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PROLEGOMENON

By highlighting preservation and protection of cultural heritage in cities, urban risks must be minimized. In the middle of climate emergency new ways of adapting to our changing cities are required. Urban and architecture design can influence change and put into attention more sustainable performances. For instance, enhancing and bringing back nature in historic cities has emerged as an important objective in recent years.

However, there is a growing recognition that providing nature in sensitive urban environment is becoming an issue of ecological justice for climate mitigation. Perceptions for Urban Greening and its role with positive implications for health and well-being of people are now well in evidence. Designing healthy resilient places of unique beauty, it could be described as a complex discourse, but the near future demands present feasible solutions.

This volume looks at recent development of the conception of 'Urban Heritage' dealing with 'Climate Change'. The contributions collected from the 9th INTEGRO Annual Meeting held online in March 2023¹, debates a variety of issues on cultural heritage, its evaluation and protection from current urban risks. The book presents a gathering of contributions on Urban Heritage to be protected and regenerated. It explores place-appropriate concepts, policies, and strategies to face urban changes as well as several cultural attitudes at the different contexts that could reflect mainly on how to cope urban emergencies and climate change. It is important, however, to explore new approaches and instruments of planning and design at the different scales of intervention that systematically will include nature solutions to meet societal needs.

Common themes such as integrating Urban Greening with sensitive historic environment can better define research findings with good practice through a combination of qualitative and quantitative methods. In addition, research studies suggest that the use of responsive design strategies, Urban Green Infrastructures, and the need for technical fixes at the unit or building scale could be powerful in supporting sensitive historic environments in the face of climate change.

Dimitra Babalis
The Series Editor

¹ The "International Group of Urban and Architecture Design", (INTEGRO UAD) is an International Research Partnership. The 9th INTEGRO Annual Meeting has been organized and chaired by DIMITRA BABALIS, Founder and Chair of INTEGRO UAD since 2014.

INTRODUCTION

Perceptions and Values in Historic Environment. A Critical Future

In recent years new trends such as extreme weather events including violent storms and intense rainfall have been observed due to climate change. Initiatives to reduce greenhouse emissions and other urban risks in historic cities is subject of much debate. On the other hand, there is a clear intention by local authorities to significantly reduce vehicular traffic within the city centres while increasing walkable streets with associated urban regeneration which may help mitigate climate change. At the current, planners, designers, and managers of Green Infrastructure, (GI) attempt to prioritize health and well-being in a historic context of great cultural value. In addition, they may perceive sensitive spaces more functional associating them to the values and socio-cultural drivers of local communities for more healthy resilient places. There is a need to consider the added value that Urban Greening can provide to the urban design process.

On the above subjects, the raised main question is: How we cope with urban changes in historic cities? To respond significantly to the current scenario sustainable planning and design can lead positively to these changes. Issues on resilient strategies and the implementation of adaptable measures to mitigate climate emergency in historic environment must be clearly faced. Solutions that can be focused within the core of the city at risk to face 'urban heat islands' as well as intensive rainfall leading to flooding must be planned and designed. At the same time, protection and revitalization of 'Urban Heritage' of outstanding value should be emphasized on properly climate change adaptation methods. However, opportunities exist to link Urban Greening with Urban Design to help maximize not only the aesthetic of the Historic City but also the functionality and quality of a space to satisfy community needs.

To help to address ongoing gaps, Public Open Spaces need to be re-designed to integrate green and blue infrastructure for everyday life. A balance needs to be found between functionality of a core urban space, historic value, and socio-economic revitalization of a context. Resilience design can provide placemaking for human activity while providing an effective buffer on the site. In turn, design strategy provides movement on roads and streets to encourage sustainable connectivity through core environments of great beauty and history. On the other hand, it is important to identify future challenges in relation to built environment and climate change, to ultimate proposals that would be more resilient and adaptable to recent issues whilst delivering high-quality planning and design.

It is only through resilient approaches that it can be delivered quality of places for this emerging reality for historic environment at risk. In some instances, the need to work across different disciplines to incorporate expertise may create some difficulties. The integration of soft engineering solutions with contemporary thinking on nature-based

infrastructures to support both urban quality, aesthetic and promote innovation can become desirable. For example, we see Green Infrastructure been used as a first principle to sustainable urban mobility. However, Urban Green Infrastructure must be considered as a framework of principles to link sensitive urban environment to support both long-term and short-term sustainability goals. But the main aim is to link urban policy and planning to urban and landscape design. To this end, innovative thinking can be challenged for more integrative, and smart design for the next future. Moreover, there is the added value to attract investment in variations of place to promote interactivity, connectivity and maximize urban quality.

Structure of the Book

PART I – *Resilient Responses for Historic Environment at Risk* discusses on how research findings must be essential to evaluate existing condition of a site within sensitive historic environment. A comprehensive planning and design framework shaped by critical resilience strategies must be developed and based mainly on placemaking, nature-based infrastructure and connectivity.

Chapter 1 – *Fixing Urban Risks in Sensitive Historic Environment* by Dimitra Babalis discusses on recent urban emergencies such as climate change and Covid-19 crisis that have generated new principles and tools for long-lasting urban quality improvement in historic environment. Accordingly, core urban spaces can play a vital role as identity spaces that need to be preserved and re-designed under new ecological, sustainable, cultural, and historic criteria. In turn, urban spaces need to be of high-quality by making 'big and little streets' more attractive; By promoting Green Infrastructure (GI) in inner and outer city areas and along urban waterfronts; By making use of under-used small public open spaces; By making urban parks, historic gardens and courtyards more attractive. Measures to promote air quality, reduce urban traffic, create sustainable and resilient cycle and pedestrian paths can help people to re-gain public open space image, value, identity, and safety. But urban changes and urban risks can be challenging for an advanced open space planning and design. However, historic environment of great beauty and value can satisfy the UNESCO recommendations and UN targets by implementing distinctive strategies for preservation, urban safety, climate protection, health and well-being. Public spaces need to be designed to integrate green and blue infrastructure and the daily lives of local communities, while evaluating resilience strategies. Resilience design allows sensitive historic environment to support city-structuring of green and open spaces with walking routes and cycleways to cover significant energy consumption and greenhouse gas emissions. Sustainable urban mobility can also take place for human activity by adopting a good network strategy and connections for 'active travel' (walking and cycling).

This chapter aims to show quality improvement of site transformation as a defined 'Heritage Open Space in Transformation', (HOST); To develop comprehensive urban design frameworks and masterplans shaped by critical resilience-based strategies within the Florence UNESCO Area. Particularly, to obtain a higher degree of space equity and place value a better city-connectivity must be proposed through a network of walkable and cycle routes, green streets, and open spaces. Dynamic, sensitive approaches must be adopted to transform and revitalize open spaces towards strengthening small spaces, pedestrian green streets. Mostly, one of the main goals of historic cities policy is for a greener urban environment that can help improve urban quality, health, and well-being, reduce urban heat impacts, and bring nature into the city. Consequently, the green living must focus on providing easy people's access to quality green spaces to address climate and health challenges. It is essential, therefore, to develop strategies on urban greening to meet commitments such as urban ecology, strategic action plan, urban forest strategy, streetscaping strategy increasing Tree Canopy Cover, (TCC) and so on.

Chapter 2 – *Green Fragments. Urban Courtyards' contribution to the Green Infrastructure of Historic Centres* by Maria Stella Lux and Julia Nerantzia Tzortzi considers the fragility of cities and anthropic systems in the face of increasing risks of extreme events and climate change. One of the key issues in recent decades has been the adaptation of urban structures to achieve improved resilience. The integration of Green Infrastructures (GI) into the built environment plays a key role in this process as natural components and processes can provide a more flexible and integrated answer to many stresses affecting urban areas.

However, existing GI strategies are mostly based on large-scale interventions which have major limitations when interfacing with the compactness and the scarcity of transformable public space of historic centres. Focusing on the case study of Milano and its historical centre, this chapter aims to show the potential of inner urban courtyards to the creation of a 'green puzzle', i.e. a diffused GI made of small but interconnected green pieces. Indeed, courtyards represents 14% of the void areas in the city centre and currently host 23% of the existing Tree Canopy Cover (TCC). Referring to the urban parameter of permeability, defined as "a compactness attribute, which quantifies the level of organization of the urban texture, emerging from self-organized and synchronized states between the basic elements of the urban system" (IMM methodology), it is possible to evaluate the potential increase of accessible space and accessible TCC including courtyards in the network of urban continuous open spaces. To filter the number of courtyards and prioritise the feasibility, only courtyards with semi-direct access, i.e. accessible through vehicular passages at street level, are considered. The results show an increase of accessible space of ~13% and an increase of accessible TCC of ~14%, confirming the role of urban courtyards in building social and environmental resilience in historic centres.

