

Case Study Report

Park Dok Zuid

Climate-proof public space

Bart VAN GASSEN, Tractebel ENGIE, Belgium

Mathias CORNILLE, Tractebel ENGIE, Belgium

Mieke NAGELS, Tractebel ENGIE, Belgium

Abstract

Gedempte Zuiderdokken forms a unique open space in the urban fabric of Antwerp. After the former docks were filled, the freed up space has mainly been used as a free car park. Since the 1980s, the neighbourhood has transformed into an attractive district with a number of important cultural attractions. However, the public space has not followed this evolution. Today, with the undergrounding of the current parking facilities, there is an opportunity to write a new chapter. With the construction of Park Dok Zuid, Antwerp is preparing itself for the future. As such, Park Dok Zuid will not only serve residents with abundant public space and a diverse program, but it will serve the entire city in its battle against climate change.

Keywords

Public space, Climate-proof, Sustainability, Water management, Antwerp



Figure 1 - Park Dok Zuid as a generous open space in the heart of the city

1. Project Definition

1.1. Part of the past

Park Dok Zuid is part of the remodeling of the 'Gedempte Zuiderdokken'. The project area is located south of the historic centre of Antwerp and in the middle of the 19th century city extension "t Zuid". Until recently, this unique location was used as an oversized above-ground car park. Not only its position close to the centre, but the sheer size of the area (840m long and 110m wide) show the projects potential. Park Dok Zuid aims to create a new public space; a green spot in the city. With this design, Park Dok Zuid can develop into a public space with a strong cultural-societal imagination. The public space is (re)activated and can thus appeal to the plurality of society.

The reconstruction is divided into two phases. Construction for the first phase started at the end of 2020 and delivered in May 2022. At the end of this year, construction works for phase 2 will also start and these should be completed by the summer of 2024.

1.2. Part of the future

As we all know cities will have to deal with the consequences of climate change, such as the increase in intense rainfall and longer periods of drought and heat stress. With the construction of Park Dok Zuid, Antwerp is preparing itself for the future.

Today the site's past as part of the port of Antwerp is no longer visible. The large amount of paved surface makes infiltration of rainwater into the groundwater virtually impossible. The construction of the underground car parks will further reinforce this. In the future, the mixed sewer system will not be sufficient for the proper drainage of the site and the surrounding neighbourhood due to peak downpours and an increase in the water level in the Scheldt.

Park Dok Zuid serves as a pilot project within the European SPONGE 2020 for which the City of Antwerp has committed itself as a partner. The reconstruction of the 'Gedempte Zuiderdokken' is part of an innovative system for water collection and reuse that is an integral part of the design of this new public space in the city.

