ECOLOGICAL DESIGN - best practice examples

A study trip to Paris 15-19 August 2022

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Abstract

This report presents the parks and green walls we visited on our study visit in Paris (15th-19th of August 2022). We aimed to study green spaces, which represent a good or exceptional practice of ecological design. Ecological design, in an urban landscape context, can be described as the integration of aesthetic and ecological aspects in urban green space design. Supporting ecological processes, biodiversity and providing high aesthetical and recreational values are objectives of ecological design. The visited green spaces varied in their degree and focus on how aesthetical and ecological aspects were integrated. All objects were exceptional regarding one or several aspects such as the choice of plant material, structural and vegetation complexity or the degree in which ecological processes and biodiversity were given space. For us it was very interesting to see and discuss these varying approaches and how we perceived to which degree aesthetical and ecological goals were reached.

Keywords: Aesthetics, biodiversity, landscape architecture, park, urban green space

FOREWORD

In August 2022, we did a study visit to Paris financed by SLU landscape (Call for ideas) with the aim to study examples of ecological design of urban green spaces. The visit was very interesting and inspiring for us, not least the discussions that evolved around the studied objects. We hope that this report will contribute to further discussion and the development of incorporating ecological design into practice, research and education.

Christine Haaland, Carola Wingren, Karin Svensson, Petra Thorpert

Figure 1. The team visiting the vegetative wall at Musée du Quai Branly (photo: Petra Thorpert).

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BACKGROUND

The objective of this study trip was to visit, study and discuss best practice examples on ecological design in urban green space. After preliminary investigations, Paris was chosen as the study area since it is a city that has several new and interesting objects suitable for our purpose. We visited five parks and two green walls in Paris between the 15th and 19th of August 2022 (Fig. 2). The study trip was financed by SLU landscape via a '*Call for idea'* (CFI).

In a previous project (Haaland &Wingren 2019, unpublished), we defined good ecological landscape design in an urban environment as an integration of distinct and conscious form that at the same time maintained or enhanced a high biodiversity. In the actual project, we aimed to enhance our knowledge and widen our experiences and possible definitions by visiting new sites where we expected good ecological design as defined above.

Ecological design is an approach, which today is gaining greater and wider spread within landscape architecture and in which the linking between nature and cultural perspectives is a way of strengthening the integration between the two angles of ecology and design (Van der Ryn & Cowan 1996). According to Rootle and Yocom (2010), *ecology* is a branch of science that deals with organisms' relationships to each other and their physical environment, whereas *design* involves the deliberate performance of planning the functions and aesthetics of objects, places and processes. In the context of this project, the authors who have professional experience as ecologists, landscape architects and artists have agreed on the following definition: *Ecological design is the adaption and integration of distinct and conscious aesthetics while at the same time supporting or enhancing high biodiversity and ecological processes. Ecological design involves relevant spatial and temporal scales; it minimises environmental impacts and makes the design itself be part of the ecological processes*.

