# DIPLOMA THESIS

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BUDAPEST

**MASTER OF ARTS IN LANDSCAPE ARCHITECTURE AND GARDEN ART**

# Sha-Li River Scenic Area Landscape Design
## ——Section from Jinshan Road to Huanghe Road

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**MATE Organizational and Operational Regulations**
**III. Requirements for Students**
**III.1. Study and Examination Regulations**
**Appendix 6.13: The MATE Uniform Thesis / thesis / final thesis / portfolio guidelines**
**Annex 4.1: Consultancy statement**

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# CONTENT

# I INTRODUCTION

## 1.1Background

The waterfront area, as a zone where the city meets the water, integrates natural elements with human activities, making it the most vibrant and lively part of the urban landscape. Reasonable landscape planning for the waterfront area can not only enhance the overall image of the city but also attract more people to live, work, and travel here, thus bringing significant positive impacts on the city's economic and social development.

Given that the urban waterfront area is located at the intersection of terrestrial and wetland ecosystems, its landscape ecological effects are pronounced, thus requiring extremely high standards for ecological protection. Scientific and reasonable landscape planning for the waterfront area can not only effectively protect the waterfront environment, making it a green ecological corridor for the city, but also prevent natural disasters such as floods and water pollution.

With the continuous advancement of urbanization, people's demands for the quality of urban life are also increasing. Quality landscape planning for the waterfront area can not only provide a wealth of life experiences such as leisure and entertainment, fitness, and cultural exchanges, but also meet people's diverse needs for a high-quality urban life.

## 1.2 Purpose and significance

### 1.2.1 Purpose

In the course of historical development, the role of waterfront landscapes has been continuously improved and developed. However, their current forms tend to be overly uniform, deviating from the original intention of ecological civilization construction. Given this, based on the current site conditions, the Shali River Scenic Area (from Jinshan Road to Huanghe Road section) is chosen as a practical case study. The aim is twofold: on one hand, to address the existing shortcomings of the park and enhance the quality of life for nearby residents; on the other hand, to meet the demands of ecological sustainable development, creating a unique segment within the Shali River Scenic Area that further enhances its tourist appeal.

### 1.2.2 Significance

The typically belt-shaped urban waterfront area traverses diverse locations within the city, including commercial entertainment districts, residential areas, industrial production zones, and cultural and educational regions. Each of these locations poses distinct requirements for its landscape. Through site investigation and research, a thorough understanding of relevant urban planning policies is gained, and consideration is given to the land use nature of the urban area in question as well as the surrounding living conditions, particularly those of the residential areas. Based on the needs of the site, a waterfront space landscape that is compatible with its location is rationally planned and designed, aiming to fulfill both ecological sustainability and the needs of citizens.

## 1.3 Design scope and content

### 1.3.1Design scope

The site is designed for a section of the Sha-Li River scenic area, specifically ranging from Jinshan Road to Huanghe Road. The length of the Sha River within this area is 1400 meters. The specific scope encompasses the area south of Huang he Road, east of Jinshan Road, west of Binhe East Road, and along the Shahe River. The total design area of the project measures approximately 187,720 square meters. It is a comprehensive park, classified as a park green space.

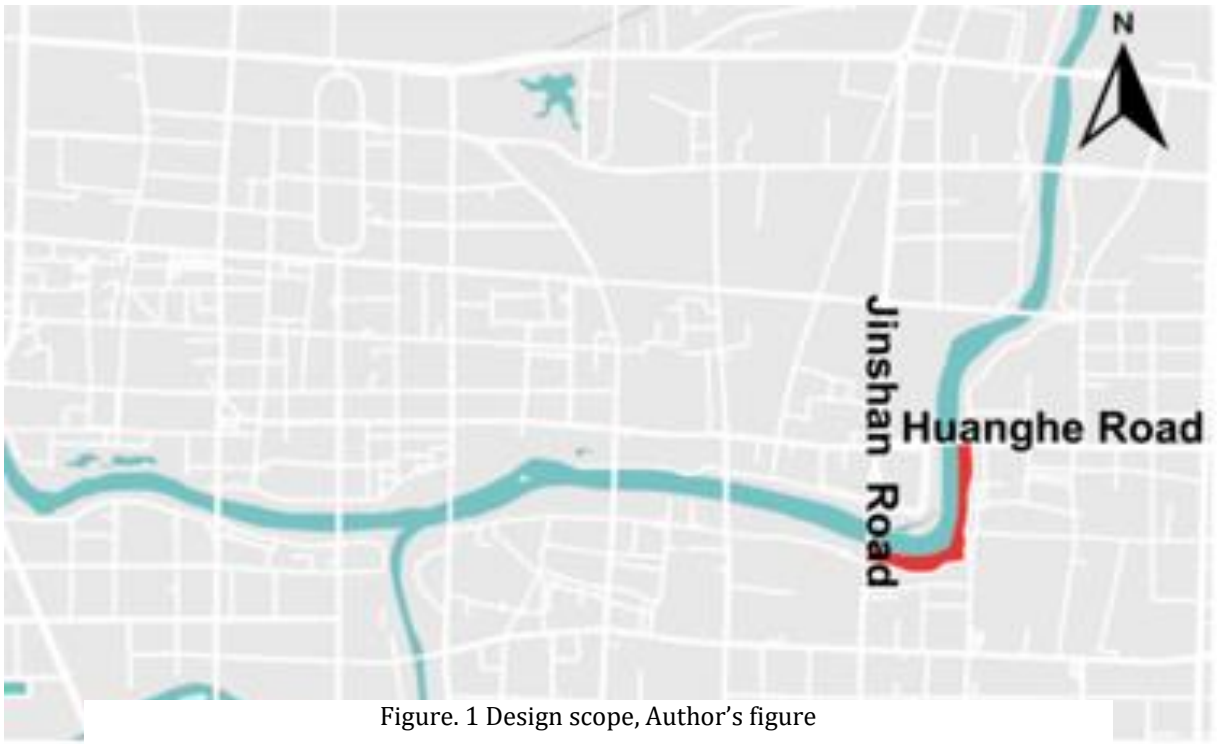



Figure. 1 Design scope, Author's figure

### 1.3.2 Design content

（1）This aims to collate and summarize relevant theories related to riverside green spaces, urban riverside parks, ecological environments, and leisure and recreation, laying a solid foundation for subsequent design work.

（2）Through on-site inspections, this analyzes the existing issues in the landscape planning and design of the Shali River Scenic Area (from Jinshan Road to Huanghe Road). Meanwhile, by drawing insights from excellent waterfront landscape design cases, it explores effective methods for landscape renovation and ecological restoration in the Shali River Scenic Area.

（3）Based on prior theoretical research, case analysis, and on-site inspections, this has carried out landscape renovation and enhancement of the Shali River Scenic Area (from Jinshan Road to Huanghe Road). The design plan covers various aspects, including overall plan layout, functional zoning, traffic flow design, plant landscaping, service facilities, and landscape ornaments.

（4）Guided by a clear design concept and philosophy, this translates the design concept into specific scheme renderings and presents the overall design plan in the form of posters.

## 1.4 Methodology

(1) Literature Research Method:

Collected and organized literature on riverside green spaces, urban riverside parks, and ecological research through extensive searches of books and journals.

(2) Case Analysis Method:

Analyzed outstanding cases and drew insights from their successful experiences, exploring new possibilities for waterfront greenway landscape design in combination with the current landscape status of the Shali River Scenic Area.

(3) Field Research Method:

Conducted field research on the usage and landscape of the Shali River Scenic Area (from Jinshan Road to Huanghe Road) during different time periods and seasons, gaining an overall

understanding and analysis of the area. Summarized the strengths and weaknesses of the existing design, providing a basis for the overall scheme design and paper writing.

# Ⅱ. RELATED DEFINITIONS

## 2.1 Related definitions

### 2.1.1 City riverside park

Urban riverfront park is one of the important parts of the city park, is the main show place of urban riverfront landscape[1]. An urban riverfront park means a city park that is near water or contains a large body of water[2].

### 2.1.2 Riverside green space

Riverside green space refers to the open space and green space built along rivers and other waters to protect and restore the ecology of the waters, and at the same time provide the public with recreation, fitness, cultural excursions and other functions, and also has the riverfront parks, riverfront walking paths, waterfront plazas, waterfront commercial and other urban public supporting facilities and functions. Various types of riverfront green spaces have differences in scale and content, including strip parks, community parks, comprehensive parks, wetland parks, ancillary green spaces and protective green spaces[3]. The functions of the riverfront green space are adjusted according to the urban land use condition, and the main functions are to provide open space, prevent soil erosion, conserve water, and regulate the urban climate, so that the city can maintain a good ecology and sustainable development of the landscape. In the design of urban riverfront green space, the principles of accessibility, safety, hydrophilicity and sustainability should be considered. With its natural environment advantages and multiple functions, riverfront green space has become an important part of urban planning and construction with great potential and development prospects[4].

### 2.1.3 Urban waterfront parks

An urban waterfront park consists of three parts: water, land and waterline, and is a special area connected by water and land within the urban planning area, which integrates and connects "waterfront urban space" and "public green space".

The water and soil of the region are the main factors of its natural environment. Many urban planning activities are carried out in urban waterfront parks, waterfront parks are important carriers of urban waterfront ecology and urban life, closely related to the lives of residents, providing residents with water recreation, comfortable communication, sports and fitness space[5].

## 2.2 Relevant theoretical studies

### 2.2.1 Theory of landscape ecology

Landscape ecology is a macroscopic and comprehensive ecological discipline which takes natural landscape as the main research object and focuses on the structure, function and change process of natural landscape as well as its scientific planning and effective management[6]. The model of patch-corridor-substrate constitutes the model framework structure of the whole landscape ecology, which is applicable to the landscape analysis of various systems and scales, and provides a strong theoretical basis for the waterfront landscape design[7].

### 2.2.2 Ecological restoration theory for urban waterfront landscapes

Ecological restoration is based on the law of nature, relying on a variety of ecological restoration methods, such as creating plant and animal communities, setting up water conservancy facilities, etc., through the ecological restoration technology to re-establish the natural ecosystem of the waterfront, so that the ecological environment can regain self-renewal ability, so that the ecological environment damaged by pollution to regain new life. In the face of the waterfront such a fragile ecosystem should do specific analysis of specific problems, absorbing a lot of principles of landscape ecology, will be applied to the management of the ecosystem, the construction of ecological priority, people-oriented waterfront ecological landscape. At present, ecological restoration mainly focuses on river sewage treatment, ecological restoration of plant and animal habitats, and redesign of waterfront landscapes[8].

### 2.2.3 River ecosystems

Ecosystem refers to the unified whole formed by the interaction of living and non-living environments in a specific natural space.

As one of the categories of river ecosystems, river ecosystems are relatively complex in terms of their natural structure and ecological functions due to their special openness, and remain in a relatively stable and dynamic state for a certain period of time.

As one of the categories of river ecosystems, due to the special openness of river ecosystems, the natural structure and ecological functions are relatively complex, and they remain in a relatively stable dynamic

As one of the categories of river ecosystems, the natural structure and ecological functions of river ecosystems are relatively complex due to their special openness[9].

The ecosystem of a river consists of three main components: trophic structure, spatial and temporal structure and compositional structure. The trophic structure of a river is the structure of nutrient cycling at different trophic levels through food chains and food webs. The river ecology under the perspective of spatio-temporal structure is a dynamic development process, in terms of time, a certain length of time nodes can be selected for the research objectives, and in terms of space, the horizontal, vertical, and vertical directions of the river as well as the abiotic environment of the river should be taken as a reasonable study. The composition of the river is composed of plant producers, aquatic animal consumers and microbial decomposers, and the interaction between the three, which are mutually constrained and influenced by each other, and together form the river ecosystem [10].

# Ⅲ ANALYSIS

## 3.1 Large scale analysis

### 3.1.1 Luohe City

Luohe is a small city located in the central-south region of Henan Province. As a second-tier t ransportation hub, it boasts beautiful scenery and convenient transportation[11]. The city has

a total area of 2,617 km2 , including Yuanhui District, Yancheng District, Zhaoling District, Wu yang County and Linying County, of which Luohe City Centre is located in the south-eastern p art of the city, with a total area of 157.9 km2[12] .

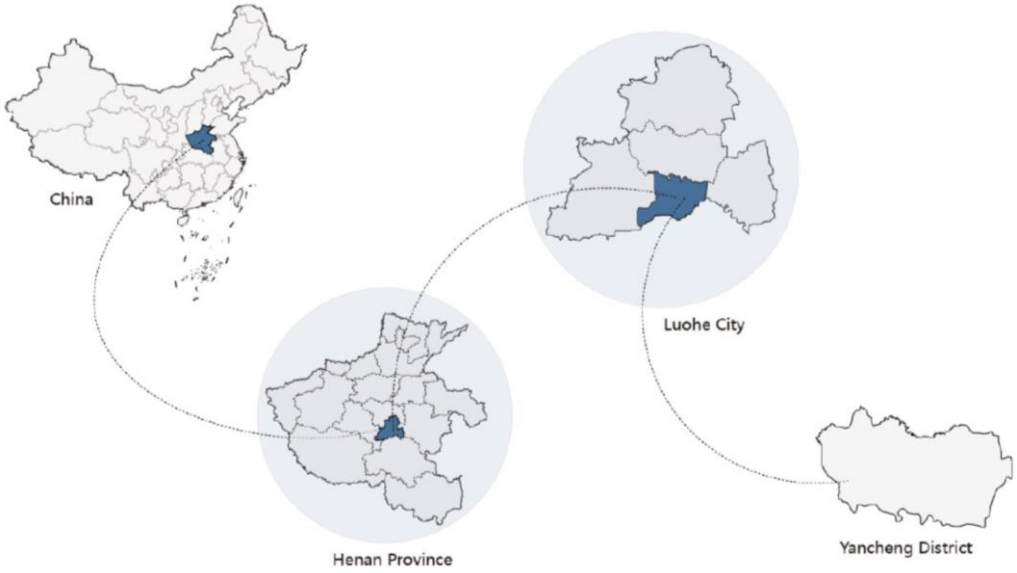



Figure. 2 Location, Author's figure

The convergence of the Sha River and the Li River forms the core of the city, collectively known as the Shali River. The waterfront landscape along the Shali River serves as the city's east-west axis, spanning across the Zhaoling, Yancheng, Yuanhui, and Xicheng districts. In recent years, the development and utilization of the waterfront area have yielded significant ecological and economic benefits, attracting various foreign businesses to the city. This has led to Luohe being honored as the first "Chinese Brand City" in central and western China and the second in the country.

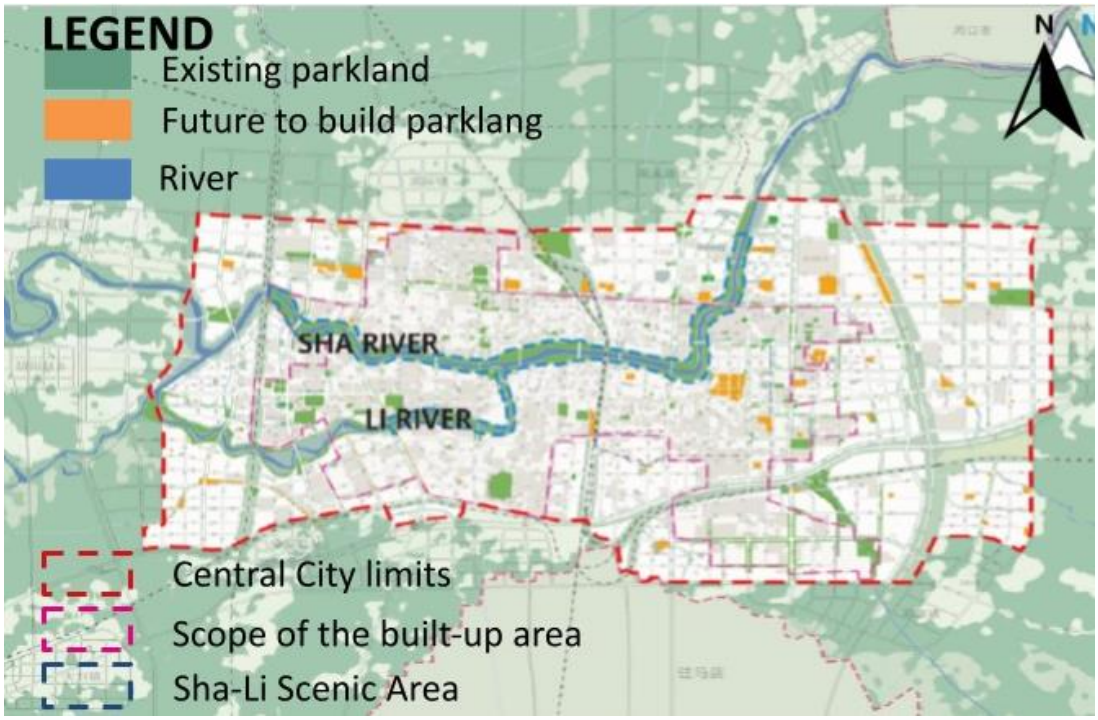



Figure. 3 Luohe City Park System Planning, INT-01

During the short period of its development, the improvement of the environment and the several rounds of design and development along the Shali River waterfront have played a pivotal role in achieving this honor. To this day, the waterfront landscape along the Shali River continues to be refined, significantly influencing the overall urban planning and development trends of Luohe.