PART II – *A Call to Action* tries to identify a comprehensive methodology that is mainly based on both qualitative and quantitative analyses and evaluations of strategies and actions to be adopted on preservation and reused of cultural heritage to face climate change. To gather perceptions on a wide range of issues including legibility, accessibility, bulding design improvement, enviromental awareness it is important to observing activities in different types of contexts and under different climate conditions.

Chapter 3 – *Development of a Methodology to Monitor and Evaluate the Adaptation of Greek Cultural Heritage to the effects of Climate Change* by Eleni Maistrò, Fani Mallouchou-Tufano, Vassiliki Pougkakioti, Georgia Kotzamani, Miltiades Lazoglou. This chapter presents a comprehensive framework for Monitoring and Evaluation (M&E) which, on the one hand, makes it possible to assess the expected impact of climate change on cultural heritage and, on the other hand, makes it possible to formulate measures and policies for adapting cultural heritage to these impacts. The approach followed was developed by the 'Hellenic Society for Environment and Culture', (ELLETT) as part of the LIFE-IP AdaptInGR Programme. The basic steps for the Methodology involve understanding the terms 'cultural heritage', 'climate change' and 'adaptation', as well as the studying strategies, policies and related actions which are already being developed at international, European, and National levels. The integrated M&E Framework follows the actions of the 'National Strategy for Climate Change', (NAS), enriching it with additional measures and indicators. The main goal of the project is to strengthen domestic cultural heritage's resilience to the expected effects of climate change and to enhance its ability to adapt to these effects. The next step in ELLETT's work will be to confirm the validity of the M&E Framework. This will be done by applying the Framework to five different types of case studies on Greece's cultural heritage. Completing these case studies will facilitate the development of a set of guidelines that will ensure that different types of cultural heritage can adapt to the effects of climate change through the management of anticipated or existing risks.

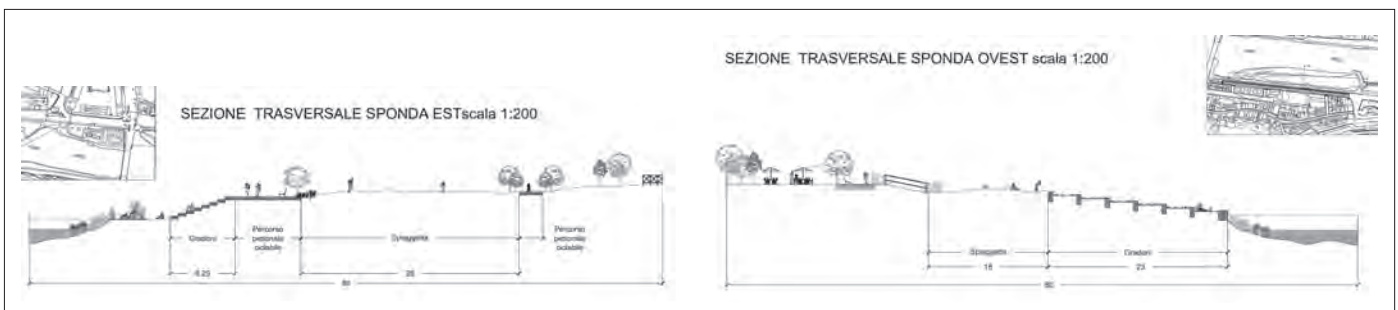
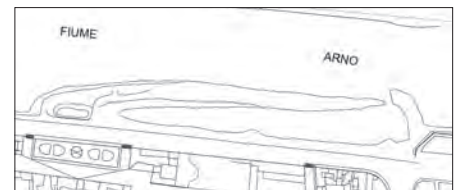
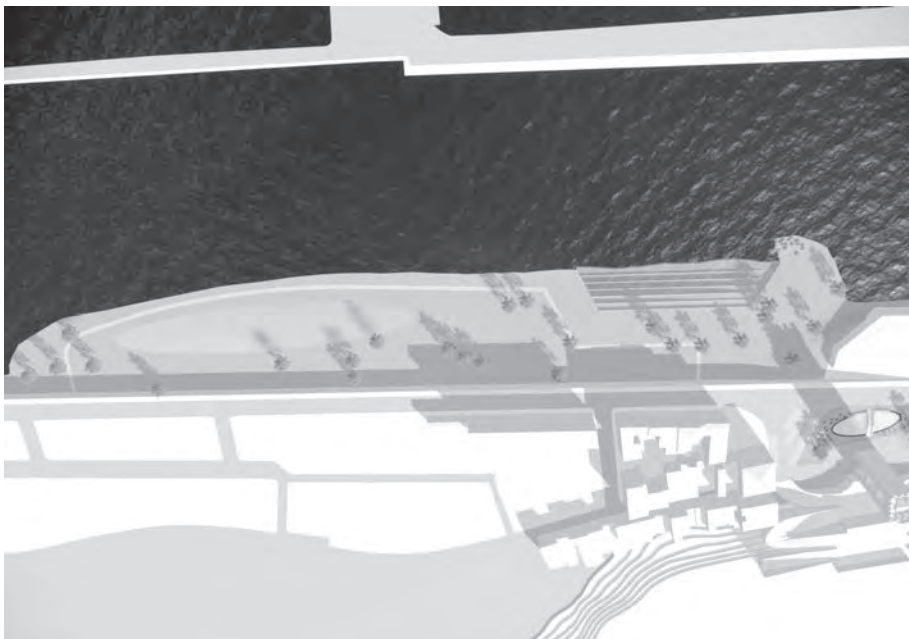
Chapter 4 – *Urban Integration and Reuse of Old Tobacco Warehouses in Greece. Use of Blockchain Technology and Environmental Policies for an Enriched Urban Resilience* by Dimitris Polychronopoulos and Maria Grigoriadou discusses on how the World Heritage Committee recognized that climate change has become one of the most significant threats to World Heritage to the conservation of many cultural sites. On November 2021 its policy document on the impacts of climate change on World Heritage properties has been updated such as: "Improving cultural heritage resilience to climate change will involve a strategic shift towards investment in new forms of safeguarding and restoration." In this framework, the aim of this chapter is to analyze a recent research program concerning on the regeneration and integration of architectural heritage of tobacco warehouses in contemporary urban environment of three different cities of Northern Greece by using of blockchain technology. The chosen buildings – one for each city – are obviously abandoned and without any use. The proposed interventions included the recording and analysis of the historical, structural, ownership, institutional characteristics of the three tobacco warehouses and their surrounding area; The planning of their utilization as buildings; The investigation of their potential functionality by determining land uses in the wider area which will also

determine the variety of options for the uses of the specific buildings. The main purpose of the research was to upgrade the case studies buildings and their dynamic integration into the social and economic life of cities, as well as to regenerate the surrounding space, in accordance with principles of sustainability, urban resilience, and smart city approach.

Chapter 5 - *Restitching Post-industrial Sugar Heritage for Sustainable Communities: A Pedagogical Approach* by Gabriela Campagnol and Awilda Rodriguez Carrion. The chapter describes condition from the early plantations through the mid-twentieth century company towns, sugar production exerted a substantial influence on land use and settlements. As the first and most important economic activity established in Brazil by Portuguese colonists, sugarcane played a critical role in the socio-economic development of Puerto Rico and was the reason for the urbanization of south Texas, in Sugar Land. These agro-industrial communities, which built up around the processing plant, often in areas now vulnerable to climate change, expanded considerably in the Americas throughout the late nineteenth to the mid-twentieth century. Many of these post-industrial structures contributed to the urban history and, such as in Puerto Rico, reflect the political and economic relationships between the United States and one of its most important Caribbean possessions. Due to a lack of preservation measures, governmental failures, economic crisis, and natural forces, important industrial buildings, and many of the surrounding structures, such as the