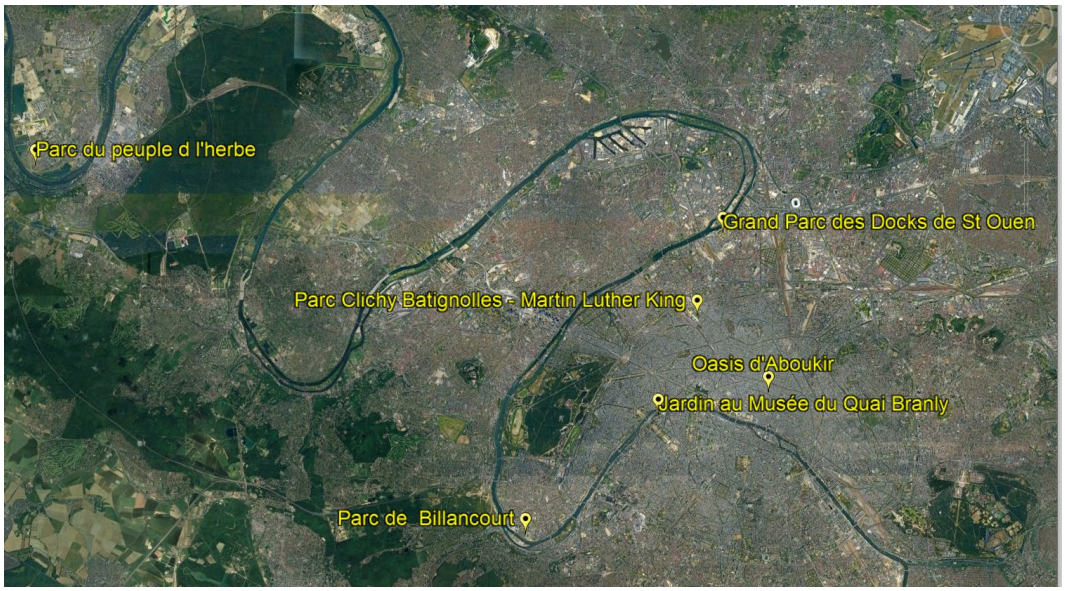

Figure 2. Location of the studied parks and green walls in Paris (Google Earth).

Figure 3. Parc de Clichy-Batignolles – Martin Luther King (photo: Karin Svensson).

1. GRAND PARC DES DOCKS DE SAINT-OUEN

Year:	2010 (designed), opened to public 2013
Size:	12 ha
Design team:	Agence Ter and other design firms involved: Agence Ter (lead consultant) + Agence Ter Architectures + BERIM (engineering and cost consultant) + Coup d'Éclat (lighting consultant) + Biotope ecological consultant) + ISL (geo-engineering) + Phytorestore (Hydraulic & Pond ecology) + Skatepark Service Conseil + Razel (main construction contractor)
Budget:	30 million Euro
Background:	Redevelopment of sports field & allotment gardens
Award:	LILA 2017 – Landezine International Landscape Award
Concept/theme(s):	"Two types of place: spaces for nature and gardens for the public"

Figure 4. View of Grand Parc des Docks de Saint Ouen and parts of the surrounding building blocks (photo: Carola Wingren).

Parc des Docks de Saint-Ouen is located in the northern part of the outskirts of the centre of Paris. The park was designed in 2010 by Agened Ter (https://landezine.com/saint-ouen-park-of-the-docks-by-agence-ter/; https://landscape.coac.net/parc-des-docks-parque-de-docks). The ecological parts of the park, elaborated in collaboration with the companies Biotope and Phytostore, contours the park's heart or social areas with allotment gardens, a glasshouse and activities. Between the hardscape of the city and the greenery there is a clear edge of concrete/stone encircling the water canal and watershed that softens the clash between hard and soft material and gives a better climate for shrubs and living creatures inside.

Overall design

The park is open and well connected to the local environment, both visually and through a number of entrance points. The park's organisation consists of large rectangular areas both accompanying and overlapping each other in an intrinsic park pattern that gives it its urban character and patterns. This provides a good overview, clear structure and easiness for orientation, tying together the different characters that can be found in each part of the park. The forms frame the looser vegetative areas in a clear way, and order and complexity are achieved by this well-defined relation and hierarchy between the vegetated, the water and the hardscape areas. Open spaces provide natural light, and the water edges deliver light reflections, enhancing the park's clear and characteristic urban form as well as the more natural environmental attributes. Edges between the different and well-defined areas are sharp and clear, for example, between hard surfaces and water and between water and biodiversity. Within each area, the same kind of materiality is strictly applied all over, whether it is stone or concrete pavement, perennials with or without trees and shrubs, or water. Contrast and control are important, and even in the seemingly "messy" vegetation parts the control of planting is important. The water shed takes care of the transition from strict form within the hard surfaces to more undulating forms within the biodiverse and ecologically developed "soft" planting areas. Inside the park, the visitor finds the allotment gardens and the big "community greenhouse" where strict forms frame individual approaches to planting and design.

Vegetation design

The park mainly consists of three defined parts. There is an outer area with a formal structure of trees in rows and a right-angled parterre framed by low growing *Hebe* planted with bedding plants. In the interior of the park there is an allotment garden filled with vegetable and fruit cultivation run by residents of the area. The largest part of the park consists of a varying degree of naturalness where native plant species coexist with some non-native varieties. The naturalistic design with high diversity in plant species is most evident along the crossing watercourse and in areas with mixed meadow and shrub vegetation, but there are also large areas of mowed lawn. Free-growing shrubbery screens off and contributes to room formation. Both newly planted and older trees bring shade to parts of the park.

