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International
Conference on
Urban Planning



ICUP2022

PROCEEDINGS

Serbia, Niš, November 9-10, 2022



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MAKING CITIES MORE RESILIENT THROUGH URBAN DESIGN: CASE OF RECREATIONAL COMPLEX IN “BLOCK 44”, NEW BELGRADE

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ABSTRACT

Throughout history, cities have faced risks but have also demonstrated their resilience to different kinds of disturbances and changes. Today, the scale and the unpredictability of urban risks are increasing due to the complexity of city systems and the uncertainty associated with many hazards, including climate change. The need to make cities more resilient affects how we plan, design, and build our cities. Urban design is a discipline that links architecture, landscape, and urban planning to provide meaningful, safe, functional, and pleasant places for people. As such, it is recognized as an essential tool for adapting cities to climate change and responding to other risks and disturbances.

This paper explores how urban design can be used to improve the recreational quality of abandoned urban spaces while, at the same time, helping to make cities more resilient. The case of a planned but only partially built and abandoned recreational complex in New Belgrade is chosen as a context and a starting point of the study, being an example of the absence of resilience thinking in urban development. The study uses research by design method (in the context of an urban design studio) to identify new urban design models through which links between cultural landscape, urban recreation, and climate change adaptation can be established and analyzed. The results indicate that, although all identified urban design models enable the introduction of measures to adapt to climate change, the level of their contribution varies concerning spatial scales as well as different dimensions of urban resilience.

Keywords: *urban design; resilient cities; climate change; urban recreation; cultural landscape*

1. INTRODUCTION

Contemporary cities face variety of challenges that threat both their built, natural and socio-economic structure and the quality of life of people and other living beings. Growing complexity of the city systems on one side, as well as the uncertainty associated with many natural and man-made hazards on the other, increase the scale and the unpredictability of urban risks (Meerow and Newell, 2019; Živković, 2020).

But, although throughout history cities faced variety of risks, they also demonstrated resilience to disturbances and changes. It has been shown that the capacity to overcome challenges is related not only to cultures and societies but also to how we plan, design, and build our cities (Mumford, 1961). In that sense, urban design has been recognized as an essential tool for adapting cities to climate change and responding to other risks and

disturbances, while at the same time aiming to provide safe, meaningful, functional, and pleasant places for people (Handley & Carter, 2006; Živković & Đorđević 2016)

Therefore, exploring paths towards more resilient cities become one of the main topics in urban planning and design research and practice. The literature review points out to several lines of the research that focus on different issues (Meerow et al. 2016; Pickett et al. 2013; Eraydin and Taşan-Kok, 2013). While one line of the research explores problems of existing urban structures in relation to specific challenges, such as climate change and natural disasters, there have also been attempts to develop models for planning resilient cities (Meerow and Newell, 2019) and designing more resilient urban forms (Lak et al. 2020)

Despite the main research focus, in general, it has been recognised that introducing specific spatial measures to combat challenges is necessary, but not enough. Cities and their components operate not as isolated entities but as systems and therefore “silo thinking” should be replaced by “systems thinking” that recognise importance of links between spaces, times and scales. The debate is still open in relation to why and how to link urban design and systems thinking in order to contribute to urban resilience.

The paper aims to contribute to this debate by exploring different paths to urban resilience through urban design. The research goal is to reveal possible links between urban design process and issues of resilience. It does so based on case study of planning and development of the recreational complex in Block 44 in New Belgrade.

First part of the paper introduces the concept of urban resilience and relates urban design as process and product to issues of urban resilience. In that sense, it provides theoretical framework through which urban resilience is further analysed and discussed in the case study of development of recreational complex in New Belgrade, Serbia.

The second part of the paper first introduces the context, planning and development goals for the researched area. In this way, it set the scene for the case of non-resilient urban project of Aqua Park as well as for further exploration of potential paths to more resilient urban recreational complexes. The research is based on the results from applying the research by design methodological approach in “Ecological urban design” studio at Master of Architecture programme of the University of Belgrade - Faculty of Architecture.

