

### Critical issues and growth opportunities

The emergence of Karlovac, related to its history and important strategic position, is to change its definition of a military city into a contemporary European town. The design of the city in the last decades revealed a potential urban development, which has been underused and left incomplete or not done.

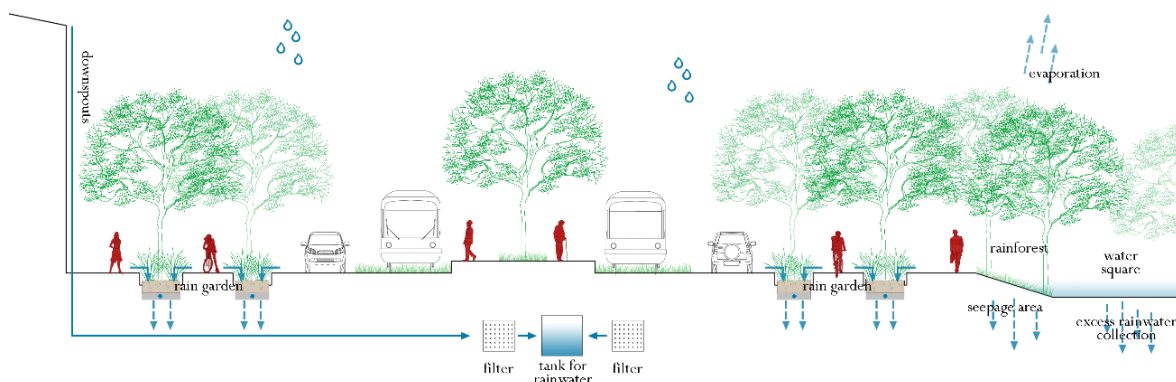
The functional analysis shows a sectorial growth of the districts, characterized by a mono-functional use: residential areas, which are mainly diffused, are alternate to commercial and productive hubs. The only area marked by mixed-use is the historic centre Zvijezda, which contains institutional, cultural, commercial and residential buildings. It represents a strategic matrix to look at during the future development of the city. The new zone of Nova Centre also contains problematic and unsolved solution of growth; it shows an incomplete and undefined use of land that, finally, doesn't work as plug for the areas around it. The main Croatian motorway crossing the city centre represents a potential as well as a critical presence for the city life: the breaking, created by the expressway, contributes to display an incoherent vision of the urban plan. The whole infrastructure of the city seems oriented mostly a vehicular use (90%), instead of a more complex network.

This unevolved vision is reflected lastly in the green areas: the presence of park in the city appears everywhere but, if looking at closer analyses, the whole green system is unused and undefined. The green areas are diffused and linked to the residential districts as well as the commercial ones. Given this unsolved use of land, linked with the presence of the four rivers and the diffuse ground permeabilization, the risk of floods, which afflicts almost the entire city, appears as a direct consequence.

### The natural matrix

The *Dandelion* project decides to use green and blue network as a matrix, through which define and re-develop Karlovac. Parks, boulevards and meadows design the new layouts of the city, they work closer with water, which shifts from scourge to asset. The aim is to lay the groundworks for the creation of a green infrastructure, that becomes an integral part of spatial planning and territorial development, offering a better alternative to standard "grey" system and promoting ecosystem health and resilience.

The first step is the new plan of the main axis, that links Luščić to Gaza: the project transforms a typical vehicular 4-lanes network into a "linear park" (440 trees from the old town to Luščić – 128 trees from Zvijezda to Gaza). It reduces the vehicular road to 2-lanes and it shifts the freed space into an integrate systems of green and water assets. The boulevard section hosts, depending from the width, pedestrian and bike paths and tramways, always connected by rows of trees and bushes.