Biodiversity

Supporting and enhancing biodiversity is one major goal of the park. To reach this goal, several semi-natural habitats were created such as meadows, shrubbery, ditches (watercourses) and water edges. There is a focus on planting native tree and shrub species (Trojanowska 2020). The allotment gardens moreover offer high variety of flowering plants (and others) that benefit, for example, pollinators. Some breeding help (birdhouse) was also offered. The structural diversity is high and the semi-natural and water areas cover a comparatively large area.

Sustainability

The project aimed for a sustainable and inclusive development (water, energy, materials, health, risks, pollution, etc.; https://www.reichen-robert.fr/en/project/amenagement-des-docks).

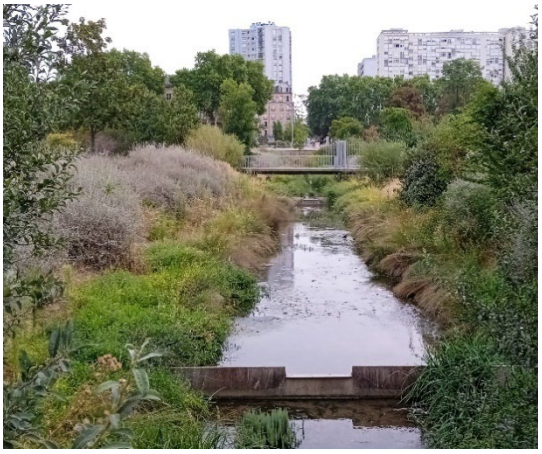

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Figure 5. Parc des Docks de Saint-Ouen (photo: a, c, e, f Petra Thorpert; b Carola Wingren; d Karin Svensson; g Christine Haaland).

2. PARC CLICHY-BATIGNOLLES – MARTIN-LUTHER-KING

Year:	2007-2017 (three stages)
Size:	10 ha
Design team:	Atelier Jacqueline Osty & associates
Budget:	46 million Euro (without VAT)
Background:	Part of development project in Clichy-Batignolles (former railway area)
Concept/theme(s):	"Theme of the seasons, the theme of water and the theme of the body: sport, aesthetic and recreational uses"

Figure 6. Parc Clichy-Batignolles – Martin-Luther-King (photo: Carola Wingren).

Parc Clichy-Batignolles – Martin-Luther-King is located in the northern part of the centre of Paris (https://landezine.com/martin-luther-king-park-by-atelier-jacqueline-osty-associes/; https://land8.com/13-years-to-create-the-dream-of-martin-luther-king-park/).

Overall design

The park's overall design includes several parts with differentiated characters, where some have a clear design language and other less. Especially in the main and south-eastern part of the park, the structure is clear with a variety in relation to shapes, spatiality, materiality and scale: seating areas, plant beds and ground material contribute to a harmonious design expression. As a whole, the park also includes more "messy" parts and characters, which contributes not only to complexity but also a feeling of a lack of order and control, particularly in the more vegetative parts of the north-western part. Water features (canals and rectangular surfaces) are important in the park that is divided principally by its surfaces, creating a presence of sculptural forms, movement and light reflections. Edges between the different areas of the park are principally sharp and clear. However, in some parts of the park functional needs have overcome the formal distinctions or managerial issues have made them less obvious: for example, new planting fences have been put up in the middle of the south–eastern part of the park, plants sometimes give a messy impression, and in the north-western part, an overwhelming bush and tree plant is left to grow on its own. This indicates that there might be a lack of resources for care-taking, which might also influence the feeling of safety for the park visitors. This is something that was also supported in discussion with managerial staff on site and that announces an insecurity in relation to how the layout, design and management can support the initial design in a good way. In the parts where plants meet water, the formal aspects are more obvious. The water shed functions quite well in relation to the organisation of strict forms, namely walkways and different planting areas.

Vegetation design

The planting design of the park is varied and partly complex. Despite the fact that the species are dominated by non-natives, the planting design is highly inspired by nature and contrasts clearly with the park's otherwise formal layout and strict lines. The sharp edges of canals and ponds are softened by vegetation volumes of, e.g., *Phragmites australis*, *Typha latifolia* and *Mentha aquatica*. There are gravel plantings with drought-resistant forbs and grasses, sparsely planted and randomly mixed. A stylised cherry grove is planted with a mix of *Paeonia sp*, *Heuchera sp,* autumn flowering *Anemone* and other forest species. Trees, mostly pink flowering cherry trees, are planted both along walkways and in groups. In the northern part of the park there is an almost impenetrable dense forest consisting of a mixture of both deciduous trees, conifers and shrubs of mostly native species such as *Betula pendula, Carpinus betulus* and *Pinus sylvestris*. This forest was established with very densely planted young plants and the processes of natural succession are evident. Various spontaneous vegetation (weeds) occurs throughout the park

without spoiling the overall impression thanks to the naturalistic planting design placed in a very formal setting.