2. CONCEPT OF URBAN RESILIENCE

2.1. Concept of urban resilience

Contemporary cities are more densely populated and more interconnected than ever before. But at the same time they face variety of challenges, where urbanisation, climate change, refugee crises, disease pandemics, are among the most prominent ones. These challenges and risks are unprecedented in scale, scope, and complexity, and place serious pressure on local institutions to adapt (Meerow and Newel 2016). This situation requires new models of governance that mitigate risk and respond to evolving challenges (ARUP, 2014), and requires designing more resilient urban forms (Vaništa Lazarević et al. 2018, Lak et al 2020). It is assumed that *“Business-as-usual models of reactive planning and siloed decision-making will not generate the fundamental strength and flexibility essential for us to thrive in the face of the acute shocks and chronic stresses of the 21st century”* (Resilient cities network, 2022).

In order to help cities to effectively adjust and sustain their key functions, academics and policymakers are recognising the concept of “urban resilience” as an important organizing principle (Meerow and Newel 2019). Urban resilience confronts environmental, socioeconomic, and political uncertainty and risk, and acts as a “boundary object” that have significance and emerging attention across many disciplines (Konstantinos , 2022)

Different conceptualisations of urban resilience exist in academic literature and practice. According to Meerow, Newell, and Stults (2016) *“Urban resilience refers to the ability of an urban system-and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales-to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity.”* Another useful general definition is provided by Urban resilience network (2022) suggesting that *“Urban resilience is the capacity of a city’s systems, businesses, institutions, communities, and individuals to survive, adapt, and grow, no matter what chronic stresses and acute shocks they experience.”*

These definitions illustrate that at the very heart of the concept lays the idea of cities conceptualised as (set of) systems and a necessity of systems thinking in order to built and govern resilient cities. As opposed to silos view, systems thinking is, as defined by Arnold and Wade (2015) *“a set of synergistic analytic skills used to improve the capability of identifying and understanding systems, predicting their behaviours, and devising modifications to them in order to produce desired effects.”* From this perspective, it is assumed that the future can't be predicted, but that *“it can be envisioned and brought lovingly into being”* (Meadows 2007). In that sense, systems can't be controlled, but they can be designed and redesigned.

This means that achieving urban resilience demands that cities look holistically at their capacities and their risks, and that besides introducing only specific measures to combat or adapt to urban challenges, integrating the systems thinking and design thinking may be necessary for development of more resilient urban structures.

2.2. Urban design as a tool for developing resilient cities

Urban design is a process and a product of designing man-made environment by creating connections between people and places, nature and urban fabric, urban movement and urban form (Živković and Nikezić. 2021). It is concerned with settlements of all sizes, including villages and rural settings. Urban design deals with different elements of urban form and operates at different scales. Two broad traditions of urban design- “visual artistic” and “social usage” tradition - recently blended into “making places” approach to urban design that simultaneously refers to urban space as an aesthetic entity and as a behavioural setting. Besides that, contemporary environmental and urban challenges additionally put forward ecological dimensions of urban form, and support flourishing of variety of ecological approaches to urbanism that affirm holistic and systems view on the city (Živković et al. 2019).

During the design process, designers make decisions on how to relate program and form in order to produce spatial interventions that have meanings and values for people and nature. Their actions build upon knowledge base that helps them define the purpose and guide decisions in different phases of the design process. Specific social, cultural, economic and environmental characteristics and relations of the site need to be recognized, so that urban designer can establish a knowledge base and a framework for the design, and make decisions on how to incorporate specific elements into a project (Djukanovic et al. 2021). Urban design connects knowledge to action through a systematic process that is related to specific context. For Palazzo and Stainer (2011) the design process has four key steps: (1) Defining the problem; (2) Developing a rationale for spatial intervention; (3) Summarizing development opportunities and constraints; (4) Conceptualizing and evaluating design options. It is in this context that integrating resilience issues into design process might be explored.