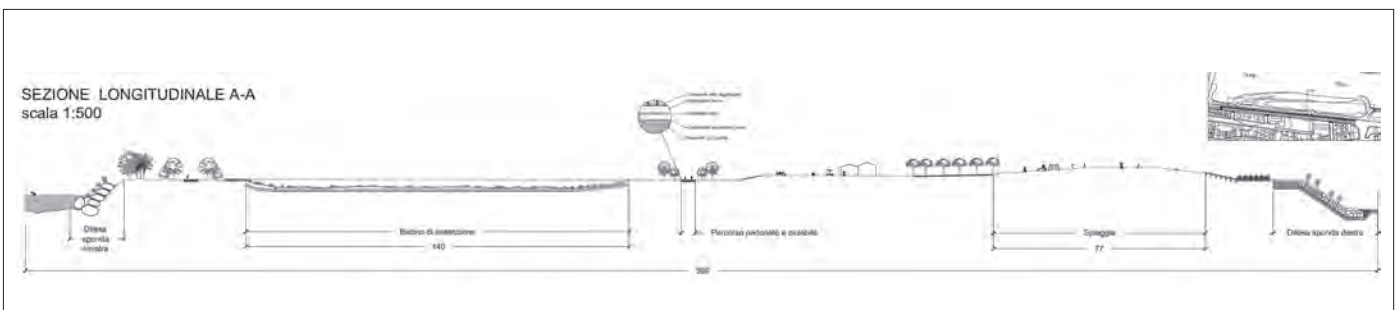
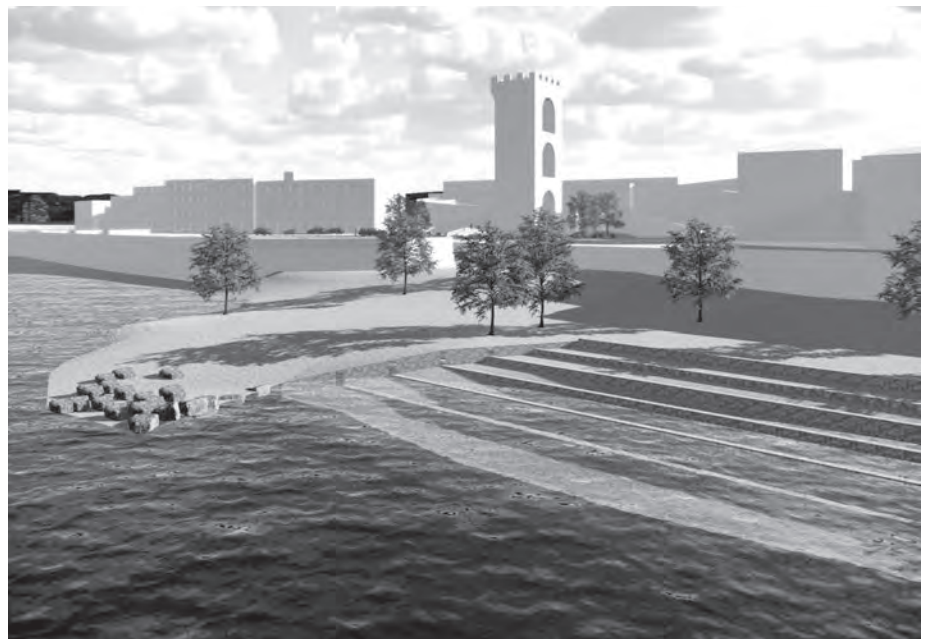
"Florence UNESCO Area/ Arno Riverfronts"
Proposal for a green-blue intervention along the Arno Rivefront "Serristori" - "Terzo Giardino" with flood barriers and bioswales for an effective flood management to respond to urban risks and climate change.

FLORENCE UNESCO AREA



administrators' homes, workers' housing, hospital, theatre, and hotel, continue to degrade. Extreme weather events, such as Hurricane Maria (2017) and the earthquakes of 2020 in Puerto Rico, have contributed further to the deterioration of this neglected terrain. The conservation of the cultural landscape is no longer limited to the preservation of buildings and structures, but inclusive of its surrounding environment. Departing from sugarcane heritage areas vulnerable to climate change, this chapter examines a pedagogical approach to advocate for preserving historic buildings and their contextual locations to promote cultural heritage as an indispensable component of livable, sustainable communities. A comparative study attempts to reveal common models and to distinguish specific characteristics of each location, looking at issues related to sustainable regeneration in post-pandemic times, and using this as a way to empower students to develop common narratives that build common understanding of architecture and place. There are places such as the company town of Central Aguirre-Puerto Rico where losing its main iconic structure may substantially affect the urban character of the town, both physically and emotionally. This contribution examines a pedagogical approach for students to develop a moral compass and a decision-making path to navigate these situations, to reflect on the consequences of the disappearance of industrial buildings in general, and on the role played by architects and planners in defining the contribution of industrial heritage to contemporary (and future) urban identity.

FLORENCE UNESCO AREA





Fixing Urban Risks in Sensitive Historic Environment

Dimitra Babalis

Recent emergencies in historic environment such as climate change and Covid-19 crisis have generated new principles and tools for long-lasting urban quality improvement. Accordingly, core urban spaces can play a vital role as identity spaces that need to be preserved and re-designed under new ecological, sustainable, cultural, and historic criteria. In turn, urban spaces need to be of high-quality by making 'big and little streets' more attractive; By promoting Green Infrastructure (GI) in inner and outer city areas and along urban waterfronts; By making use of under-used small public open spaces; By making urban parks, historic gardens and courtyards more attractive. Measures to promote air quality, reduce urban traffic, create sustainable and resilient cycle and pedestrian paths can help people to re-gain public open space image, value, identity, and safety. But urban changes and urban risks can be challenging for an advanced open space planning and design.

However, historic environment of great beauty and value can satisfy the UNESCO recommendations and UN targets by implementing distinctive strategies for preservation, urban safety, climate protection, health and well-being. However, core spaces need to be designed to integrate green and blue infrastructures and the daily lives of local communities, while evaluating resilience strategies. So, resilience design allows sensitive historic environment to support city-structuring of green and open spaces with walking routes and cycleways to cover

significant energy consumption and greenhouse gas emissions. For instance, sustainable urban mobility can also take place for human activity by adopting a good network strategy and connections for 'active travel' (walking and cycling).

This chapter aims to show quality improvement of site transformation as a defined 'Heritage Open Space in Transformation', (HOST)¹ and to develop comprehensive urban design frameworks and masterplans shaped by critical resilience-based strategies within the Florence UNESCO Area. Particularly, to obtain a higher degree of space equity and place value a better city-connectivity must be proposed through a network of walkable and cycle routes, green streets, and green open spaces. Dynamic and sensitive approaches must be adopted to transform and revitalize open spaces towards strengthening small spaces, green streets.

Particularly, one of the principal goals of historic cities policy is for a greener urban environment that will help improve urban quality, health, and well-being, reduce urban heat impacts, and bring nature into the city. Consequently, the green living must focus on providing easy people's access to quality green spaces to address climate and health challenges. However, it is important to develop urban greening to meet commitments such as urban ecology strategic action plan, urban forest strategy, streetscaping increasing Trees Canopy Cover, (TCC) and so on.

¹ ATE Research *Heritage Open Space in Transformation, (HOST)*, University of Florence, Year: 2017, Coordinator: DIMITRA BABALIS.

To this end, investing in GI offers the opportunity to enhance the existing infrastructure and protect the environment. At the same time, green technologies can revitalize urban core areas and local neighbourhoods to meet stormwater management objectives, including reduction in runoff volume, peak flow rate reduction, water quality protection. Lastly, the following GI benefits are included:

- Enhancing public open spaces: Green areas/ open spaces and streets networks can be linked;
- Creating liveable places: A better environment/ landscape can be created for residents, improving safety and protection from urban risks, improving air quality;
- Improving urban image and connectivity: Good urban design and management of streets and spaces can be reached;
- Integrating policies, strategies and actions: Policy objectives and project delivery can be integrated in strategic planning process and water management.

In a historic environment delivering sustainable and healthy places which allow natural systems can ensure more intimate spaces that everyone can benefit from the value that contact with nature brings. This provides the opportunity to create dynamic and resilient ecosystems that must also be controlled by a good City Action Plan. In short, the following GI practices are included Sustainable Drainage Systems (SuDS) and different solutions such as:

- Pervious Pavement/ Permeable Pavement;
- Rain Garden/ Bioretention Basin/ Pocket Wetlands;
- Planter Box/ Planter Trees;
- Extended Tree Pits/ Tree Trench/ Street Trees;
- Storm Water Basin/ Rain Barrels/Cisterns;
- Water Square/ Water Basins;
- Green Roof/ Vegetated Roofs;
- Green Track/ Soil Amendments (BABALIS, 2021).

The Florence UNESCO Area and its urban risks

Since 1982 the Florence City Centre has been recognised as an UNESCO site due to its valuable built heritage and history. Despite, its unique beauty, urban character, and value, at the current, the City Centre has a lack in public green space apart of its valuable historic small parks, gardens, and inner green courtyards. Recently, the Florence UNESCO Area has been seriously at risk for the climate change effects, over

tourism consequences and Covid-19 emergency.

The latest adopted Florence UNESCO Management Plan¹³ is proposed as an ambitious and flexible plan to reimagine the Florence City Centre and Florence wide *Buffer Zone*. The Plan is proposing to preserve the stated by UNESCO 'Historic Urban Landscape'¹⁴ (HUL), that will offer sustainable management for a new active and more resilient City Centre. In detail, the Plan is focused in the following five strategic Goals: (1) Governance, institutional and international relationships, and urban democracy; (2) Conservation and understanding of Urban Heritage; (3) Viability, commerce and living in the City Centre; (4) Management of the tourism system; (5) Developing common goals for climate change and environment to protect Urban Heritage of 'Outstanding Heritage Value' as is stated by the UNESCO Convention in 1997; (6) Management for Sustainable Mobility in accordance with the principles of the EU Sustainable Urban Mobility, (SUM)¹⁵.