### 3.1.2 Sha-li River Basin

Both the Sha River and the Li River belong to the Huai River Basin. Among them, the Sha River serves as a major river in Luohe City, intersecting with the Li River in the downtown area. The Sha-Li River Basin is located in the central part of Henan Province, with a geographical coordinate range of approximately 33.07-34.35°N and 112.18-114.87°E. It belongs to the Ying River System of the Huai River Basin. The terrain in this area is generally higher in the west and lower in the east, exhibiting extreme complexity and a diversity of landforms. The Sha-Li River Basin traverses 16 cities, including Ruyang, Ruzhou, Jiaxian, Baofeng, Lushan, Pingdingshan, Xiangcheng, Fangcheng, Yexian, Wugang, Wuyang, Luohe, Linying, Xihua, Zhoukou, and Shangshui, covering six regions in total. The main river systems within the basin

include the Sha River, the Li River, the Beirut River, and the Ganjiang River.

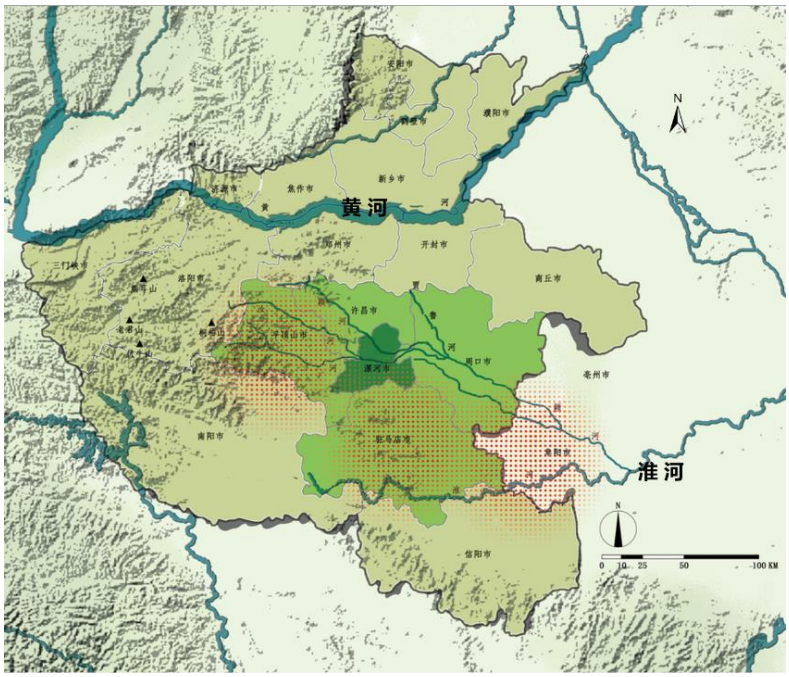



Figure. 4 Huai River System

As the main trunk of the Sha-Li River Basin, the Shahe River originates from Shiren Mountain in Lushan County and flows eastward through Baofeng, Yexian, Wuyang, Yancheng, Luohe, Xihua, Shangshui, Zhoukou, Huaiyang, Xiangcheng, and Shenqiu before entering Anhui Province and converging with the Huai River at Zhengyang Guan. The total area of the Sha River Basin is 39,880 square kilometers, with a portion of 34,440 square kilometers located within Henan Province. The length of the river section above the provincial boundary is 418 kilometers.The Li River, a significant tributary of the Shahe River, originates from Silidian in Fangcheng County and eventually merges with the Shahe River in Luohe City. The Li River spans approximately 163 kilometers and covers a drainage area of 2,787 square kilometers.

Multiple reservoirs are constructed within the basin, with notable ones including the Zhaoping Tai Reservoir, Bai Guishan Reservoir, Gushitan Reservoir, and Yanshan Reservoir. Particularly, the Yanshan Reservoir located upstream of the Li River was completed and put into operation in 2007, playing a crucial role in regulating water resources and ensuring water security within the basin[13].

### 3.1.3 Sha-Li River Scenic Area

The Sha-li River Scenic Area traverses the urban area of Luohe City, boasting a shoreline of 36 kilometers and an area of 669 hectares. Centered on urban leisure and cultural tourism, it has

been recognized as a national star-rated scenic area and a national sports park. Fully leveraging the natural resources of the two rivers flowing through the city, the scenic area focuses on developing tourism products such as ecological sightseeing, water sports, leisure and entertainment, and sports and fitness, centered on the theme of "water". It has created unique green ecological corridors, historical and cultural corridors, leisure and entertainment corridors, and sports and fitness corridors, making it a charming waterfront tourist destination in the Central Plains region[14].


Figure. 5 Master plan of Sha-Li scenic area, INT-02

The scenic area is divided into eight sub-areas: Xiwan Chenxia, Fangfeng Yasong, Languy Hanyuan, Lijian Xizhao, Haopu Kuaiyi, Fufeng Chengshuang, Qingxiu Xieqiu, and Yifeng Anhua. Beneath these eight sub-areas, there are 20 parks of varying sizes, collectively forming a waterfront park belt. Through such planning and design, the Shali River Scenic Area not only

Figure. 6 The name of the park in Shali River Scenic Area, Author's figure

enriches the leisure life of citizens but also promotes the prosperous development of the tourism industry in Luohe city[15].

### 3.1.4 City climate analysis

Luohe City is located on the southern edge of the warm temperate zone, characterized by a warm and humid monsoon climate. Its winters are cold and dry, while summers are hot and


rainy. This climatic pattern leads to significant inter-annual variations in the water volume of the Sha and Li Rivers, with average precipitation in wet and dry years differing by as much as twice[16]. The average annual precipitation is stably maintained at around 786 millimeters, with July and August accounting for 40% of the annual total. Luohe experiences distinct seasons with alternating cold and warm periods. According to statistics, the cumulative annual average temperature of the city is 14.7°C, with July being the hottest month, averaging 27.5°C, and January being the coldest, averaging 0.5°C. The annual sunshine duration is 2,181 hours, and the frost-free period lasts between 216 and 225 days. Overall, Luohe enjoys ample sunshine, abundant heat, moderate precipitation, and a warm and pleasant climate[17].

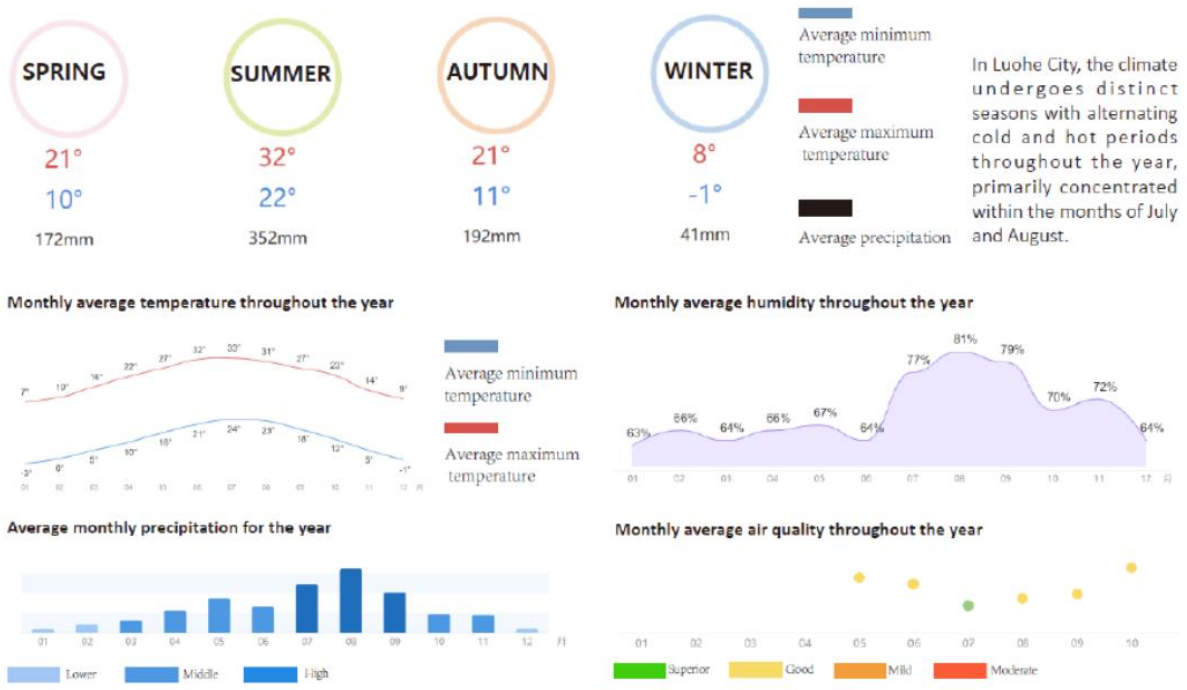



Figure. 7 Luohe weather, INT-03

### 3.1.5 History analysis

Before 2007, the overall environment of the Shali River was poor, with a lack of awareness among people regarding protection. The riverbanks were surrounded by urban villages, and even domestic waste was dumped around the river channels, rendering them scarcely appealing visually. Additionally, flood disasters frequently occurred in areas prone to heavy rainfall. The construction of the river levees was only three to four meters higher than the water level, lacking any hydrophilic design, and thus limiting the areas accessible to people.

In 2007, the construction of the Yanshan Reservoir on a tributary of the Li River, combined with the Gushitan Reservoir on the mainstream, effectively controlled most of the upstream floodwaters from the mountainous areas of the Li River, raising the flood prevention standard to once in 20 years. Subsequently, the Beijing Beilin Dijing Garden and Landscape Planning and Design Institute Co., Ltd. commenced comprehensive renovation designs in 2007, which were fully completed in 2012. Given that the Xicheng District is situated in a narrow strip between the Shali River, it faces flooding threats on three sides. Therefore, in 2012, the government proposed the artificial excavation of flood diversion channels to enable the Li River floodwaters to converge into the Sha River ahead of time[18].

The renovation project of the Shali River waterfront area involved a total investment of over 2 billion yuan, implemented in three phases with a construction duration of three to five years. The project officially commenced in November 2006. In 2007, the Luohe Municipal Party Committee and the Municipal Government made the decision to develop the landscape project along the Shali River waterfront. Significant human, material, and financial resources were annually invested along the riverbanks, focusing on extensive greening, water expansion, the construction of riverside theme parks and scenic roads, and intensified efforts to transform the riverbanks. Additionally, the implementation of the "water diversion into the city" project aimed to create a "city of water charm," achieving harmonious integration of "city, water, people, greenery, and culture." These endeavors resulted in a picturesque landscape where "the city is reflected in the water, the water flows amidst greenery, and people wander as if in a painting." In June 2010, after approval by the Henan Provincial Tourism Scenic Area Quality Rating Committee, the Shali River Scenic Area was officially designated as a national AAA-level tourist attraction[19].

### 3.1.6 Urban structure analysis

According to *Luohe City Master Plan (2012-2030* ) (INT-04), the urban development goal of Luohe City is to become an open regional central strong city and a waterfront livable city with strong comprehensive strength, optimized industrial structure, complete service system, reasonable urban layout, perfect infrastructure, convenient transportation, good environment, and urban and natural integration.

The overall plan defines Luohe as a famous national food city, a regional transportation hub city, an important modern commercial logistics center in the Central Plains Economic Zone, and an ecologically livable city.

By 2030, the planned urban population size of the central city of Luohe will be controlled at about 1.2 million. The urban construction land in 2030 will be 120 square kilometers.
In the future, the central city will form an overall urban pattern of "one main center, three sub-centers, two axes, and six areas". The overall space of Luohe City will follow a dual mode of connotative promotion and extension expansion. Through the primary and secondary

development axes, the connection between each area will be further established to guide the overall orderly development of the city.

In 2018, the net green space area in the central city of Luohe was 991.18 hectares, with a gross area of 1098.77 hectares. Among them, the net green space area of the park is about 412.31 hectares, and the gross area is about 495.70 hectares. The greenbelt area is about 87.28 hectares. The net site area of the square is about 18 hectares. The beach area of the Shali River is about 497.79 hectares.

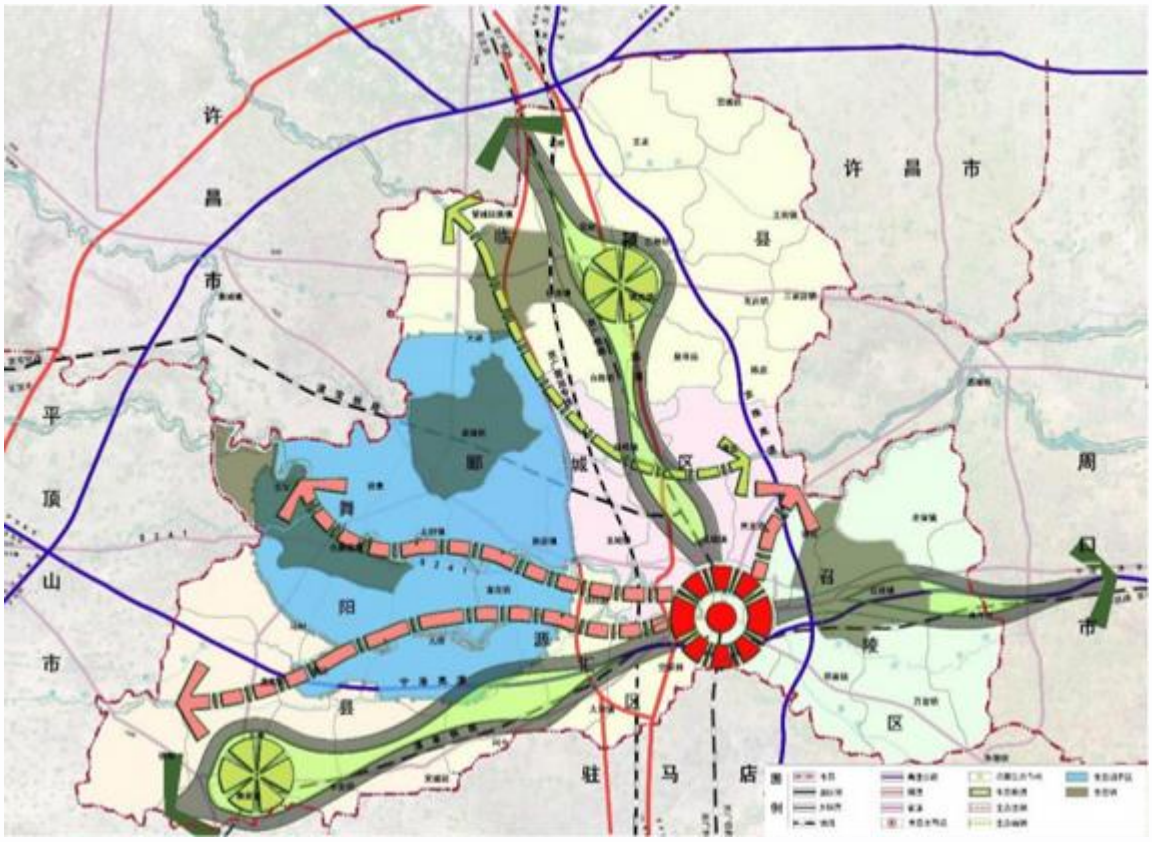



Figure. 8 Luohe City Master Plan, INT-05

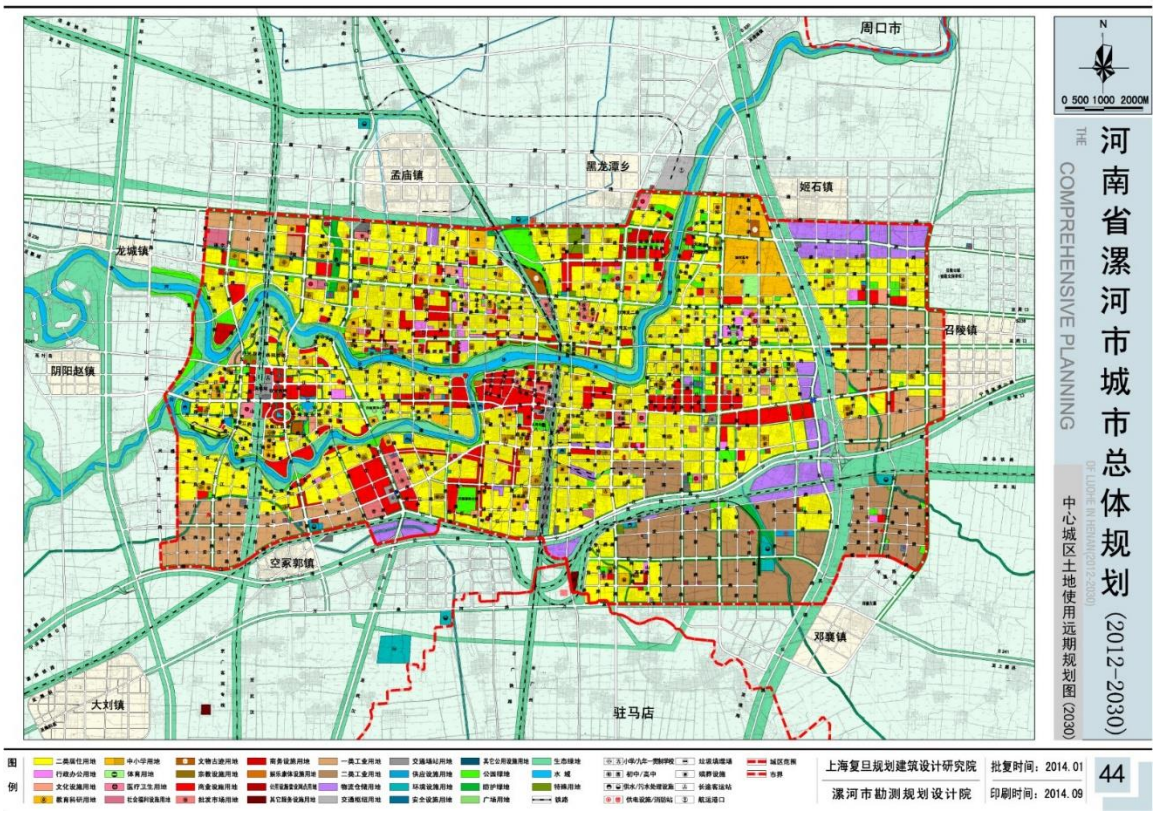



Figure. 9 Luohe City Master Plan 2012-2030, INT-06

## 3.1.7 Green infrastructure of Luohe city

According to the *Luohe City Urban Green Space System Special Plan (2018-2035)*, （INT-07） the plan focuses on the Shali River Park as the main body, opens up major ecological corridors, and builds the structural skeleton of the urban greenbelt. We will accelerate the construction of community parks and green spaces, narrowing the gap between the per capita park indicators of old and new urban areas.