Examining the relationships between urban design and urban resilience is not a new. Anne Whiston Spirn (2014) nicely pointed out that *“Humans’ survival as a species depends upon adapting ourselves and our...settlements in new, life-sustaining ways, shaping contexts that acknowledge connections to air, earth, water, life, and to each other, and that help us feel and understand these connections, landscapes that are functional, sustainable, meaningful, and artful”*. Urban design theory constantly explores and discusses how links between nature and culture are established, supported or endangered through urban planning and design. While some authors focus on the effects of human activities on nature, others point out to our vulnerability and need to overcome the need for absolute control over the urban form, by embracing the inevitability of risks and changes and integrating them into design process and products. For example, in addition to authenticity, hybridity and connectivity, as already recognised principles that support sustainable development, Nan Elin (2006) suggest the principles of vulnerability and porosity as key principles of integral urbanism. These principles are important because they embrace limits of human knowledge, and suggest the need to adapt to changes that can't always be predicted. In that sense, they are directly linked to the concept of resilience.

Recently, several scientific (Lak et al. 2020, Vanista Lazarevic et al.2018, Pickett, et al. 2013) and practical (Resilient cities 2021, ARUP 2014) approaches have been developed linking urban design with resilience. What they have in common is a need for a) applying measures to mitigate or adapt to challenges, b) embrace uncertainties, risks and vulnerabilities, through development of flexible, adaptable, multifunctional and nature-based urban structures, and c) to apply systemic view on the problem as basis for resilience thinking. It is in this context that case studies of developing Recreational complex in Blok 44 in New Belgrade will be further explored and discussed.

3. CASE STUDY: RECREATIONAL COMPLEX IN NEW BELGRADE

3.1. Context for development of the Recreational complex in Block 44, New Belgrade

New Belgrade is a municipality of the City of Belgrade, capital of Serbia. It was built after WW2 (1948 -) in a previously uninhabited, wetland area on the left bank of the Sava. The new municipality was planned, designed and built as socialist modern city. It has all characteristics of the “functional city” model and layout based on concept of super blocks.



Figure 1 – Location of a) New Belgrade, b) Sava Blocks and c) Block 44 in urban structure of Belgrade

Block 44 belongs to Sava Blocks, the area located in parallel to the Sava River that consists of several super blocks (45,44,70 and 70a). The urban plan from 1965 conceptualised Block 44 as the administrative, commercial, cultural and recreational and center of the entire area of Sava Blocks. Besides that, General plan from 1972 opened up the possibility for new public recreational riverfront - SAVA Quay to be developed in the area between Sava superblocks in south-east part of New Belgrade

Until 80', except for "Novi Beograd" health centre, none of the planned facilities were built in Block 44. Following changes in General plan, during 80' and 90's, a commercial zone was formed along Jurija Gagarina Street, with a market (1982) and shopping centre Piramida (1994), bordering the central pedestrian promenade “Lazaro Kardenas” that links all Sava Blocks. The function of the middle area of the Block 44 was converted to collective housing, and a new housing area was built in 1982.

But the area, covering 7 ha, between new housing neighbourhood and Sava Quay, planned as a recreational complex, stood inactive for decades. According to General Plan of Belgrade (1985, 2003, and 2016) it was planned as a regional public multifunctional recreation complex for sport and leisure. Although there were several design competitions and attempts to activate it, it was during the post-socialist transition at the beginning of 21st century that substantial changes of the area occurred.