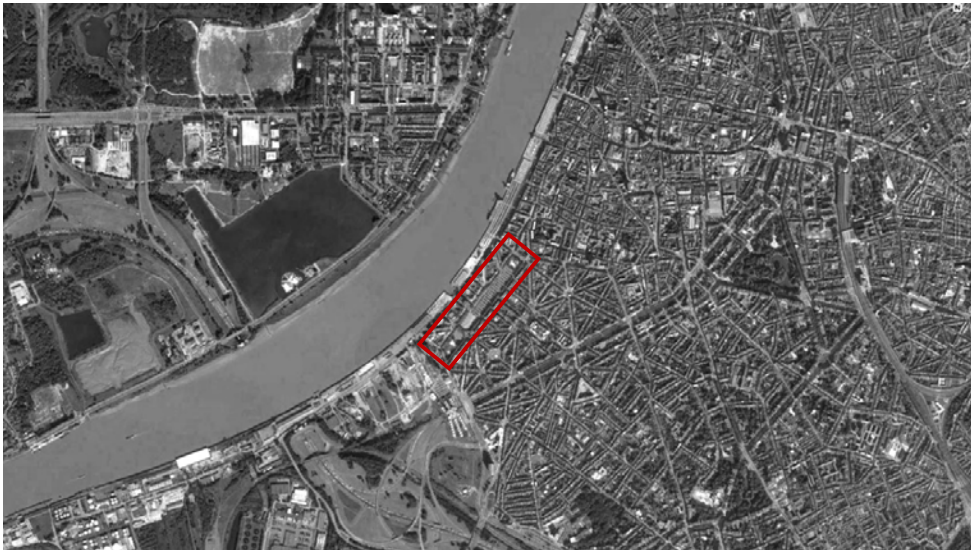


Figure 2 - Park Dok Zuid bordering the Scheldt and close to the historic centre

2. Designing Public Space for the Future

2.1. New public space for Antwerp

Park Dok Zuid is a new large-scale public space for Antwerp (approx. 9 ha). It is simultaneously a park and a square. The historical layout of the docks is reflected in the design as a succession of three spacious tables. The development of a green framework and walkway creates a more intensive interaction between Park Dok Zuid and the activity on its edges. A number of cross-connections across the square strengthen the relationships with the surrounding area: the Scheldt, 't Zuid, KMSKA...

The crown forms a green framework with trees around the square in which the circulation is included and which also integrates an important residential quality. The three tables cover the three former docks. At the same time, the design of the three tables is based on a clear coherence and a pronounced complementarity. The central space - the former 'Schippersdok' - is conceived as a spacious meadow. The two adjacent docks - the former 'Kooldok' and 'Steendok' - are conceived as a garden. A rich variation of vegetation leads to different atmospheres with pockets in which different programmed components can find a place: rain gardens, silent gardens, playgrounds, terraces, dog-meadow, sports fields...



Figure 3 - Plan of Park Dok Zuid



Figure 4 - The crown functions as a green framework

2.2. Towards a more sustainable future

The softening and greening of the ‘Gedempte Zuiderdokken’ contributes in two ways to a more sustainable future.

On the one hand, softening this mineral space creates possibilities in terms of water buffering for the site and the surrounding neighbourhood. The development of a more sustainable water system is one of the major challenges for Park Dok Zuid. Water is handled in an innovative way. Instead of channelling rainwater directly into the sewer system, it will be used to highlight certain spots in the park and to enable extra playful water element. A water concept is being developed in which a unique route is being set out for the various streams.

On the other hand, greening this mineral space will create a shady, biodiverse and ecologically valuable green lung in the middle of the city. Park Dok Zuid aims for a strong diversity of permanent green. In addition to strengthening the trees of the crown, a rich variation of shrubs, perennials and flower bulbs is also aimed for. The presence of spacious grassy meadows also enhances the green character. The crown forms a green framework for Park Dok Zuid, a threshold space between Park Dok Zuid and its surroundings. It is a dynamic and cool urban spot under a generous canopy of trees. The existing row of trees will be supplemented with an extra row of trees on the side of the square. A more punctual and varied undergrowth will further strengthen the green structure and intensify the seasonal variation of the crown.



Figure 5 - The Gedempte Zuiderdokken as an oversized car-park; a hard surface



Figure 6 - Depaving this mineral space will enable water to infiltrate

2.3. Integral water management

The concept of water management introduced at Park Dok Zuid is innovative because of the wide range of applications and facets that are applied and appear in the park, both underground and aboveground. Together with the realisation of this project, an ambitious construction of a rainwater drainage system will be realised. This takes into account the maximum infiltration and buffering of rainwater within the project area and, in the case of expansion, part of the neighbourhood. Taking climate change into account, the rainwater system will be dimensioned for a 20-year precipitation rate (in the year 2100) and consists of four different circuits:

1. A rainwater pipe network to collect the water from the roofs of the buildings at the square's edge. This network will be made of concrete pipes (non-porous) that will be connected to a rainwater harvesting pit (capacity 1500m³). The water collected in this well will be used for various purposes in the future, such as irrigating trees in the city.
2. A system of substrate and plastic crates under the crown for irrigation of the new trees.
3. A rainwater pipe network to collect water from the adjacent road, parking strips and pavements/terraces. This pipework will be constructed of porous tubes.
4. A rainwater pipe network to collect water from the surrounding neighbourhood.

In the total water concept for Park Dok Zuid, before the rainwater is discharged (delayed) into the surface water (the Scheldt), it is stored (if it cannot infiltrate) in three buffers that are installed in the 'Schipperdok':

- a wadi of which the soil will be partially made impermeable;
- an underground buffer in expanded clay granules;
- a sunken meadow that can buffer the water once the underground buffer is saturated.

