

常州大学|美术与设计学院

Strategy for the regeneration of space under viaducts by means of design (on the example of the PRC)

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Part One

Theoretical research

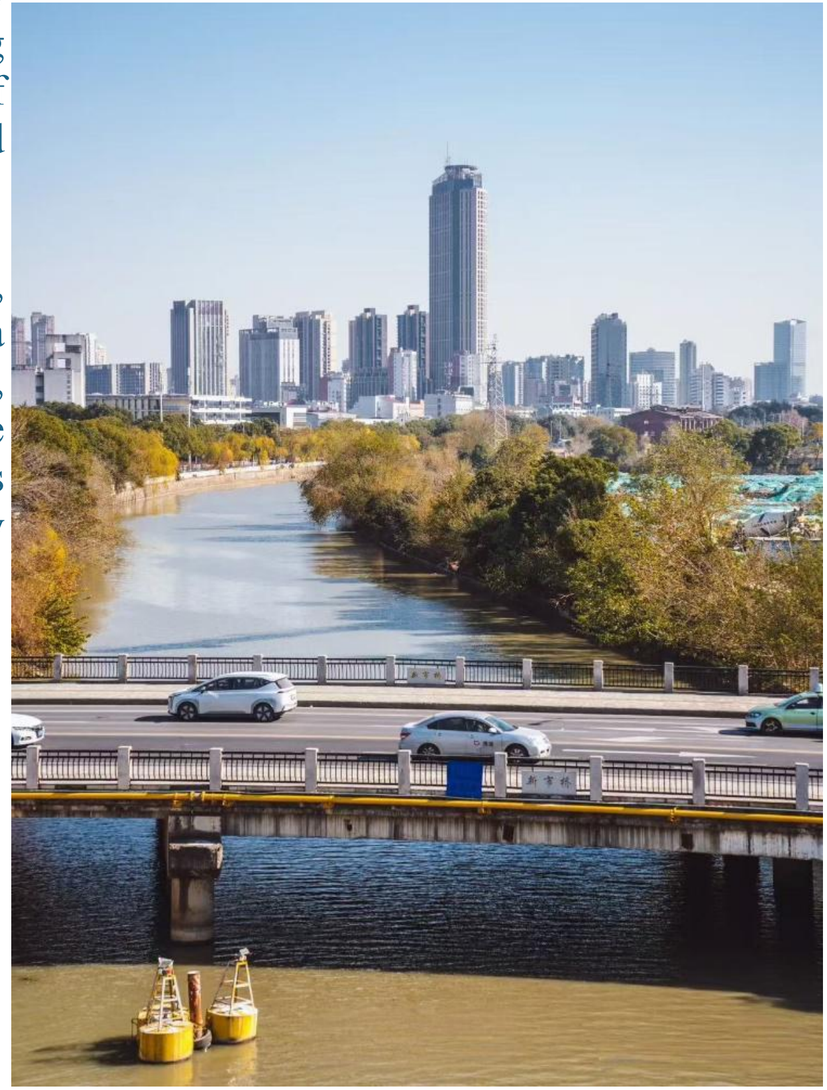
Theoretical support and geographical advantages

Research topic

In the current rapid urbanization process, elevated bridges improve traffic efficiency but also lead to issues such as the fragmentation and marginalization of the space beneath them, making the reutilization of existing spaces increasingly important. However, at present, the ways of utilizing under-bridge spaces in China are still relatively crude, mostly limited to parking and basic functions, and there is an urgent need for systematic improvement.

As an important node along the canal, the Zhongwu Bridge section in Changzhou carries the multiple potential of ecology, culture, and urban connectivity beneath its structure. This study, based on the theory of restorative environments and combined with field research and data analysis, proposes a systematic strategy integrating spatial construction, cultural display, recreational functions, and landscape beautification. The goal is to transform the space under the bridge into an urban vitality point with restorative qualities, contributing to Changzhou's achievement of its urban development goals of being "livable, ecological, and culturally coordinated."

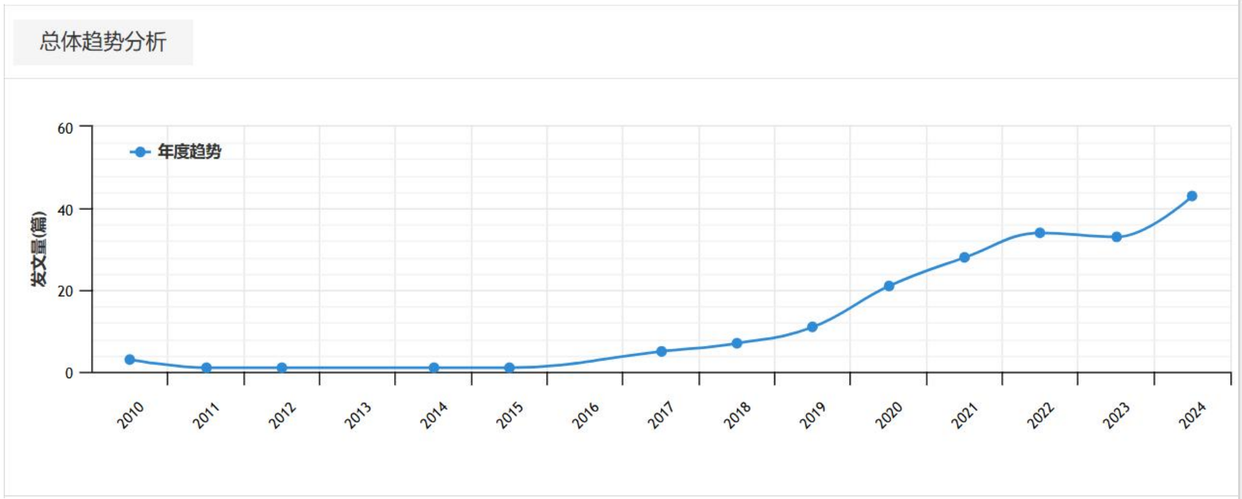




Research Background/Theoretical support

This topic contains a rich theoretical foundation (Tables 1–4) and includes an overall trend analysis of 'recoverability' based on CNKI Academic Journal Network (China National Knowledge Infrastructure). The number of publications on 'recoverability' shows an increasing trend year by year; similarly, the number of publications on 'space under elevated bridges' is also increasing year by year.