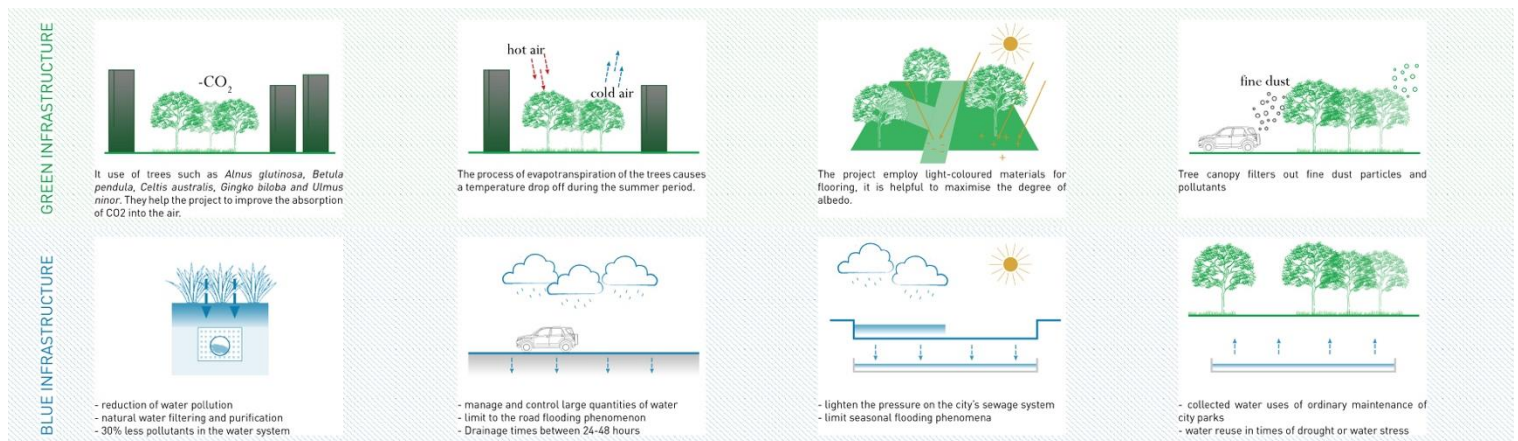


The current knowledge about the benefits related to the presence of green spaces into urban landscapes vary from ecosystem health to biodiversity conservation, improving also social and economic standards of the city. The implementation of trees in the urban field is strictly related to the air quality: there is evidence that types of trees, such as *Alnus glutinosa*, *Betula pendula*, *Celtis australis*, *Gingko biloba* e *Ulmus minor*, help to absorb a largest amount of particulate matter, carbon dioxide (22 tons per year of CO<sub>2</sub> absorb by 1 acre) and nitrogen oxide. Finally, the treetops generate shadows that, combined with light floors, maximize albedo (reflectivity of Earth), reducing the heat absorption of the ground.

The natural-system is implemented with the continuous presence of the rain gardens, an attractive native plant garden with a special purpose: to capture, soak up and filter stormwater runoff from roofs, driveways, parking lots and other impervious surfaces before it enters local lakes, ponds, rivers or bay. Rain gardens use the concept of bioretention: a water quality practice in which plants and soils remove pollutants from stormwater naturally.

But the whole strategy is to tackle flood risk across different scales: if the rain gardens support resilience at a parcel level and they help partially at neighbourhood scale, the creation of water squares acts at a watershed level. This urban tool combines water storage with the improvement of the quality of urban public space. It can be understood as a twofold strategy: most of the time the water square is dry and in use as a recreational space but, during stormwaters, it works as a basin collected rainwater. It retains water from the square's pavement as well as rainwater from rooftops of surrounding buildings. As a result, these buildings' wastewater pipes could be disconnected from the municipal sewage system. The water square retains fluids during peak rainfall, easing the stress on the city's sewage system, which in turn prevents urban floods. It also helps the city avoid the significant financial cost associated with upgrading sewers in the future. The collected water can also be reused for ordinary maintenance of urban parks and rows of trees.

AS636



The Lušćić model

The green and blue infrastructures shape the development of the new district of Lušćić. The main axis ends into a great urban park, a “green lung” that appears as a welcome area of the new neighbourhood. In the middle, a water square collected rainwater from rooftops of the whole buildings and, through the terraced step edges, mitigates the impact of stormwaters at the ground level. The natural matrix dialogues with the anthropological one. The public space and green areas are strictly linked with the buildings and their functions, they create a complete model of new urban planning.

## KARLOVAC (HR) - DANDELION

Given the different possibilities of growth of Karlovac, the project suggests four different development scenarios and each of them is focused on a specific future vision: *Home sweet home* (residential), *Karlovac manufacture* (productive), *Croatian holidays* (tourist) and *Poly-Karlovac* (university). Each scenario is characterized by different typological constructions, services and public spaces.