Biodiversity

Supporting biodiversity is one of the goals of the park. This was reached by creating areas with water and other habitats. However, the water features often have sharp edges. Thus, it is rather the water/reeds themselves that are important rather than the water edge. Other habitats with semi-natural character are a small meadow, areas with a high abundance of flowering vegetation (e.g., slope), hedges, shrubs and a small woodland. Both native and non-native plant material was used. The structural diversity is in some parts high.

Sustainability

The aim was for sustainable water management, sustainable energy, the use of low power equipment for park lighting, and the reuse of materials from the site (https://landezine.com/martin-luther-king-park-by-atelier-jacqueline-osty-associes/).

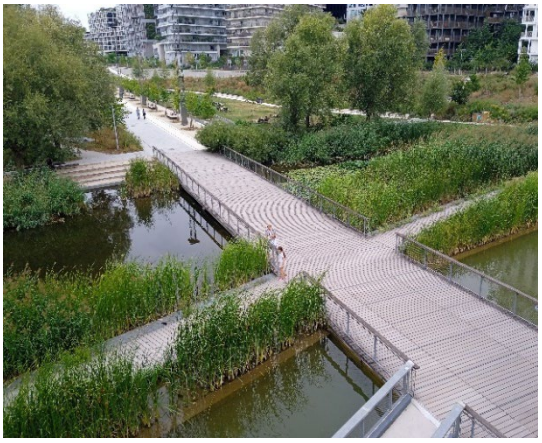

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Figure 7. Parc Clichy-Batignolles – Martin-Luther-King (photo: a, d Petra Thorpert; b, e, g Karin Svensson; c Carola Wingren; f Christine Haaland).

3. JARDIN AU MUSÉE DU QUAI BRANLY

Year:	2006
Size:	1.6 ha
Design team:	Gilles Clément
Background:	The Musée du Quai Branly – Jacques Chirac comprises indigenous art and cultures of Africa, Asia, Oceania, and the Americas. The garden was established as the museum's outdoor environment
Concept/theme(s):	**"**the garden reflect[s] the ethos of the museum […] and of plants from the continents featured inside" (Harris 2020)

Figure 8. Jardin au Musée du Quai Branly (photo: Karin Svensson).

Jardin au Musée du Quai Branly is situated in the centre of Paris. The garden was established together with the museum Quai Branly on the indigenous art and culture of Africa, Asia, Oceania and the Americas. Harris (2020; Savannah in the city, the gardens of the Musée du Quai Branly, Paris | Jardins à l'Anglaise (wordpress.com)) describes the garden in the following way;

"*Clément rejected the idea of creating a traditional style park for the Quai Branly, instead wanting the garden to reflect the natural landscapes of the objects within the museum. He wanted to find biotopes (ecological communities) that were common to all four continents, but that would also thrive in the Parisian climate. His solution was to plant a savannah garden, dominated by grasses. The museum's aim is to send visitors on a voyage around the world, and this garden is their first step, bringing the visitor abruptly in from the Parisian street into a garden that is at once both exotic and familiar*."

Overall design

The overall structure of the park plays on the effect of contrast, where the composition between textures, structures, shapes and plant communities creates a whole that contributes to a complex park or garden that contribute with a complex system of experiences. The colour scheme of the park/garden is important for this experience. With contrast as one of the main tools, order and complexity melts together, and the red accent colour guides the visitor through the park's plant communities and various spatial contexts. The red colouring of the building architecture of the museum contributes to a cohesive unit of order and complexity. The whole design is undulating, and this concerns both hard surfaces and planted areas, which means that this ecological design differs from other studied projects. Still, the edges between hardscapes and planted areas are sharp and clear with an undulating concrete walking surface (both vertically and horizontally) "moving" between the different plantings and to some extent within the plantings. The border of the park is on one side a canal that everybody needs to pass on a convex walkway; on the other side it is a glass wall taking away the noise from the busy boulevard between the garden and the river Seine.

