GREEN4GREY

GREEN AND BLUE INFRASTRUCTURE FOR GREY PERI-URBAN LANDSCAPES

VLAAMSE
LAND
MAATSCHAPPIJ

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THE CHALLENGE

Less grey infrastructure in the Flemish landscape

Every day in Flanders we lose around 6 hectares of open space to new hard developments, such as housing projects, business parks and infrastructure. With this figure, we are top of the league in the EU. It is expected that the population will increase by one million by 2050. With this there will be no reduction in the pressure on open spaces.

Furthermore, Flanders is very fragmented. The 'landscape' is divided into ever smaller fragments of open space, surrounded by other functions. The pressure of grey infrastructure on the remaining open space is very strong in peripheral urban areas.

'Greying' in **the 'Vlaamse Rand'** (around Brussels) is creating fragmented landscapes that lose their functions (photo of the border zone between Asse and Ganshoren)

A landscape in **De Wijers** that is under great presure due to urbanisation.
(Stiemerbeek stream, Genk)

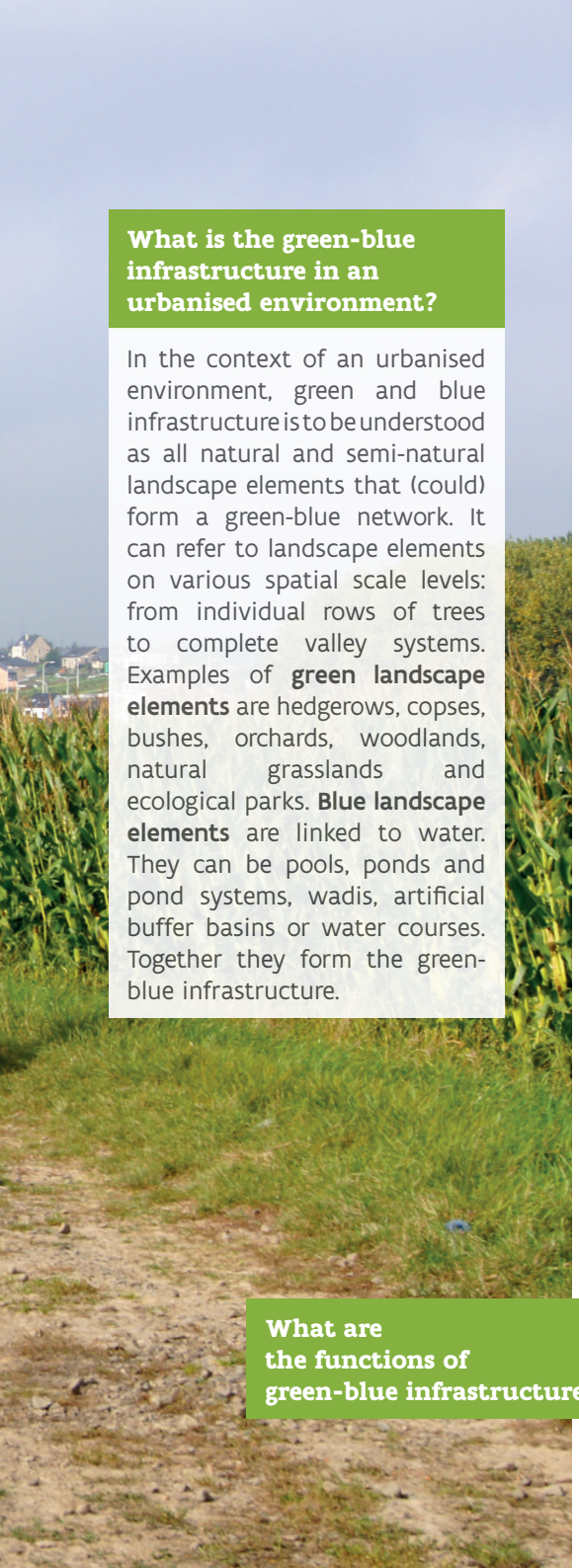
With an unlimited 'greying' of the peri-urban landscapes there is the threat of (in) direct environmental and health problems such as:

- the loss of natural habitats for animals and plants
- the lack of natural water retention possibilities with the risk of consequent flooding
- the deterioration of water quality
- the reduction in opportunities for the resident and working population to relax outdoors
- the lack of space and capacity to counter the effects of climate change
- the lack of space for sustainable food production

GOAL OF THE PROJECT

Constructing a multifunctional green-blue infrastructure

With this project, we wish to give a new **multi-faceted and natural** character to the scarce and fragmented undeveloped spaces that are still to be found in an urbanised environment: the so-called "green and blue infrastructure". We wish to transform the remaining open spaces into natural stepping stones, so that they become the driving force behind the development of an urban natural network. We will create a high added value for society if we give the stepping stones various functions, such as water retention, recreation, food production, and green lungs.



What is the green-blue infrastructure in an urbanised environment?