The planning structure of the greenbelt system in the central city can be summarized as: one ring around the city, green networks crisscrossing, one belt connecting the city, and multiple parks scattered like a chessboard.

"One belt connecting the city" refers to the urban waterfront cultural landscape formed along the Sha and Li rivers, connecting green spaces in various functional areas of the city, forming a diverse and complex landscape belt. "Multiple parks scattered like a chessboard" refers to planning comprehensive parks and large-scale specialized parks in the central city, which are evenly embedded in the central city like chess pieces.

Development goals: By 2020, the goal is to achieve a city green coverage rate of 48%, a greenbelt rate of 37%, and a per capita public green space of 6.31 square meters; by 2030, the goal is to achieve a city green coverage rate of 50%, a greenbelt rate of 38%, and a per capita public green space of 7.13 square meters.

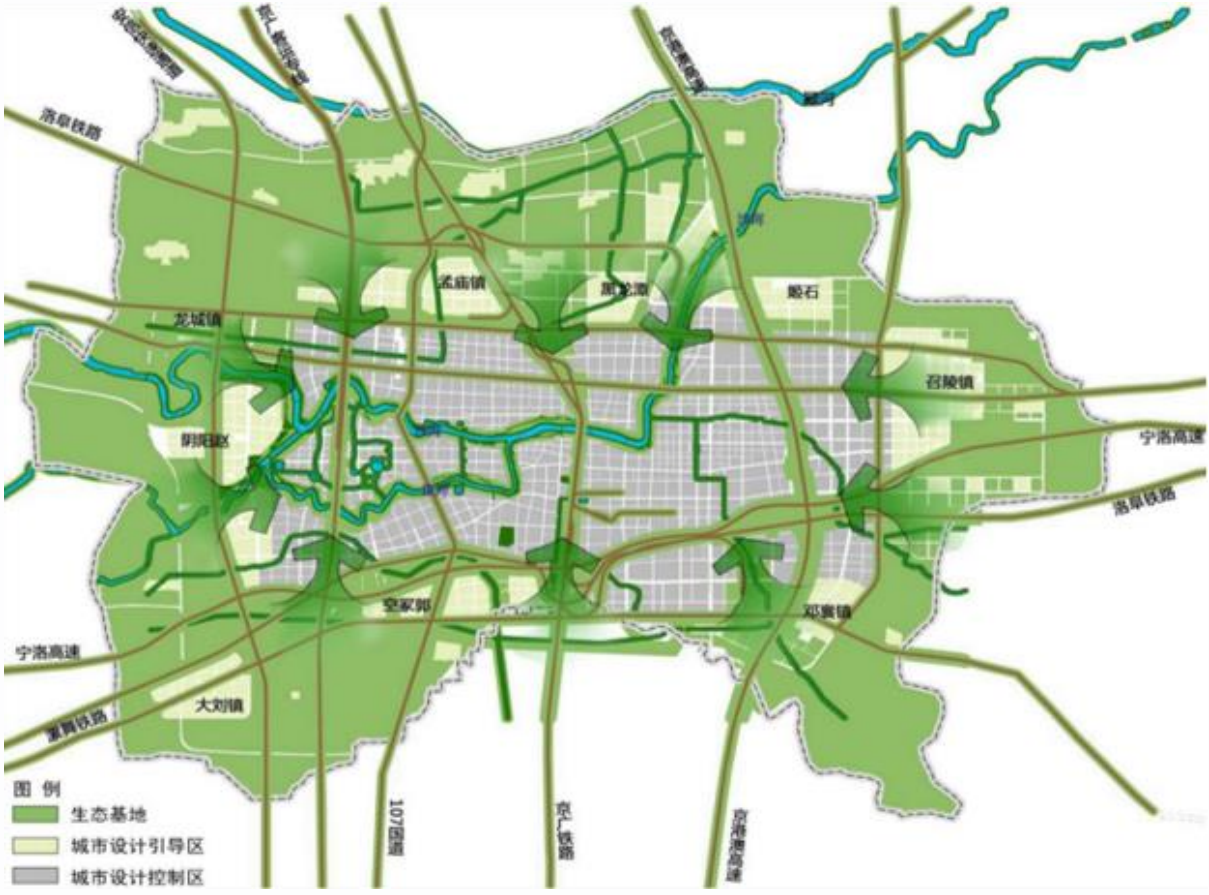



Figure. 10 Urban green space system planning, INT-08

Most parks in Luohe City are located around the green spaces along the Shali River. The Sha River Scenic Area, Jinshatan Park, People's Park, Xiaonanhu Wetland Park, and Laohutan Park are all situated near the Shali River. As the main river in Luohe City, the green spaces on both sides of the Shali River are the primary green resources in the urban area. There are many scattered lakes and green areas around the river, providing a good foundation for the construction of parks, where most of them are located.

The current urban parks in Luohe City can meet the basic urban leisure needs and have certain urban ecological functions. However, there are still deficiencies in park distribution, types, and supporting facilities construction. There are many gardens in the urban parks,

providing a good place for nearby residents to relax and exercise, but there is a lack of specialized themed parks, such as botanical gardens and children's parks.

According to the *"Urban Green Space Classification Standard" CJJ/T85-2017*,(INT-09) the Shali River Scenic Area is an urban comprehensive park, and the Jinshan Road to Huanghe Road section is part of it. According to the green system planning, there are mainly gardens and community parks around the site. Therefore, the functions of plant science popularization and children's activities can be added to the comprehensive park.


Figure. 11 Luohe downtown green space system planning, INT-10

## 3.1.8 Water analysis

The river surface of the Sha River is approximately 100 meters wide, and the riverbank is about 200 meters wide. Currently, after the water level of the Shali River has been raised, the normal water level of the Sha River remains stable at 57.5 meters. Given the scarcity of water resources, a significant amount of domestic and industrial water usage relies on the Shali River and surface runoff water. Among these, the Sha River, as the largest water reserve, occupies a pivotal position[13].

The water depth of Shahe River is 5 meters under normal circumstances, and it will not exceed 12 meters even in floods. As a seasonal river with a rainfall source, the Sha River has the function of unloading flood water from the city and at the same time provides nutrients for the city's greenery.

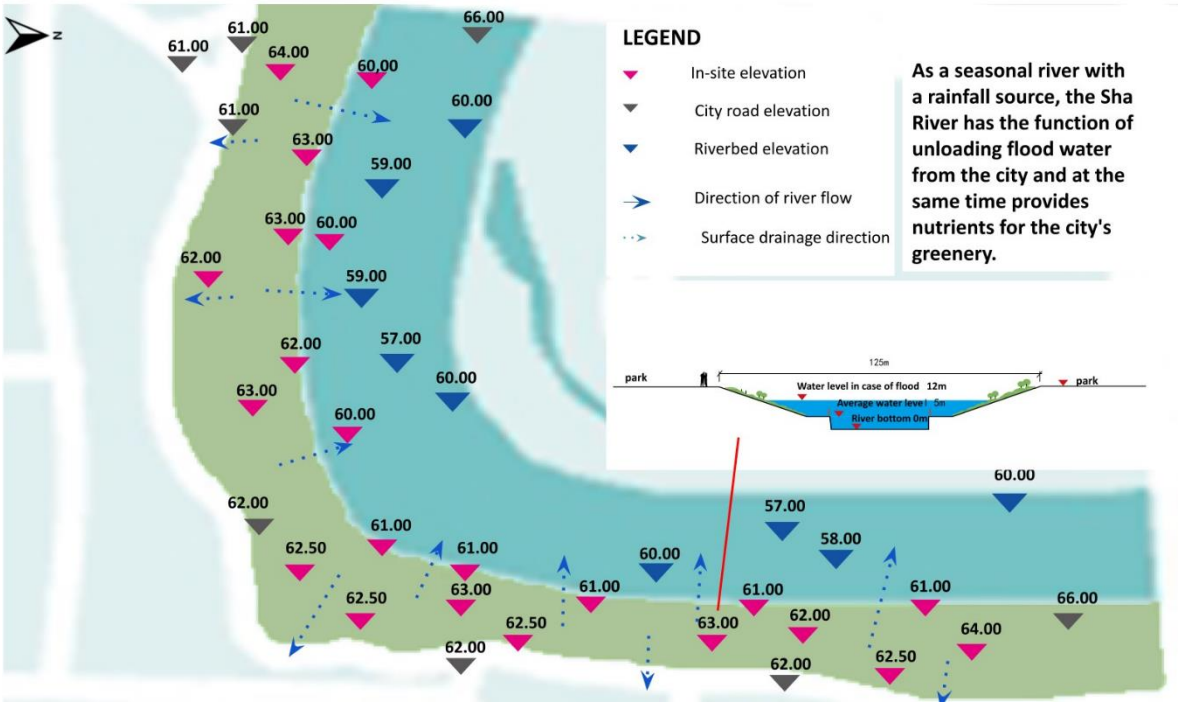



Figure. 12 Depth of river water, Author's sigure

### 3.1.9 Use and users analysis

The site boasts an open space with rich landscape layers. Nevertheless, there is a relative scarcity of fitness and sports spaces, and a low utilization rate of some leisure spaces and plazas, coupled with the insufficient provision of service facilities. The main activities conducted within the site include romantic rendezvous, sitting in meditation, walking, roller skating, martial arts practice, jogging, square dance performances, water play, family outings, and fishing.

## 3.2 Small scale analysis

### 3.2.1 Surrounding analysis

The perimeter of the site is primarily residential areas, which can be categorized into two types. One is newly developed housing estates with buildings ranging from 10 to 20 stories tall. The other is an area with lower-rise buildings, with floor heights between 3 and 6 stories. The areas

adjacent to the site are mainly composed of low-rise residential districts. Additionally, the site is situated in the heart of the city, surrounded by vital facilities such as commercial centers, medical centers, and educational institutions. Furthermore, public service facilities like parking lots and public toilets are also available in the vicinity of the site, providing convenience to citizens.

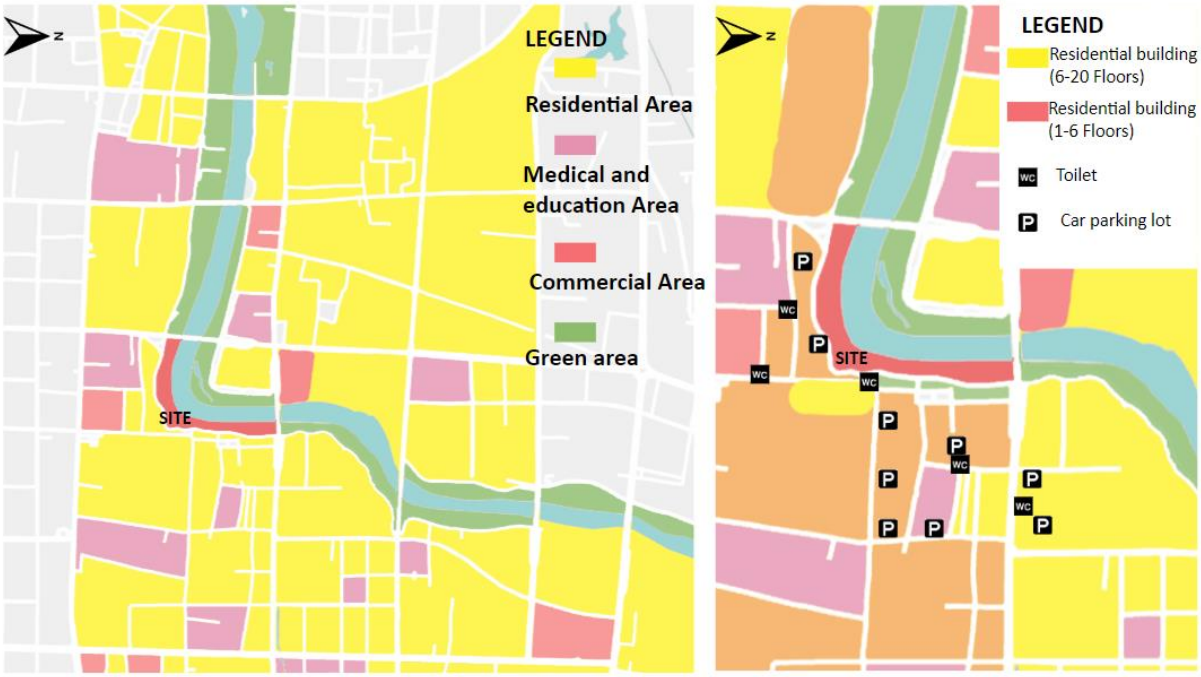



Figure. 13 Land use around the site, Author's figure

## 3.2.2 Traffic analysis

The surrounding area of the site boasts convenient transportation and a well-developed traffic system. The city's main roads, Jinshan Road and Huanghe Road, span both sides of the river, facilitating easy access for citizens to the site. The urban branch road, Binhe East Road, defines the boundary of the design site. Other urban secondary roads intersect with Binhe East Road at two points, connecting the urban structure with the green space. While the construction of green spaces and residential areas may undergo changes, the urban structure remains constant. The park entrances are strategically located based on the connection points between the urban structure and the green space, ensuring convenient access for residents. Residents primarily access the site by car, bicycle, or electric bike, making it essential to have conveniently located and sufficient parking spaces.The riverside is separated from the neighboring communities by roads, providing convenient access for residents living nearby. Other citizens, however, would need to take a detour to the bridge entrance to enter the area.

The road design within the region primarily focuses on scenic routes, with a particularly long waterfront viewing path.

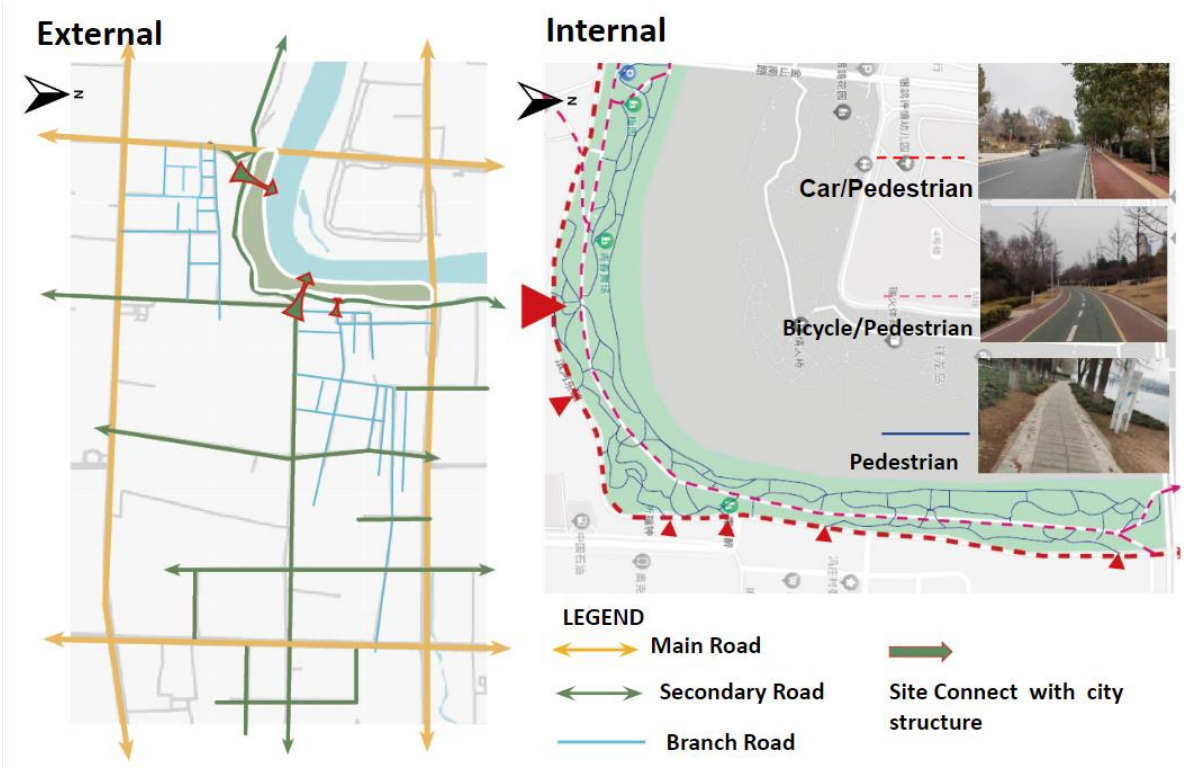



Figure. 14 Surrounding traffic analysis, Author's figure

### 3.2.3 Existing functions/zones analysis

The current activity functions within the site are relatively limited, primarily consisting of a sculpture with historical value - the Prayer Bell, a meteorological observation station, a plum garden, a bicycle path, and ample parking spaces. Additionally, two small wooden platforms are situated along the water's edge, providing an opportunity for people to get close to nature and relax while enjoying the scenery. There is also a fitness area within the site, catering to the daily exercise needs of citizens. Three small rest plazas are distributed along the bicycle path, offering spaces for citizens to rest and engage in social interactions.