Vegetation design

Although the park is influenced by natural plant communities, native and non-native, it has a very high horticultural character. The plants are carefully selected based on their way of fitting into an aesthetically pleasing composition, together creating different characters and moods. The canopy of trees and tall bamboos shadow most of the park, but there are also areas with more light reaching the ground. Multi-stemmed trees and shrubs of different heights contribute to a sense of naturalness, as well as the uneven placement of the plants. A distinct horticultural feature is a climbing rose, *Rosa filipes*, trellised into an egg-shaped cave enclosing a small seating area. The field layer in some areas consists of various woodland plants like ferns and sedges, sprinkled with flowering plants like *Anemone* and *Aconitum*. In areas with more light there are mixes of sun-loving plants like grasses and *Euphorbia*. Sweeping sections of *Miscanthus* grass line the paths and add a characteristic sound to the park.

Biodiversity

It is assumed that the aim of this garden was not in particular to support biodiversity. The plant material was consciously chosen to create habitats with a mixture of native and non-native plants. Thus, it is not a copy of natural or semi-natural habitat that was created but areas with the character and structure of, for example, a woodland. The structural diversity is high; water bodies exist. The biodiversity of animal species is probably limited due to the setting (an entrance to a museum with many visitors, many paths) and limited size. According to the museum's website, the garden contains 150 different plant species and is called '*a true urban biodiversity reserve, managed in a strictly agro-ecological manner*' (www.quaibranly.fr).The website also states that nesting boxes for birds and insect hotels are installed to support these animal species groups (www.quaibranly.fr).

Sustainability

The museum aims to manage the garden in an "agro-ecological manner", which is not defined in more detail (www.quaibranly.fr). In general, the museum's goal is to conduct "proactive work to reduce the environmental footprint of its exhibitions" (www.quaibranly.fr).

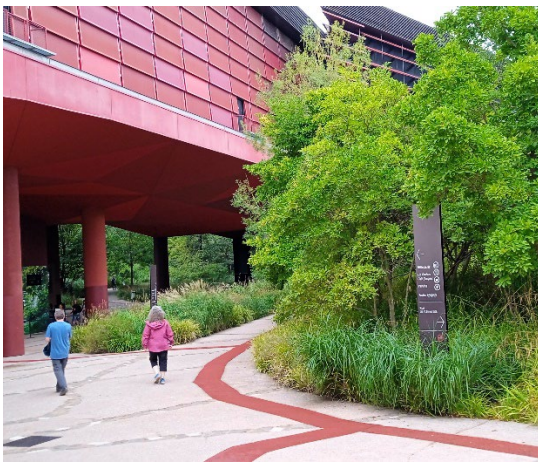

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Figure 9. Jardin au Musée du Quai Branly (photo: a, f Petra Thorpert; b, c, e Carola Wingren; d Karin Svensson).

4. PARC DE BILLANCOURT

Year:	2011
Size:	7 ha
Design team:	Agence Ter
Budget:	18 mio Euro
Background:	Redevelopment of industrial area, Parc de Billancourt is situated in the western part of the city, on the outskirts of the centre of Paris.
Concept/theme(s):	Rainwater management and adapted vegetation, creating spaces of freshness, promoting awareness for variability of water levels

Figure 10. Parc de Billancourt (photo: Petra Thorpert).

Overall design

The park is framed by strong stone and concrete elements that encircle the park, with a clear paved walkway that runs through it. The outer frame is accompanied by water, submerged vegetation surfaces and vegetation edges, which separates the park from the surrounding building blocks. The park itself is divided in two separated parts, where activities such as rest, walks and other kinds of recreation like play and sport coexist. The overall design of Parc de Billancourt is visible but partly fragmented, and the way variability and complexity interact with order is not clearly outlined in the same way as in other visited sites. As in the St. Ouen case, the edges between the different and well defined areas are sharp and clear, for example, between hard surfaces outside the park, the water shed encircling it and the planted areas within the park itself. Within each area, materiality is strictly applied all over but different from several of the other parks, these areas are designed with a formally strict layout. This means that the way of using strict for hardscapes and loose/undulating for vegetated areas is not pushed as far as in other examples, which also means that the contrasting effect is to some extent absent. One of the most interesting things with this park is how the green also infiltrates several streets and walls in the housing blocks outside the park, with an overall design that is clear and conscious.