It has been mainly centred on urban heritage protection including urban change at cultural, socio-economic and spatial level. Nevertheless, Goal 5 and Goal 6 are increasingly promoting actions to provide a variety of future sustainability and resilience benefits. To deliver a more climate resilience City Centre, urban greening must become central to urban planning and design. Additionally, the recent adopted *Structural City Plan* and *City Action Plan* (FLORENCE CITY COUNCIL, 2023) have put in their vision more resilient strategies and actions for protection of the built environment and more sustainability items within the City Centre.

Research activities at the University of Florence have also taken under consideration the city's new adopted planning system and the new UNESCO Management Plan verified the application of adaptation methods and analysis in selected HOSTs/POSItS sites within the historic City. Previously mentioned research activities and findings have embodied significant statements and methodologies to be adopted along the selection and the proposed design of key spaces to be transformed. Specifically, research objectives on Urban Greening¹⁶ already started to deal with key site opportunities to change from being increased greening and climate resilience; From being car dominated to more car-free with pedestrian streets and with both permanent and temporary cycle lanes. The design can be low impact in its planting trees approach bringing a

¹³ FLORENCE UNESCO OFFICE/ CITY COUNCIL OF FLORENCE, (2023), *The UNESCO Management Plan*, Florence.

¹⁴ UNESCO, (2011), '*Historic Urban Landscape*', (HUL).

¹⁵ *Ibid.*, endnote 13.

¹⁶ ATE Research, *Urban Greening to Mitigate Climate Change in the Transforming City*, Year: 2023, University of Florence, Coordinator: DIMITRA BABALIS.

quality experience to the streets and little streets to help people enjoy the historic environment. A network of nature-based solutions can bring a unique City Centre experience that will help air quality, provide attenuation from stormwater, increase biodiversity, and offer a physical connection to nature.

Methodology and design approach

According to the '2030 AGENDA for Sustainable Development' identified actions have been encouraged that promote synergies among them and make Cities and Human Settlements Inclusive, Safe, Resilient and Sustainable (SDG13); Stabilize and adapt to climate change (SDG13); Promote Good Health and Well-being (SDG 3). Based on the above and on the emerging urban resiliency theories, nature-based solutions to mitigate and adapt climate change and ensure health and well-being are proposed for the Florence UNESCO Area. Specifically, a HOST/POSiT placemaking framework has become central to resilient urban design with the emphasis on local people daily activities to celebrate both urban heritage and site potentiality. The proposals will aim to transform an urban public space into attractive, vibrant public spaces. The design concept provides green routes and sustainable mobility along the core areas and a more direct connection with the riverfront. More water activities can also take place to allow locals and visitors to fully experience on the riverfront.

The design approach developed on the following tracks includes:

- Appropriate analyses of the UNESCO Area are performed to identify critical points to determine the GI;
- Research study to document communities that effectively are implemented GI programs including the use of GI techniques;
- Selection of potential contexts and sites for possible GI implementation;
- Projects are prioritized and conceptual designs are developed for several focus HOSTs/POSiTs and proposed projects.

The Greening Strategy

To achieve a green, connected, and healthy City Centre the following strategic approach must be pursued:

- Creating a climate resilient core city by deploying urban greening/ nature-based solutions to ensure the benefits of ecosystem services;
- Providing a network of urban green spaces and a good quality of life for people;

- Providing opportunities for people to encourage active travel while protecting the environment.

In detail, the valuable Florence UNESCO Area and its priority themes for sustainable change and protection requires an advancing quality improvement of valuable urban spaces to obtain a higher degree of space equity. In this respect, it is important to develop a proactive GI Strategy to protect and enhance core area's vulnerability.

As part of the GI approach the Florence UNESCO Area will seek more green areas, healthy placemaking to face climate change, provide effective flood management and encourage active travel.

The proposed *Greening Strategy* can reveal on how core urban spaces can be managed to reflect selected sites' character/distinctiveness and respond to current urban pressures and risks. Particularly, the following landscape-first approach is proposed to combine placemaking and resilient greening to promote ecological and social value¹⁷:

- Greening for all it is vital to distribute to the Florence UNESCO Area quality so that everyone can share benefits;
- Distribute greening equitably to provide on physical and mental health;
- Provide good accessibility to quality green spaces to accommodate a diversity of uses to meet people's and tourism needs;
- Develop a design code for parks and green areas for robust and sustainable, and well-maintained HOSTs/POSiTs;
- Adapt for climate change by providing healthy landscapes for future generations and provide historic garden network;
- Access to Riverfront Urban Space for mental and physical health and well-being that increasingly look at opportunities for increased urban farming, Considering riverfront as a natural resource for biodiversity;
- Create good urban spaces and little streets to facing most of the city's high urban heat and impacts;
- Increase easy streets to improve walkability and liveability of core areas through tree planting, shading and using water in the landscape;
- Create places with green areas and water landscaping that helps to restore and invigorate urban environment;
- Create pocket parks with sustainable drainage systems to face and protect from local emergency needs and risks such as extreme and urban heat, storms, and flooding¹⁸ (BABALIS, 2023b).

¹⁷ A great inspiration to formulate the proposed Strategy for the Florence UNESCO Area was taken by the *Greening Sydney Strategy* (2021) updated (2023), The City of Sydney.

¹⁸ The 'Greening Strategy' for the Florence UNESCO Area have been formulated by DIMITRA BABALIS in the framework of the ATE Research *Urban Greening to Mitigate Climate Change in the Transforming City*, cited in endnote 16.

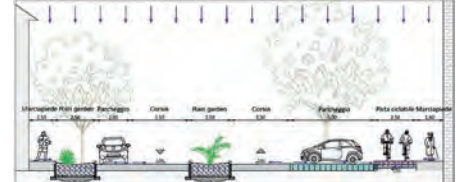
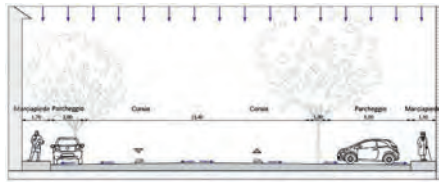
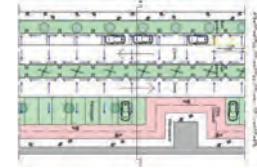
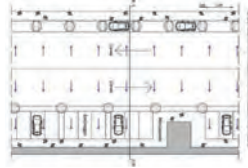
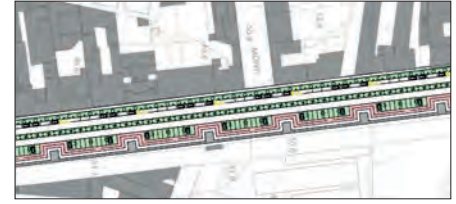
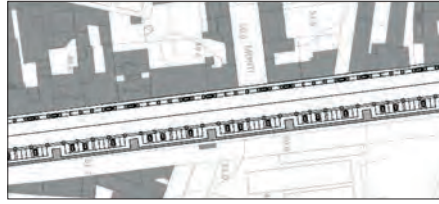
FLORENCE GREEN ROADS

“VIALE PETRARCA”

GREEN ROADS

In an existing urban environment of great heritage value, Green Road Intervention is often proposed as a retrofit in a location with existing improvements including sidewalks that must be repaired where new construction meets the existing sidewalks. A new trees plantation may have different facility configurations that provide opportunities to preserve existing street trees and maximize opportunities for new street trees in accordance with the site characteristics and street classification.

*“Viale Petrarca”
Proposed rain gardens/ Permeable pavement in parking lanes.*



FLORENCE GREEN ROADS

“VIALE DELLA GIOVINE ITALIA - AMENDOLA”

*“Viale della Giovine Italia – Amendola”
Proposed rain gardens/ Permeable pavement in parking lanes.*



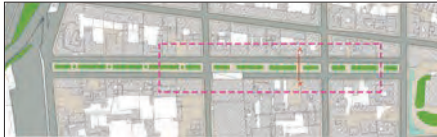
“VIA SOLFERINO”

FLORENCE GREEN STREETS



GREEN STREETS

Proposed Green Streets can have significant benefits for heritage buildings and sites and offer opportunities for other, Urban Green Infrastructures (UGI) in addition to stormwater management. Street Trees and plants can help address specific heritage conservation challenges providing shade which reduces Urban Heat Island effect and help conserve energy, capture air pollutants, improve aesthetics, and recover human health.

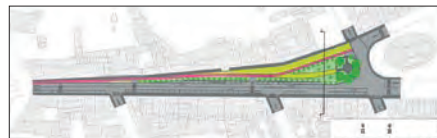
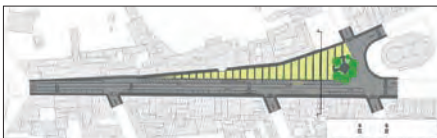


“Via Solferino”:
Proposed Bioswales and rain gardens.