In the context of an urbanised environment, green and blue infrastructure is to be understood as all natural and semi-natural landscape elements that (could) form a green-blue network. It can refer to landscape elements on various spatial scale levels: from individual rows of trees to complete valley systems. Examples of **green landscape elements** are hedgerows, copses, bushes, orchards, woodlands, natural grasslands and ecological parks. **Blue landscape elements** are linked to water. They can be pools, ponds and pond systems, wadis, artificial buffer basins or water courses. Together they form the green-blue infrastructure.

What are the functions of green-blue infrastructure?

Nature and biodiversity: Valleys in a peri-urban context often serve as hotspots for protected fauna and flora, such as the tree frog, the grass snake or rare orchids.

Water retention: Naturally meandering streams not only stimulate biodiversity, but also act as water buffers offering protection against flooding during heavy rainfall events.

Water quality improvement: Enhanced water quality is favourable for people, animals and plants.

Green environments for outdoor activities and as meeting places: Green spots in a peri-urban context can be designed as attractive places to meet people. By connecting these stepping stones, a green network is developed that stimulates cycling, hiking, jogging, ...

Health and well-being: Green spots not only provide fresh air but also offer a retreat from urban stress.

Green business sites: Working in a beautiful green landscape enhances productivity and well-being.

Green living environments: Attractive green neighbourhoods and green elements between residences increase real estate value.

Sustainable food production: A tree orchard or pesticide-free community garden provides local and sustainable food.

Climate-adaption: Green climate-proof environments can help to cope with climate change impacts, such as alternating periods of drought and heavy rain.

Environment education: People building their own living environment, learn more about nature and appreciate it more.

WHAT ARE UNDEVELOPED RESIDUAL GREEN SPACES?

Residual spaces are created when, by means of spatial planning, we allocate space mainly to hard functions such as housing, working and infrastructure. In the past we often paid too little attention to the natural infrastructure and the result is the development of residual green spaces. These have little or no function any longer and their significance for the community is negligible. Some of these residual spaces are, in fact, small islands, completely surrounded by residential, industrial, or transport infrastructure. Nevertheless, these spaces often provide opportunities on the level of nature. For examples, ponds along the Dauteweyers are a breeding habitat for the extremely rare tree frog just when increasing urbanisation threatens the survival of this species.

Aerial photo Dauteweyers (Diepenbeek): enclosed ponds surrounded by residential buildings.

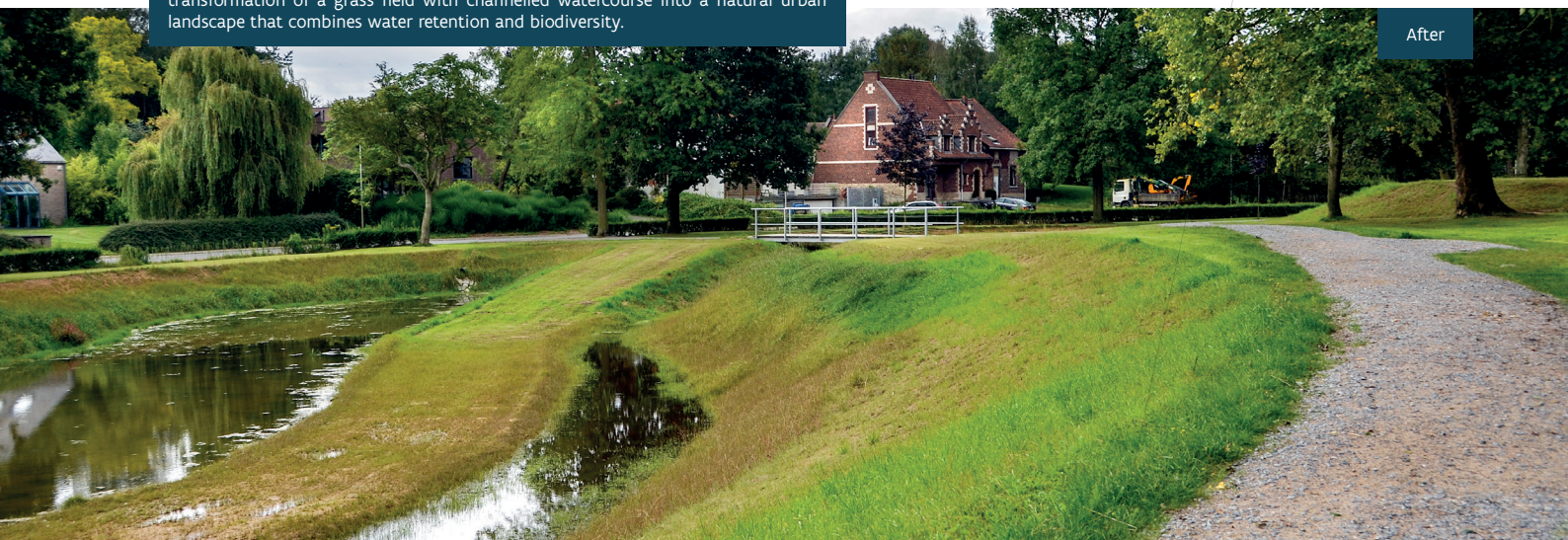
FIVE CORNERSTONES FOR ACHIEVING A MULTI-FACETED GREEN-BLUE INFRASTRUCTURE

This project is composed of five cornerstones for achieving a multi-faceted green-blue infrastructure with a range of functions for all those involved (residents, working population, day trippers) in a (peripheral) urban environment.

