



## **For cities of a different nature**

### **Bringing sustainable infrastructure to urban areas**

**Sylvain Petitet and Jérémy Grangé**

*City-dwellers want to see more of their metropolitan areas turned over to nature and urban public spaces; however, our cities today are still structured by a network of roads that were primarily built to manage motor traffic flows. Sylvain Petitet and Jérémy Grangé show how implementing sustainable urban infrastructure could provide city-dwellers with easy and convenient access to the places that generate most of their journeys, revealing a new form of network-based public space.*

The 20<sup>th</sup> century profoundly transformed our cities by seeking to adapt them to the automobile, a symbol of modernity, and thus encouraging speed and (individual) motorised travel. In France, the wide avenues and boulevards produced by the Haussmann-style urban planning of the late 19<sup>th</sup> century – intended to aerate cities and provide their inhabitants with fresh air, light, generously proportioned and spaces, often shaded by trees, for strolling and socialising – have gradually been transformed into arteries for ever growing and ever more pervasive car traffic, with nothing more than residual spaces left for pedestrians and the minimum necessary for the existing trees. The pedestrian city gave way to the motor city (Wiel 1999). Broad vistas and tree-lined avenues have become main roads and multi-lane highways serving the city and its suburbs. Riverbanks have been turned into waterside expressways. Squares and public gardens are now often nothing more than the superstructures of underground car parks. Industrial wasteland, temporarily unoccupied spaces and private gardens, as well as natural spaces and “green lungs” in the city, have been gradually built over. In the process, the city has also become increasingly impermeable and “mineralised”, transformed into an expanse of stone, concrete and asphalt, where nature struggles to exist except in meagre designated spaces whose dimensions have been calculated to the last square metre.

In recent years, the mistakes of these design principles have become all too evident. While cities continue to increase in density, in the name of more sustainable urban planning, public spaces and nature in the city appear to be increasingly necessary and appreciated by city-dwellers, as evidenced by their desire for a new form of proximity to nature (Bourdeau-Lepage 2013) and, on a different level, by the financial value attached to these “structural gaps” in determining real-estate prices.<sup>1</sup> These environmental amenities also contribute to segregation phenomena, as the growing importance accorded to locally accessible urban nature and the quality of public spaces often goes hand in hand with an uneven spatial distribution that is at the origin of environmental inequalities (Heynen *et al.* 2006). We have also become increasingly aware of the harm to public health presented by urban pollution that is difficult to control, and of problems related to the thermal discomfort of cities in summer, both in the day and at night, when the temperature barely falls due

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<sup>1</sup> Here, this brings to mind the hedonic demand theory and hedonic pricing method, which is quite controversial in French urban research but frequently mobilized in operational urban planning to justify, economically, the development of a park or public space (breakdown of land costs). It highlights a relationship between property prices and environmental characteristics associated with the location, such as landscape amenities nearby (Choumert 2009; Oueslati 2011). The classic example of this is the price differential between an apartment overlooking Central Park (in New York City) and an apartment of similar specifications but located on an adjacent street.

to the nocturnal release of heat stored by the materials of city buildings, leading to urban heat islands (Gill *et al.* 2007).

### **The return of sustainable transport modes**

Reversing this trend is not easy – although, over the last 30 years or so, there has been a gradual reduction in the amount of road space devoted to motor traffic. Historic city cores and central shopping districts have been pedestrianised (Feriél 2013), and the amount of public transport in reserved lanes has increased (bus lanes, bus rapid transit (BRT), trams/light rail, etc.). In terms of public spaces, innovative policies were initiated in certain French cities in the 1990s (e.g. Lyon, Nantes, Bordeaux), and the transformation of busy main roads into urban boulevards and avenues (Lecroart 2012) has proved to be a golden opportunity to allocate more road space to public transport and sustainable transport modes (i.e. walking and cycling) and even take over waterside spaces for recreational use temporarily (e.g. the annual “Paris Plages” event that sees the expressway on the banks of the Seine transformed into beaches over the summer) or on a permanent basis (as in Lyon and Bordeaux, whose riverbanks have been recently redeveloped). More generally, the layout of urban thoroughfares, in addition to promoting mass transit (with reserved lanes) and sustainable transport modes, also aims to reduce the number of parking spaces and/or implement paid parking (CERTU 2011).

But the priority given to sustainable transport modes at the expense of motor vehicles is starting to show its limits: assigning each user its own lane (pedestrians, cyclists, public transport, perhaps even skaters and pushchairs soon?) is necessarily restricted by the width of the street. This spatial constraint is today generating new usage conflicts and hindering the development of cycle-route networks. Furthermore, deliberately exacerbating traffic conditions in the hope of reducing car use is a questionable approach for the many people today who still depend on a motor vehicle for their essential mobility requirements (Dupuy 2002); such action must therefore be discussed even in the case of a relative decrease in traffic (Lecroart 2012).