Vegetation design

The plants in Parc de Billancourt are a mix of well-known and widely used garden plants – both native and non-native. Most of the plants are forming volumes used for architectural purpose like screening off, softening edges and defining rooms. Simple combinations of reliable plant species have led to successfully established and well-functioning vegetation. The individual species have been placed in suitable conditions due to their preferences, which has resulted in the overall successful development of the plant material.

Biodiversity

The park aims to support biodiversity, which can be seen in the choice of plant material (many native species) and creation of several semi-natural habitats. The park includes several water bodies, which offer habitat for, in particular, water birds and dragonflies. Many of the water edges are sharp and artificial, but not all. Several semi-natural habitats have been created such as water edges, areas with shrubs and ditches (see also https://landscape.coac.net/en/node/1803). Some areas of the lawn are less often cut to allow flowering vegetation for insects. It can be noticed that several of the plant species chosen in the herbal layer are in particular attractive for pollinators (e.g., *Echium, Symphytum, Cichorium, Centaurea*). *Buddleia* has been planted, which can potentially attract a large number of butterflies. An area with some kind of weedy vegetation has also been established. Here an insect hotel has been placed. A special feature are the lowered gravel parts, which are supposed to collect rainwater. Here vegetation was designed independent from natural or semi-natural vegetation types. The structural diversity is high in certain parts, particularly regarding the herb and shrub layer and some of the water edges.

In an article by Palazzo (2019), the park and its design is described as:

"*The need to safeguard and protect the river's ecosystem led to the delineation of areas inaccessible to people and reserved for natural processes. These spaces have high ecosystem and multifunctional value, integrating biodiversity, technical functions and designed landscapes focusing on the element of water[…]. Responding to these objectives, the design proposal achieved a truly variable landscape. This concept is also identified by the designers as a new aesthetic or design language, where the interdisciplinary team of designers, hydrologists and ecologists master ecological and technical processes rather than 'create' a new spatial conformation.*"

Sustainability

Water management was given particular attention (Palazzo 2019; Ravagnan et al. 2019; http://www.agenceter.com/project/parc-de-billancourt). Rainwater, which is collected in the adjacent district, is led to the park. Plantings are adapted to different water levels.

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Figure 11. Parc de Billancourt (photo: a, d, f Petra Thorpert; b Karin Svensson; c, e Carola Wingren).

5. PARC DU PEUPLE DE L'HERBE

Year:	2013
Size:	113 ha
Design team:	Agence Ter
Budget:	14 million Euro
Awards:	"National wetlands prize 2018" (Grand prix national des zones humides 2018) by the French Ministry of Ecology
Background:	Redevelopment of area used for farming, mining that was abandoned. Parc du peuple de l'herbe is located in the northern-Western part of the city, on the outskirts of Paris.
Concept/theme(s):	Offer recreational spaces in combination with the preservation of biodiversity and the landscape, linking nature and the city, restoration of abandoned spaces

Figure 12. Parc du peuple de l'herbe (photo: Christine Haaland).

Overall design

The overall design of the park is deliberately organised; however, the park design is perceived as relatively loose in relation to form and structure. Part of the park's edges are facing surrounding water features (the Seine and a lake), which offer contrasting effects and reflect light. The overall structure of Parc du peuple de l'herbe contributes with a relatively fragmented complexity based on the local soil and vegetation. In the design this vegetative complexity is contrasted to constructed elements such as pathways, bridges or buildings. With clear edges between the park as a whole and the built structures, the difference between the seemingly natural and unstructured and the artificial and constructed is emphasised. Also, the bird tower (see also Puskas et al. 2018) and the insect museum have clear and "edgy" architectonic features that are striking within the loose frame of the park. Materiality is quite strictly applied throughout the park, with loose vegetated areas clearly divided from the walkways where visitors can pass. The water shed that follows the park on one side is natural (partly the Seine) with visible cottages and houses outside the park as an integrated view.

Vegetation design

Most of the vegetation in the area has established spontaneously or consists of preserved vegetation remaining from previous land use. Although there are some planted trees, the main strategy for bringing in vegetation is to invite nature and natural processes of colonising the open fields. The process of natural succession is clearly visible with shrubs like *Rosa, Rubus* and *Salix* forming dense and impenetrable volumes where seedlings from trees find a sheltered location. Ten years after becoming a park, most of the area, and the vegetation in particular, still has a ruderal characteristic. Except for some planted trees, of which most have not been established successfully, there are no signs of designing by planting plants. Designing with vegetation takes place partly through limited maintenance measures.