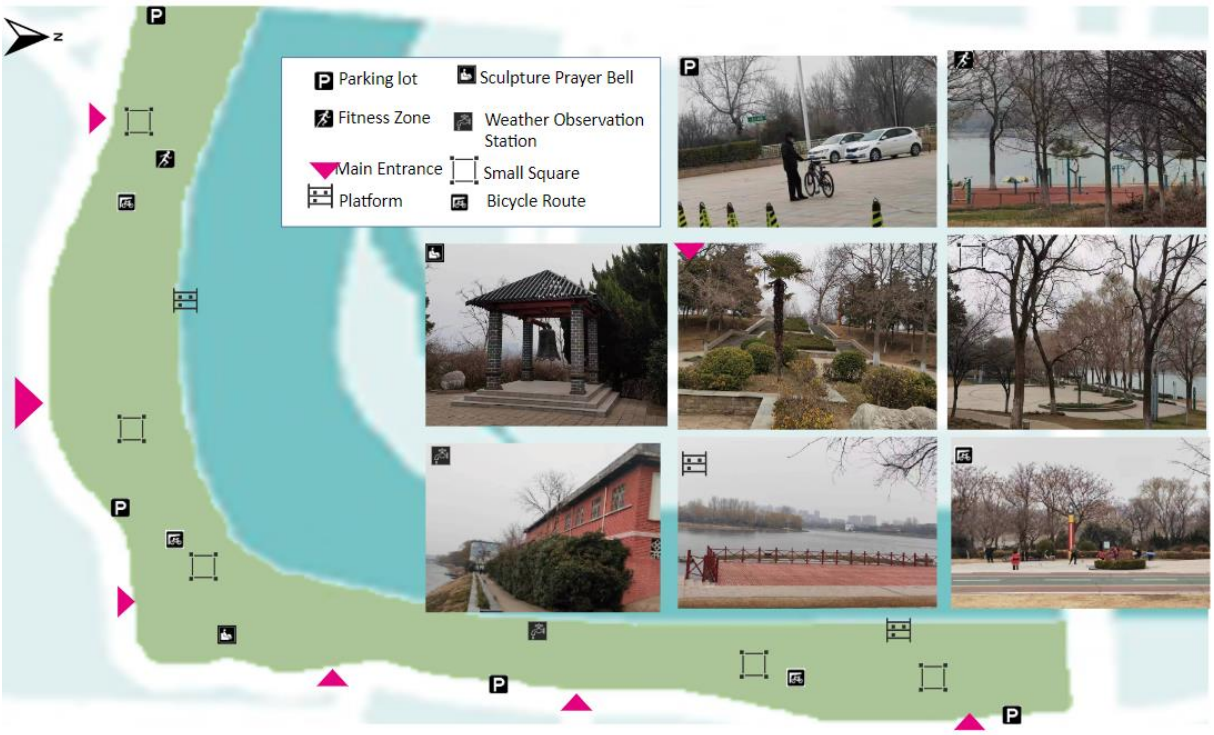



Figure. 15 Existing functions on site

### 3.2.4 Materials analysis

Currently, there are various pavement materials in the park. Marble is used at the entrance plaza, colored concrete is mainly for bike lanes, slate is used at the event plaza, permeable bricks are used on secondary roads, and preservative-treated wood is used for the waterside platform. Some sidewalks also use sandstone. Most of the rest seats are made of iron, there

are wooden pergolas, as well as sculptures made of stone and copper.

Figure. 16 Materials on site, Author's figure

### 3.2.5 Topography analysis

Based on information from the topographic website, the terrain of the site has been queried. Currently, the elevation of the highest point on the site is 64 meters, and the elevation of the lowest point is 60 meters. The height difference between the highest and lowest points is 4 meters. The width of the site ranges from 100 to 150 meters. In this situation, it is found that the entire park is almost flat, with the middle being higher and the sides lower, and the

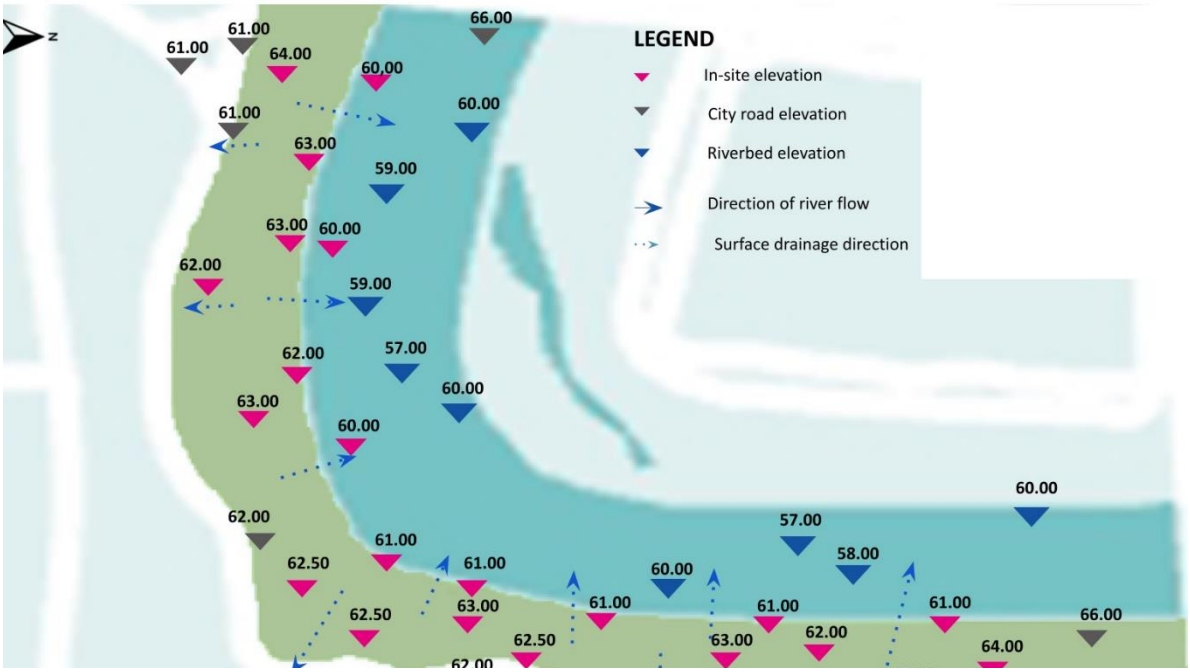



Figure. 17 Site elevation, Author's figure

part near the river being the lowest. Therefore, grassy slopes can be designed near the water, and more activity-based functional areas can be designed at the higher middle part. Taking into account the needs of disabled people, barrier-free access should be designed where there are height differences.

### 3.2.6 Vegetation analysis

The survey shows that there are 66 families and 104 genera of plant species along the Sha Li River in Luohe City, including 30 families and 48 genera of arbor species, 23 families and 35 genera of shrubs, and 13 families and 21 genera of herbs. There are five planting forms, specifically single planting, paired planting, row planting, group planting, and ground planting. The configuration of garden plants basically adopts a single regular configuration form, and only a few small areas and some small garden scenes adopt natural planting methods. In addition, there is a lack of connectivity and communication between plant configuration and the surrounding water bodies, which makes it look like several fragmented parts rather than a unified whole. This makes the overall lack of flexibility, naturalness, and coordination.

The main ground cover plant species in the Sha Li River Scenic Area of Luohe City are: Euonymus fortunei var. radicans, Iris, Weigela 'Red Prince', Cynodon dactylon, Ophiopogon japonicus, Mahonia bealei, Lysimachia nummularia, Phlox subulata, Verbena hybrida, Sedum spectabile, Hosta plantaginea, Iris pseudacorus, Pittosporum tobira, Hemerocallis middendorfii, and Rosa chinensis.

There are a total of 203 species of wetland plant resources, including 27 wetland plants, 11 aquatic plants, and 65 shade-tolerant wetland plants. Generally, in shallow waters near the shore, emergent plants such as Phragmites australis, Typha orientalis, and Iris pseudacorus grow. In deeper waters, floating-leaved plants such as Nymphaea tetragona, Nelumbo nucifera, Trapa bispinosa, and Nymphoides peltata grow. Another part is located in deeper waters or the central area of the water body, submerged underwater, such as Myriophyllum verticillatum and other aquatic plants.

After investigation, it was found that the arbor species in the site include Cedrus deodara, Ligustrum lucidum, Ginkgo biloba, Sophora japonica, Cinnamomum camphora, Robinia pseudoacacia, Platanus orientalis, Koelreuteria paniculata, Acer mono, Salix babylonica, Fraxinus chinensis, Magnolia grandiflora, and Metasequoia glyptostroboides. The shrubs include Prunus cerasifera, Photinia, Lagerstroemia indica, Hibiscus syriacus, Cercis chinensis, Buxus sinica, Rosa chinensis, Jasminum nudiflorum, Forsythia suspense, and Syringa. The herbs include dwarf Bermudagrass, Trifolium, Ophiopogon japonicus, and Oxalis corymbosa, as well as Ophiopogon japonicus, Axonopus compressus, Ophiopogon japonicus, Calendula officinalis, Tagetes patula, and Zinnia elegans.

The primary function of this section is leisure and observation. It boasts a rich and diverse landscape with a comprehensive array of features, particularly a large variety of ornamental trees and flowers. Special attention has been paid to the seamless transition and complementarity of plant blooming periods throughout the four seasons. There is a well-maintained plum orchard on the site. Most of the trees in the area were planted during the landscape design in 2007. There are both 20-year-old large trees and newly planted saplings. While most trees are in good condition, plant maintenance and management are relatively weak, with some trees not being pruned in a timely manner. Additionally, the variety of plants

is somewhat chaotic.

Figure. 18 Existing plants, Author's figure

## 3.3 Summary of the analysis

### 3.3.1 Value analysis

After the large scale analysis and the small scale analysis, there are many values of design scope that are summarized. Firstly, a reasonable layout has been implemented in the park, providing a large number of car parking spaces, which makes it convenient for the public to arrive by car. Secondly, the cycling track in the park is flat and spacious, designated as the venue for the City's annual mountain bike riding competition. Cyclists can enjoy the thrill of cycling here while also admiring the park's stunning scenery. Additionally, the installation of the bike path encourages more people to adopt green travel modes, thereby contributing to the city's environmental protection. Further more, the park's topography is undulating, featuring both gentle grasslands and winding paths.Finally, the city's pleasant climate is conducive to the growth and maintenance of plants. Simultaneously, this agreeable climate

attracts a large number of tourists to visit the park, further enhancing its popularity and influence.

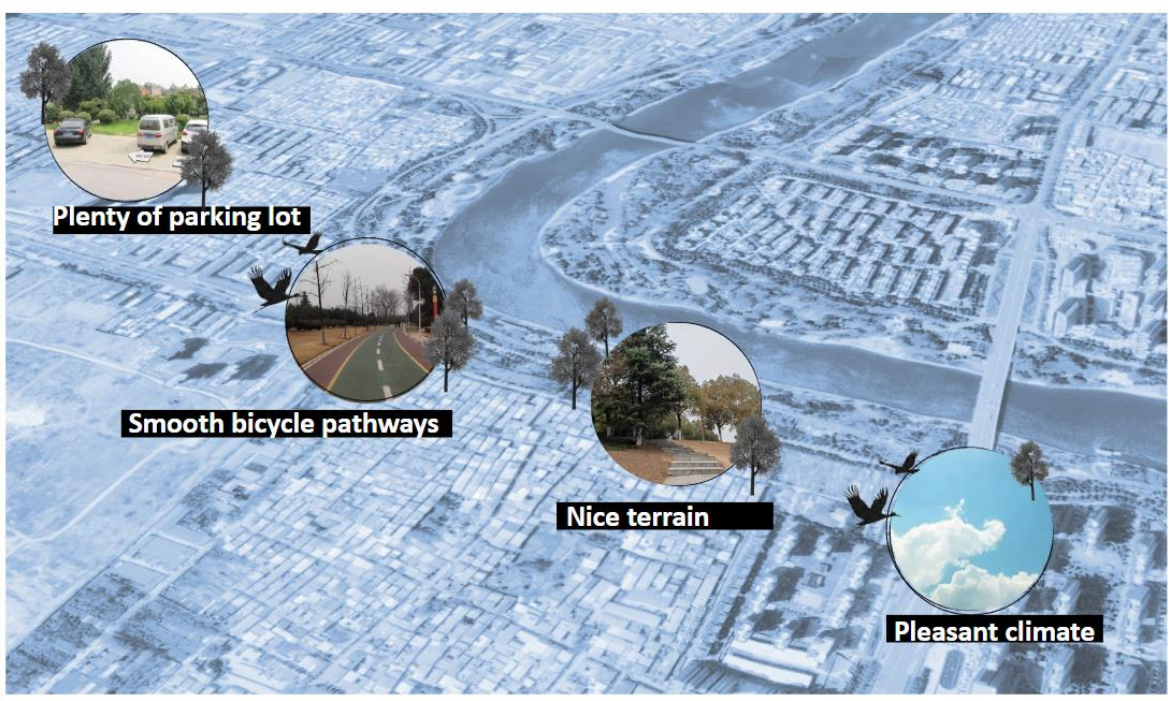



Figure. 19 Value map, Author's figure

### 3.3.2 Conflicts analysis

Although there are many advantages of the park, some conflicts are found. Firstly, the entrance landscape of the park is unattractive, which not only affects the overall image of the park but also reduces visitors' interest in exploring it. Improving the entrance landscape would highlight the unique characteristics of the park and effectively guide visitors to enter and discover the various areas within. Secondly, the pedestrian paths in the park are narrow and uneven, lacking the necessary resting facilities and directional signs. This results in visitors feeling easily tired and disoriented during their visit. Further more, the connection between the park and the water bodies is insufficient, preventing visitors from getting close to the water and experiencing its charm. Finally, the park suffers from obvious deficiencies in functional zoning, lacking a clear division of functional areas. This leads to confusion and

inconvenience for visitors during their use of the park.

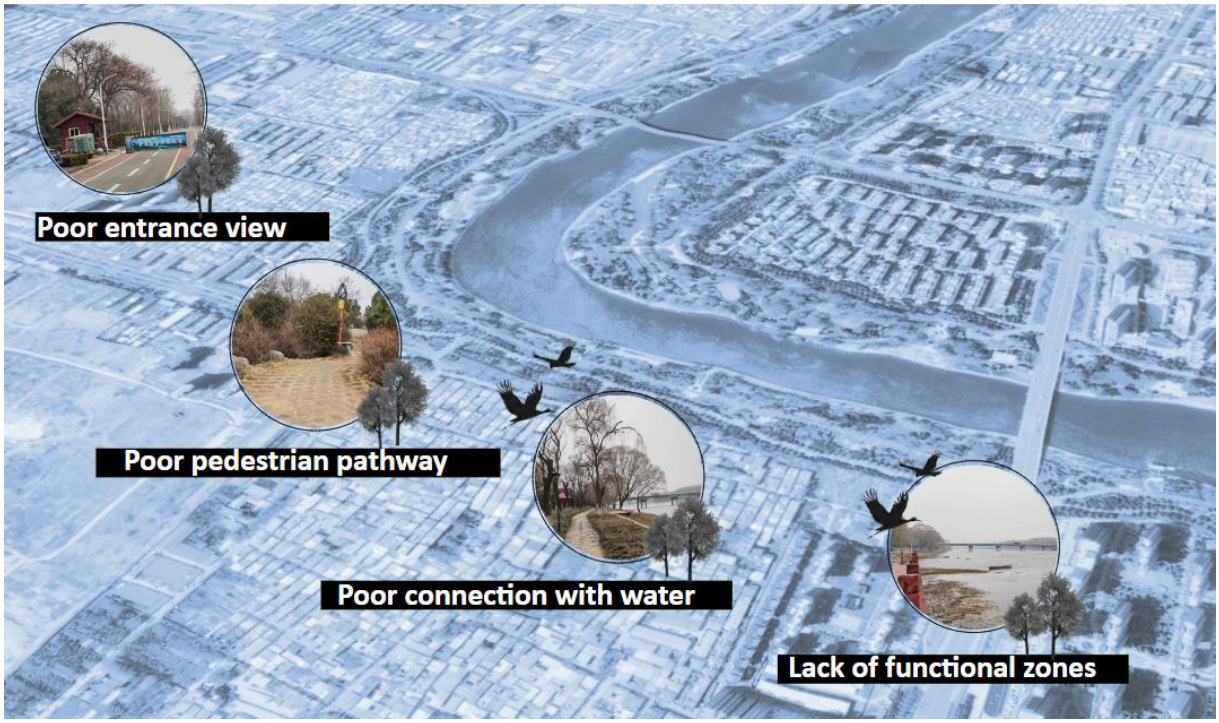



Figure. 20 Conflicts map, Author's figure

# IV. DESIGN CONCEPT

## 4.1Relevant Laws and Policies

*"General Land and Space Planning of Luohe City 2021-2035"*

*"Special Green Space Planning in the Central City of Luohe 2018-2030"*

*"Urban Master Plan of Luohe City 2012-2030"*

*"Urban Green Space System Planning of Luohe City 2013-2030"*

*"Regulations on Urban Greening Management in Luohe City (revised in 2020)"*

*"Classification Standards for Urban Green Spaces (CJJT85-2017)"*

*"Park Design Specification (GB51192-2016)"*

*Luohe City Urban Greening Implementation Rules,2009 (INT-11)*

## 4.2 Target use and users

On a smaller scale, the park provides a diverse range of services as a comprehensive riverfront green space for neighboring residents. On a larger scale, the green space is an integral part of the Shalee River Scenic Area, primarily serving the general public. Both residents and visitors can freely choose and carry out their favorite activities in the venue. For example, they can

choose more peaceful activities such as meditation, walking,  fishing and resting, or they can participate in more lively activities such as games, sports, boat tours and learning exchanges.