### **The difficult return of nature to the city**

As regards nature in the city, restoring its rightful place and reinforcing its presence for its soothing and invigorating qualities – and even health and social benefits – is no easy matter. Despite what is often a genuine political desire to provide responses to the “greening of society” (Bourdeau-Lepage 2013) and give a territorial embodiment to injunctions arising from expert knowledge on global environmental change, it has proved difficult to reconstruct natural continuities (known in French as *trames vertes et bleues*, or “green-blue urban grids”), which are essential if urban ecosystems are to thrive and biodiversity is to be encouraged (Clergeau 2007). In addition, and perhaps more pressingly, it has proved difficult to ensure the right level of coherence between this urban ecology on the one hand with the way these spaces work for city-dwellers on the other (via a socio-ecological approach). We now seek to preserve and develop the presence of this nature in the dense city by reclaiming, albeit only temporarily, certain abandoned spaces and by introducing nature in vertical contexts (trees, green façades) or high spaces (green roofs and terraces; rooftop gardens<sup>2</sup>). All these actions, while interesting and beneficial, typically do not, however, constitute a coherent and readily understandable ensemble that anyone can access and use on a daily basis, nor do they re-establish continuities and ecological functions (ecosystem services) – and this is without even considering the technical, regulatory and even economic constraints that they are facing.

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<sup>2</sup> See, for example, the technical guide titled *Biodiversité & bâti* (“Biodiversity and the Built Environment”) produced by the Conseil d’architecture, d’urbanisme et de l’environnement (CAUE – Council for Architecture, Urban Planning and the Environment) for the Isère *département* and the Ligue de protection des oiseaux (French Bird Protection League). URL: [www.biodiversiteetbati.fr](http://www.biodiversiteetbati.fr).

## **New city-dwellers, new expectations, new practices**

Ultimately, lanes dedicated to sustainable and public transport modes still tend to be designed according to opportunities that arise when redeveloping roads rather than as a result of any real urban planning, and such redevelopments still tend to be conceived in terms of commuter needs. And yet, although work-related journeys still structure urban mobility, they are now far from being the main reasons for travel.<sup>3</sup> For a century now, the unprecedented rise in life expectancy and the amount of free time we have – combined, to a certain extent, with changes in the way work is organised today – has modified urban practices and rhythms, but urban planners and city managers have so far struggled to take account of this. While the expectations and practices of city-dwellers are changing and proving increasingly diverse, those responsible for developing our cities are struggling to move beyond a functionalist approach that assigns a unique function to each type of space, and a specialised response to each type of question. Urban thoroughfares cannot be reduced to their circulatory function only. Should the concept of the “shared” street boil down to the unlikely juxtaposition of a series of reserved lanes, or should it instead be a space where all users harmoniously coexist?

Sustainable infrastructure – born out of debate and discussion on the reintroduction of nature into the city, the development of public spaces, and the accessibility of these spaces via sustainable transport modes – takes the form of a vast network of urban thoroughfares that encourage walking and cycling. It allows easy and convenient access to the key points of attraction in urban areas: public facilities (government buildings, cultural venues, places of worship, sports and leisure facilities, entertainment venues, schools, colleges, universities, etc.), public spaces (parks, plazas, squares, gardens, semi-natural areas), markets, shops, economic centres, multimodal transport hubs, and so forth. This infrastructure forms a network that offers easy access to all – in other words, an extensive web-like public amenity on the scale of neighbourhoods and cities that enables everyone to make use of the city at their own pace, according to their own desires, and in a calm and pleasant context.

## **Some methodology : revealing and developing sustainable infrastructure**

Implementing sustainable infrastructure across a whole urban area requires a preliminary diagnosis and analysis of the way the city works, according to three criteria:

- identification of the main “urban attractors” (public facilities and spaces, shops, parks), together with other remarkable features, some of which may be private (e.g. trees and private gardens, frontages and gables that can be planted);

- analysis of the way the road network functions across the urban area with an identification of the hierarchy of thoroughfares (primary and secondary routes between different neighbourhoods and districts), together with public transport routes (CERTU 2009);

- identification of what will form the basis of this sustainable infrastructure – in particular pedestrian streets, esplanades and promenades, and redeveloped riverbanks.

Based on this initial work, it is then initially a question of defining, on the scale of the whole urban area, a few broad corridors within which the sustainable infrastructure should be detailed more precisely, including all key thoroughfares and the ramifications on the neighbourhoods concerned. Next, the exact layout of these various elements will be defined, based on a more in-depth analysis of the area’s “urban attractors” and isolated remarkable features in the urban landscape, taking care to place special emphasis on those sections that already exist (Ward Thompson 2002).