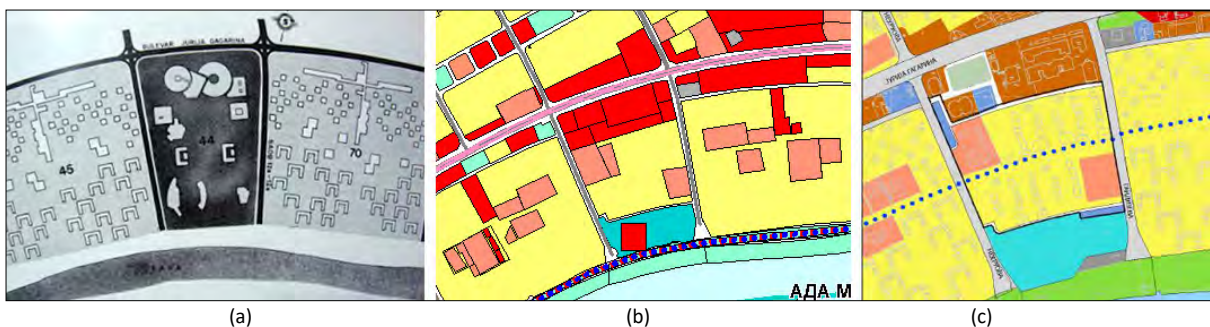


Figure 2 – a) Concept plan for Sava Blocks (1965) and Block 44 in b) Master Plan of Belgrade for 2021, and c) Master Plan of Belgrade for 2041 (draft)

3.2. Project for Aqua-park in Block 44 - example of non-resilient development

a) History, design, realisation and current state of Aqua-park project

Although planned as public and multifunctional recreational complex, in reality the location was envisioned as commercial and profitable investment, and this economy-driven approach will actually determine its destiny. The initial idea to build an Aqua park in Block 44 dates back to the end of the last

century, but was realised at the beginning of the new millennium. The construction of the sports and entertainment water complex in New Belgrade began in October 2005, and the work was planned to be completed within a year.

The project was designed as a unified complex on 50 000m², with 11 swimming pools and 21 slides. The investors wanted to attract visitors with the highest "kamikaze" water slide in Europe, but also with lazy river 405m and unique "family slides" 132 meters long.



Figure 3 – Location, model and layout of Aqua Park project in Blok 44. Biro 59 (<https://biro59.rs/info/138?r=all&l=sr>)

However, during time, only half of the originally planned structures were completed, and several million euros were spent on the project. The original investors quickly gave up. Since then, several investors have changed. The construction started on several occasions, but the investors successively withdrew from the project. In 2010, the city of Belgrade tried to reclaim this land under its ownership and planned to diversify recreational offer by adding a bowling alley, an ice rink, and outdoor courts for team sports to the original project, but this never happened. Finally, only about 3/4 of the basic construction works remained from it (concrete pools, wall and gate) (Figure 4). The area was left completely abandoned. In 2019, the restart of work on the project was announced.



Figure 4 – Location of recreational complex in: 2001 (before construction), 2008 (under construction), 2022 (current state)

b) Discussion on Aqua Park project's resilience: dimensions and levels

The project of Aqua Park can be read as an example of silo-thinking in urban planning and design. Although planned to be public recreational complex, in reality the location was allocated for the development of the private-owned and managed recreational complex. This decision induced the *formal and functional closure*, and thus affected the relationship of the project and its environmental and social context.

Besides that, any aqua-park is by definition an introvert complex, which in this case also influenced the applied general design strategy of a large enclosed structure. These kinds of structures are *not flexible or adaptable* to changes and do not allow for incremental or piecemeal growth. In the case of Aqua Park, they were left abandoned after financing of the project stopped, producing *functionally, economically, and socially non-active* space and *physical barrier* between housing area and Sava River.