Biodiversity

Biodiversity aspects were given high priority in this park. This can be seen in the choice of plant material, how ecological processes are enabled (secondary succession) and habitats created. The park is by far dominated by semi-natural habitats such as grasslands, shrubs areas that have been established through secondary succession and woodlands. Water edges have been designed in a natural manner. The aim was to restore ecosystems typical for this section of the Seine Valley (www.landscape.coac.net/en/node/525). The park is large, and structural diversity is high. The large grassland areas are expected to offer vast flower resources in spring. The area is known for each species' rich bird fauna. In addition, visitors are informed about species occurring in the area through signs.

Sustainability

Regarding sustainability, the water management is mentioned (Ravagnan et al. 2019).

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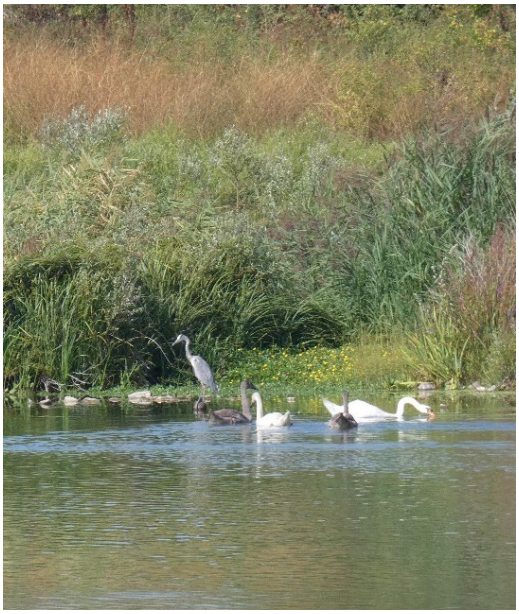

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Figure 13. Parc du peuple de l'herbe (photo: a Petra Thorpert; b, c Carola Wingren; d, e, f Christine Haaland; g, h Karin Svensson).

6. GREEN WALL QUAI BRANLY

Year:	2005, reconstructed 2018
Size:	799 m^2
Design team:	Patrick Blanc
Background:	The green wall is part of the architectural setting on Musée du Quai Branly – Jacques Chirac created by Jean Nouvel.
Concept/theme(s):	Patrick Blanc's green wall is known as Le Mur Vegetal in French. The theme is to allow both plants and buildings to live in harmony with one another.

Figure 14. Green wall Quai Branly (photo: Petra Thorpert).

The green wall is positioned in the central part of Paris, on The Musée du Quai Branly – Jacques Chirac. The building was designed by architect Jean Nouvel, and the green wall which covers the façade is 200 m long and 12 m tall, covering the entire northwest façade. The designer of the green wall, Patric Blanc, strives to design living walls, which influence senses of human well-being through inspiration from art and natural habitats (Blanc, 2008).

The green wall of the Musée du Quai Branly – Jacques Chirac is designed through an awareness of the plant materials' living conditions as well as the structure of the plant species and aesthetic combinations. The aesthetic expression of the green wall contributes to a perceived cohesive unit of order and complexity. The plant material ranges from red nuances to dark- and light green nuances, planted on the wall in rows that create a fabric of various structures.

The wall consists of 15.000 plants (Shelton 2009). Species were selected from North America and Europe, as well as Asia (China, Japan, Korea) (https://www.greenroofs.com/projects/musee-du-quai-branly-greenwall/). "*It was obviously impossible to include tropical species in the Paris outdoors, on a facade with northern exposure swept by air currents from the Seine. Yet I insisted that the biodiversity represented in this vertical garden echo the cultural diversity of artists the world over, whose works were on exhibit in that very museum*," (The Vertical Garden, 2008; cited from https://www.greenroofs.com/projects/musee-du-quai-branly-greenwall/). Some of the species were even collected in Asia (https://www.greenroofs.com/projects/musee-du-quai-branly-greenwall/).

It is not known to us to what extent native plant species were included.

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Figure 15. Green wall, Quai Branly (photo: a ,b, d, e Christine Haaland; c Petra Thorpert).