Recovery Theory



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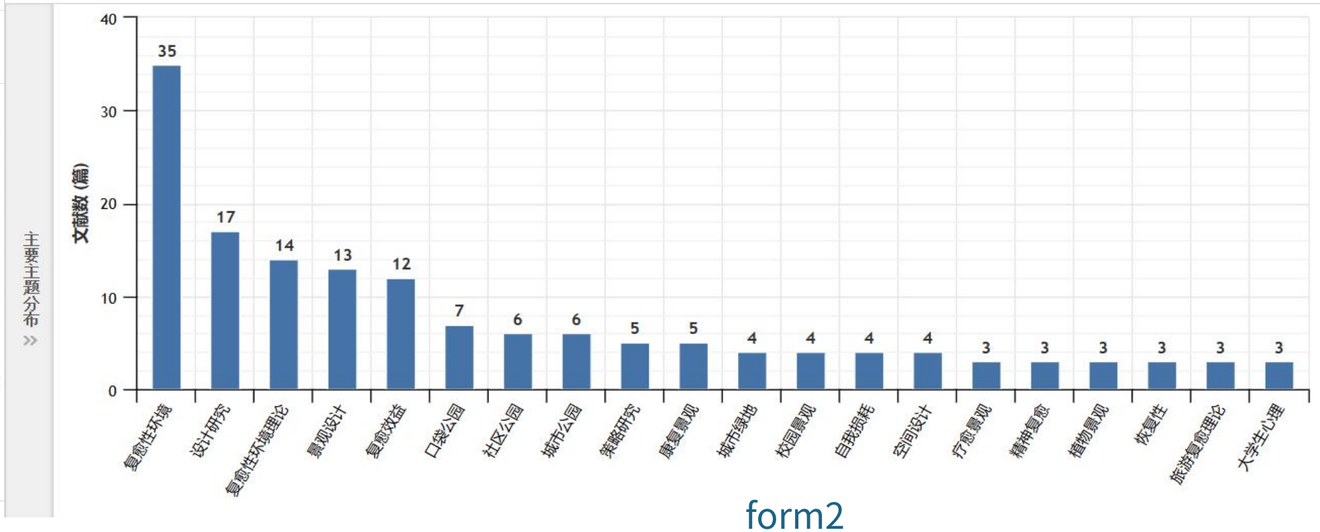
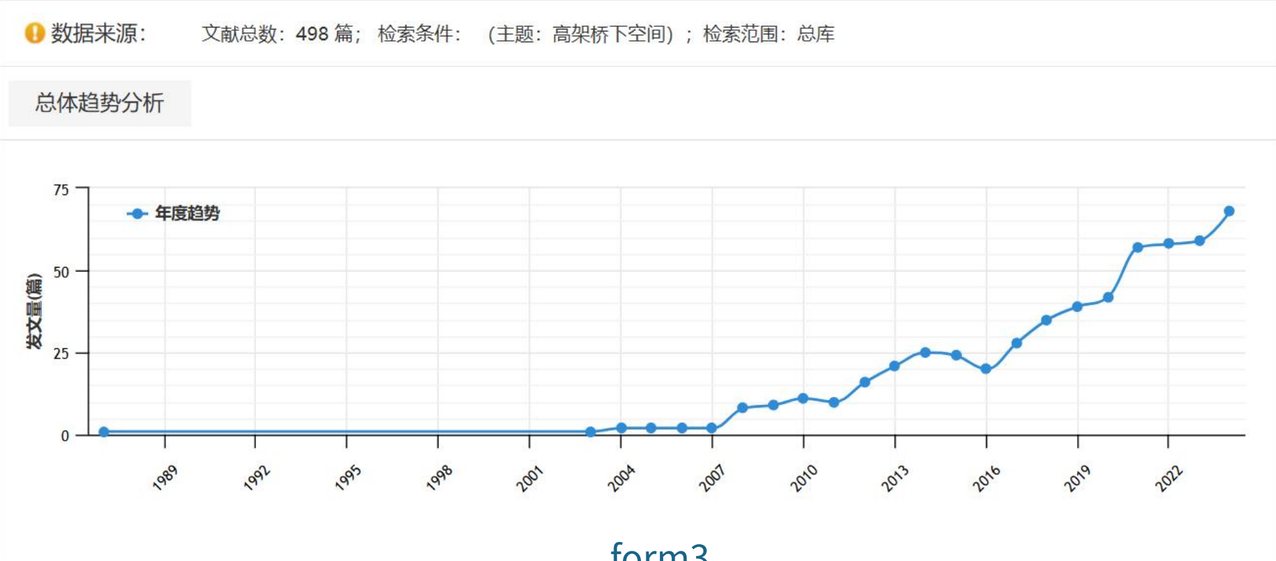


form2

In recent years, research on restorative theory has mainly focused on restorative environments and theoretical studies, and it also involves other related fields, such as therapeutic landscapes and rehabilitation landscapes.

Research Background/Theoretical support

Space under the overpass



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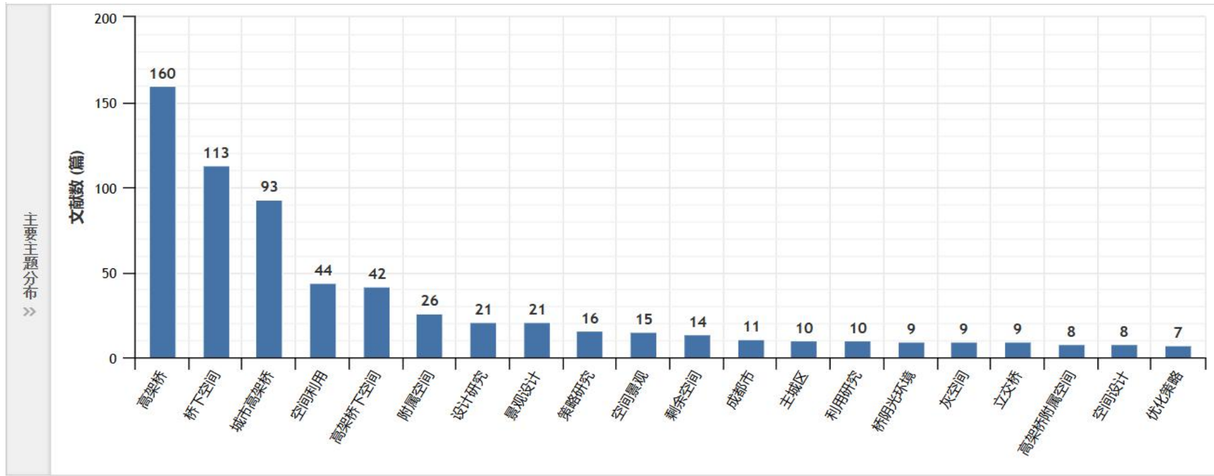


form4

The study of the space under elevated bridges includes both theoretical and practical aspects, with a greater focus on practical research. The theoretical aspect also involves design research, utilization research, and other areas, covering a very wide range of topics.