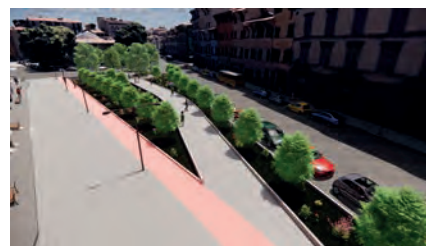
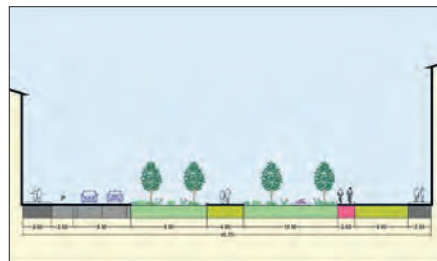
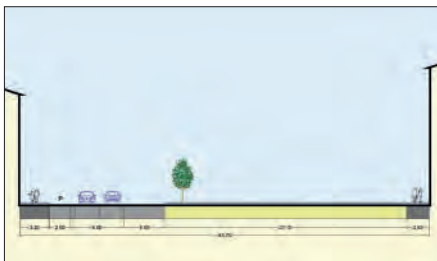


“VIA IL PRATO”

FLORENCE GREEN STREETS



“Via il Prato”
Proposed Tree pits/ Green Features.



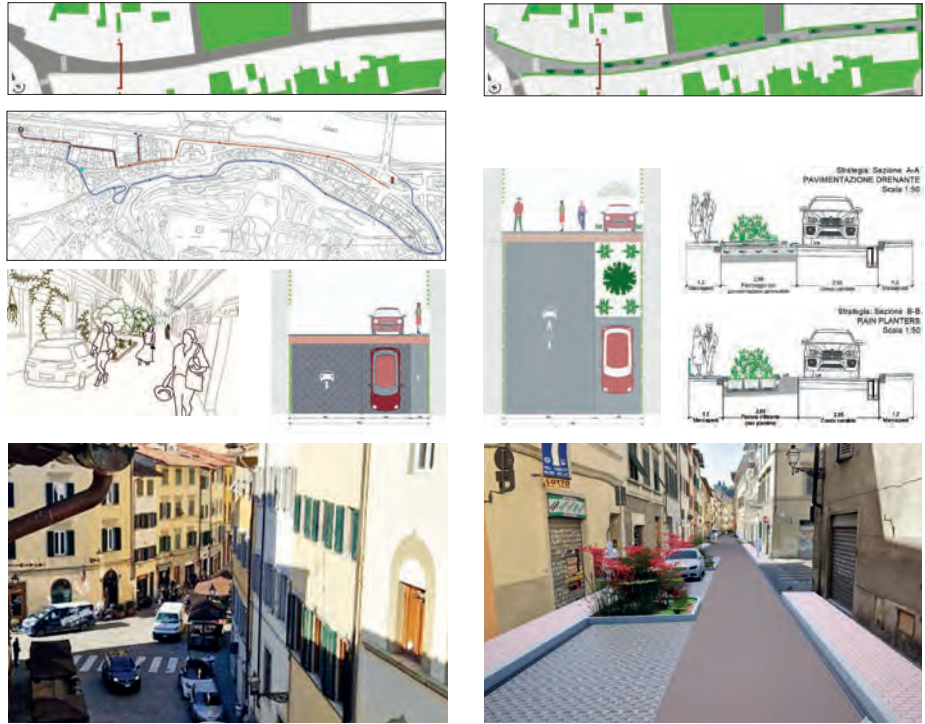
FLORENCE GREEN LITTLE STREETS

"VIA DI SAN NICCOLÒ"

GREEN LITTLE STREETS

The proposed stormwater systems within Florence UNESCO Area vary by location. The presence of drainage ways such as rain gardens, filter strips on little streets site may restrict where nature-based facilities can be placed, create visual screens and provide heritage value. Nature is seen as a threat to cultural heritage.

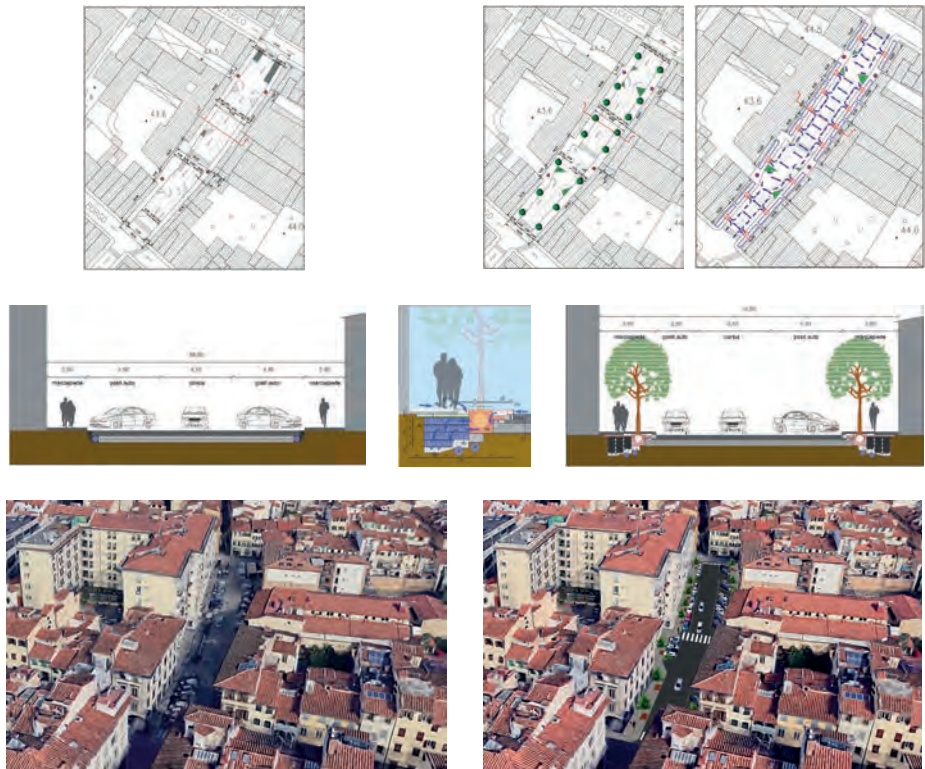
"Via di San Niccolò"
Proposed Planter boxes/ Permeable pavement.



FLORENCE GREEN LITTLE STREETS

"VIA MASO FINIGUERRA"

"Via Maso Finiguerra"
Proposed Rain Garden/Tree pits.



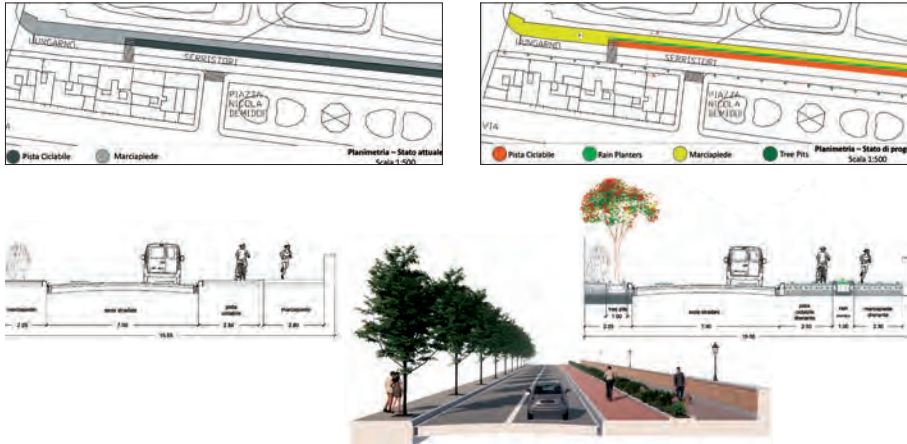
"LUNGARNO SERRISTORI"

FLORENCE GREEN RIVERFRONTS

GREEN RIVERFRONTS

Along the Florence Riverfronts, the interface between stormwater facilities and pedestrian and cycle areas require good design consideration. New or upgraded landscaped areas as vegetated facilities to manage impervious area runoff where feasible are very much considerable to create connectivity, windbreaks, improve health and well-being. They help to reduce risk of water-related damage to heritage assets and sites, e.g. flooding and water ingress to historic buildings.