1. NATURAL LANDSCAPES IN AN URBAN ENVIRONMENT
2. INTEGRATED PLANNING FOR MULTI-FACETED LAND USE
3. PARTICIPATION
4. ATTENTION FOR THE PRIVATE SECTOR
5. TOWARDS AN INNOVATIVE POLICY FOR GREEN-BLUE INFRASTRUCTURE

1. NATURAL LANDSCAPES IN AN URBAN ENVIRONMENT

We transform **grey semi-artificial landscapes** into green and blue landscape elements in urbanised residual spaces. These, in turn, help to maintain and reinforce the more natural urban landscapes



Project zone in 'de Vlaamse Rand' area surrounding Brussels (Wezembeek-Oppem): transformation of a grass field with channelled watercourse into a natural urban landscape that combines water retention and biodiversity.

2. INTEGRATED PLANNING FOR MULTI-FACETED LAND USE

A zone can be structured for a single function: only for food production, for example. We then refer to a unilateral or monofunctional structuring. This often results in dull landscapes. With **integrated planning** we refer to a single zone that combines goals on the basis of various themes: nature, recreation, water buffering, landscape, sustainable production of food, and climate change ... In this way, we strive for an **integrated and multi-faceted land use** that makes optimal use of the scarce space in an urbanised environment. Moreover, this increases the multifunctionality, the environmental quality and the dynamics in a particular area.

Design of an integrated plan for the project zone Schansbroek (Genk): transformation of a grey former mining landscape into an attractive and ecologically valuable zone with the recovery of water management, space for allotments, a neighbourhood park, etc.

3. PARTICIPATION

We establish participative working methods together with inhabitants, the working population, students, policy makers, experts and NGOs. Together, we integrate the different wishes for a given zone and thus give shape to a typical business/industrial and residential environment. In this way **we raise the consciousness of** the users of green infrastructure concerning its multiple functions. This creation of awareness can contribute to better knowledge of the green-blue infrastructure, greater awareness of its importance and greater motivation for the maintenance, respect for and long term management of the landscape elements

4. ATTENTION FOR THE PRIVATE SECTOR

We promote the multi-faceted character of green infrastructure and the importance of investing in that green infrastructure by the private sector or business sector. By including these sectors in the development of the green infrastructure, we avoid business sites forming a spatial barrier between green zones and, at the same time, create an attractive working environment that benefits the well-being and the productivity of the people working in the area.

5. TOWARDS AN INNOVATIVE POLICY FOR GREEN-BLUE INFRASTRUCTURE

The project zone in Flanders can serve as an **example** for the application of the 'Green Infrastructure Strategy' of the European Union in other **peripheral urban areas in the EU.**

With **policy recommendations** for local, regional and European policy makers, we wish to emphasise the versatility and the importance of green and blue for peripheral urban areas.

More info on EU Green Infrastructure Strategy?

www.ec.europa.eu/environment/nature/ecosystems/

HOW WE GO ABOUT IT?