Research subject/Location Analysis

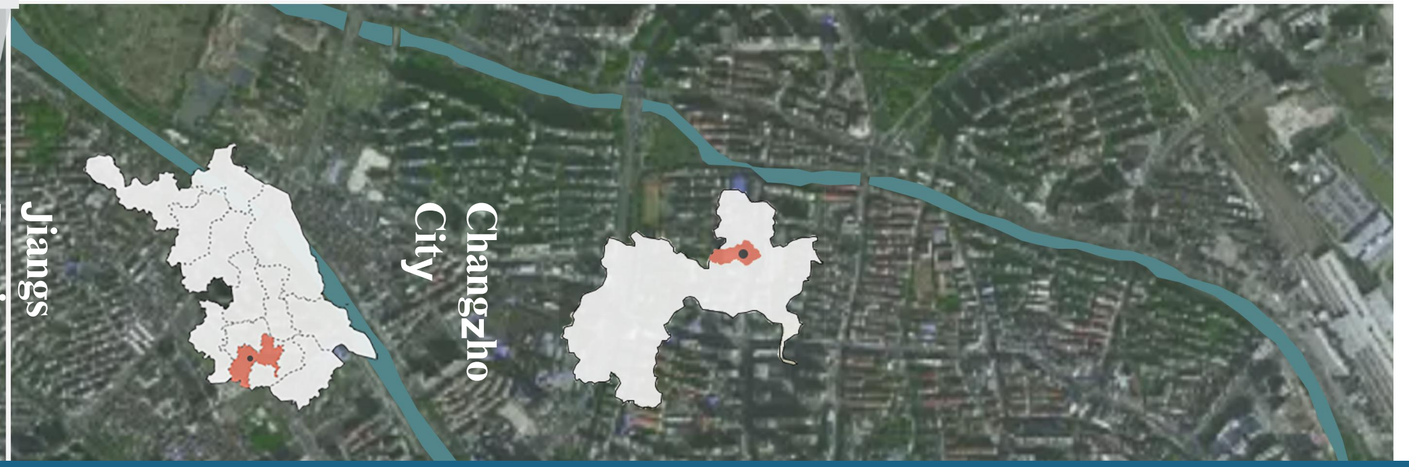
Changzhou Zhongwu Bridge Section

Jiangs Province - Changzho City - Zhonglo District

LATITUDE 119.93269°E

LONGITUDE 31.792850°N

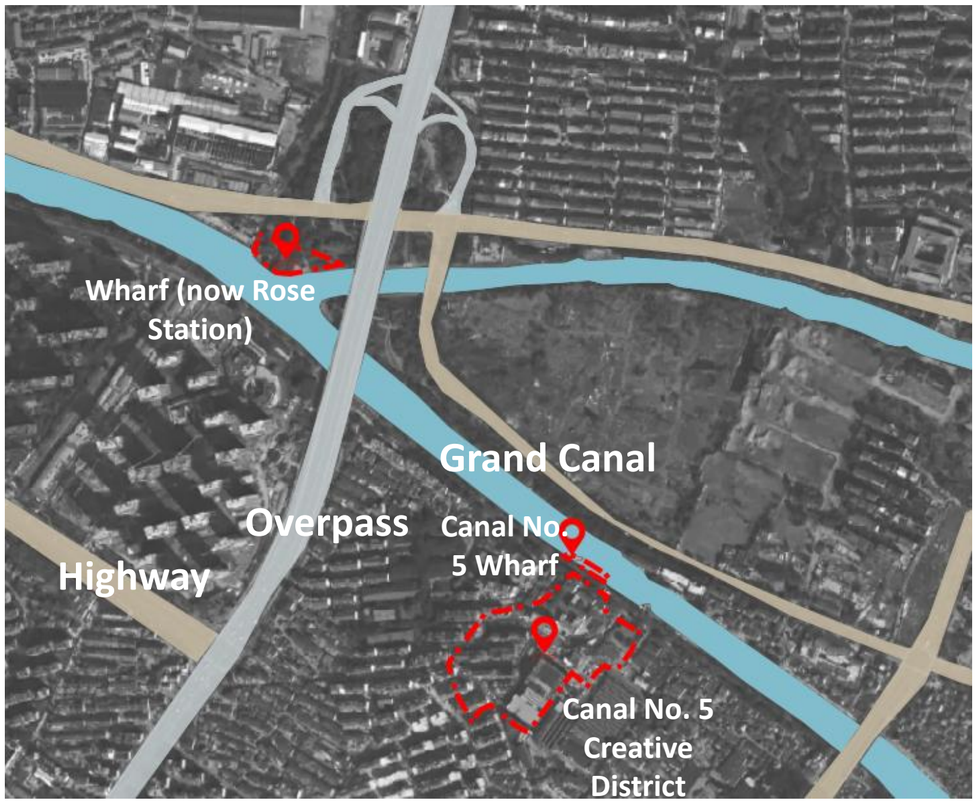




Research subject/Location Analysis

This project is located in Zhonglou District, Changzhou, with the canal crossing the Zhongwu Bridge. The surrounding area is rich in historical and cultural resources, and the historical landscapes interact well with one another. It is situated around the Grand Canal route, adjacent to the Canal No. 5 Creative Block.