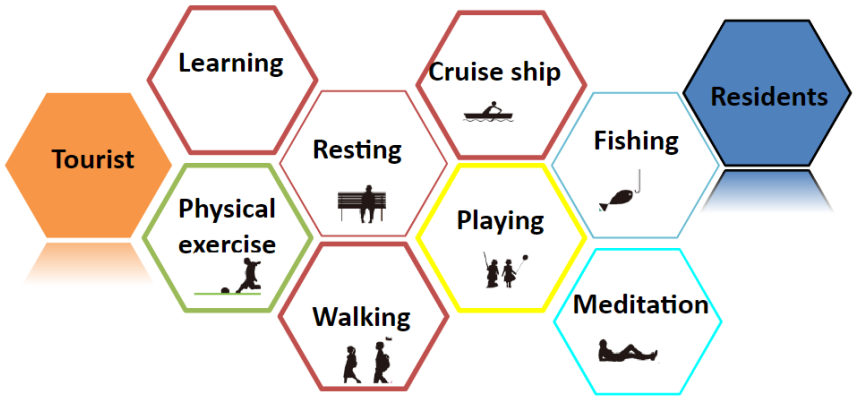



Figure. 21  Target use and users, Author's figure

## 4.3 Design strategy

1.Connection between city and waterfront

Strengthen the connection between the waterfront and adjacent land, and create a variety of recreational spaces to establish a connection between the city and the waterfront.

2.Connection between man and nature

Build a natural and harmonious water ecological environment and establish a connection between man and nature.

3.Plant science education theme

Design several groups of gardens with different themes, stimulate tourists' curiosity and exploration, and gain popular science knowledge.

## 4.4 Design Concept

A comprehensive riverside park with plant science education function.

In the functional areas are mainly plant species that have been artificially selected and planted for ornamental purposes. Other areas are native, low-maintenance plant species with ecological functions.

## 4.5 Functions strategy

The connection between the city and the green space is primarily achieved through the main roads of the city. At the two intersections where the urban roads meet the green space, main entrances have been designed to facilitate the access of crowds to the site. Situated between these two entrances, the primary activity area encompasses a range of public functions, including sports facilities, squares, architectural elements, and spaces for gatherings. The riverfront green space borders the river on one side and the city on the other. Consequently, during the functional design process, this aspect was taken into careful consideration. Specifically, as the design approaches the river, it becomes more naturalistic; whereas, nearer to the city, it adopts a more urbanized style. This layout strives to foster a harmonious coexistence between nature and the city, offering citizens a public space where they can both embrace the tranquility of nature and enjoy the amenities of the city.

## 4.6 Road system strategy

Considering the existing topography of the site, it is characterized by a high center and low sides. In order o meet the needs of different people using the site, the road design is divided into three main levels of hierarchy. Firstly, the first level is the existing cycle paths and footpaths, which are located at the highest part of the site topography. Secondly, the second hierarchy of paths is adjacent to urban roads for residents who simply want to participate in activities and do not want to be close to the water's edge. Finally, the third hierarchy of paths is adjacent to the river, providing visitors and residents with the convenience of viewing and accessing the water while minimizing disturbance to the watershed in order to emphasize its ecological qualities. In addition, road connections between the three levels ensure easy access

to the various functional areas, thus demonstrating the integrity of the site.

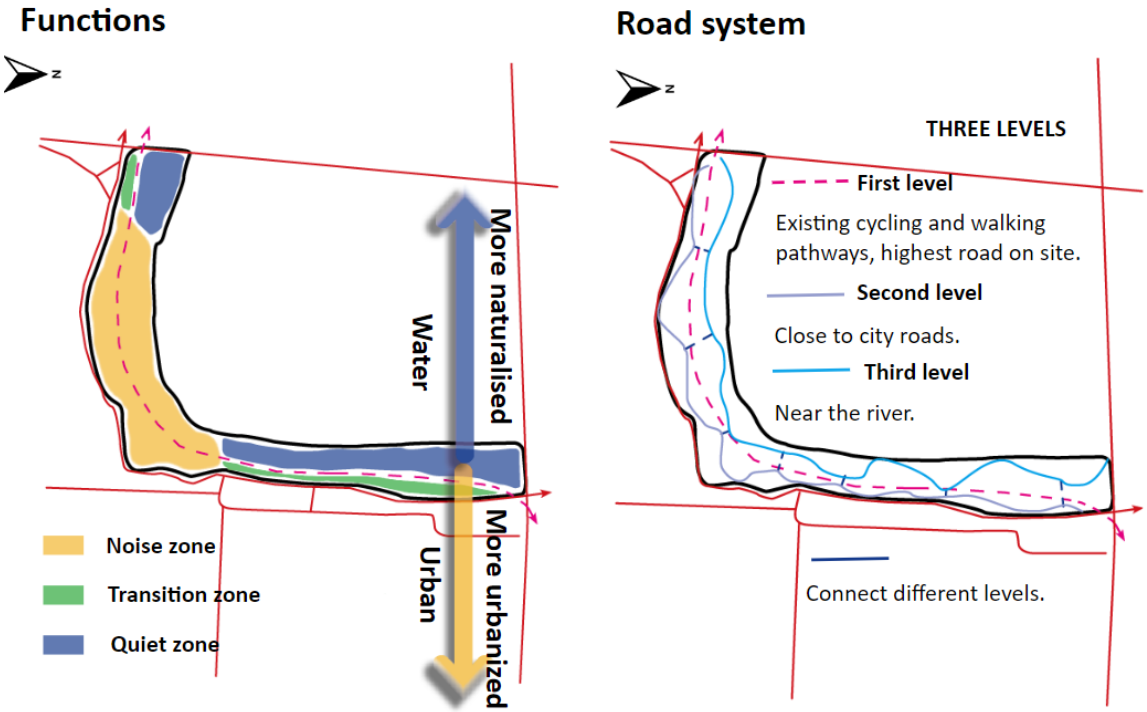



Figure. 22 Fouctions, roadsystem strategy, Author's figure

## 4.7 Pedestrian aggregation strategy

The accessibility, comfort, and functionality of an area contribute significantly to pedestrian congregation. The artful application of color, texture, and lighting enhances the appeal of the space. Additionally, the integration of plants, sculptures, and other landscape elements creates a visually captivating environment that encourages people to linger and admire. Within pedestrian-congregated areas, the provision of ample activity spaces and rest facilities such as seating is crucial for fostering social interaction. In the later stages of design, I aim to achieve three distinct levels of crowd density: high-density areas between the two entrances, medium-density areas in the wetland region, and low-density areas around the meteorological observation station. It is anticipated that crowds will primarily gather in activity zones, waterfronts, and around various landscape facilities. Through this design approach, we strive to create pedestrian-friendly spaces that are both functional and

aesthetically pleasing.


Figure. 23 People gathing strategy, Author's figure

## 4.8 Bubble diagram

After preliminary analyses and in conjunction with the strategy development, a careful spatial layout of the site was planned. Firstly, the meteorological observatory was retained and a small plaza was designed near it to create a functional and coordinated area. The entrance plaza serves as a comprehensive activity center, combining an assembly plaza, service buildings and an observation deck to meet the needs of a wide range of activities. In the layout, the core area between the two entrances is set to be the main focus of pedestrian activity, with relatively little consideration of its natural attributes. Therefore, activities of a more athletic nature that may generate noise, such as a waterside theater, children's area and outdoor fitness area, are located in this area. The areas near the water are more natural and ecological in nature. In order to maintain the natural appearance of the site, fewer functional areas are set up in this area, allowing native plants to grow naturally, and at the same time functioning as a flood defense when the water level is high. In order to highlight the characteristics of the site, a plant display design was carried out, and five distinctive plant display areas were carefully planned at different locations of the site. In addition, through the

construction of a three-level road system, it effectively connects the various functional areas and meets the needs of different people.

Through the above layout planning, it aims to realize the multi-functionality, ecology and characteristics of the site, and provide users with a practical and aesthetic spatial environment.

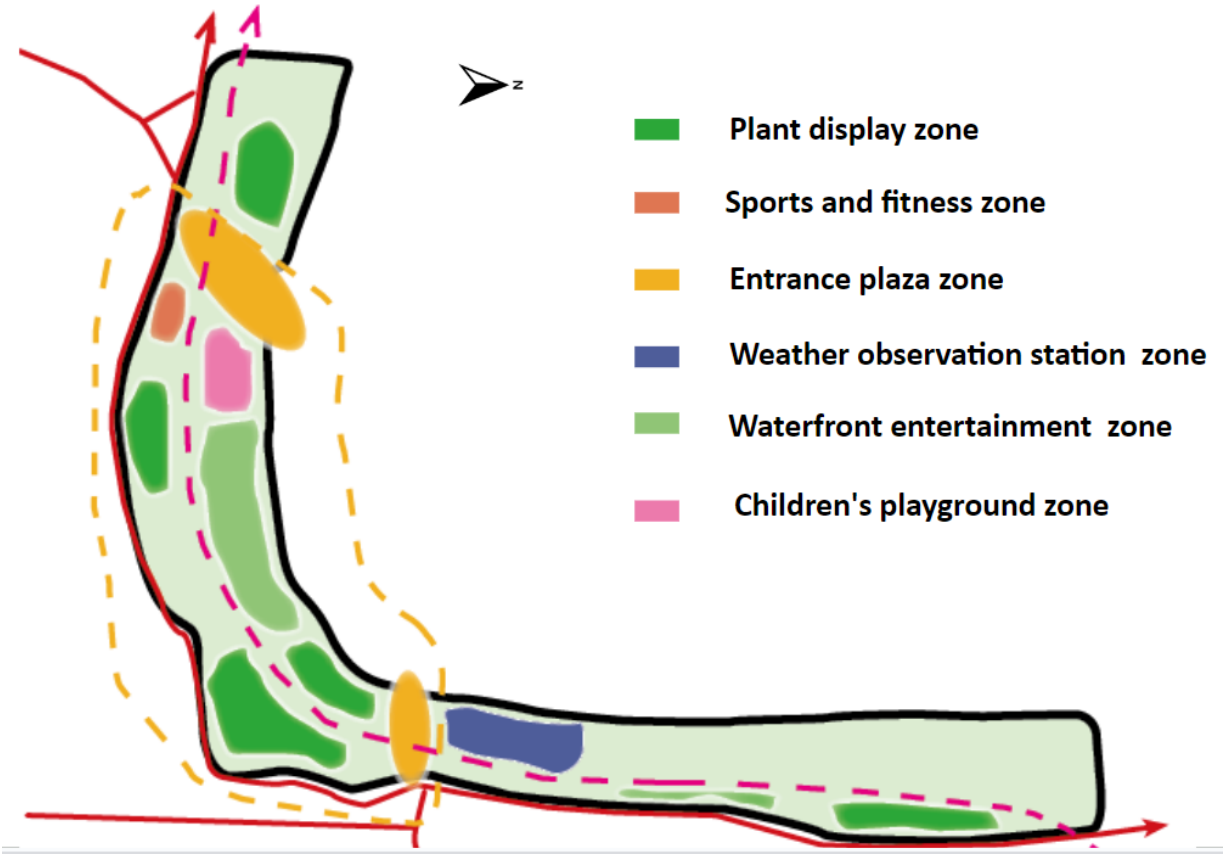



Figure. 24 Bubble diagram, Author's figure

# V SITE DESIGN

## 5.1 Masterplan

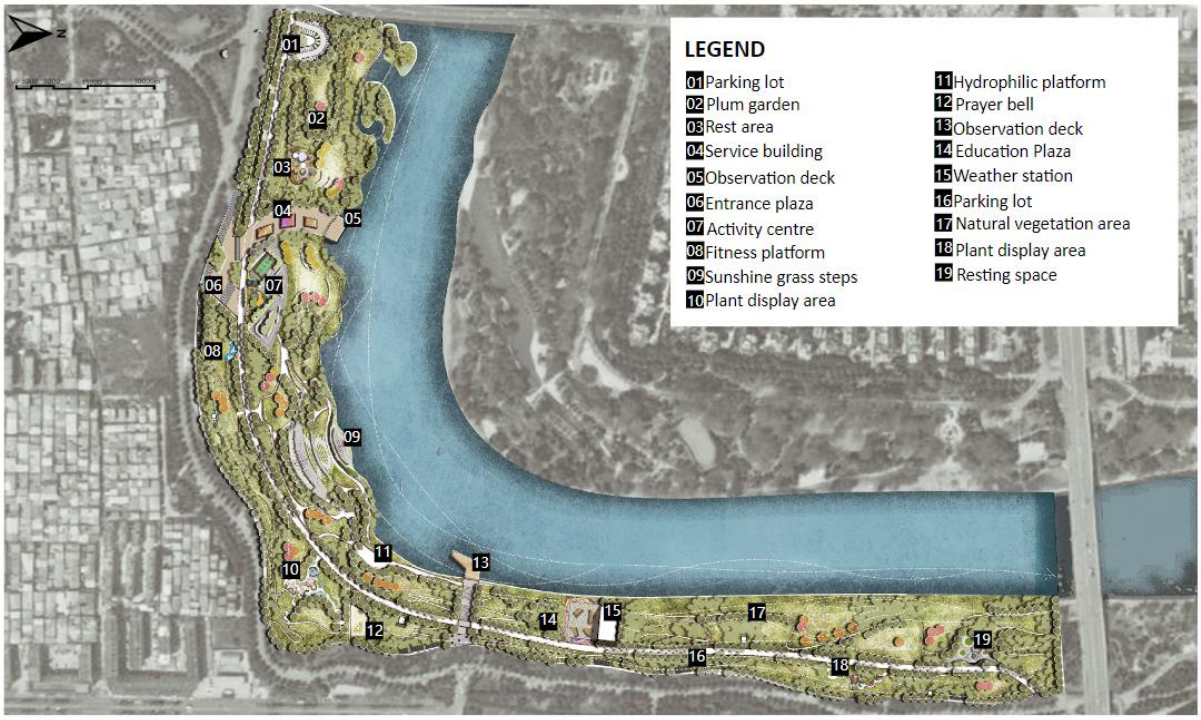



Figure. 25 Masterplan1:3000, Author's figure

After design, within this area, the green space accounts for 172,327 square meters, resulting in a green coverage rate of 91.8%. The remaining 8.2% is occupied by structures, landscaping elements, and roadways. After the design, a total of 104 parking spaces are provided.

In the design of urban waterfront areas, it is generally observed that the more entrances are designed, the higher the visibility and accessibility to the water space, leading to increased footfall and subsequently greater impact. Therefore, multiple small entrances have been strategically placed along the roadside near the city, facilitating access to the site.

I have retained the site's inherent strengths while addressing its shortcomings through transformational and enhancement designs. Spatial organization and planning have been reimagined to enrich functionality, highlight unique features, and inject vitality into the site, thus satisfying the needs of both residents and visitors. The existing major roadways have been preserved, connecting other green spaces and providing a seamless and enjoyable cycling experience. Furthermore, the existing parking lot and meteorological observatory have

been retained, and an activity plaza has been designed adjacent to the observatory. Historical sculptures, such as the Prayer Bell, and well-established plants have also been preserved.

To enhance the entrance image of the park, I have employed a combination of stairs and platforms to address elevation changes, incorporating barrier-free facilities for the convenience of disabled individuals. The entrance area has been reinforced with children's play areas, rest plazas, service buildings, and an outdoor fitness center. Within the core area between the two entrances, hydrophilic designs have been introduced, including a waterfront plaza, amphitheater, and sunny lawn, to enrich visitor experiences.

The western side of the main entrance highlights ecological resilience, featuring ecological floating islands and wooden walkways that allow visitors to experience the wetlands while also serving a flood control function through wetlands and storm sewers. The existing plum garden has been retained and complemented with a rest area and a botanical exhibition zone. On the northern side of the secondary entrance, the focus is on ecology, primarily through plant experiences, with designated zones for plant displays, resting areas, and the meteorological observatory.

Through these designs, the aim is to create a functionally comprehensive, ecologically harmonious, and vibrant public space that caters to the diverse needs of residents and visitors.