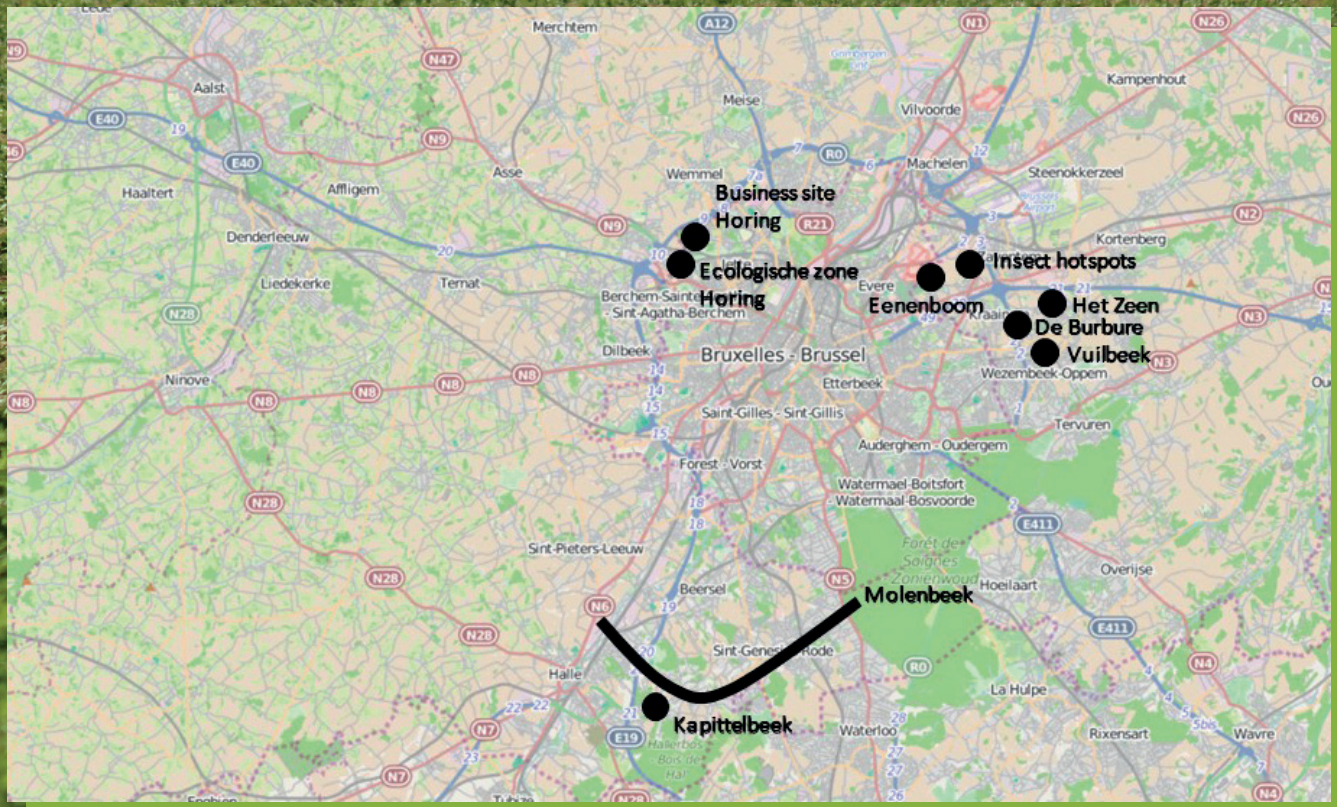
In this project we devote our efforts to creating an **overall and multi-faceted** set up of the green-blue infrastructure in an urbanised environment.

In **six examples of projects** we achieve green-blue stepping stones: three projects in 'de Vlaamse Rand', the green Flemish Belt around Brussels, and three in the urbanised zone around Hasselt-Genk, in De Wijers. All project zones are green and undeveloped residual spaces that are under the pressure of increasing urbanisation.

In addition, we wish to develop a future vision for two larger valley zones: the Stiemerbeek valley in Genk and the Molenbeek valley in Beersel and Sint-Genesius-Rode.