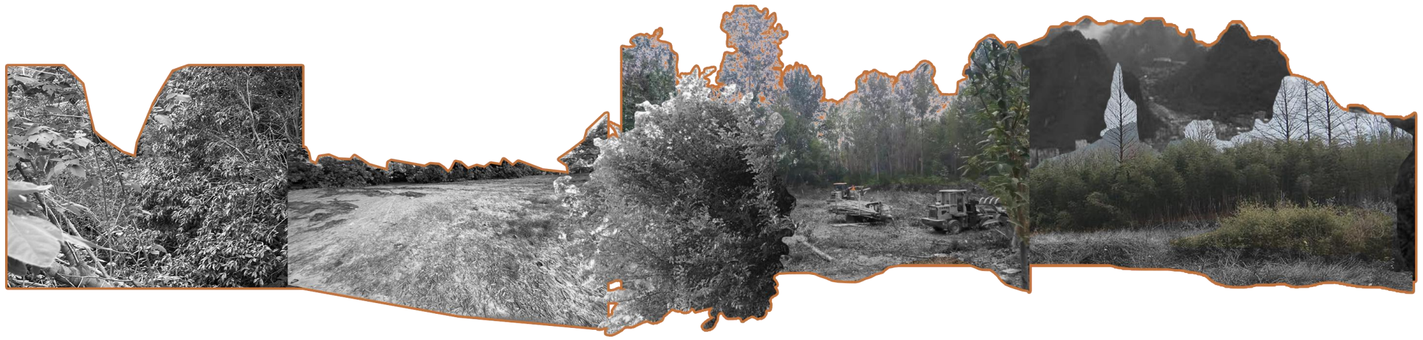
One Bridge: Zhongwu Bridge

One River: Grand Canal

Two Wharves: Current Rose Station, Canal No. 5

WharfMultiple Nodes: Canal No. 5 Creative District, Green Park, Sanbao Street

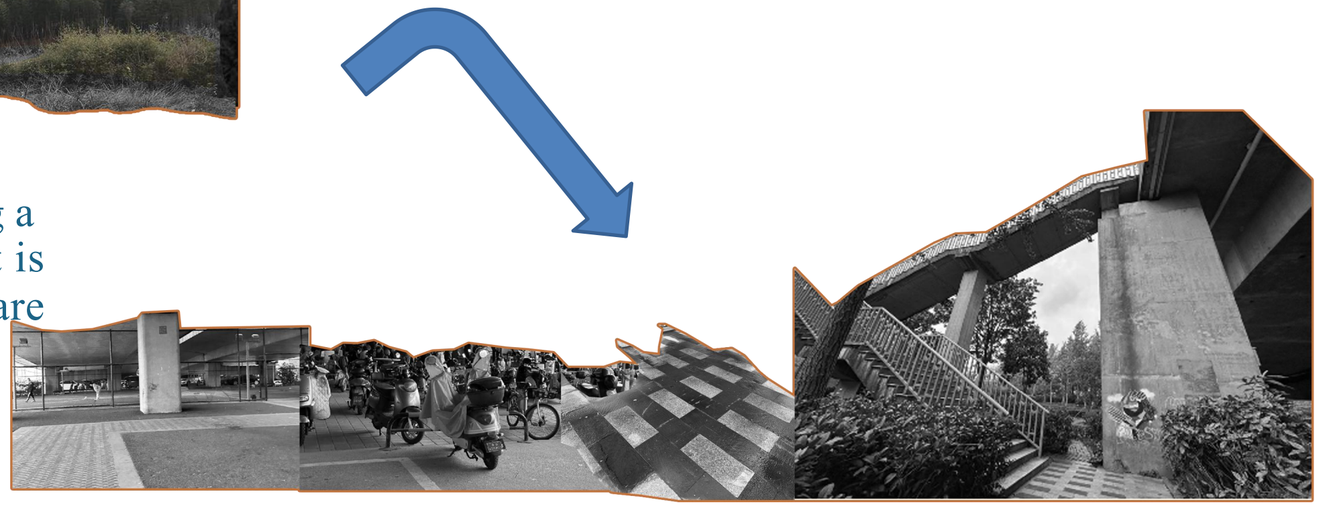
Research subject/Analysis of Current Issues



The area surrounding the site has a rich variety of plants, providing a good plant foundation. However, growth is disorderly, management is lacking, and the land is exposed. Additionally, the seasonal changes are not prominent, and there are few distinctive plants.



The Grand Canal has calm and clear waters, with pollution-free water quality.



The sports area under the elevated bridge has insufficient lighting, serious issues with vehicles parked haphazardly, water accumulation on the road, and the building facades lack unified management.

Research Objectives

1. The correlation between the perspective of restorative environments and spatial regeneration is explored. Through theoretical analysis and practical design, a feasible and innovative revitalization plan for spaces under elevated bridges is proposed, aiming to enhance the quality of urban public spaces, promote citizens' mental health, and advance sustainable urban development.

2. In-depth exploration of regeneration strategies for spaces under elevated bridges is conducted. By drawing on successful domestic and international experiences, urban space planning and design methods for areas beneath elevated bridges are examined, with the hope of providing a scientific, systematic, and practical design framework for the regeneration of these spaces.

3. Taking the Zhongwu Bridge section in Changzhou as an example, the aim is to improve the urban spatial environment, further enhance citizens' mental health and well-being, and promote the city’s development towards a more human-centered, ecological, and sustainable direction.

Conclusion

From the perspective of a restorative environment, a comprehensive and in-depth study was conducted on the activation of the space under the Zhongwu Bridge viaduct in Changzhou. By enhancing the environmental quality of the area through scientific design strategies, it aims to transform it into a unique restorative space within the city, thereby promoting the overall improvement of the urban ecological environment and the quality of life for residents.

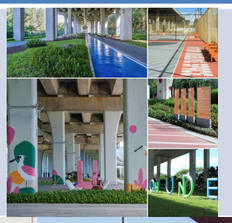
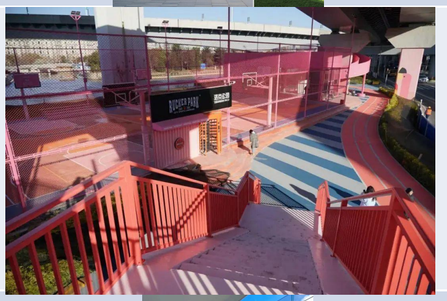
Part Two