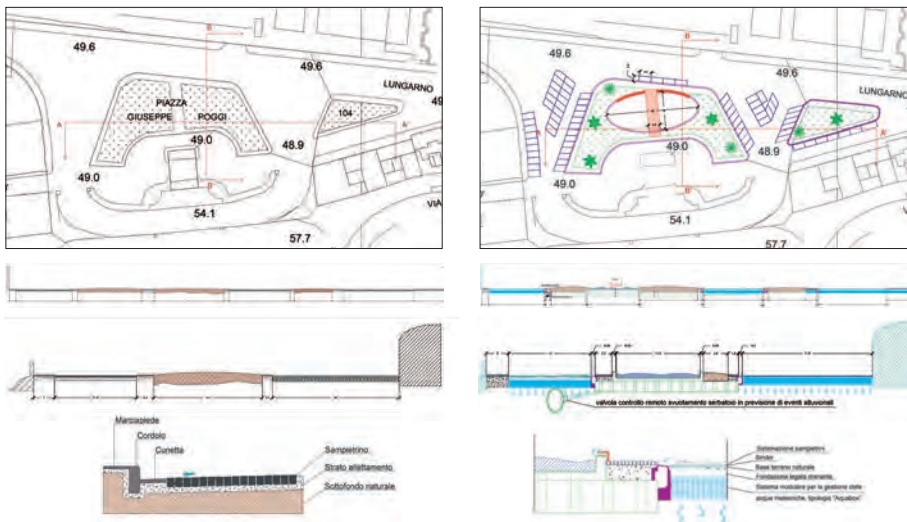
"Lungarno Serristori"
Proposed Tree-pits and permeable cycle and pedestrian path



"LUNGARNO SERRISTORI - PIAZZA POGGI"

FLORENCE GREEN RIVERFRONTS

"Lungarno Serristori - Piazza Poggi"
Proposed new upgrades landscaped areas with a water square to manage impervious area runoff where feasible.

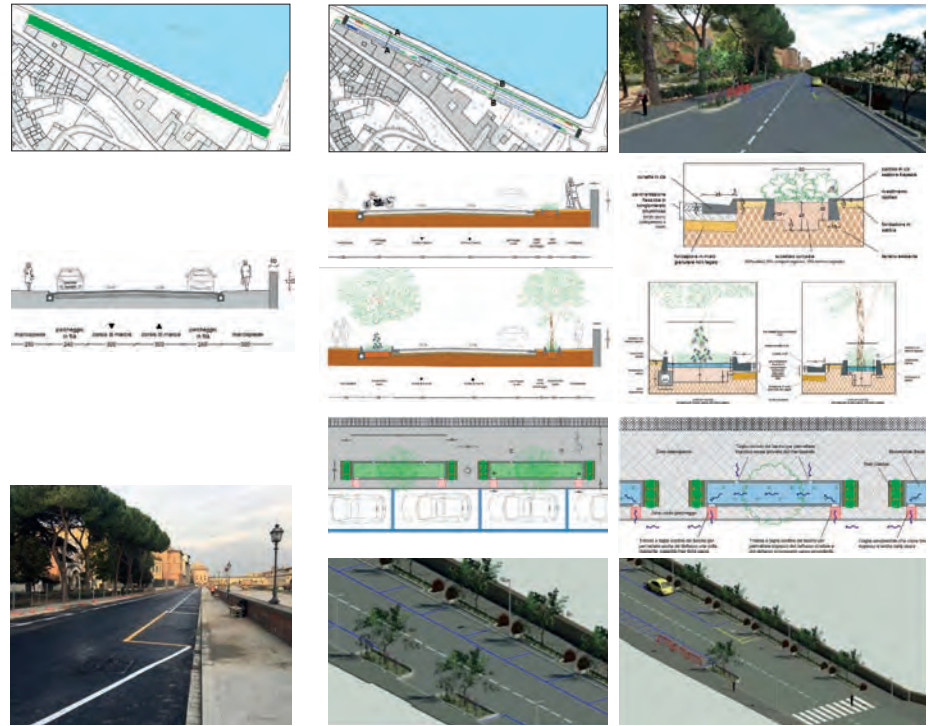


FLORENCE GREEN RIVERFRONTS

“LUNGARNO TORRIGIANI”

“Lungarno Torrigiani”

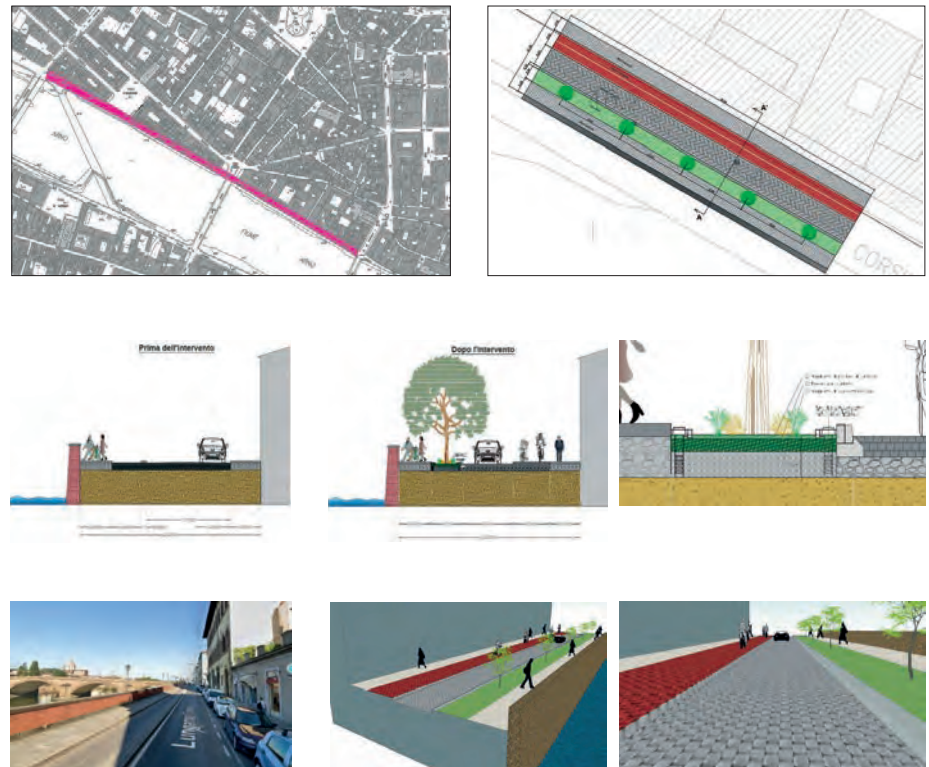
Project proposal with new drainage areas to a stormwater receiving and the creation of rain gardens and bioretention basins, including facilities setbacks. Renderings and technical sections.



FLORENCE GREEN RIVERFRONTS

“LUNGARNO VESPUCCI” AND “LUNGARNO CORSINI”

*“Lungarno Vespucci” and “Lungarno Corsini”
Proposed permeable pavement and drainage cycle path.*





Green Fragments. Urban Courtyards Contribution to the Green Infrastructure of Historic Centres

Maria Stella Lux
Julia Nerantzia Tzortzi

Considering the fragility of cities in the face of extreme weather events and Climate Change, one of the key issues in recent decades has been the adaptation of urban structures to achieve improved resilience. The integration of Green Infrastructures (GI) into the built environment plays a key role in this process as natural components are able to provide a more flexible and integrated answer to many stresses affecting urban areas. However, existing GI strategies are mostly based on large-scale interventions which have major limitations when interfacing with the compactness and the scarcity of transformable public space of historic centres. Focusing on the case study of Milano and its historic centre, this contribution aims at demonstrating the potential of inner urban courtyards to the densification, strengthening and integration of the existing green network.

Overview

At a global scale, we are currently facing a period of increased uncertainty, largely driven by human impact on environmental conditions and the ongoing process of urbanization. Urban research and strategic planning have become essential in preparing human society for these challenges, with cities at the forefront of these studies. Cities are at the very centre of these studies and experiments for several reasons. Urban areas are where the majority of the world's population resides, with

projections suggesting that by 2050, 68% of the global population will live in urban areas. (UNITED NATIONS, 2018) Urban environments are particularly vulnerable due to the concentration of activities and assets (IPCC, 2023). Moreover, the fragility of urban systems is increased due to the high level of anthropisation that has caused a total break with the rest of the biosphere. (ANDERSSON ET AL., 2014; DODMAN, 2022)

The balance between natural and anthropic elements and processes is at the heart of any discourse on urban resilience and preparedness for Climate Change and uncertainty scenarios. Therefore, his research focuses on the reintegration of GI in urban environments, particularly in dense historic urban cores¹.

Indeed, historic urban cores are even more fragile contexts from cultural, social, and environmental perspective. (CASSAR, 2005; SABBIONI ET AL., 2006; SESANA ET AL., 2021) They house a significant portion of tangible and intangible cultural heritage, thus increasing the exposed value. However, due to urban expansion and densification, historic cores often lack green spaces, making them more susceptible to the adverse effects of urbanization and climate change.