## 5.2 Function

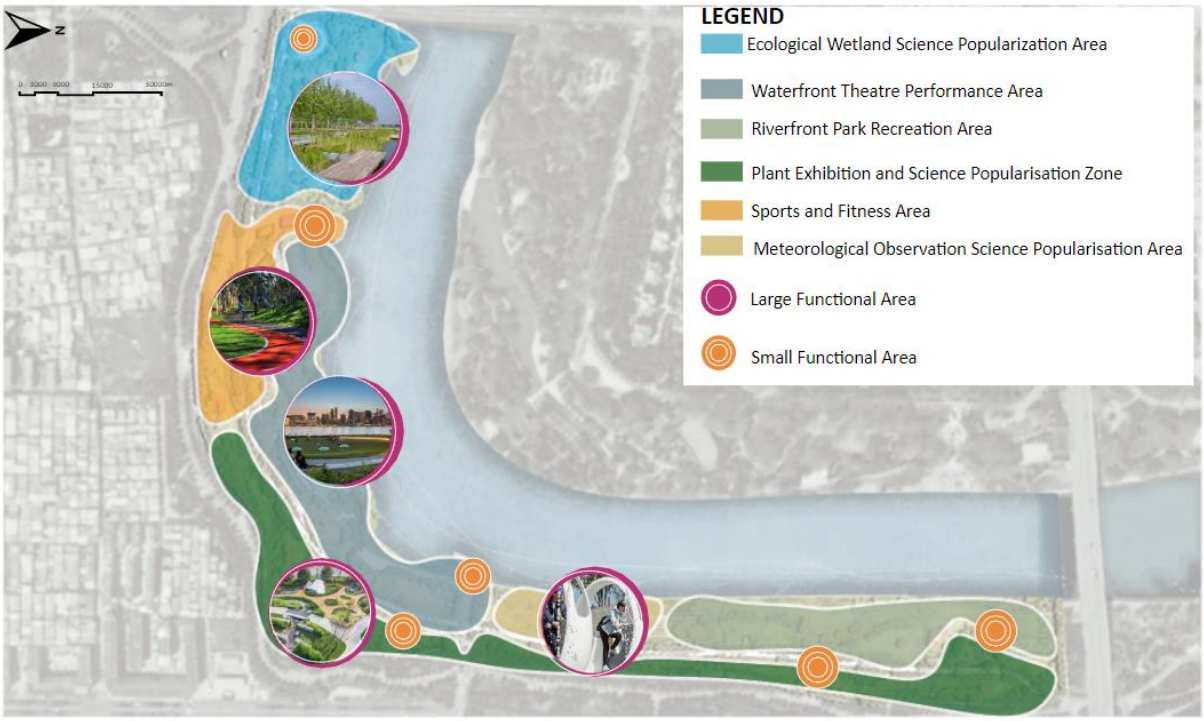



Figure. 26 Function, Author's figure

The entire area is divided into six distinct zones: the Ecological Wetland Science Popularization Area、the Waterfront Theatre Performance Area、the Riverfront Park Recreation Area、the Plant Exhibition and Science Popularisation Zone、the Sports and Fitness Area and the Meteorological Observation Science Popularisation Area.

These zones are further categorized into dynamic linear spaces and nodal spaces. Through the connection of these dynamic linear spaces, different types of activity units are integrated, creating a coherent and balanced waterfront activity space that seamlessly integrates movement and tranquility.

This space accommodates a diverse range of activities for individuals of all ages and physical conditions, providing spaces that cater to the specific needs of residents. For instance, facilities for parents to rest are provided adjacent to play areas for children's doodling and play; viewing areas are designated for youth activities such as skateboarding, basketball, and football; and spaces suitable for elderly individuals to engage in dance activities like square dancing and social interactions are also incorporated.

## 5.3 Vertical design

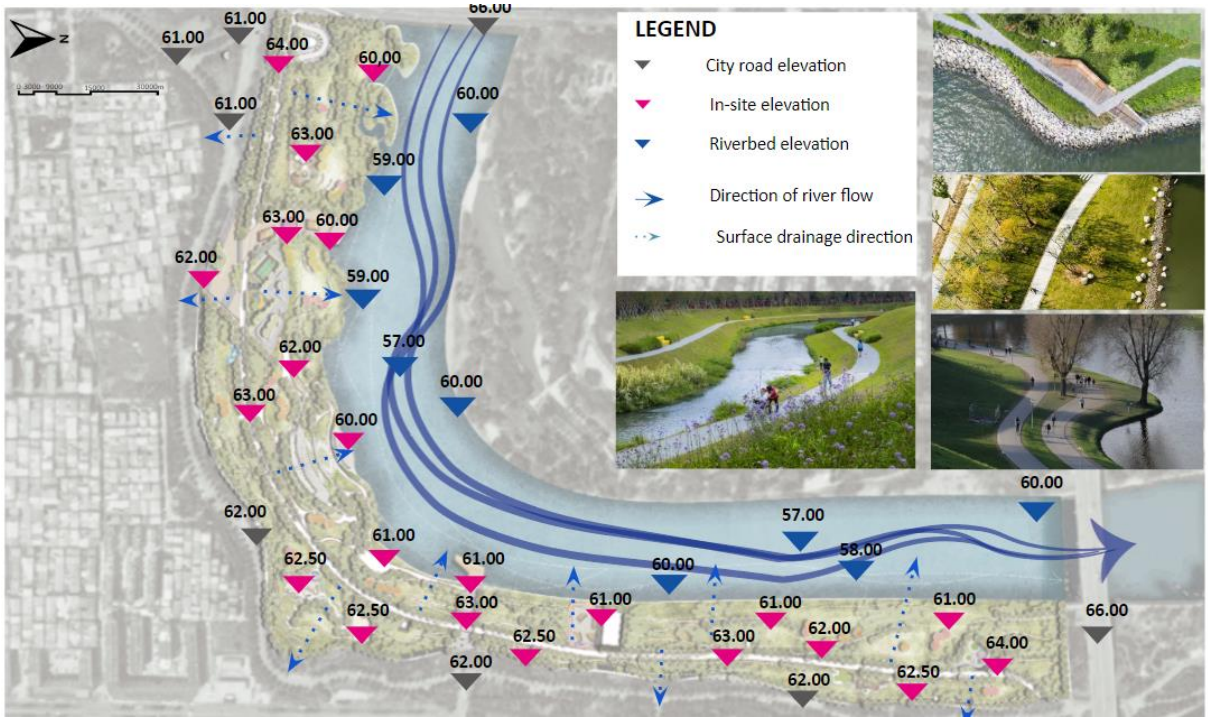



Figure. 27 Site elevation, Author's figure

The design of the terrain significantly impacts the natural conditions of the site, including drainage and microclimate, while also directly influencing the visual effects and functionality of the landscape. In detail, the elevation of the urban road ranges from 61.00 to 62.00 meters, while the river's height varies between 57 and 60 meters. The site, on the other hand, lies between 60 and 64 meters in elevation. Notably, the highest point of the site reaches 64 meters, creating a 3-meter elevation difference with the river and a 2-meter difference with the urban road. Given that the greenbelt measures approximately 100 meters in width, the site exhibits relatively flat terrain. In terms of drainage, the majority of rainwater on the site is directed towards the river, while a portion is diverted to the city's stormwater sewer system. Through careful planning of the terrain, I aim to achieve harmony between the landscape and its surrounding environment, thereby providing a comfortable and pleasant recreational space for visitors.

## 5.4 Barricade form

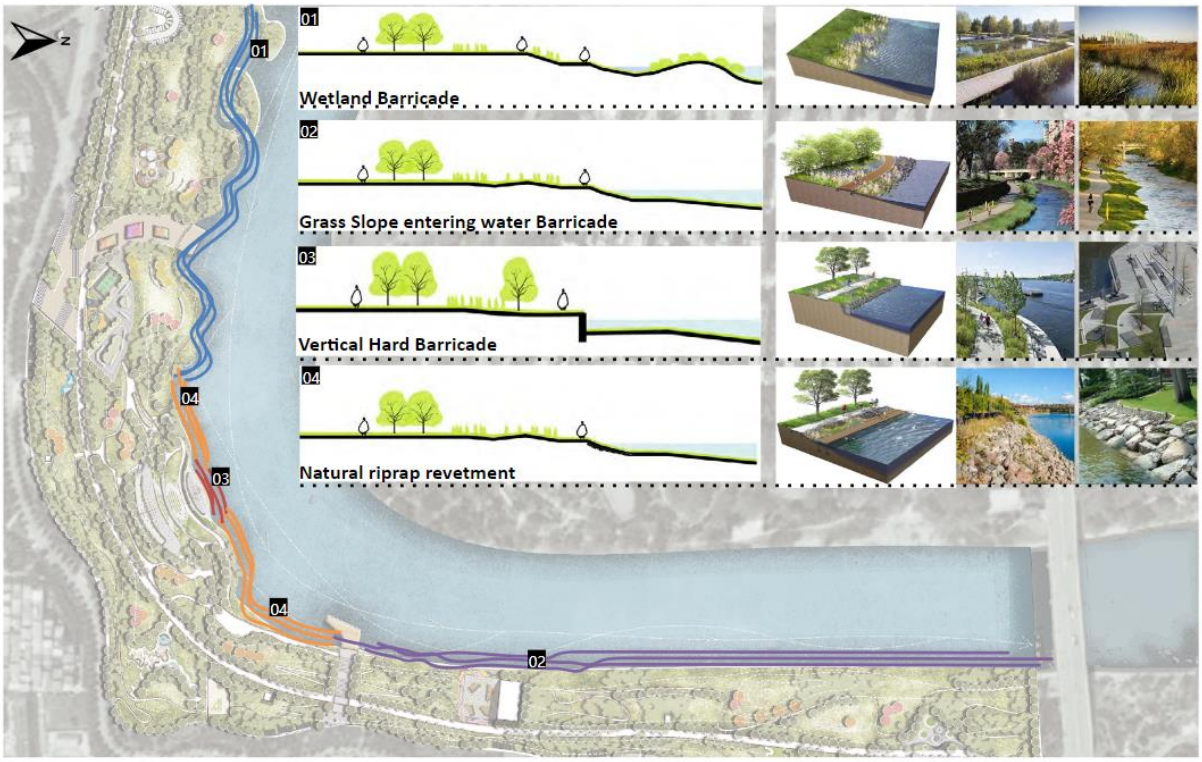



Figure. 28 Four types of revetments, Author's figure

In landscape design, the riparian zone serves as a transition between water bodies and land, and it is crucial to thoroughly consider its functional and safety requirements, including flood control and drainage. In this site design, four distinct types of riparian features have been planned: wetland barricades, grass slopes entering water barricades, vertical hard barricades, and natural riprap revetments.

The wetland barricade emphasizes the integration of ecological and natural elements, utilizing natural materials such as stones and wood. This not only helps maintain the ecological balance of the wetland but also provides diverse habitats for wetland organisms. Functionally, it plays a vital role in flood control and drainage, effectively guiding the discharge of rainwater during the rainy season and preventing flooding. During droughts, it preserves moisture, maintaining the wetland's ecological functions.

The grass slope entering the water barricade combines the gentle lines of the grass slope with the sturdy form of the barricade. During the rainy season, the grass slope absorbs rainwater, slowing down the flow and serving as a flood control and drainage measure. Meanwhile, the

barricade, constructed with durable materials, takes into account ecological factors, providing habitats and breeding spaces for aquatic organisms while also offering an excellent location for people to appreciate the waterscape.

The natural riprap revetment employs a variety of naturally shaped and sized stones, such as pebbles, gravel, and boulders, densely laid on the slope of the riparian zone. This type of revetment effectively resists erosion and water flow, safeguarding the stability and safety of the riverbank. The gaps between the stones allow water to flow freely, maintaining the humidity and ecological balance of the riverbank. Additionally, these gaps provide growth spaces for microorganisms and plants, fostering rich biological communities that further improve water quality and enhance biodiversity.

The vertical hard barricade is constructed from durable materials like concrete and stone, effectively preventing erosion and facilitating water management tasks such as water level control and flood prevention. Functionally, it also serves as an observation deck or resting platform, offering people the opportunity to get close to the water and appreciate the beauty of the waterscape. Its sturdy structure also provides safety for aquatic activities.

## 5.5 Road System design


Figure. 29 External road pathway, Author's figure

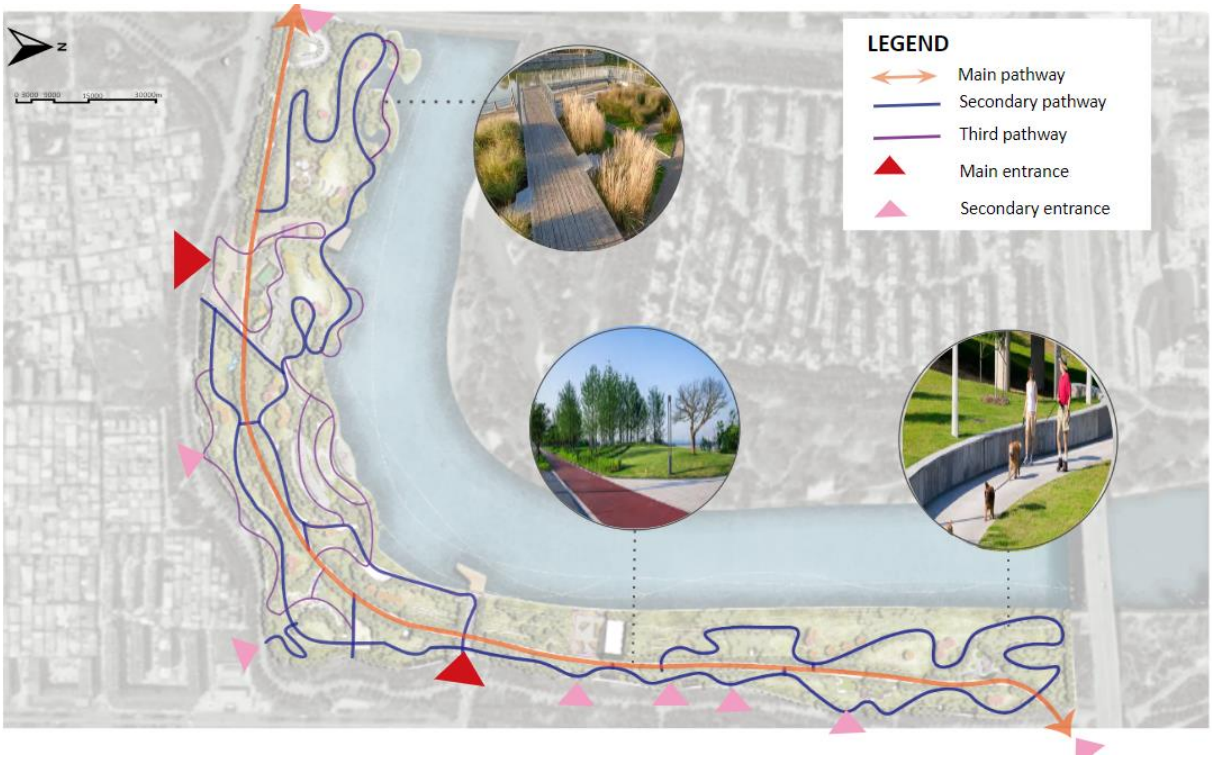



Figure. 30 Internal pathway system, Author's figure

Only pedestrian traffic is permitted on the site, with no cars allowed. City roads connect the site, and access to the site is via footpaths after parking at the various entrances.

After the design, the road system comprises three distinct hierarchies. The first level consists of existing roads. The main road has a width of 8m, with 6m designated for bicycle riding and 2m for pedestrians. The bicycle road extends to a length of 1400m. The material used for the main road is colorful concrete. The second level comprises roads located near city streets. These secondary roads measure 3m in width and are constructed using bricks. The tertiary roads, with a width ranging from 1.5m to 2m, are designed for the passage of three or two people. The materials used for these roads include rubber, gravel, wood, and other similar substances.

## 5.6 Public service


Figure. 31 Public service, Author's figure

Certain aspects of the region's infrastructure and accompanying roadways and paving appear unreasonable. For instance, some seating arrangements are situated in grassy areas, rendering them unusable due to muddy conditions after rainfall. Additionally, some leisure pavilions and gazebos lack accessible paths, or the paving is uneven and challenging to walk on, leading to a substandard user experience. Consequently, the frequency of utilization is significantly reduced.

The supporting facilities are primarily limited to basic amenities such as seating and trash bins, which fall short in meeting modern demands, particularly those related to mothers with infants and pet activities. In terms of infrastructure maintenance, some facilities are outdated and lack proper care. Notably, the paving in certain areas has not been maintained for a considerable period, resulting in impassable conditions. Furthermore, there are issues with the functional layout, which does not align with the spatial usage requirements or is unreasonably arranged. For instance, many sports facilities lack adjacent resting areas and toilets.

After the redesign, the area will possess a comprehensive range of infrastructure, including toilets, pergolas, bicycle stations, drinking water points, activity areas, car parking lots, and public service areas. This will cater to the diverse needs of different user groups, ensuring a more inclusive and functional environment.

## 5.7 Vegetation


Figure. 32 Vegetation zones, Author's figure

The proportion of the green area after design is 91.8%, which is much higher than the current situation. And the proportion of built-in area is reduced to 8.2%. In the tree felling map, although I tried to keep most of the trees in the park, there are still some trees I need

to remove because of the design. I will cut the trees which are old or diseased, and for the young and healthy trees I would like to transplant them to other places.

In areas primarily designed for human activities, such as activity plazas, rows of arbor trees are often planted. In contrast, in areas specifically designed for plants, we pay more attention to ecology, striving to preserve their original varieties and allowing them to grow and regenerate naturally. As for ornamental areas, colorful flowers and trees with graceful shapes are used. Through reasonable layout and combination, we utilize the diverse colors, shapes, and textures of plants to create landscapes with rich layers and excellent visual effects. When selecting plants, we carefully choose varieties that are well-adapted and grow at a normal rate in Luohe City, in order to avoid introducing exotic species that may disrupt the ecological balance. Specific plant varieties will be presented through pictures.