Practical research

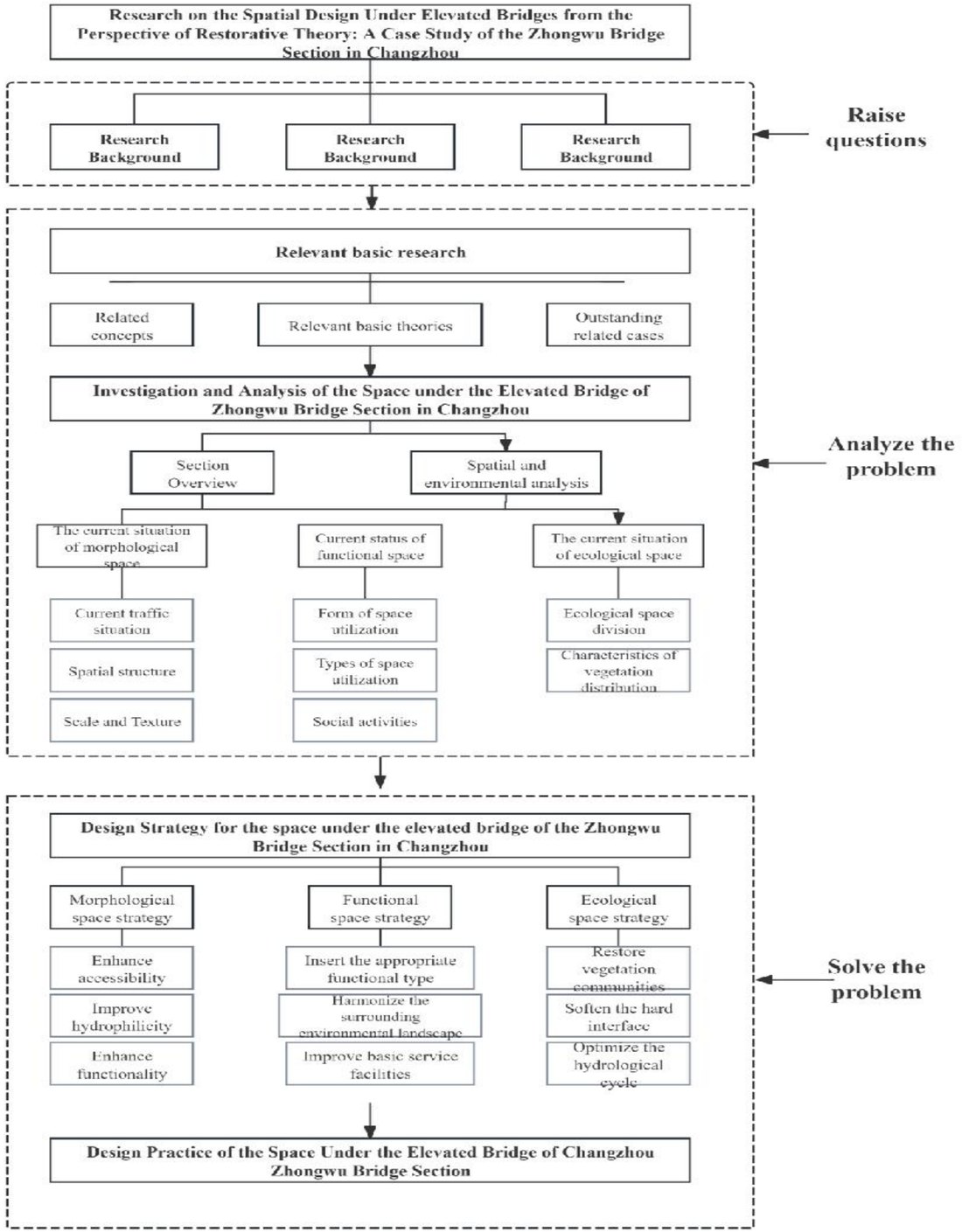
Icons, renderings

Domestic and international practical cases

Analysis of Domestic and International Cases: 1. Similarities Both domestically and internationally, there have been attempts to repurpose the space beneath elevated bridges, transforming it into multifunctional public areas.2. Differences Domestic: The design of spaces under elevated bridges in China tends to focus on compensating for the lack of urban functions, such as parking lots and sports facilities.International: In Europe and the United States, there is more emphasis on the public and social nature of the space, such as plazas and markets; in Japan, the focus is more on commercial use, such

Country	Name of the space design under the viaduct	Design-related plan	Image
China	West Bay - Qianhai Bay Pedestrian Public Space	In addition to leisurely activities such as walking, jogging, cycling, fitness, and children's play, spontaneous activities like skateboarding, dog walking, and photography further enhance the charm of the space under the bridge.	
	Shanghai Rock Sports Park	The design uses stylish and vibrant color schemes and prominent animal-themed patterns to create an easily recognizable identity for each area. The added functional facilities such as sports courts, seating, and lighting also echo the design theme, creating a harmonious yet cheerful atmosphere.	
	Shanghai 'Smart Bay' space under the bridge	It has developed into a new popular space for sports, fashion, and leisure among young people. After enjoying a good workout, you can also go to the nearby 'One Wall Art Gallery' to experience an artistic immersion.	
India	Green Paradise	The project transforms concrete-built infrastructure into public spaces that serve the local community, adding much-needed amenities and green areas, improving traffic flow, and giving the community a stronger sense of identity.	
Melbourne	SKY-RAIL Community Activity Park	Removing the level crossings along the railway opens up previously inaccessible public areas, transforming them into new spaces for community use, thereby creating a shared network of pathways under the railway lines. Community activity hubs along the tracks provide sports facilities and recreational amenities, making the area a unique, vibrant, and highly recognizable space.	

Research Ideas and Methods/Technical route



SWOT Analysis Table for the Space Design Under the Elevated Section of Zhongwu Bridge in Changzhou		
	Specific content	Corresponding strategy
Strengths	1. The Zhongwu Bridge (North) 'Heyue Sports Park' provides a mature renovation case that can serve as a reference.2. As an urban transportation hub, the surrounding area experiences a large flow of people, providing a foundation for high utilization.3. Some areas have already established smart courts, offering existing conditions for functional expansion.	1. Replicate the 'Heyue Sports Park' concept, optimize functional layout according to the characteristics of this section, and create distinctive spaces.2. Leverage the high foot traffic advantage, enhance the accessibility and attractiveness of the space, and increase usage frequency.3. Centered on the existing smart courts, supplement supporting facilities to form activity areas with functional linkage.
Weaknesses	1. Severe noise and air pollution under the viaduct affect the user experience.2. The spatial layout is complex (including areas under the bridge and between bridge piers), making design and construction challenging.3. Located near major traffic routes, there are safety risks from mixed traffic, and some areas have insufficient lighting.	1. Install soundproof panels and micro-particle adsorption devices, paired with noise-reducing and dust-absorbing plants, to improve environmental quality.2. Use 3D modeling technology for precise planning, and enhance space utilization through elevation differences and partitioned designs.3. Set up buffer zones, warning signs, and adequate lighting to clearly separate pedestrian and vehicle paths,
Opportunities	1. Jiangsu Province has issued guidelines for the utilization of space under bridges, providing policy support and potential resource allocation. 2. The demand for urban renewal has increased, making it possible to include it in special projects to integrate resources for development. 3. Residents have diverse needs for public spaces, requiring multifunctional uses such as	1. Design a multifunctional space for "fitness, leisure, and convenience" to meet the needs of different groups (children, the elderly, and young people).
Threats	1. Coordination is required among multiple departments such as transportation, municipal affairs, and planning, making the process complex and prone to delays.2. The design, construction, and post-maintenance require substantial funding, which is difficult to secure from a single source.	1. Collect public opinions through questionnaires and hearings in the early stage, and announce the plans during the design phase to increase acceptance.