Urban Green Infrastructures

The impact of anthropogenic activities has been now recognised by the scientific community among the primary causes of the intensification and acceleration of Climate

¹ The research study entitled *Re-integrating private spaces within the Urban Green Infrastructure. A culture-based approach to improve historical district resilience towards Climate Change* has been carried out by PhD candidate MARIA STELLA LUX since November 2020, under the supervision of Prof. JULIA NERANTZIA TZORTZI. It has been supported by Politecnico di Milano and the H2020-MSCA-RISE 'YADES' project (GA No 872931) and has been developed at the Department of Architecture, Built environment and Construction Engineering (DABC).

Milan – Biblioteca degli Alberi park and Bosco Verticale building: different components of the Urban Green Infrastructure ranging between the landscape and building scales (image by M.S. Lux).

Change and its effects. Thus, two primary strategies, adaptation and mitigation, have been defined over the past decades to deal effectively with this changing scenario and to improve the overall resilience of urban environments (TURNER & SINGER, 2014). Considering urban resilience as *the measurable ability of any urban system, with its inhabitants, to maintain continuity through all shocks and stresses, while positively adapting and transforming toward sustainability* (UNHABITAT, 2018, p. 19), both lines of action are necessary as they play complementary roles. Indeed, the former mostly aims at reducing climate-altering emissions in the medium-long term and the latter is focused on the transformation of existing settlements in order to cope with the actual or expected climatic stimuli (UNISDR, 2009), generally on a smaller scale and in shorter time frame. The integration of GI into urban areas has gained prominence as a key component of urban adaptation strategies. (FRANTZESKAKI, 2019) Indeed, highly urbanized environments have demonstrated limitations in responding to rapidly changing conditions, while green spaces offer various benefits, including microclimate regulation and reduced water runoff. (GILL ET AL., 2007)

The concept of GI firstly emerged in the 1990s and has been increasingly discussed over the past two decades. The GI approach takes advantage of previous theoretical and practical experiences of urban planning and integration of green areas in urban environment, such as the Garden City model proposed by Howard since the end of the XIX century. (G. ROWE & HEE, 2019) The novelty lies in the infrastructural design of urban greenery, which, like other urban infrastructures, must be designed to meet given parameters. Moreover, the scientific grounding of the approach definitely overcomes the aesthetic-decorative conception of urban greenery defined by nineteenth-century urban planning. Building on the outcomes of the Natura 2000 project, the definition commonly adopted at the European level describes the GI as *a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services*. (EUROPEAN COMMISSION, 2013) The main purpose of this approach is to create a multifunctional networks of green spaces in order to enhance the systemic behaviour of natural components and to provide multiple benefits. GI is recognized for its ability to deliver environmental, social, and economic ben-

efits that artificial solutions alone cannot achieve (PETSINARIS, 2020), a fact further highlighted by the COVID-19 pandemic's impact on green spaces perception. The pandemic crisis has significantly contributed to make even a non-expert public aware of the urgency of a radical transformation, paving the way for participative co-design processes of urban greening solutions. Therefore, the reintegration of GI into urban system is not only effective but also essential for sustainability and urban resilience. (RAMYAR & ZARGHAMI, 2017; PAULEIT ET AL., 2017) This approach is supported and promoted by EU policies for both rural and urban areas (BOUWMA ET AL., 2018)

Types and scales of Urban Green Infrastructures

As above mentioned, the design of Urban Green Infrastructures (UGI) should follow specific criteria to maximize its benefits. The guiding principles are susceptible of slight variations according to the reference source, however the categorization provided by DAVIES (2015) and refined by PAULEIT (2017) can be considered as exhaustive. They provided a set of four principles about the content of UGI and three additional principles for the planning process. Content-related principles include:

- **Connectivity:** to create added value by interlinking green spaces functionally and physically to improve connectivity;
- **Multifunctionality:** as urban green space, re able to provide ecological, socio-cultural, and economic benefits simultaneously;
- **Green-Gray Integration:** as part of the general urban infrastructural system, the integration and coordination of green and gray infrastructures in terms of physical and functional relationships should be promoted;
- **Multi-scale:** as the UGI can be applied at different spatial levels, from city-regions to local projects.

Additionally the UGI planning process should be:

- **Strategic:** as it refers to a long-term vision and should be supplemented by flexible actions and means for implementation. ;
- **Inter and Transdisciplinary:** as the implementation of UGI necessarily requires the convergency of science, policy, and practice.
- **Socially inclusive:** emphasizing collaborative and participatory processes that involve diverse stakeholders and consider their different perspectives and needs.



Milan – courtyards (images by M.S. Lux).

Conceptual spatial distribution of the green infrastructure in urban environments (drawing by M.S. Lux based on DELGADO-CAPEL & CARIÑANOS, 2020).

Identification of the existing and planned green infrastructure components in the city of Milan, Italy (drawing by M.S. Lux based on DUSAF6 and PGT 'Milano 2030').



LEGEND

- Milan municipality
- Historic urban core
- PATCH - core
- PATCH - node
- PATCH - other
- PATCH (planned)
- LINK
- LINK (planned)



Urban Integration and Reuse of Old Tobacco Warehouses in Greece. Use of Blockchain Technology and Environmental Policies for an Enriched Urban Resilience

Dimitris Polychronopoulos
Maria Grigoriadou

The World Heritage Committee recognized that climate change has become one of the most significant threats to World Heritage sites. That's why it's currently updating on November 2021 its policy document on the impacts of climate change on World Heritage properties¹.

"Improving cultural heritage resilience to climate change will involve a strategic shift towards investment in new forms of safeguarding and restoration"².

Within framework, the aim is to analyze a recent research program, concerning on the regeneration and integration of architectural heritage of tobacco warehouses in contemporary urban environment of three different cities of Northern Greece by using blockchain technology. The chosen buildings – one for each city – are obviously without any use and abandoned. The interventions included the recording and analysis of the historical, structural, ownership, institutional etc. characteristics of the three tobacco warehouses and their surrounding area, the planning of their utilization as buildings, and the investigation of their potential functionality by determining land uses in the wider area – which will also determine the variety of options for the uses of the specific buildings. The main purpose of the research was to upgrade the case studies buildings and their dynamic integration into the social and economic life of cities, as well as to regenerate the surrounding space, in accordance with principles of sustainability, urban resilience, and the "smart city".

Overview

It is true that architectural heritage buildings without any use is an important issue in urban centres, due to the many risks to the safety and health of citizens. At the same time these buildings, which are many nowadays, obviously degrade the natural and urban environment. This main issue is a big problem in many cities, all over the world, throughout Europe and the USA.

However, apart from their negative side, under certain circumstances, abandoned buildings, if they could be activated, could serve as receptors for urban development and regeneration. By offering a series of opportunities and strategic approaches for the cities for growth and urban innovation, these buildings could produce a useful guide³. So, it is a fact that it is more climate friendly to maintain these buildings, to repair, reuse and retrofit them than to demolish and build new⁴.

"Heritage buildings that have lost their original function still have cultural, historic, spatial and economic values. Adaptive re-use aims to preserve those elements of the buildings that contain such values, while at the same time adapting the place for new uses"⁵. From the other hand, the World Heritage Committee recognized that climate change has become one of the most significant threats to World Heritage to the conservation of many cultural sites. That's why it's currently updating on November 2021 its policy document on the impacts of climate change on World Heritage properties⁶.

¹ <https://whc.unesco.org/archive/2021/whc21-23GA-inf11-en.pdf>.

² EUROPEAN COMMISSION, *Protect cultural heritage from the impact of climate change, Ten recommendations on how to better protect cultural heritage from the impact of climate change*, 7 September 2022, Brussels https://ec.europa.eu/commission/presscorner/detail/en/IP_22_5353.

³ GOSPODINI A., (2012). *Economic Crisis and the Shrinking Greek Cities*, Proceedings of the 3rd Panhellenic Conference of DPRD, University of Thessaly, 27-30 September, Volos, Greece.

⁴ *Strengthening cultural heritage resilience for climate change*, Executive summary of the report of the EU open method of coordination (OMC) expert group of member states – April 2022, p.3

⁵ LEEUWARDEN DECLARATION, *Adaptive re-use of the built heritage preserving and enhancing the values of our built heritage for future generations*, Adopted on 23 November 2018 in Leeuwarden.

⁶ <https://whc.unesco.org/archive/2021/whc21-23GA-inf11-en.pdf>.

“Improving cultural heritage resilience to climate change will involve a strategic shift towards investment in new forms of safeguarding and restoration”⁷. It is true that “climate actions for heritage resilience involve a strategic choice to invest in new forms of development”⁸. The importance of restoring and re-use of any kind of heritage buildings included also in the New European Agenda for Culture, where it has been emphasized that through the smart restoration and adaptive reuse, old buildings could bring economic as well as social dynamism to cities⁹.