This set of measures means a considerable improvement with regard to integral water management and will contribute to a reduced risk of flooding as a result of heavy rainfall. A completely separate system will be constructed for wastewater. All existing mixed sewers within the project area will be replaced.

2.4. Added value for 't Zuid

The concept of water management not only regulates the water buffering capacity for the site, but also for the surrounding neighbourhood. Moreover, various infiltration and filter systems ensure that water can be reused by the surrounding area:

- The rain gardens consist of a green topography with trees in which the water can temporarily remain and can infiltrate slowly.
- Since a tree can consume double the amount of rainwater over the timespan of one year, it is crucial to direct as much water as possible to the tree line. This can be done through infiltration on the one hand, and on the other hand by collecting it and sending it to an underground crate system.
- The remaining water from the roofs that is not absorbed by the trees eventually flows to the cistern for reuse. Applications range from water for sweeping vehicles to irrigation to cooling the square or turning it into drinking water for the residential tower at 'Nieuw Zuid'.
- Water from the footpaths, squares and adjacent roads is sent via infiltration pipes to a hydrocarbon filter and eventually led to the wadi.
- Once parts of the neighbourhood are disconnected from Park Dok Zuid, the wadi will overflow more quickly into the underground argex buffer and then flood the meadow. Finally, the system empties again, first drying up the meadow, then the underground buffer and finally lowering the level of the wadi.

The diagram accompanying the water concept gives an overview of the streams on Park Dok Zuid with origin (blue) and destination (green or red) depending on whether the measure is visible or not.

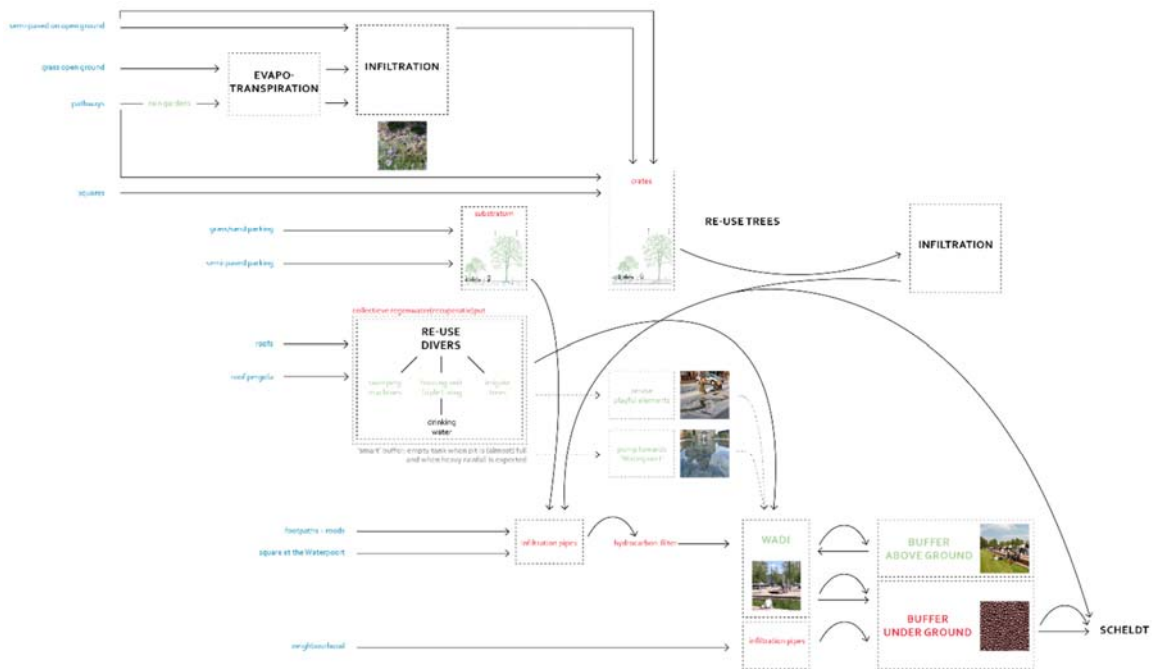


Figure 7 - Waterconcept as a schematic diagram

2.5. Public space as a tool to raise climate awareness

Open space of this magnitude in the heart of the city is scarce. Park Dok Zuid is therefore the perfect place to create awareness among on the importance of urban green space in creating a climate-proof urban environment. Throughout the seasons, Park Dok Zuid will also take on a different form each time. Not only is the varying colour palette of the plants crucial, but the fluctuating water system will also help shape Park Dok Zuid. In this way, the influence of weather conditions within the urban context is also made tangible for the neighbourhood.