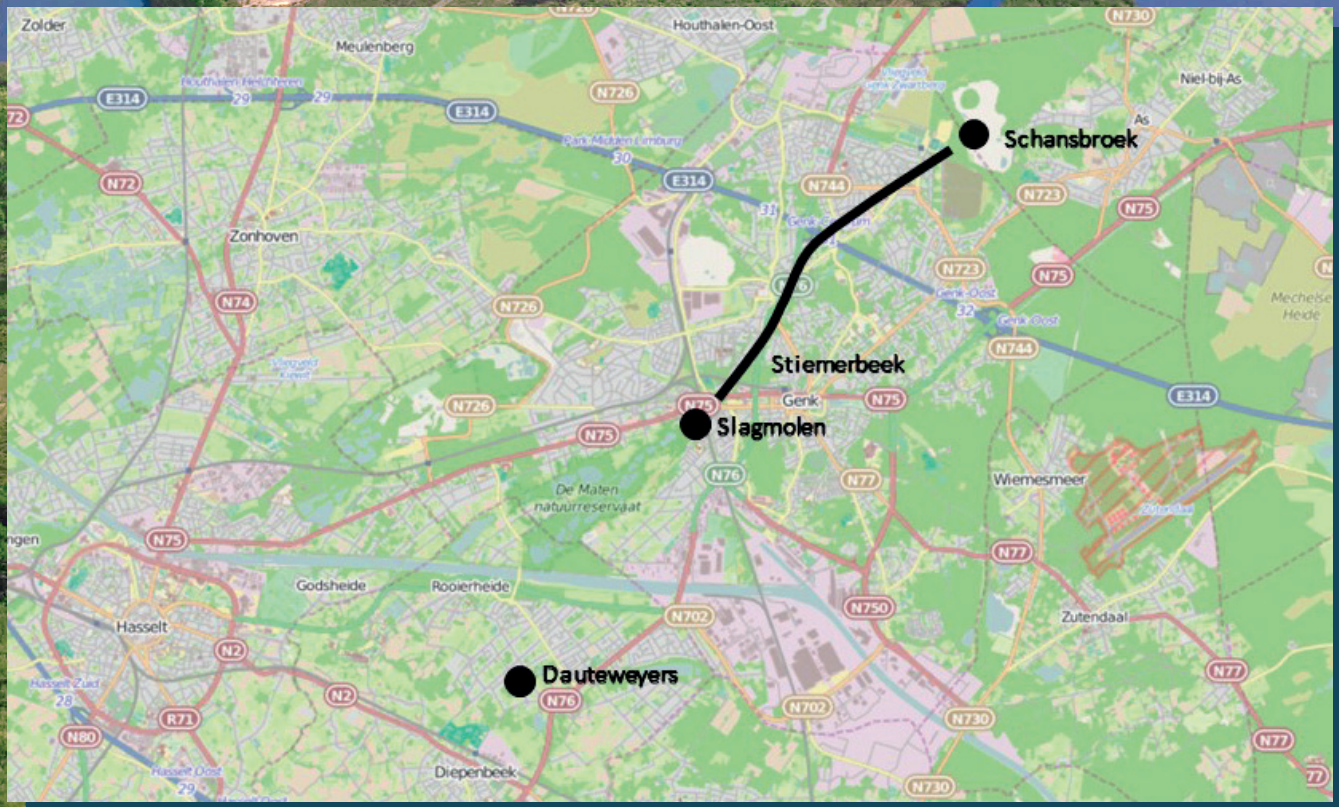
IN THE 'VLAAMSE RAND' AROUND BRUSSELS

Asse	**Horing** (Kerremans park and the adjacent research park in Zellik)
Beersel	**Kapittelbeek** and the **Molenbeek valley**
Zaventem, Kraainem and Wezembeek-Oppem:	**Woluweveld** (Eenenboom, insect hotspots) **Vuilbeek/Kleine Maalbeek** (source zone of the Vuilbeek, Zenne and Burbure)



IN ‘DE WIJERS’

Genk	**Slagmolen** and **Schansbroek** within the Stiemerbeek valley
Diepenbeek	**Dauteweyers**