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<sup>3</sup> In Switzerland, for example, work-related journeys and official travel represented 36% of all journeys made in 2005, compared with 56% for leisure and shopping (OFS 2007).

All that remains then is to propose a suitable redevelopment programme based on the specific contexts of each thoroughfare, organised in several phases if necessary, in which vegetation plays an important and relevant role, and which will create spaces that are conducive to strolling, recreational uses, and foot- and cycle-based transport, while also ensuring the harmonious cohabitation of different users (Soulier, 2012). Depending on the contexts encountered, these developments of public space need to provide relevant responses to two difficult questions: first, the amount of space given over to motor vehicles, whether for serving residential areas or parking (today the main function taken into consideration when roads are redeveloped); and second, the intersections between these redeveloped thoroughfares and more conventional roads, devoted to motor traffic, so as not to interrupt the continuity sought for this sustainable infrastructure. Regarding the first question, in cases where residual car use seems appropriate, some form of dynamic lane management may be considered to organise traffic according to daily or weekly patterns, which may include the implementation of specific technical measures (movable street furniture, variable lane markings, etc.). With regard to the second, current thinking on shared streets and “home zones” – led in particular by the “Territories and Cities” division of CEREMA (the French Centre for the Study of Risks, the Environment, Mobility and Planning)<sup>4</sup> – offer interesting avenues for solutions (Murard 2012) for these strategic junctions, which are both entry and exit points for our sustainable infrastructure, and both links and separations vis-à-vis the inherited “grey infrastructure”.

## Providing cities with sustainable infrastructure

By seeking not only to meet an urban desire for more nature in the city and for the development of sustainable transport modes, but also to respond to the territorial problems posed by global environmental change, sustainable infrastructure provides city-dwellers with a network of new types of public thoroughfares and spaces that have been sorely lacking ever since our cities – both large and small – were adapted to accommodate motor traffic. This infrastructure could be used to ensure coherence between various territorial policies that are often sector-based at urban area level – such as intermunicipal development policies,<sup>5</sup> environmental policies,<sup>6</sup> and even some aspects of urban policy (social cohesion, public space, territorial equity) – on the proviso that proposals for projects involve, as far as possible, the technical departments of different tiers of local government, ranging from town/city level to intermunicipal bodies and the *département* (county), or even the region. In its practical implementation, this new infrastructure – to be created on the basis of an analysis of urban attractors, local potential and pre-existing sections – must be considered on different scales, from the whole urban area<sup>7</sup> right down to individual neighbourhoods. It also calls for the use of a precise vocabulary to describe the development of these specific and innovative spaces, and for an awareness at all times of the generic nature of the methods developed, to ensure the project remains adapted to its context. Particular attention must be paid to uncertainties and

<sup>4</sup> This division was known as CERTU (Centre d'études sur les réseaux, les transports, l'urbanisme et les constructions publiques – Centre for the Study of Networks, Transport, Urban Planning and Public Facilities) up to January 2014.

<sup>5</sup> *Schémas de cohérence territoriale* (SCOTs – regional integrated development plans), *inter-SCOTs* (combining several SCOTs, usually covering a single metropolitan area), *plans locaux d'urbanisme* (PLUs – local urban development plans), *plans locaux d'urbanisme intercommunaux* (PLUIs – intermunicipal urban development plans), and *projets d'aménagement et de développement durable* (PADDs – sustainable development projects), while also taking account of the views of the *autorités organisatrices des transports* (local transport authorities).

<sup>6</sup> *Trames vertes et bleues urbaines* (“green-blue urban grids”), *plans climat-énergie territoriaux* (PCETs – territorial climate and energy plans), *parcs naturels régionaux* (PNRs – regional natural parks), *projets stratégiques agricoles et de développement rural associés à la protection des espaces naturels et périurbains* (PSADER-PENAPs – strategic projects for farming and rural development associated with the protection of natural and periurban spaces), and *schémas régionaux de cohérence écologique* (SRCEs – regional ecological coherence plans).

<sup>7</sup> Ideas regarding the development of sustainable infrastructure in urban areas, and even in wider city regions, can be found in the work of Thomas Sieverts on the *Zwischenstadt* and, in a slightly different register, in the work of Yves Chalas on the “void-city” and the “nature-city”, two figures associated with the emergence of contemporary “city-territory”.

other “unintentional consequences” of development operations (Chalas and Soubeyran 2009), which are in part linked to the daily use of these spaces by inhabitants in the long term (including usage conflicts, maintenance and future upgrades).

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