Making the water system on Park Dok Zuid visible and experienceable not only refers to the history of the site as a former port area, but will also respond to future climate changes and the ecological potential of the site. For example, at the 'Waterpoort', just before a heavy storm and when the rainwater tank is (almost) full, a quantity of water will be pumped to this spot. This has a cooling effect during a summer storm and makes the underground system visible.

The added value lies in the fact that the design succeeds in combining various components to create meaningful everyday places that are differentiated thanks to the water, the rich planting and numerous trees, the past, and the attention paid to a public culture. Places are created that further activate, structure and organise the space. Places with an increased intensity of use and/or experience. The wadi, a crucial link in the water concept for Park Dok Zuid, is one of these places. It is a large-scale water element (two elements of approx. 100 metres long) that forms the edge of the central table. On one side, it is bordered by a generous seating step. In the lowest step of the seating, the historical quay wall of the 'Schippersdok' is made visible again. On the other side, a wide green border forms the transition to the central meadow. The green border is composed of different types of plants: water plants, bank plants ... Stepping stones through the wadi form an interesting playful element and a more adventurous passage between the crown and the meadow.



Figure 8 - A wadi makes the water system tangible in the public space

3. Lessons learned

The success of the Park Dok Zuid project so far is mainly due to a shared ambition. An ambition to transform this iconic spot, which had been relegated to an oversized car park, into a meaningful place for the city. An ambition to create a new public space that generates a multitude of new social opportunities to live in the city in a different way. An ambition to make this mineral space more environmentally friendly and to fully exploit the site's climate-adaptive potential for the entire city. Crucially, these are not ambitions expressed solely by the design team, but shared ambitions. Both the clients (AG Vespa and Waterlink) and the City of Antwerp created a framework for an ambitious story. For example, the Park Dok Zuid project was also entered in the ambitious European Interreg 2 Seas project, in which the City of Antwerp is a partner. As a pilot project in the European SPONGE 2020 project, the construction of a collective cistern became an integral part of the reconstruction of the 'Gedempte Zuiderdokken'. From the outset, a close collaboration was established between the design team, engineers, city services with mutual trust and knowledge sharing.

The local residents and surrounding cultural centres also supported the creation of a green public space. The dialogue that was entered into with the neighbourhood during the co-productive process was part of the basis for the support.

In recent years, Park Dok Zuid has become a real reference for us as a design team. Not only can the method of the co-creative process no longer be excluded from our working method, but the expertise we have built up and the various applications for the climate adaptive design of public space are more than ever part of our design practice.



58TH
ISOCARP
WORLD
PLANNING
CONGRESS

FROM
WEALTHY
TO HEALTHY
CITIES

URBANISM AND
PLANNING FOR
THE WELL-BEING
OF CITIZENS

3-6 OCTOBER
2022
BRUSSELS
BELGIUM



Figure 9 & 10 - Park Dok Zuid has something to offer to all ages

58TH

ISOCARP
WORLD
PLANNING
CONGRESS

**FROM
WEALTHY
TO HEALTHY
CITIES**

**URBANISM AND
PLANNING FOR
THE WELL-BEING
OF CITIZENS**

**3-6 OCTOBER
2022
BRUSSELS
BELGIUM**



Figure 11 - The squares offer space for events to be hosted and interact with the edges



Figure 12 - Park Dok Zuid with its biodiverse, ecological valuable greenery serves as a green lung for the city

58TH

ISOCARP
WORLD
PLANNING
CONGRESS

**FROM
WEALTHY
TO HEALTHY
CITIES**

**URBANISM AND
PLANNING FOR
THE WELL-BEING
OF CITIZENS**

**3-6 OCTOBER
2022
BRUSSELS
BELGIUM**