3.3. Exploring pathways to resilience of Recreational complex in Block 44

a) "Ecological urban design studio"- task and pedagogical concept

Potential pathways towards more resilient development of Recreational complex in Block 44 was explored in the context of "Ecological urban design" studio at UBFA Master of Architecture programme during 2020/2021 and 2021/22 and included 32 students projects. Using inherited situation of abandoned Aqua park as a starting point, they investigated *how urban design can be used to improve the recreational quality of derelict urban spaces while, at the same time, helping to make cities more climate resilient.*

The „Ecological Urban Design Studio“(EUD) is conceptualised and designed to enable students to acquire complex and deep awareness, knowledge, skills to design place based ecological urban design project. The work in the studio is based on the premise that the ecological urbanism draws from ecology to inspire urbanism that is more socially inclusive and sensitive to the environment, and that seeks for new ethics and aesthetics of the urban (Mostafavi and Doherty, 2010). Pedagogical process combines research, design and reflection phases that weave together to help students produce design project at different spatial scales, and gain wider knowledge on how can urban design and environmental issues be integrated (Živković & Nikezić 2021).

b) Results

This study uses research by design method (Nikezić et al. 2021) to identify new urban design approaches as models through which links between cultural landscape, urban recreation, and climate change adaptation can be established and analysed. Analysis of the students' urban design projects, reveal that *there are different potential pathways* to developing resilient recreational complexes. Based on their primary focus and conceptual grounding, all analysed urban design projects can be grouped around five general design approaches, namely:

- FORM based approach- that aims at developing aesthetically pleasing and meaningful place
- FUNCTION based approach- that uses provision of variety recreation activities for diverse public as a starting point for design
- COMMUNITY based approach- that relates existing social system, local assets and neighbourhood needs to project, and develops design solutions aiming to improve overall quality of life
- NATURE based approach- that looks at the nature as metaphor, mentor, process and system to develop spatial interventions that emphasize human place in nature.
- LANDSCAPE based approach- that emphasize wider understanding of place as produced through time by natural and cultural processes, and integrates this view into urban design intervention.

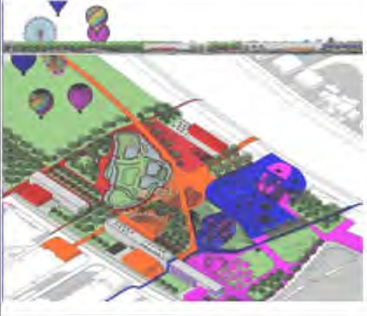




Table 1 presents the representative projects for all five design approaches through their concept and design characteristics of Recreational complex structure and elements and reveals sequences of relations between Landscape, Program (recreation), Form, Community, Nature and Climate adaptation measures established during the design process. It further comments issues related to RESILIENCE, such as a) Climate adaptation measures, b) Flexibility of structures, and c) presence of systems thinking as reflected in design project.

c) Discussion on urban design paths to resilience

The results indicate that, although all identified urban design approaches (models) enable the introduction of measures to adapt to climate change, the level of their contribution varies concerning, flexibility of structure (that enables different aspects resilience), and level of integration into wider systems. Differences between identified design approaches are based on different focus and priority values as starting points for project development, that affect how the links to resilience issues are established at different points in design process.

This reveals that some approaches allow for better integration of resilience thinking into urban design process. While traditional Program and Form based approaches allow for implementation of resilience oriented climate adaptation measures and flexible design structures, more general Nature, Landscape and Community-based approaches support systemic thinking that, at the very beginning anchor urban design actions to social and environmental systems. In this way, throughout design process designers ought to develop program and design solutions having in mind links between people and nature in different spaces, times and scales.