Renderings

Street Corner Rest and Viewing Area





The street corner park cleverly utilizes the space under the overpass, integrating elements such as flowing water, sculptures, and seating to create a multifunctional urban recreational area for citizens that combines relaxation, sightseeing, and social interaction.

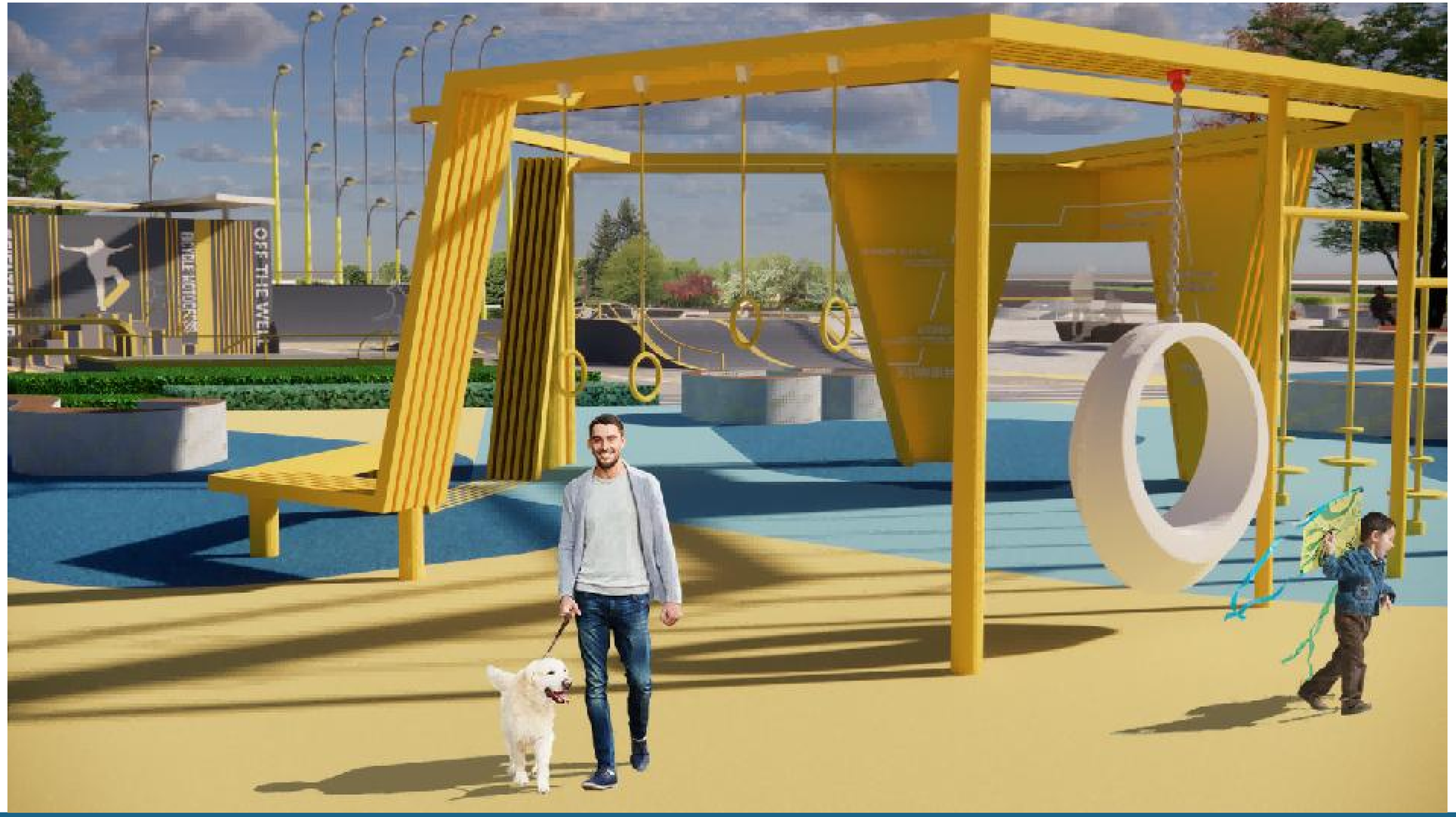
Renderings

Amusement and recreation area



Renderings

Amusement and recreation area



Renderings

Amusement and recreation area



Renderings

Space under the overpass 1



Renderings

Space under the overpass 1



Renderings

Space under the overpass 1



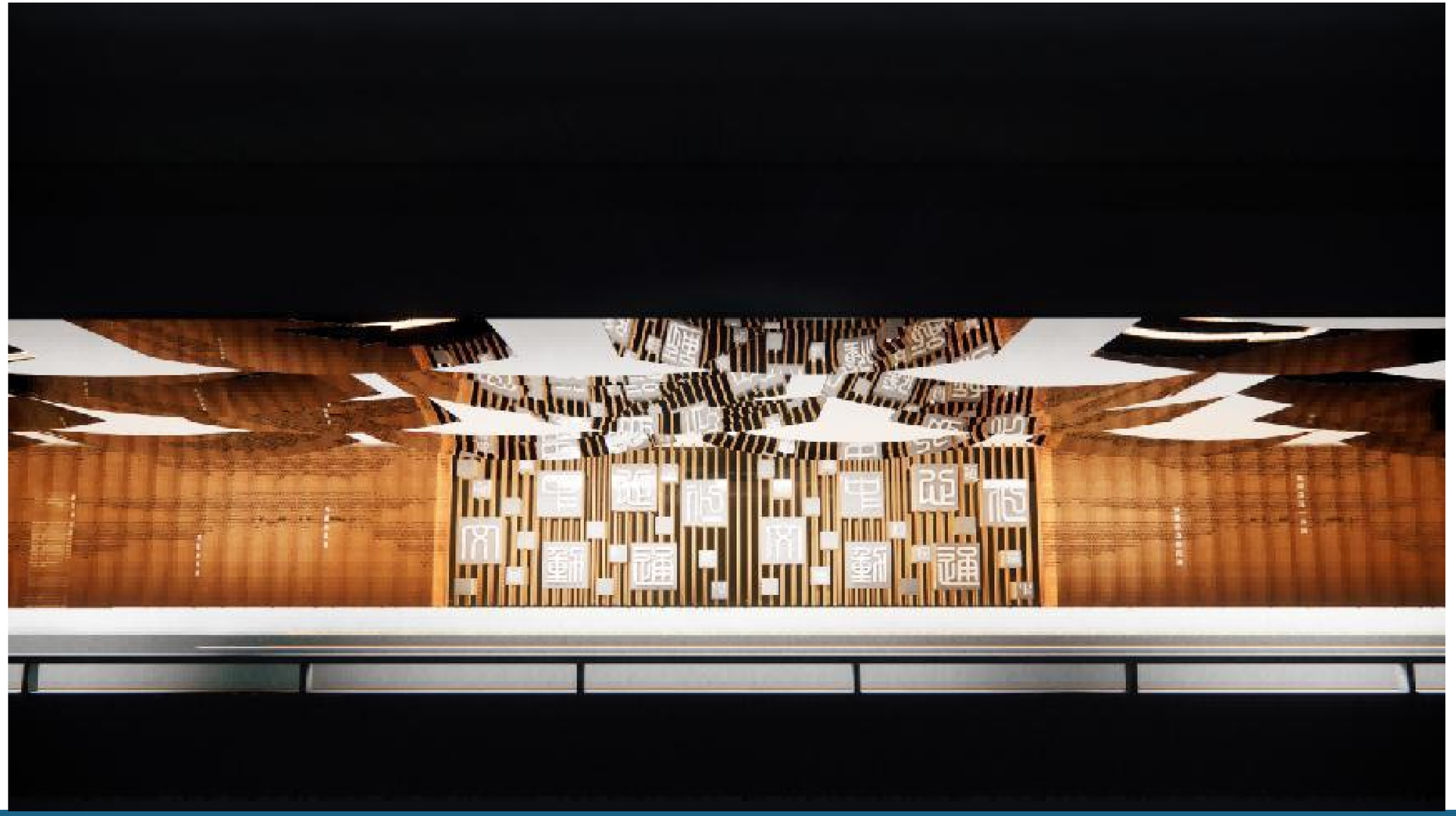
Renderings

Space under the overpass