7. GREEN WALL L'OASIS D'ABOUKIR

Year:	2013
Size:	250m^2
Design team:	Patric Blanc
Background:	Green installation in a historic district in the heart of Paris
Concept:	The green wall is intended to contribute to the well-being and environmental consciousness of the inhabitants.

Figure 16. Green wall, L' Oasis d'Aboukir (photo: Petra Thorpert).

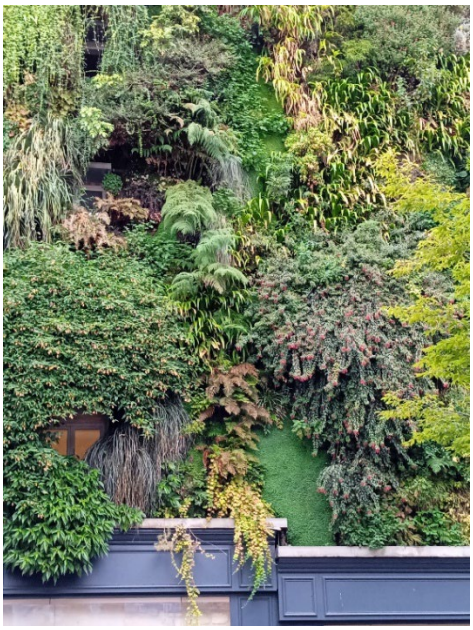
The green wall L'Oasis d'Aboukir is positioned in the central part of Paris (Sentier-Bonne Nouvelle) and covers a large area. The design creates a verdant mass of greenery in a public open urban space area, surrounded by cafés and walking paths.

The plant material varies in structure and texture, as well as in its colouring, which ranges from red nuances to dark- and light green nuances. The plant material is planted in clear long lines/rows that create a fabric of various structures and textures and contribute to a cohesive unit of order and complexity. Edges between planted areas on walls and the rest of the urban fabric (walkway, street, windows, roof, etc.) is to some extent clearly maintained, but there has been an acceptance of the vegetation's "overfloating" some of the windows of the building.

The green wall was planted with 7600 plants of 240 species. Thus, the wall definitely enriches plant species diversity. It can also be assumed that animal species from species groups such as insects and spiders benefit from the green wall. Birds were observed while visiting the place, but it is unclear if there was nesting there. Blanc himself (Blanc 2015) aimed at enhancing biodiversity (see also Gandy 2010). According to Kmieć (2014), the structure of Patrick Blanc´s green walls consist of PVC, polypropylene foil and felt. Plants are automatically moisture.

a

b



c

d

Figure 17. Green wall, L' Oasis d'Aboukir (photo: a Karin Svensson; b, c Petra Thorpert; d Christine Haaland).

SYNTHESIS AND REFLECTIONS

The visits to the selected parks and green walls, together with the discussions that evolved around them, have given interesting insights as well as new questions on aesthetics and biodiversity in urban green space. In Paris, urban green space has come into focus with new tree planting policies put in place (www.thelocal.fr). With the current progressive mayor Anne Hidalgo, several measures have been undertaken to make the city more green and more biodiverse. One of her latest proposals, to establish urban forests at roundabouts in the city (www.euronews.com), has been preceded by other measures. The way Paris is developing, large neighbourhood parks in redeveloped areas is an interesting development to follow, especially as we could see in several of the visited parks that a comparatively high attention is given to biodiversity within the design or re-design of green areas.

We could distinguish different ways and degrees regarding how biodiversity has been incorporated into the design of the green spaces:

- Area/percentage of area set off for biodiversity goals or biodiversity goals combined with others (aesthetics, recreation), including "wild" areas (unmanaged, little managed, less accessible)
- Habitat design (species choice, vegetation structure, adaptation to ecological processes – water cycles)
- Choice of plant species (native and non-native)
- Accomplishment of multifunctionality (e.g., biodiversity, aesthetics, recreation), for example, through multiple functions in the same area or a mosaic approach with a focus on different functions in different areas or a combination of both
- Support/maintenance of ecological process (e.g., water cycles)
- Management forms that are beneficial for biodiversity (cutting of hay meadows once a year, less intensive management forms)

Our study shows that ecology, biodiversity and design must not be seen as opposites, but instead as values, that could easily be combined in urban green space design. In this way, these types of ecological designed urban green spaces can also raise a pedagogical awareness through its framing of "nature" or natural elements, so that users become both aware and curious about the biodiversity that can be found in their neighbourhood.

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