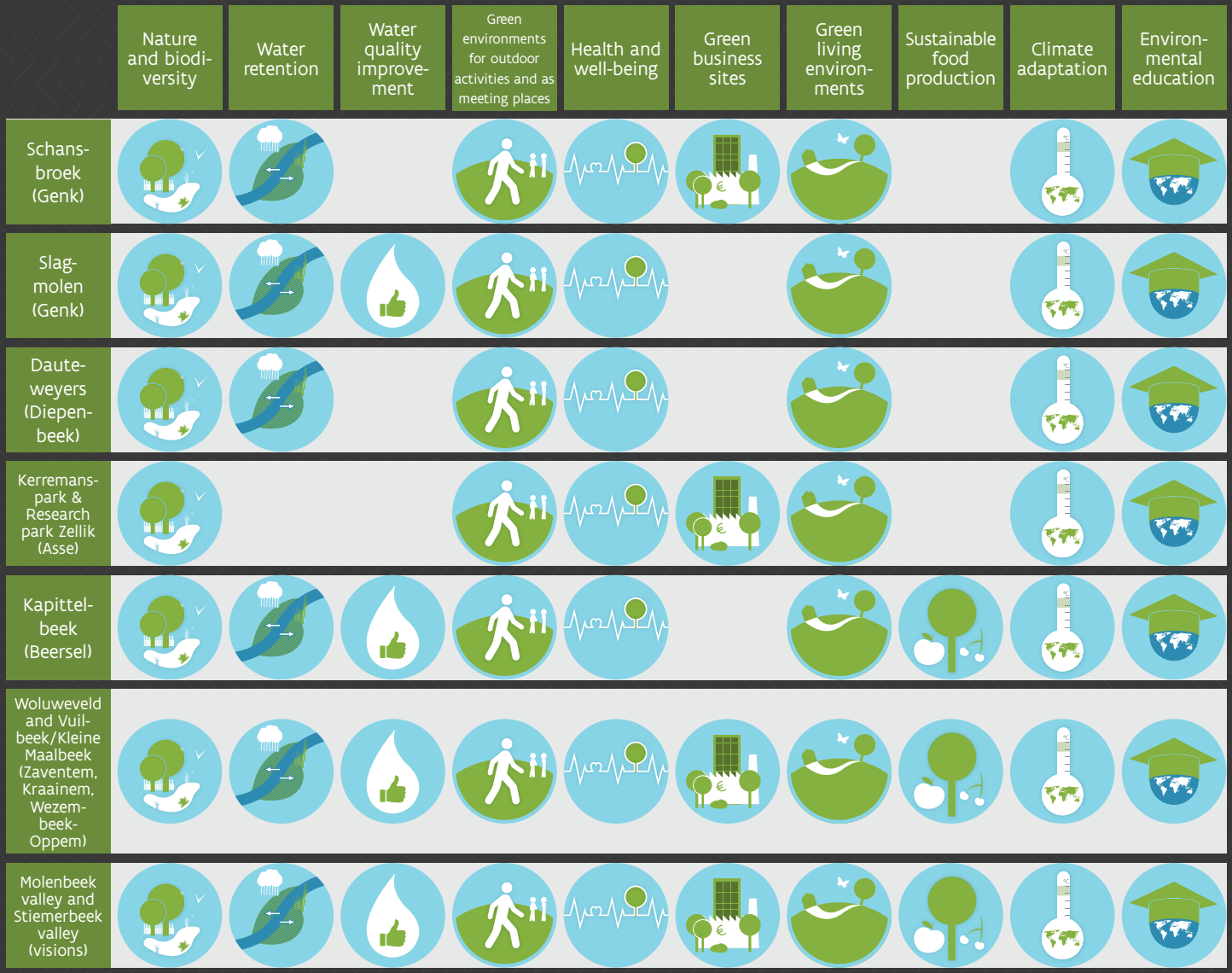


INTEGRATED DESIGNS AND PLANS

When making a design we try to take account of as many aspects as possible. In this way we arrive at a single plan with many functions. Nature and landscape are the basic structures in a zone and we develop these in order to arrive at a multi-faceted plan. Depending on the possibilities and the wishes for a zone, we then add various **complementary functions**. Ultimately, we achieve a large degree of **added value** for the community

Composition of an integrated plan to structure the Kerremans park in Asse in a multi-faceted manner.

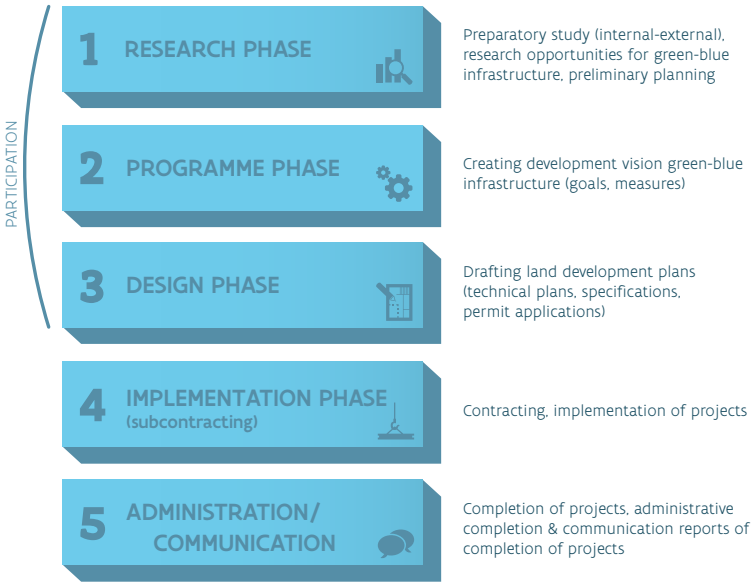
The following table shows the functions that are found in the six example projects and in two valleys after the structuring of the zone.



A PLANNED AND PHASED APPROACH

In order to realise a green-blue infrastructure on the terrain, the project zones must pass through a number of planning phases. First we make a detailed analysis of the zone. We investigate the possibilities for achieving a green-blue infrastructure and the feasibility of these possibilities. On the basis of this, we draw up the first development vision. We then convert this vision into a land development plan. We work according to a plan and elaborate our design, preferably together with all the people in the zone who are involved. We present our plans and adapt them in consultation with the people concerned. After that, the development plan is transformed into a technical file that we can have implemented on the terrain.

For example, with this project we want to ecologically (re)create twenty ponds, pools and natural water buffers, redirect three water courses in a nature-friendly manner, plant orchards and urban woodlands, construct walking paths and five green meeting spaces, protect habitats against flooding, etc.



NEED OF COLLABORATION AND CREATION OF AWARENESS

The Flemish Land Agency (VLM) collaborates in the realisation of green and blue infrastructure, thanks to:

- a multidisciplinary team of experts on the level of nature, green, landscape, water, recreation, spatial planning, ...
- collaboration with different partners in the area of: local authorities regional authorities, local organisations and associations, residents, visitors, businesses and other relevant partners
- participation in a European network for peri-urban areas

This is how the VLM wishes to create awareness among inhabitants, day trippers, the working population, businesses and local authorities concerning the importance of green-blue landscape elements in an urban environment. In this way we ensure the ongoing development of the green-blue infrastructure and its maintenance.

SIX PROJECT AREAS

1. SCHANSBROEK (GENK)

Converting an abandoned area near the Waterschei mine to an attractive and ecologically valuable (meeting) area with restoration of the water management system

Schansbroek is situated at the source area of the Stiemerbeek stream, at the coal mine of Waterschei. The former mining activities completely disrupted the area. Due to mining subsidence, natural water runoff is no longer possible. Instead rainfall and groundwater are continuously pumped to the Stiemerbeek. Furthermore, the lower water levels disturbed the ecosystem. The poor drainage causes flooding, which is a problem for local residents. Although a 16th century defensive structure 'De Schans' can be found in the project area, the surroundings are unattractive and there is a lack of recreational infrastructure for visitors, residents and employees of the neighboring business site 'Thorpark'.