Within this framework, the aim is to analyze a recent research program, concerning on the regeneration and integration of architectural heritage of tobacco warehouses in contemporary urban environment of three different cities of Northern Greece by using the blockchain technology¹⁰. From one hand, “the renovation of old buildings has been proven to be more climate friendly than demolition, research and innovation are indispensable drivers of change that can make substantial contributions in the fight against climate change”¹¹. From the other hand, the blockchain technology is a new one technology that its spread is rapid, having applications concerning on land and land rights management, urban governance, and spatial planning. Blockchain technology can help transform part of urban governance in a way that offers, among other things, transparency, security and privacy protection, allowing for increased and equal participation. In this research project, blockchain technology has one more characteristic. It is adopted as a synthetic component for the intelligent development of the city. An open blockchain protocol is being created for the green financing of real estate use and development activities in the web of smart cities where everyone can participate equally, securely and efficiently¹².

Tobacco warehouses as a cultural heritage

It is worth mentioning that architectural heritage, within the multicultural character of the modern post-industrial society, is becoming more and more attractive, not only for the tourists themselves, but also for the city dwellers, as an important resource in the new cultural and leisure economies¹³. We must have in mind that “the architectural heritage of cities reflecting differences among cities – and thereby their authenticity – in terms

of history, culture, society and particularly in terms of urban space morphology, constitutes a counterstructure to globalized design trends promoted by international architectural and urban design movements”¹⁴. We must have also in mind the principles of the “Venice Charter” where: “The concept of an historic monument embraces not only the single architectural work, but also the urban or rural setting in which is found the evidence of a particular civilization, a significant development or a historic event”¹⁵. Tobacco warehouses are a typical example of such heritage in Greece, especially in northern Greece, one of the largest centres of tobacco production and distribution all over the country during 19th century.

If we go back in history, it is worth referring to the growth of tobacco, as the systematic cultivation of tobacco begins before 1821 in eastern Macedonia and Thrace, while from the 19th to the middle of the 20th century, tobacco production and trade constituted the economic and general development basis of Eastern Macedonia and Thrace. The process of use the tobacco commercially was carried out exclusively in the tobacco warehouse complexes, which worked as industrial buildings. Tobacco processing was directly linked to the specific characteristics of the tobacco warehouses, while it was determined the functional and morphological organization of these buildings.

So, tobacco warehouses nowadays work as monuments for a specific period of tobacco growth in Greece. After all, a monument could be anything that can transmit information from our past¹⁶. In this context, a monument is not only a building, but also its surroundings, its equipment, its ancillary spaces, all of which form a unified whole. All these are remnants of the everyday life of the average person of the previous century and therefore have great social value, providing a sense of local identity.

The era of tobacco warehouses in Northern Greece

The process of production, processing and trade of eastern type tobacco leaves had a catalytic effect on the organization of the urban space of the tobacco processing centers of Eastern Macedonia and Thrace. The location of the new industrial buildings of the tobacco warehouses in these cities did not happen by chance, but was related to a series of factors concerning on the storage, processing and transportation of the product¹⁷. From 1899 until 1909 there was a huge increase in tobacco sales.

⁷ EUROPEAN COMMISSION, *Protect cultural heritage from the impact of climate change...*, *op. cit.*

⁸ *Op.cit.*, executive summary of the report of the EU OMC.

⁹ *Built Cultural Heritage, integrating heritage buildings into contemporary society*, Policy Brief for the Policy Learning Platform on Environment and resource efficiency, Interreg Europe, June 2020.

¹⁰ Research Program titled: *Regeneration of areas, reuse of buildings, business plan for the development of tobacco warehouses in Drama, Kavala, Xanthi using Blockchain technology*, 2020-2022. Coordinator the Department of Planning and Regional Development. Participants: Department of Electrical and Computer Engineering of the Polytechnic School of the University of Thessaly, Department of Architectural Engineering, Democritus University of Thrace. Scientific Coordinator: Prof. LALENIS Kostas. Funded by Green Fund, Innovative actions and smart cities 2020. The project has as its main goal the restoration and re-integration of large tobacco warehouses in the urban environment and most importantly, in the local economic community.

¹¹ *Op.cit.*, executive summary of the report of the EU OMC p.5.

¹² Final report of the research program,

¹³ GOSPODINI A., (2001). *Urban Design, Urban Space Morphology, Urban Tourism; An emerging new paradigm concerning their relationship*, in *European Planning Studies*, Vol. 9, No. 7 9(7): 925-935.

¹⁴ *Op.cit.*

¹⁵ *International Charter of the conservation and restoration of monuments and sites*, 11nd International Congress of Architects and Technicians of Historic Monuments, Venice, 25th – 31st May 1964, principle 1.

¹⁶ ΖIVAS D., (1997). *Τα μνημεία και η πόλη*, Αθήνα: Εκδόσεις.

¹⁷ ΣΙΝΑΜΙΔΙΣ Ι., (2022). *Καπιταλιστικές Καβάλας, Δράμας και Ξάνθης: Το ιδιοκτησιακό καθεστώς ως διαχρονικό κοινωνικό φαινόμενο, Τα Κάστρα της Βιομηχανίας, Αποκατάσταση / Επανεξέταση / Αξιοποίηση*, Πανελλήνιο Συνέδριο Αρχιτεκτονικής, ΤΕΕ, Τμήμα Κεντρικής Μακεδονίας, Θεσσαλονίκη, εκδόσεις Ιανός, Πρακτικά Συνεδρίου, ISBN:978-618-5846-06-6.



building. It is used as a bioclimatic space, as it permits light and air to enter the whole building. Finally, it is a space for disabled access, as in it an elevator is proposed. In general, with this intervention, the interior of the building is upgraded and at the same time interesting spatial units and communications are created.

On the ground floor there is the main entrance of the building with a reception area and a number of office spaces for staff, placed around the openings for natural light. The main structural system of the building (masonry walls, timber frame grid etc) restored in order to remind the previous use of the building.

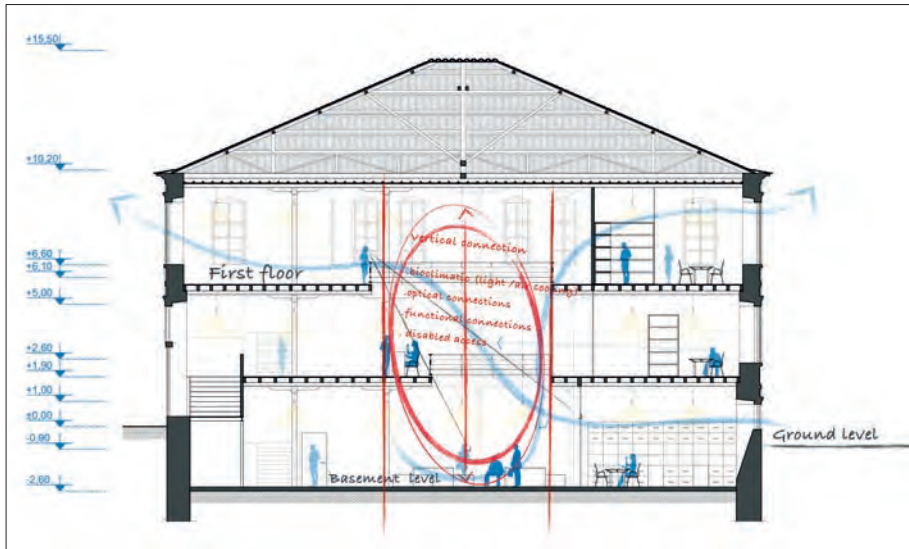
On the first level, new principles are introduced in the design, respecting the use of the space, worked as an open plan space for the tobacco production. Transformable open plan variable spaces are created, in which collaboration between employees is encouraged to process different concepts. Also, on the same level there are individual offices and a meeting room/presentation room.

Finally, the semi-basement space of the building is transformed into a sustainable space, both for work and for employees to relax. Sufficient natural lighting and ventilation of the offices is ensured and a small gym for employees is proposed. In addition, on the same level there is a café preparation area, a separate secure area for the company's files and a climate-controlled area that houses the company's central server and digital security systems.



Discussion

it is evident that the high number of abandoned, without any use warehouses is mostly due to the inability of their owners to renovate them. Either because of lack of money or financial incentives, or because of the very strict regulations imposed for any intervention by the state. However, this research approach described above, has a strong challenge: urban sustainability in the form of reuse of traditional structures and integrate them in contemporary urban life, became a necessary component in city planning in Greece³³. Through blockchain technology this significant cultural and architectural heritage of tobacco warehouses could be maintained, by attracting interest for investing on them.



Basioudi Tobacco warehouse in Xanthi: section and 3d picture showing the atrium inside the building; (below) ground floor plan, proposal (all drawings and proposal by D. Polychronopoulos and M. Grigoriadou).