- *Home sweet home*: the attractiveness and functionality of the green and blue infrastructures increase the appeal of Karlovac as well as other emerging European cities as headquarters. The lot is the grafting district of the progressive transformation into a purely residential city. The city will have to meet it, thanks to the constant demand, supported by an infrastructure system of connection services and carbon free public transport.

## AS636

- *Karlovac manufacture*: local and national policies favour the transformations of the area (as a case study and subsequently of the entire city) towards a novel model in which manufacturing and service activities are increasingly integrated. The goal is qualifying the area as a pole of a manufacturing industry with a high intensity of culture and technology. Inspired by the Silicon Valley, it maintains a balance between high technological innovation and attention to green and blue infrastructures.
- *Croatian holidays*: the city achieves important cultural and environmental goal as a good practice and it becomes an international leader in different areas, such as conscious and green tourism. The area of intervention satisfies a hotel demand that was lacking in the past. Karlovac hence becomes the fulcrum of international tourist routes, that branch off to other locations through hiking and cycling routes that go from the sea to the mountains.
- *Poly Karlovac*: national policies encourage the development in the City of Karlovac of the new Croatian University Centre of Excellence, whose aim is the development of new technologies and deliberately inspired at the "Massachusetts Institute of Technology - MIT" (US). The main settlement area is structured as a real university campus, branched with the context through a functional network of public services, with traditional premises for learning (classrooms), avant-garde spaces (fab lab, server-farm etc..) and related to student residences (co-living, gym, bar, etc.).

Differentiation of investments (high rise, low rise), their progressive development over time and therefore the consequent evolution in characterized scenarios, responding to the emerging needs in the current Croatian context.

### The mixed-use hub

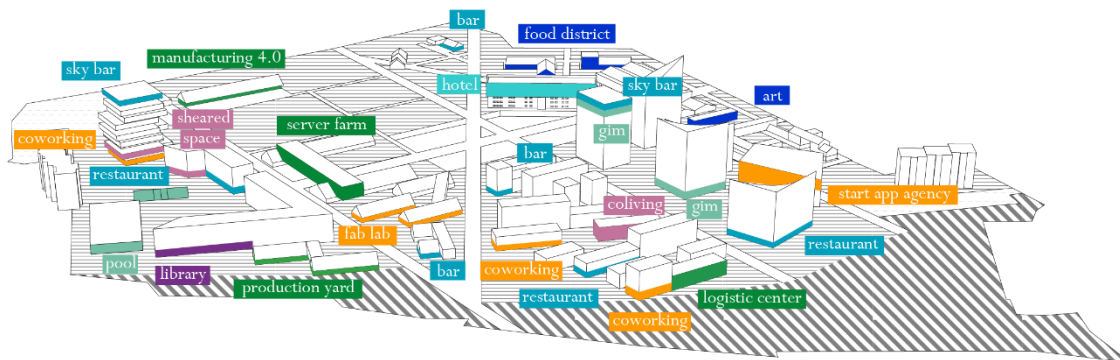
The most probable development scenario is focused on a mixed-use hub, hosting different context (residential as well as touristic, productive and university) and several tools for the public spaces. Here the former buildings take on new shapes and functions: volumetric additions are designed to implement the spaces and to adapt the heritage to the new functions.

## KARLOVAC (HR) - DANDELION

The *Dandelion* project's objective is to propose a planning model, "The Lušćić model", capable of bringing together the public and private dimensions in a single urban area. In this way, it develops a type of settlement common to the entire neighbourhood, with a mix of services and functions able of transforming over time and adapting to multiple uses. Hence, "The Lušćić model" translates principles into settlement, within the project area, which could be flexible to different growth scenarios. It could expand incremental additions, preserving a substantial share of spaces open to the desires of the entire city.

The green and blue infrastructures, that are the only unchanged layouts of all the development scenarios, dialogue with a system of renewable energy sources: solar and geothermal energy system will be planned according to the development of the site.

# AS636



### Time as a tool

Lušćić could open soon! Given the impossibility of the citizen to visit the former military areas, the idea is to gradually bring people into the new district: a series of cultural and recreational event during the first phases of the construction site allow to increase the relationship between citizen and the new public areas (worldwide it's widespread to open periodically the building sites). The subsequent phases will explore a timetable program, which will be able to share portion of the site step by step: from the reuse of the former buildings with their additions to, subsequently, the creation of the public equipment and the construction of the new buildings.

A programmatic vision for the new district and for the entire municipality of Karlovac.