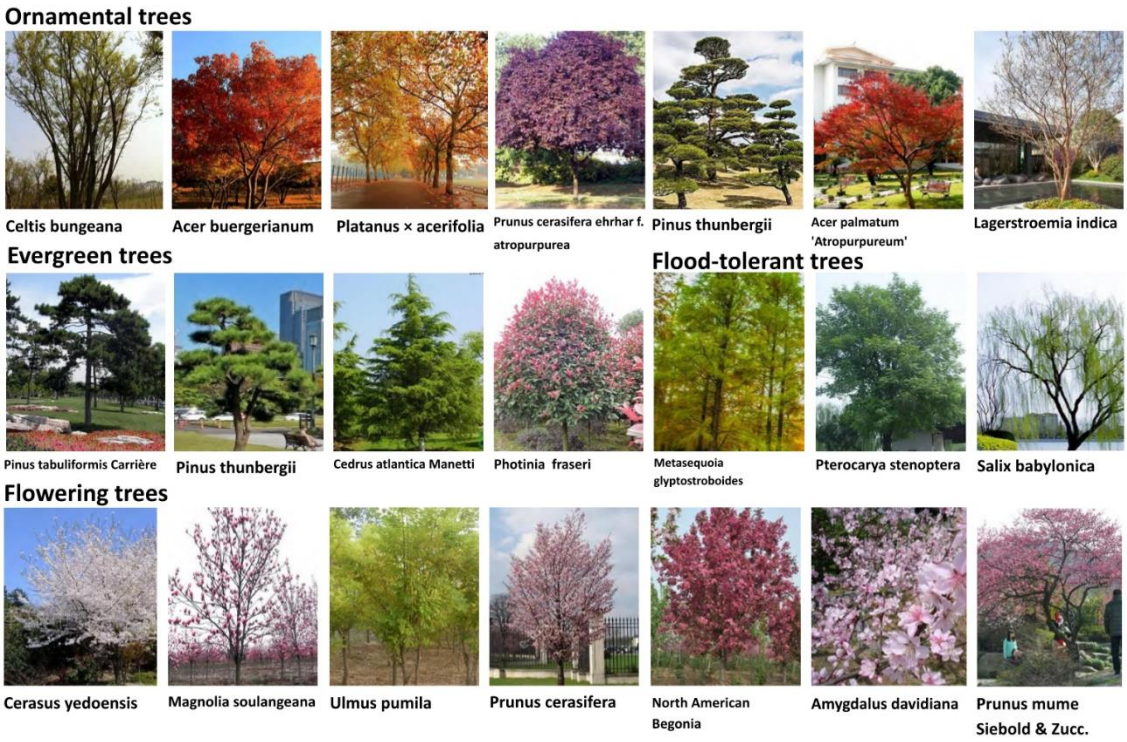



Figure. 33 Plant species , Author's figure

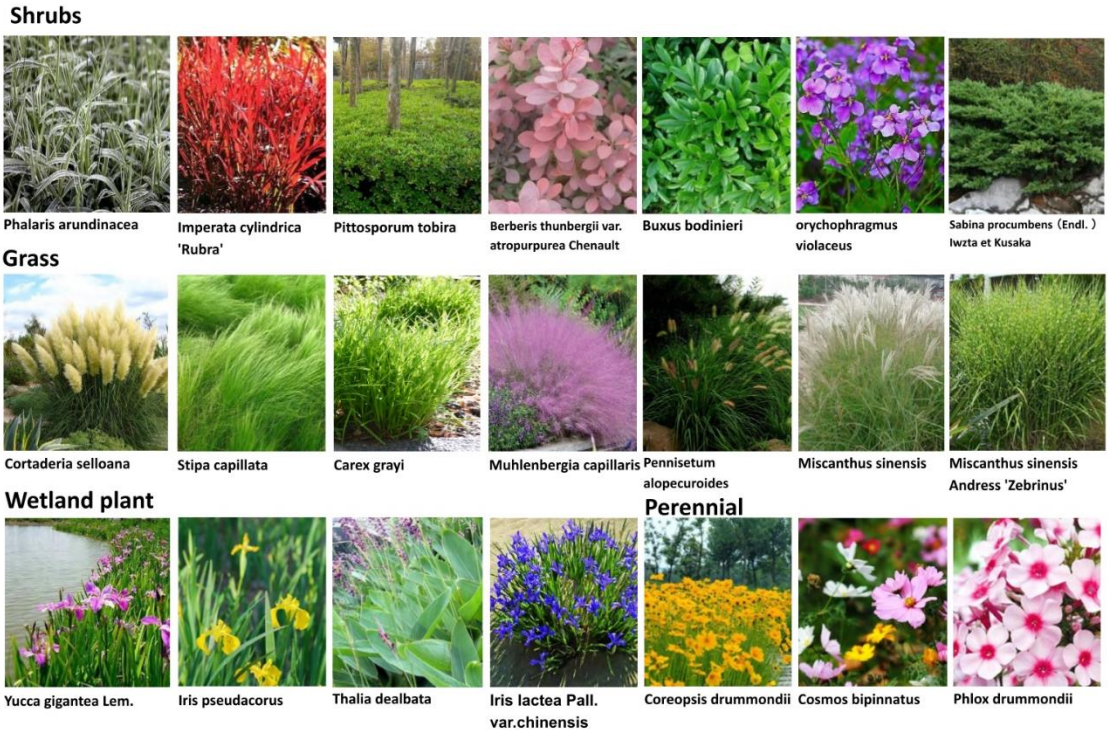



Figure. 34 Plant species, Author's figure

# 5.8 Visualizations

## 5.8.1 Plant science exhibition area

Currently, there are relatively few aquatic plant species growing in Luohe City. Therefore, the plant exhibition area is designed by the waterside with plenty of seats for people to rest. In terms of paving, a combination of stones and lawns is adopted to create a natural and harmonious atmosphere. Additionally, different varieties of wetland plants are displayed on the walls, allowing children to learn relevant plant knowledge while their parents are supervising their play.


Figure. 35 Visualization of plant science exhibition area

### 5.8.2 Sunny lawn area

The site is relatively flat and has an open view, enabling one to admire the beautiful river scenery and see the park across the river. Therefore, a sunny lawn area is designed between the activity plaza and the river, focusing mainly on lawn and flowers with fewer arbor trees planted. In spring, when the sun is abundant, people can freely engage in activities on this lawn, enjoying the tranquility of nature.

Figure. 36 Visualization of sunny lawn area

### 5.8.3 Road area

The roads within the site are not accessible to vehicles, while the main roads allow bicycle access and the remaining roads are exclusively for pedestrians. To create a serene atmosphere, arbor trees, shrubs, and flowers are planted along the sides of roads without designated functional areas, thereby establishing a high-quality outdoor environment for running and scenic appreciation.

Figure. 37 Visualization of road area

## 5.8.4 Observation deck area

Through two large entrances, one can directly reach the riverside. There is a viewing platform close to the riverbank, which extends partially over the water and partially onto the shore, allowing for closer contact with the water and a better appreciation of the water scenery. The material for the path near the water edge is wooden boardwalk.

Figure. 38 Visualization of observation deck

## 5.9 Detail plan

### 5.9.1 Detail master plan

I have chosen the integrated activity area to the riverbank as my detailed design area, as it not only showcases the human activity zone but also demonstrates my designed plant growth areas. The main landscape facilities include a jogging path, basketball court, table tennis table, children's slide, fitness equipment, etc. There are also landscape seats, tree pools, retaining walls, grassy slopes, and flowering borders.A detail masterplan is created to show the materials, distribution of vegetation, water management, terrine elevation and the road system. For the material design, I would like to use red concrete for the main road, brick for the secondary road, rubber for the running pathway and children play area, wood

for the waterfront pedestrian.

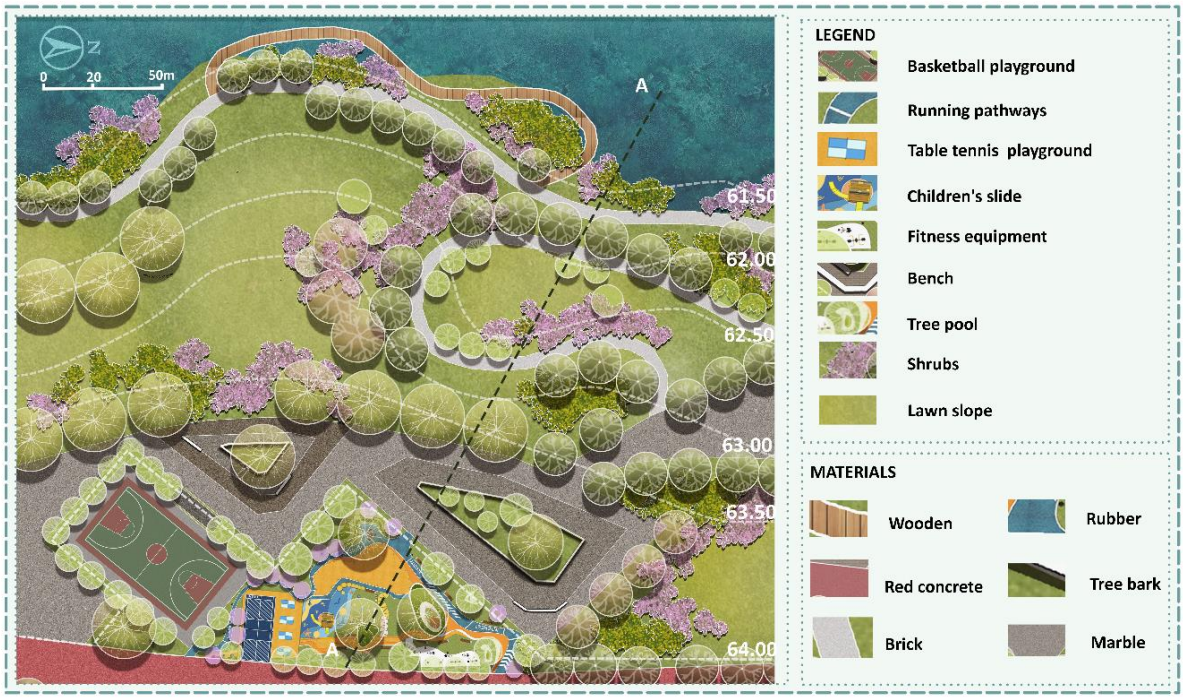



Figure. 39 Detail masterplan 1:500, Author's figure

Figure. 40 Section A-A 1:500, AUthor's figure

## 5.9.2 Vegetation design

For the vegetation design, most of the plant species that I chose are native species.

In the human activity areas, trees are planted mainly in regular rows. There are several large, preserved trees in the functional zones. Highly ornamental trees are planted on the grassy slopes. Dense forests enclose these two functional areas, creating a private space. Colorful flower beds are also planted at the entrance of the square and by the river.

The plant species are as follow:Trees: Pterocarya stenoptera, Metasequoia glyptostroboides , Salix babylonica, Cerasus yedoensis, Magnolia soulangeana , Celtis bungeana, Acer buergerianum, Platanus × acerifolia, Prunus Cerasifera ehrhar f. atropurpurea , Pinus thunbergia.

Shrubs:Phalaris arundinacea. Imperata cylindrica 'Rubra'. Pittosporum tobira. Berberis thunbergii var. atropurpurea Chenault. Buxus bodinieri.

Grass: Carex spp.  Muhlenbergia capillaris .  Pennisetum alopecuroides. Miscanthus sinensis. Miscanthus sinensis Andress 'Zebrinus'.

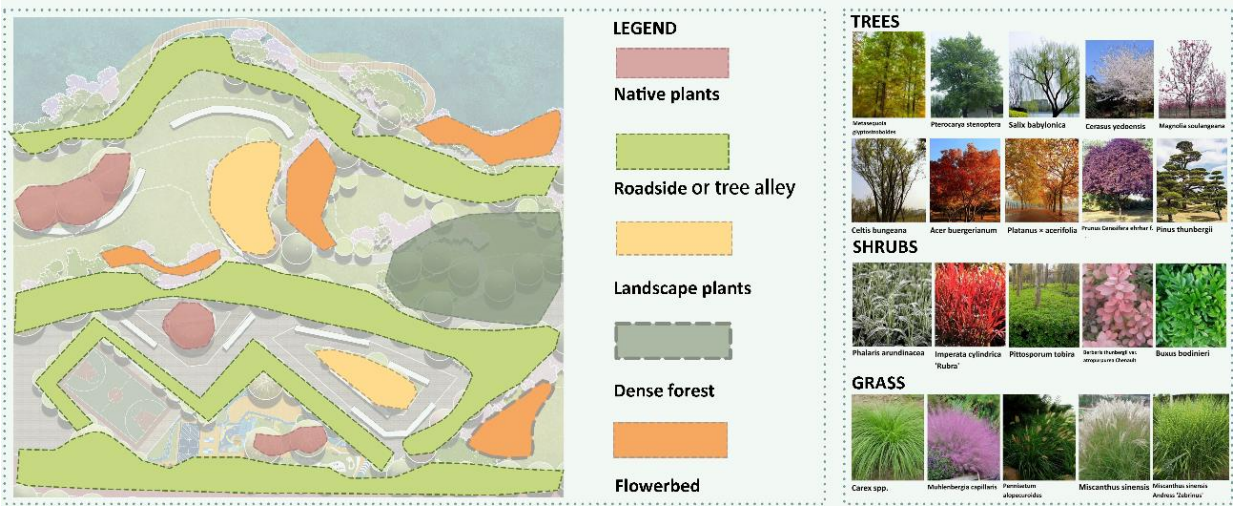



Figure. 41  Detail vegetation design, Author's figure

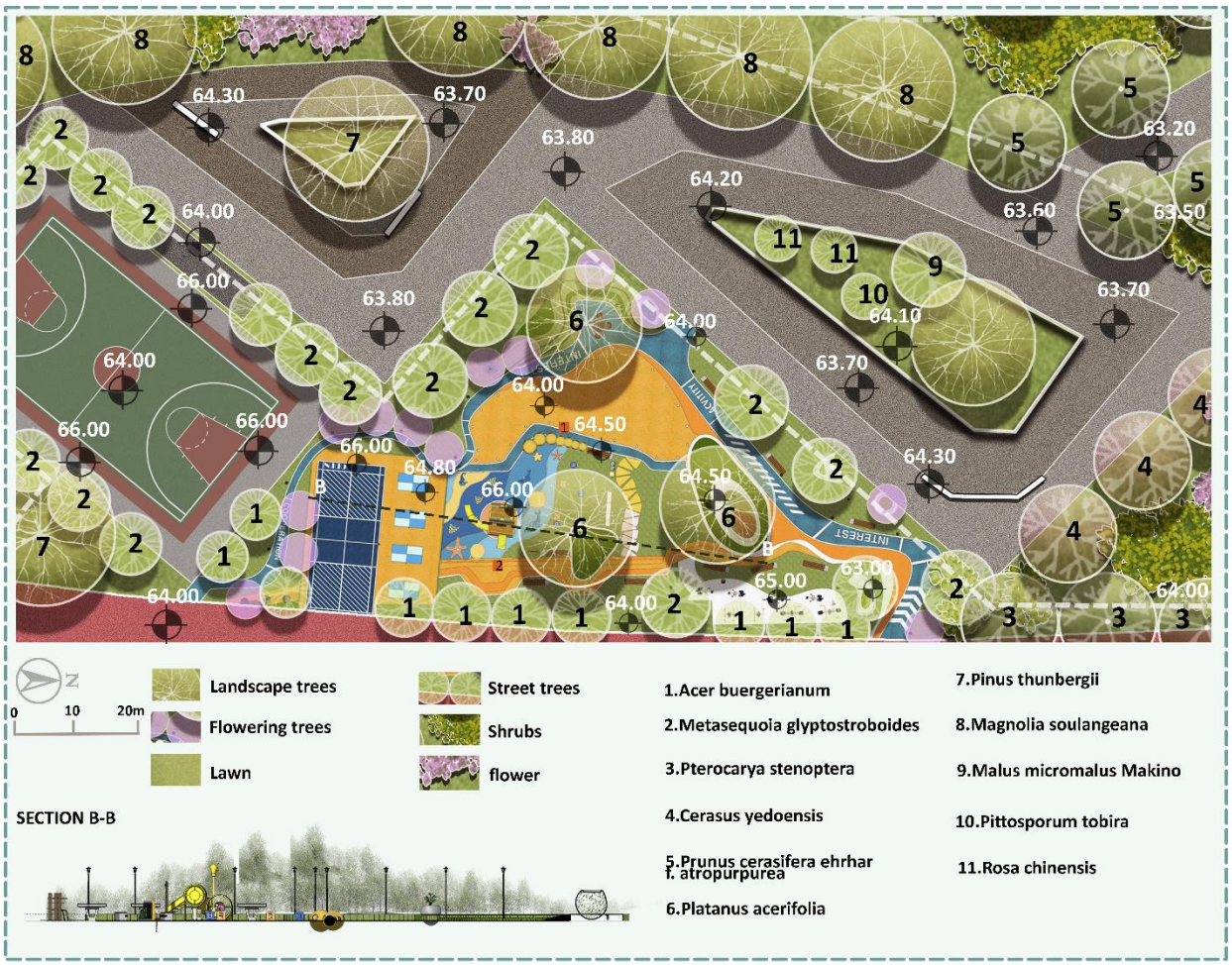



Figure. 42  Detail plant species design1:200, Author's figure

## 5.9.3 Technical detail

For the technical detail, I choose the bench on the square,to show the material and the connection between the seat and the tree pool.