Renderings

Space under the overpass



Renderings

Space under the overpass 3



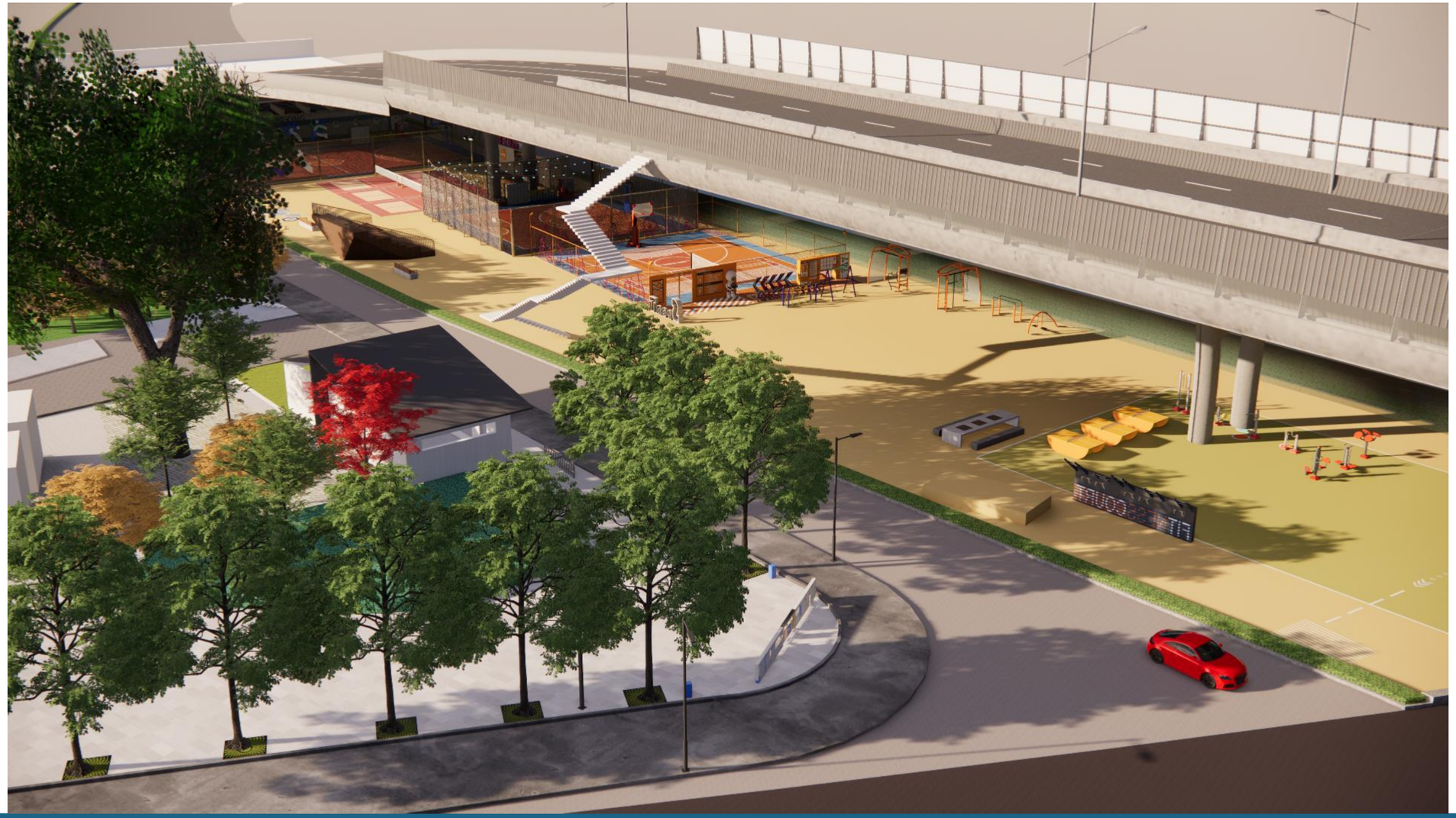
Renderings

Space under the overpass 3



Renderings

Space under the overpass 3



Renderings

Space under the overpass 3



Renderings

Space under the overpass 4



Space under the overpass 4



Renderings

Plaza area



Renderings

Plaza area



Renderings

Children's playground



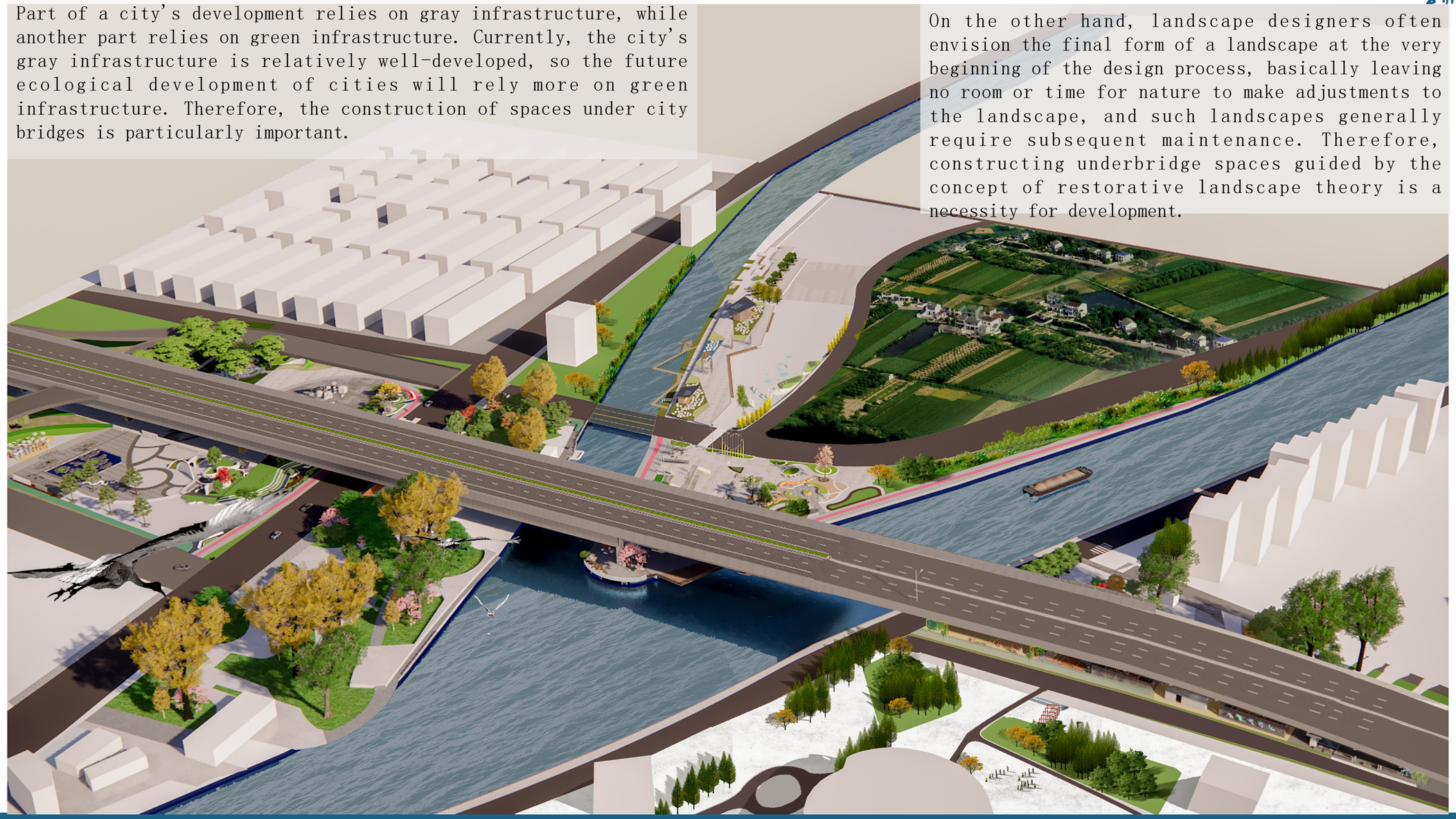
General layout plan



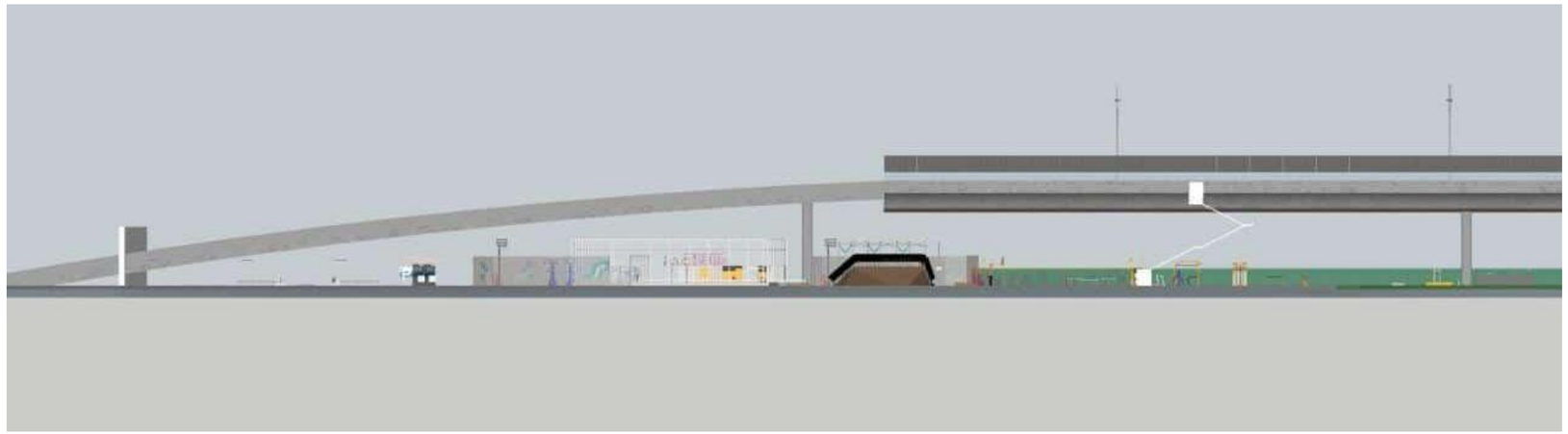
Bird's-eye view

Part of a city's development relies on gray infrastructure, while another part relies on green infrastructure. Currently, the city's gray infrastructure is relatively well-developed, so the future ecological development of cities will rely more on green infrastructure. Therefore, the construction of spaces under city bridges is particularly important.

On the other hand, landscape designers often envision the final form of a landscape at the very beginning of the design process, basically leaving no room or time for nature to make adjustments to the landscape, and such landscapes generally require subsequent maintenance. Therefore, constructing underbridge spaces guided by the concept of restorative landscape theory is a necessity for development.



Elevation drawing





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Thank you!