In 2013, a first development plan for the Schansbroek area was designed to attractively redevelop the area. The development plan describes measures to redesign the area as a wet ecotope. Planned measures include a water level rise, restoring a natural dam to prevent the nature site from drying, restoring two ponds and a pool, and an ecologically friendly transformation of an artificial water reservoir for former mining activities. At the same time, the drainage ditches have to be redeveloped to protect local residents from regular water flooding.

In order to design the area as a multifunctional natural landscape park with green meeting places, walking paths, a functional bike connection or an allotment garden, several participation workshops were organized. As a result, a first design for the Schansbroek local park was presented at the beginning of 2015.


BROEK

2. SLAGMOLEN (GENK)

Improving the natural water retention capacity and water supply to the downstream nature reserve 'De Maten' and transformation of the valley into a blue and green meeting place

Slagmolen is an unbuilt area, named after an ancient watermill, in the city of Genk where three streams flow together (Schabeek, Stiemerbeek, Dorpsbeek). This project area forms the gateway from the city of Genk to the Natura2000 area 'De Maten'. The pond system of De Maten is highly dependent on sufficient and clean water as it is a water-dependent ecosystem. However, the Stiemerbeek, which is periodically polluted by sewage overflows during peak rainfall, brings sewage water to this pond system and thus threatens the fauna and flora. In addition, at present Slagmolen is a dull, unattractive area.

This project aims to provide clean water for De Maten. Therefore, an optimisation of the water supply with clean water of the Schabeek is being looked into. The Schabeek, at present only artificially separated from the polluted Stiemerbeek by a cement wall structure, could be separated from the Stiemerbeek and transformed into a naturally meandering stream throughout a wet marsh area. That way, the natural water retention capacity can be increased to prevent flooding.

Equally, together with local residents and partners, we will explore how to upgrade the area to an attractive, green and accessible meeting place with walking and cycling connections. This meeting place will form a connection between the nature reserve De Maten and the city center of Genk. The whole area will be a strip of green in the urban area.

Possible new design for the Slagmolen area (Genk) with a naturally meandering Schabeek

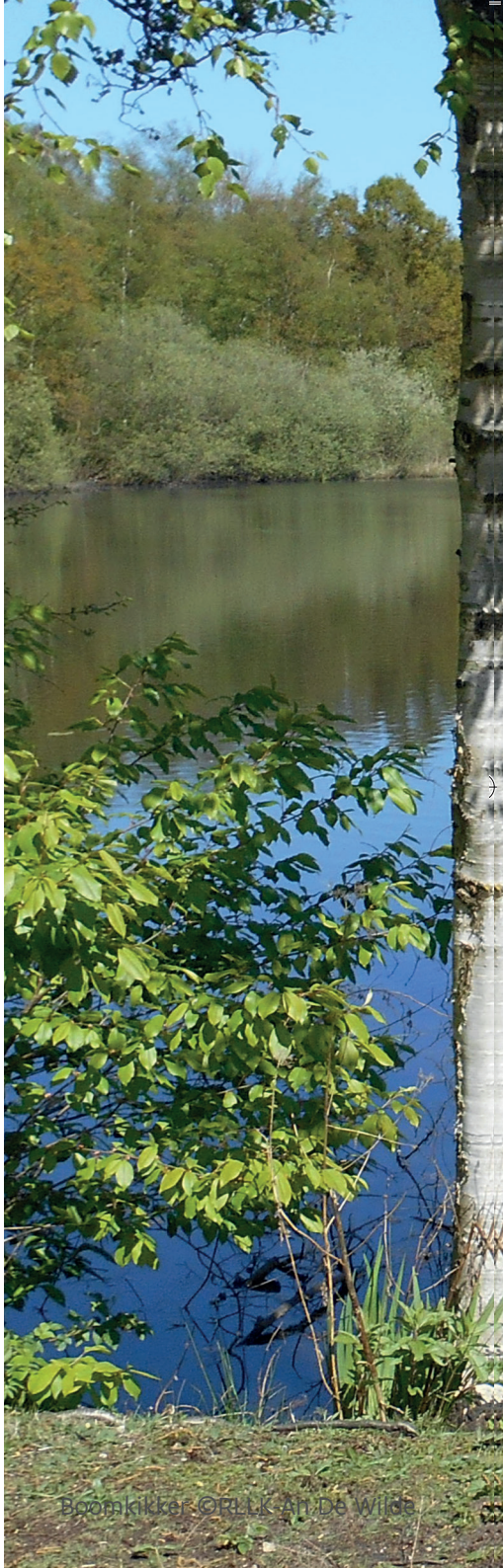
Current situation: the Schabeek (left, good water quality) and the Stiemerbeek (right, often polluted by sewage overflow) are only separated by a cement wall structure.

