

## **Residual spaces, green infrastructure and adaptive architecture: ecological and social node in the Senigallia coastal strip**

Paolo Bonvini <sup>(1)</sup> - Lucia Pro <sup>(2)</sup> - Giovanni Pietro Sergi <sup>(3)</sup>

<sup>(1)</sup> Univpm, Dica, Ancona, Italy - <sup>(2)</sup> Landscape Architect, Zurich, Switzerland - <sup>(3)</sup> Ancona Architects' Association, Senigallia, Italy

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**Abstract** The coastal strip of Senigallia, a city in the Marche region overlooking the

Adriatic Sea, has been the subject of progressive building densification from the post-war period to the present day, despite the presence of landscape and environmental constraints.

The project focuses on a 2,805 square meters area in the Ciarnin locality - one of the last undeveloped spaces in the coastal strip - recently acquired by the local parish for the construction of sports and community facilities.

The proposal starts from a twofold observation: on the one hand, the inadequacy of the current urban planning tools in recognising the value of nature-based solutions; on the other hand, the need to safeguard and enhance the existing green space as an ecological and climatic infrastructure.

The aim is to propose a replicable model of adaptive and reversible intervention, capable of integrating social functions and environmental strategies in a slow regeneration perspective.

The site, 250 m from the coast and along the Marignano ditch, represents a connection node between the hinterland and the coast, inserted in a well-defined ecological and hydrological network within the territorial quadrant. Its position makes it a potential cross-connection node between the sea and the inland territory.

The methodology is based on

- the analysis of local regulations and the PRG (G2 zone);
- the geomorphological and hydraulic study;
- the mapping of green areas and residual ecosystem functions;
- the elaboration of low-impact design scenarios inspired by Nature Based

Planning.

The project shows how it is possible to meet the demand for collective facilities without compromising the natural balance of the area.

The main strategies proposed are:

- active conservation of free soil and vegetation cover;
- integration of trees and artificial shading for the microclimate;
- use of light, multifunctional and reversible wooden structures;
- underground lamination tanks to manage rainwater;
- design of greenery as a service space, capable of generating climatic, ecological and economic benefits in the long term.

Ciarnin's experience highlights the strategic role of undeveloped marginal areas in the implementation strategy of urban resilience, if they are considered as structural infrastructures of the landscape and not as mere building reserve spaces.

It is proposed:

- the introduction of reversibility criteria, use of natural materials, plant integration and SUDS (Sustainable Urban Drainage Systems) in municipal plans;
- local guidelines for the climatic design of collective spaces;
- regulatory recognition of the ecosystem functions of existing green spaces as a common good and urban infrastructure.

The project thus offers a scalable model for coastal cities that wish to reconcile sustainability, architectural quality and climate adaptation.