Table 1: Urban design approaches for resilient cities

	RECREATIONAL COMPLEX Structure and elements	DESIGN PROCESS	CLIMATE ADAPTATION measures	FLEXIBILITY of structure	SYSTEMS thinking
<p>PROGRAM based approach</p> <p>CONCEPT "Play 44"- the idea is to create a playful environment that attract neighbours and visitors offering variety of activities</p> <p>Student: Milica Jokić</p>		<pre> graph TD P --> C C --> F F --> CAMN[CAM+N] CAMN --> L </pre>	Existing abandoned pools provide for "place for water" and help adapt to flood and drought risks. New structures and trees help in adapting to overheating.	Project can be delivered through phases and offer some flexible structures. Different areas need different levels of investment and enable economic resilience	Project is designed as a system of play, that is functionally related to surrounding areas. Relations to natural systems are relatively weak.
<p>FORM based approach</p> <p>CONCEPT "Flower 44" – metaphor of natural form is used as organising principle for structuring variety of activity areas.</p> <p>Student: Nikolina Đogo</p>		<pre> graph TD F --> N N --> PC[P+C] PC --> CAM CAM --> L </pre>	Climate adaptation measures are integrated in project following established formal and functional requirements and mainly relate to water management.	Project is designed as a clear and strong form that lacks flexibility. Adaptability of structures exist at local level.	Except for protecting existing and introducing new green areas in order to improve quality of space, systems thinking was not leading the project.
<p>NATURE based approach</p> <p>CONCEPT "Garden 44" – aims to create place where people recreate and enjoy, nurture and learn from nature in all its diversity.</p> <p>Student: Neda Stamenković</p>		<pre> graph TD N --> PC[P+C] PC --> CAM CAM --> FL[F+L] </pre>	Climate adaptation measures relate to: overheat, flood and drought. Resilience of existing structures is improved through re-use in line with local needs.	Recycling of existing structures and development on new ones can be realised through phases. Modular elements were used to provide for dominance of nature and flexibility of project .	The project is conceptualised as "situation of garden" that relates human and natural systems. This idea led new interventions to improve relations through spaces and scales.
<p>COMMUNITY based approach</p> <p>CONCEPT "WE -thorough - Block" – aims to link neighbours and spaces of Block by creating structure that can grow and adapt through time.</p> <p>Student: Dunja Putić</p>		<pre> graph TD C --> PN[P+N] PN --> FCAM[F+CAM] FCAM --> L </pre>	Climate adaptation measures relate to: overheat, flood and drought, by re-using existing pools and designing new places for water and greenery.	Flexibility of the structures is high since the principle of "increments" and "growth" were leading the project. it uses movable structures that can adapt to changing needs.	The project was conceptualised having in mind existing social and natural systems that were supposed to benefit from new spatial interventions.
<p>LANDSCAPE based approach</p> <p>CONCEPT "Enchanted Forest" – aims to attract people by creating diverse, nature-like landscape that offers variety of activities</p> <p>Student: Aleksandra Koković</p>		<pre> graph TD L --> NC[N+C] NC --> PCAM[P+CAM] PCAM --> F </pre>	Climate adaptation measures relate to: overheat , flood and drought. New landscape is formed by integrating existing pools and structures	Project is structured so that it can be realised through different phases and uses adaptable design solutions	Project is envisioned as part of green urban infrastructure, and part of both natural and social systems.
<p>P-program, F-form, N-nature, C-community, L – landscape, CAM-climate adaptation measures</p>					

4. CONCLUSION

The research aimed to increase knowledge on how to best integrate resilience thinking in urban design process in order to contribute to development of more resilient cities. The paper presented concept of resilience in relation to urban development and design, and based on the theoretical framework analysed the case of developing recreational complex in Blok 44 in New Belgrade, both as an example of non-resilience and resilience thinking.

The project of Aqua Park can be read as an example of silo-thinking where its introvert design strategy lead to absence of all aspects and levels of projects resilience. Absence of social relevance and functional and formal adaptability, flexibility and elasticity, led to abundance and neglect of the partially built project, that today function as a barrier in wider urban context. On the other hand, the analysis of students' urban design projects revealed that there are different potential pathways to developing resilient recreational complexes. But it also revealed that these design approaches differ in relation to how well they support application of resilience thinking and measures. These differences are related to different focus and priority values as starting points for project development, that affect how the links to resilience issues are established during the design process, and how they contribute to different aspects of urban resilience at different spatial scales. This all means that in order to better integrate issues of resilience into urban design process, the introduction of specific spatial measures, incremental development and flexibility of form, should be complemented with systems view on the design project as a part of the wider natural, social, spatial and temporal context.

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