000 primary school students (in year 6/7) are gardening at one of the 13 school garden sites. They spend 1 full year gardening and getting to know all the seasons, while students from other years will visit the gardens for short environmental classes. Since 2006, this school garden programme has been included in the core goals of primary education. Amsterdam is unique in its provision of nature-based environmental education in school gardens – nowhere else in the Netherlands has such a large quantity of professional school gardens for education at primary school level for free.

Cemeteries

Various cemeteries in Amsterdam have been designated as monuments based on their history. Their design, the greenery itself, their buildings, and sometimes individual graves and memorials might be protected. There are 9 larger cemeteries within the city limits, including the municipal cemetery of Amstelveen, Zorgvlied. Additionally, there are a dozen small churchyards and cemeteries (including village cemeteries in the rural north of the city). Nieuwe Ooster is the largest cemetery and is managed by the City of Amsterdam, as is De Nieuwe Noorder.

Allotment parks

The first allotment park in Amsterdam – Tuinwijck – was founded in 1909 by a group of eminent progressives as a charity initiative with the goal of improving health and increasing a sense of fulfilment by providing everyone with the opportunity to be amongst nature.

Food shortages during the First World War led the ministry of agriculture to legislate that all municipalities must promote allotments, leading to 5 large wartime allotment parks around Amsterdam, totalling about 94 hectares. These gardens proceeded to be mostly run by associations. In the '20s and '30s, allotments increasingly became places for open air recreation and a blind eye was turned to those passing the night there. Furthermore, the General Expansion Plan (1935) assigned allotment gardens the function of 'recreation'.

After the Second World War in the prosperous 1950s, the structures on allotment plots became fitted with more modern comforts and the City decided to permit habitation in the summer. As the expansion plan was executed, many allotments had to change to make way for urban developments, but the City provided the necessary funds for finding new locations and allotments were rebuilt with a more park-like landscape design. The luxury nature of many allotment buildings had the unintended consequence that many complexes decided to fence and lock the perimeters to prevent theft. Due to the aging of plants and trees, and the environmental measures of many allotment associations, many allotments are valuable for their landscape and ecology, in addition to their social and recreational value – similar to the older city parks and wild peri-urban areas.

Appendix 3
Glossary

Amsterdam Rainproof

The platform Amsterdam Rainproof, consisting of more than 90 urban actors, has as a collective goal to make Amsterdam more resilient against increasingly frequent heavy rainfall.

Asset management

Within this Green Infrastructure Vision, this refers to the (financial) management and maintenance of urban green infrastructure.

Biodiversity

This refers to the diversity of life at the level of species and ecosystems. Biodiversity includes all species that exist on earth, including all animal and plant species. Biodiversity also comprises the diversity of ecosystems (habitats) where those species thrive. In Amsterdam there are around 10,000 different species of plants and animals.

Bioswale

A bioswale is a ditch with vegetation and porous material underneath. A bioswale system gathers stormwater runoff from roofs and roads in gutters or ditches instead of sewers. The system buffers and filters rainwater into the ground.

City-wide green infrastructure

Green infrastructure whose value and use transcends a single neighbourhood, such as greenways, city parks, or the landscape surrounding the city.

Climate adaptation

The way people change their environment and how they live in it, to adapt to the changing climate, minimising vulnerability and perhaps even utilizing opportunities in the process.

Co-management

In this Green Infrastructure Vision we define co-management as the process of residents, community organisations, and businesses volunteering to help in the management of public green space in their area.

Daily management

The daily management of urban green areas, such as mowing and pruning.

Ecologic management

A form of management that aims to increase biodiversity and allow flora and fauna to develop through supporting natural processes. The focus is not merely on maintaining the existing quality of green space, but actively transforming it towards a different type of vegetation and wildlife.

Embankment

A slope along a river (or canal) bank, road, railway, or dyke. Gently sloping banks offer great benefits for biodiversity as they create breeding grounds for birds and shelter for small mammals. Another benefit is that animals can easily enter and exit the water.

Food forests

An ecosystem designed by humans mimicking a natural forest, aiming for a high diversity of plants and trees, many of which are edible.

Green façade

Vegetation growing on the outside walls of buildings. Most often, it relates to climbing plants that grow up a building's front, but there are other ways to attach plants to façades. A green façade offers shelter, food, and nesting opportunities for birds and insects.

Green gems

This refers to the landscape surrounding the city that reaches far into the urban fabric of Amsterdam, offering urban dwellers easy access to semi-wild green areas. The City considers these 'green gems' as of unique value for Amsterdam as they can be reached from anywhere in city within 15 minutes' cycling. The parts of the landscape that are closest to the city, that have penetrated deepest into the urban fabric, are called the 'crests' of the green gems.

Green Network

Amsterdam's green cycling routes are being expanded into one cycling network consisting of comfortable routes through pleasant green surroundings separated from motorised traffic as much as possible. The *Green Network* is being implemented as part of the *Long-Term Bicycle Plan 2017-2022*.

Green Space Standard

A standard that indicates the minimal amount of green space per neighbourhood or housing development in order to create a liveable city. In 2018 the green standards were developed as part of 'Amsterdam's reference standards for social amenities, green space, and playgrounds'. These standards are applied in new urban development plans and they distinguish between green space for use by people, and green space that provides ecosystem services.

Habitat

The natural living environment of plants and animals.

High streets

High streets are wide, busy streets in or between neighbourhoods such as Kinkerstraat, Weesperstraat, Wibautstraat, and Utrechtsestraat.

Invasive species

Plant and animals that are not native to the Netherlands and form a threat to native species.

Main Green Structure

The *Main Green Structure* is a legal and planning instrument that documents which green areas are valuable for the city and its direct surroundings. These green areas fulfil essential functions that improve living environments, water management, biodiversity, outdoor recreation, food production, heritage sites, and the total diversity of the green space available. The *Main Green Structure* includes areas with the primary function of green infrastructure or outdoor recreation. It will be updated with the publication of the *Strategy on Spatial Planning and the Environment*. Urban developments located within the *Main Green Structure* will be assessed according to the new policies currently in development.

Main Tree Structure

The Amsterdam *Main Tree Structure* is a planning instrument that documents which trees are defining for the image of the city.

Participation

Participation happens when residents get involved in the political processes of the City, contributing to ideas, conversations, or actions. In the context of the Green Infrastructure Vision, participation specifically refers to conversations that have been held with residents and relevant organisations, and their reactions during the official consultation period.

Public and private space

Public space is where everyone has the right to go. Every person can enjoy green public space such as public gardens or city parks. Private space is owned by individuals or organisations and is often not accessible for everyone like courtyards or rooftops.

Strategic placement plan for city-wide green infrastructure

In the upcoming years, extra investments in social amenities are planned as the city expands, which includes investments in city-wide green infrastructure. The City of Amsterdam has commissioned the development of a Strategic Placement Plan for City-wide Green Infrastructure that will partially implement goals set out in existing green infrastructure policy. The strategic placement plan will set out a medium-to long-term strategy for green infrastructure projects and the funds will be integrated into the yearly municipal budget cycle.

Urban agriculture

Small scale agriculture and food initiatives by residents, community organisations, or businesses in urban or peri-urban areas. Food production is often combined with activities relating to knowledge exchange, raising awareness, healthcare, social cohesion, landscape management, and recreation.

Wildlife corridor

Wildlife corridors allow animals to cross over, under or along an obstacle such as a road or train track, safely and undisturbed. Wildlife corridors connect different urban areas to allow animals to move around the city better.

Appendix 4
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Colophon

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A liveable city for people, plants, and animals

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