3. DAUTEWEYERS (DIEPENBEEK)

Improving the ecological infrastructure and hydrological conditions for the tree frog

Dauteweyers is a natural zone with various connected ponds which are remainders of a 19th century iron mining area. The area has the potential to form an ideal land-water habitat for the rare tree frog (Hyla arborea). At present, however, habitat conditions, such as the water level control of the ponds, water quality and the water biotope are unfavorable. The Dauteweyer's ecosystem is completely surrounded by residential housing but few local residents are aware of the unique beauty of the nature in their backyard.

This project aims to upgrade the ecological infrastructure of Dauteweyers for the tree frog. Equally, the aim is to improve the recreational and educational infrastructure, in cooperation with local residents.
Starting from an eco-hydrological analysis of the area, a land development plan for the area was made. Various measures will be taken to improve the tree frog habitat, both on land and in the water. Examples of such measures are re-profiling the riparian zones, cutting of unfavorable vegetation and digging additional pools for reproduction. Access for residents and visitors will also be improved by developing a tree frog safari path, and by constructing picnic areas and a wooden path crossing wet areas. Together with local inhabitants, we explore how to expand the tree fog habitat, for example by redesigning surrounding private gardens in a 'tree frog-friendly' manner.



Boomkikker ©RLLK Ari De Wilde

4. HORING: KERREMANSPARK AND THE BUSINESS SITE OF ZELLIK (ASSE)

Development of a peri-urban park to counter the urban expansion and green development of a local business site

The area of Horing, in the valley of the Molenbeek in Asse, is one of the few remaining open spaces in between the nortwestern part of the city of Brussels and the ring around Brussels.

It is a former agricultural area that has become less interesting for intensive agriculture due to city expansion. The natural value of the Kerremanspark is currently limited, but has great potential as it is located close to the forest of Laarbeek, a Natura2000-area. It could become a green stepping stone towards the forest. Equally, this densely populated suburban area is in need of a green area that can serve as a meeting and outdoor recreation place. The business site of Zellik currently is an ecological barrier for developing a network of green stepping stones.

In this project area the main goal is to stop the expansion of the grey infrastructure. Therefore a new ecologically developed park can become an ecological stepping stone, but also an area for walking, recreation and social interaction for residents, visitors and employees of the business site. The ecological development consists of planting additional forest, creating natural grasslands and natural redevelopment of the Molenbeek water course. For and together with the users of the park, walking paths and resting areas will be developed. In cooperation with the local businesses a greener and more ecologically friendly business site will be developed.

Creating grassland and forests in the Flemish Belt around Brussels (Asse)

The business site of Zellik remains
a landscape barrier for man and natural species

5. KAPITTELBEEK (BEERSEL)

Towards a multifunctional and natural valley for the Kapittelbeek

The Kapittelbeek (a local creek) has its source in the nearby forest (Hallerbos Natura2000). The valley of this creek is a natural corridor between this forest and the downstream area of the Molenbeek (a larger stream). The valley is surrounded by agricultural fields and a housing district. The Kappitelbeek has lost its capacity for water retention as it has been artificially straightened, and therefore frequent flooding occurs at moments of heavy rain. Erosion from the surrounding fields is also a problem. Historically valuable orchards have become rare in this landscape.

This area will be redeveloped in a multifunctional way. The water course will be redeveloped to create a more natural meandering to limit downstream flooding. A number of ecological measures will be developed in the valley such as transforming agricultural land into natural grassland and planting of trees (forest expansion). Equally orchards will be planted for local fruit picking and erosion will be tackled. This project will also create common green areas in the housing district, in cooperation with the inhabitants.

6. WOLUWEVELD AND VUILBEEK/ KLEINE MAALBEEK (ZAVENTEM, KRAAINEM, WEZEMBEEK-OPPEM)

Development of natural water storage areas/valleys and hotspot for insects

Woluweveld (Zaventem) and the valleys of Vuilbeek and Kleine Maalbeek (Zaventem, Kraainem, Wezembeek-Oppem) are one of the few remaining open spaces in the northeast of Brussels. Due to urbanization, large parts of soil have become sealed. The original natural valley character of this area also slowly disappeared. Water is now transported underground in artificial pipe infrastructure (instead of natural water courses) and water infiltration is limited due to soil sealing. This has resulted in flooding in these areas.

In this project area the underground artificial water course will be brought to the surface and redeveloped into its original natural structure. Wadis will form an essential part of this process of ecological upgrading. Wadis are undeep natural water storage areas, to enable rainwater to slowly infiltrate (and thus limit flooding in the surrounding areas).

Due to the natural character of a wadi, additional local forest planting and the creation of insect hotspots, the local biodiversity is improved. Additionally, in this project area a natural park, walking paths, orchards (for fruit picking) and a more attractive landscape will be designed and developed for visitors and inhabitants.

Near the national airport, green areas will be transformed into more natural areas with “space” for open water bodies.

Project coordination

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Life

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