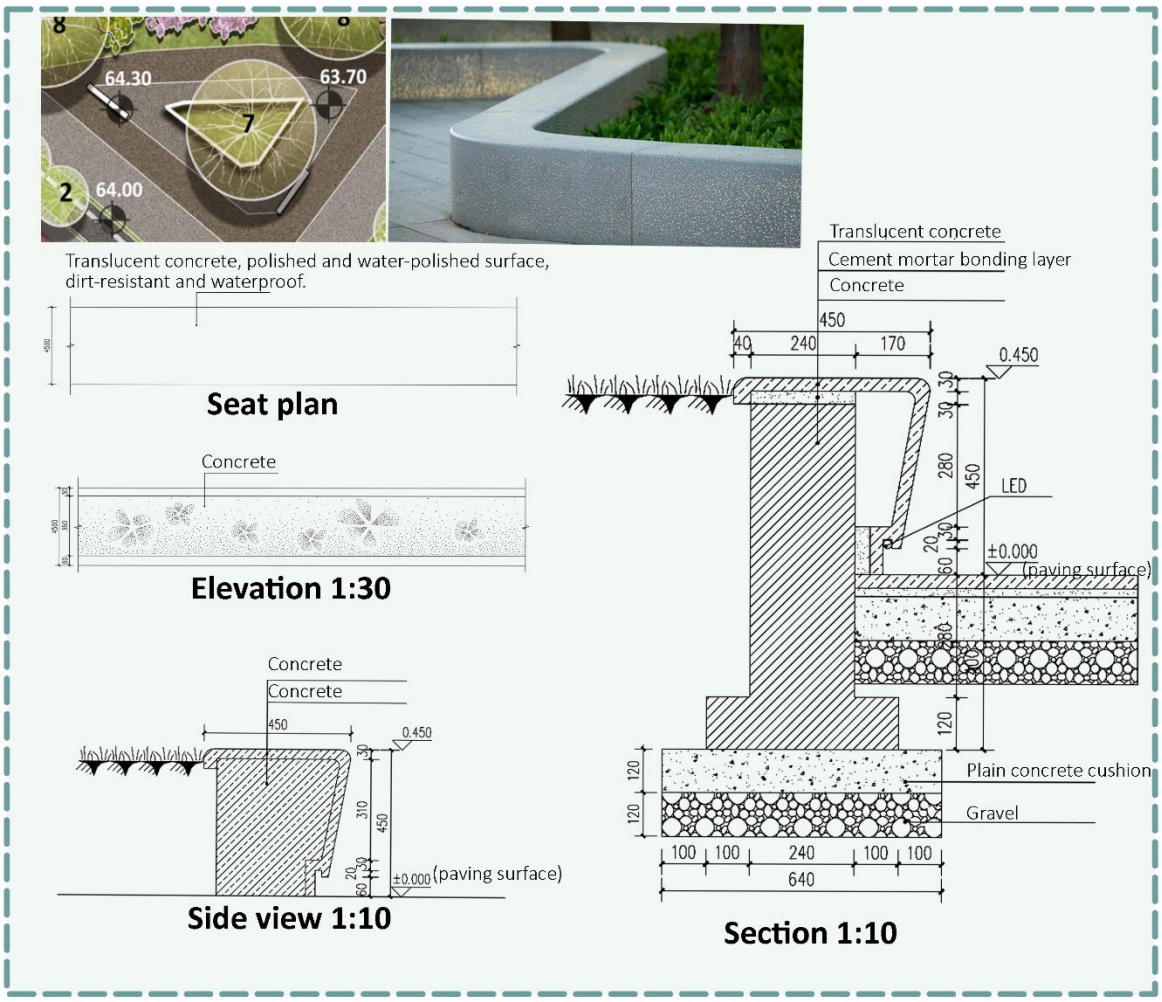



Figure. 43 Technical detail, Author's figure

## 5.9.4 Visualizations

Some visualization were created to show the size and the feeling of the playground.


Figure. 44 Visualization of rubber playground

Figure. 45 Visualization of children's playground

# VI. SUMMARY

The waterfront area, as a unique zone where the city meets the water, integrates the beauty of nature with the bustle of human activities, making it the most vibrant and lively part of the urban landscape. After more than a decade of careful construction, the Shali River Scenic Area has transformed into an important comprehensive park and green space in Luohe City, providing citizens with a rich array of leisure and entertainment, fitness, and cultural exchange experiences, fully satisfying people's diverse needs for high-quality urban life. At

the same time, it has significantly enhanced the overall image of the city, injecting significant positive energy into its economic and social development. In addition, the Shali River Scenic Area also serves as a green ecological barrier for the city, effectively protecting it from natural disasters such as floods and water pollution. However, the rapid construction process has also led to concerns about the homogeneity of the scenic area's form and function.

Generally speaking, the strip-shaped urban waterfront area traverses multiple regions of the city, including commercial entertainment areas, residential areas, industrial production areas, and cultural and educational areas. These regions have different needs for waterfront landscape design.

Given this, the Shali River Scenic Area (from Jinshan Road to Huanghe Road) has been selected as a practical case study. Through detailed site investigation, we have thoroughly interpreted relevant urban planning policies and comprehensively considered the land use nature and surrounding living conditions of this urban section, especially the characteristics of the residential areas. Based on a thorough understanding of site needs, a waterfront spatial landscape has been carefully planned and designed that is highly compatible with this location. The aim is twofold: on the one hand, to improve existing issues in the park and enhance the quality of life for surrounding residents; on the other hand, to meet the needs of ecological sustainable development and create a unique landscape section within the Shali River Scenic Area, thereby enhancing its tourism appeal.

Through analysis, I gained a deep understanding of the site's needs and discovered that the site, as an intermediate connecting the city and the water body, plays a crucial role in establishing a connection between humans and nature. Based on these insights, I proposed strategies addressing functional layout, road planning, crowd gathering, and plant display.

Hower, during the process of the project, I could not get all the information and data which is needed for an in deep design. Despite of that I tried to give relevant directions and future imagination for the park.

# Ⅶ. APPENDIX

## List of figures

# References


[1] He Junyan, and Gao Jing. Analysis of plant configuration in Taiyuan Fenhe Park from an ecological perspective." *Chinese Population, Resources and Environment 26*. S1(2016):236-238. doi:CNKI:SUN:ZGRZ.0.2016-S1-055.

[2] Guo Lihua. Summary of the key points of design and construction of urban riverside parks." *Fujian Architecture* .10(2016):26-29. doi:CNKI:SUN:FJJZ.0.2016-10-007.

[3] Yao Yao. A *Preliminary Study on the Planning and Design of Urban Riverside Green Space Plant* Landscape. 2010. Beijing Forestry University, MA thesis.

[4] Ma Lili.Shanxian Dongshun River Waterfront Greenway Landscape Planning and Design.2023. Jingdezhen Ceramic University, MA thesis. doi:10.27191/d.cnki.gjdtc.2023.000021.

[5] Zhou Yanxi. *Landscape spatial planning of riverside green space in urban fringe* area.2020. Beijing Forestry University, MA thesis.

[6] Wu Jianguo. Landscape Ecology: Concepts and Theories." *Chinese Journal of Ecology* .01(2000):42-52. doi:10.13292/j.1000-4890.2000.0008.

[7] Liu Yijing. *Research on Urban Park Design Based on Landscape Ecology* Theory. 2018. Jiangxi Normal University, MA thesis.

[8] Yu Kongjian, Li Dihua. "Improvement" and "beautification" of urban rivers and waterfronts. *Journal of Modern Urban Studies* .05(2003):29-32. doi:CNKI:SUN:XDCS.0.2003-05-005.

[9] Dong Zheren, et al. A holistic conceptual model of river ecosystem structure and function." *Progress in Water Science 21.04*(2010):550-559. doi:10.14042/j.cnki.32.1309.2010.04.016.

[10] Zhang J, and Li Dong. Theory and strategy of healthy cycle of urban water system." *Journal of Harbin Institute of Technology 42.06*(2010):849-854+868. doi:CNKI:SUN:HEBX.0.2010-06-006.

[11] Li Ye. *Research on the Design Strategy of Urban Pedestrian Space under the Concept of Healthy* City. 2020. Beijing University of Civil Engineering and Architecture, MA thesis.

[12] Wang Guifang, et al.Scale effect of land use landscape pattern in Luohe City based on UAV aerial su rvey. Acta Ecologica Sinica 38.14(2018):5158-5169.

[13] Hu Yanping. *Diagnosis, analysis and causes of heavy rainfall in the Shali River* Basin. 2008. Lanzhou University, MA thesis.

[14] Kong Xiankun, Li Wei, and Huang Linjun. Introduction and experience of the international consultin g project of urban design of Shali River waterfront area of Luohe City. China Garden, 01(2008):58-6 1.

[15] Kong Xiankun, et al. Planning and Design of Green Space Landscape in Shali River Waterfront Area, Luohe City, Landscape Architecture S1(2014):58-59.

[16] Zhou Xiaonan. Elastic Landscape Design along the Convergence of Shali Shuanghe River in Luohe Ci ty. 2018. Henan University, MA thesis.

[17] Wu Yuanhua, Problem-oriented Waterfront Urban Design: A Case Study of Luohe and Shali River, Su stainable Development, Rational Planning: Proceedings of the 2017 China Urban Planning Annual C onference (07 Urban Design). Ed. Urban Design Branch of Henan Provincial Urban and Rural Plannin g and Design Research Institute Co., Ltd., 2017, 1032-1040.

[18] Wang Yintang. Research on the Quality Evaluation of Riverside Public Space in Central Plains Cities B ased on Place Theory. 2022. North China University of Technology, MA thesis. doi:10.26926/d.cnki.g bfgu.2022.000709.

[19] Luo Biao. Research on Waterfront Landscape Design of Small Cities in the Central Plains.2014.Xi'an U niversity of Architecture and Technology, MA thesis.

## Website


INT-01: Luohe Municipal Natural Resources and Planning Bureau， Baidu Baike,2024

Available: http://www.luohe.gov.cn

INT-02: Baidu Baike, 2024

Available: http://www.lhslhfjq.com/About.aspx?1

INT-03: China Weather Network, Baidu Baike, 2024

Available: http://www.weather.com.cn/

INT-04: Luohe Municipal Natural Resources and Planning Bureau， Baidu Baike,2024

Available:http://www.luohe.gov.cn/sitesources/lhsrmzf/page_pc/jrlh/bmdt/articleb5577fdd6a4b724ae8ca55c0fdfb5e82.html

INT-05: Luohe City Master Plan 2012-2030, Baidu Baike,2024

Available:http://www.lhgtj.gov.cn/resource/upload/file/20230322/16794726913628446.pdf

INT-06: Luohe City Master Plan 2012-2030, Baidu Baike,2024

Available: http://m.lhgtj.gov.cn/show.aspx?ID=41155

INT-07: Luohe City Urban Green Space System Special Plan 2018~2035"， Baidu Baike,2024

Available:http://m.lhgtj.gov.cn/show.aspx?ID=40576

INT-08: Luohe Municipal Natural Resources and Planning Bureau， Baidu Baike,2024

Available: http://www.lhgtj.gov.cn/show.aspx?ID=40576

INT-09:Urban Green Space Classification Standard" CJJ/T85-2017, Baidu Baike,2024

Available:http://www.sxylxh.com/hyzc/832.jhtml

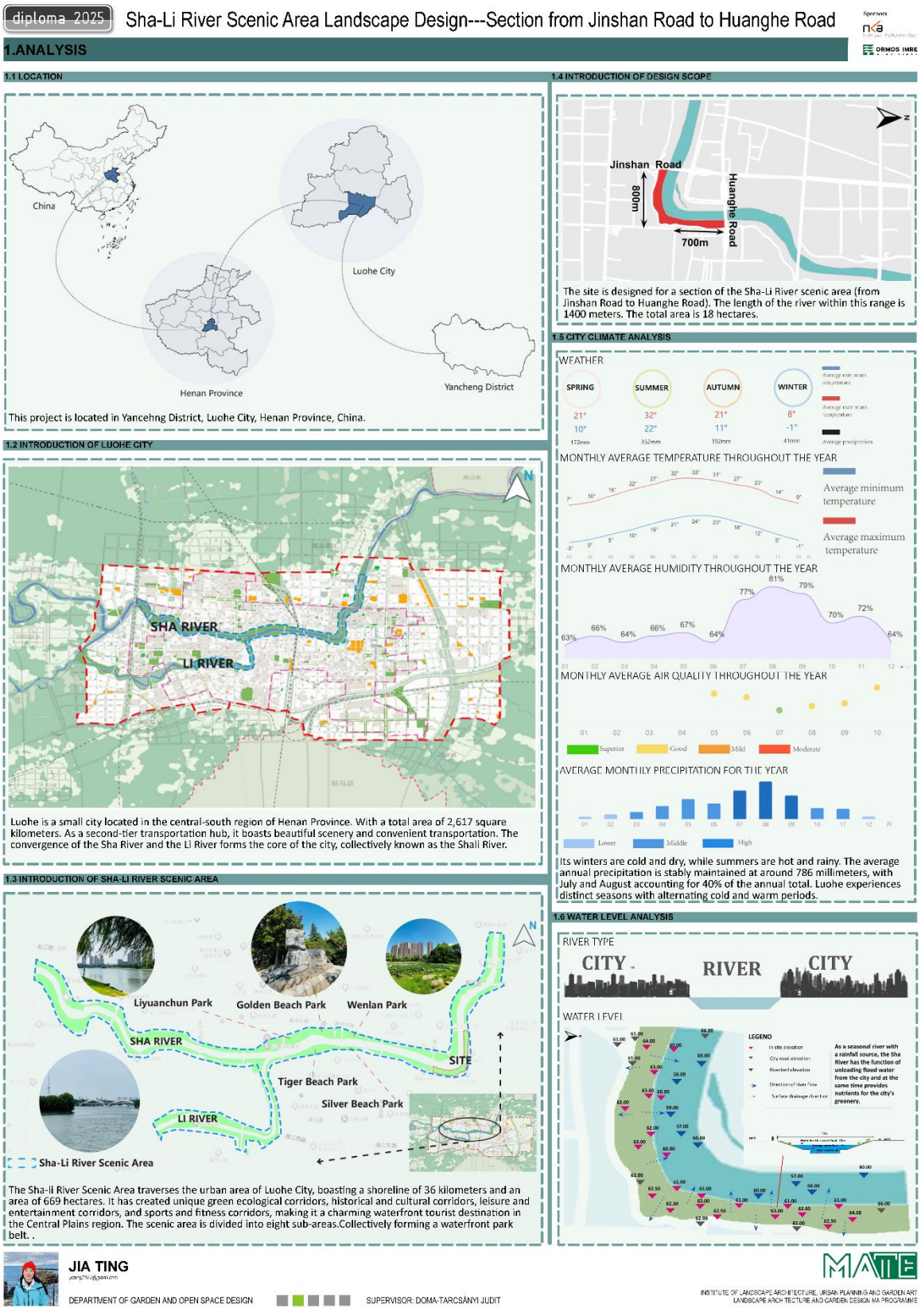
INT-010: "Luohe City Urban Green Space System Special Plan (2018~2035)"， Baidu Baike,2024

Available: http://m.lhgtj.gov.cn/show.aspx?ID=40576

INT-11:Luohe City Urban Greening Implementation Rules,2009 , aidu Baike,2024

Available:https://www.planning.org.cn/law/uploads/2013/1383860006.pdf

# Posters


diploma 2025
Sha-Li River Scenic Area Landscape Design---Section from Jinshan Road to Huanghe Road
1.ANALYSIS
1.1 LOCATION
China
Luohe City
Henan Province
Yancheng District
This project is located in Yancehng District, Luohe City, Henan Province, China.
1.2 INTRODUCTION OF LUOHE CITY
SHA RIVER
LI RIVER
Luohe is a small city located in the central-south region of Henan Province. With a total area of 2,617 square kilometers. As a second-tier transportation hub, it boasts beautiful scenery and convenient transportation. The convergence of the Sha River and the Li River forms the core of the city, collectively known as the Shali River.
1.3 INTRODUCTION OF SHA-LI RIVER SCENIC AREA
Liyuanchun Park
Golden Beach Park
Wenlan Park
SHA RIVER
SITE
Tiger Beach Park
Silver Beach Park
LI RIVER
Sha-Li River Scenic Area
The Sha-li River Scenic Area traverses the urban area of Luohe City, boasting a shoreline of 36 kilometers and an area of 669 hectares. It has created unique green ecological corridors, historical and cultural corridors, leisure and entertainment corridors, and sports and fitness corridors, making it a charming waterfront tourist destination in the Central Plains region. The scenic area is divided into eight sub-areas.Collectively forming a waterfront park belt. .
1.4 INTRODUCTION OF DESIGN SCOPE
Jinshan Road
Huanghe Road
800m
700m
The site is designed for a section of the Sha-Li River scenic area (from Jinshan Road to Huanghe Road). The length of the river within this range is 1400 meters. The total area is 18 hectares.
1.5 CITY CLIMATE ANALYSIS
WEATHER
SPRING
SUMMER
AUTUMN
WINTER
MONTHLY AVERAGE TEMPERATURE THROUGHOUT THE YEAR
Average minimum temperature
Average maximum temperature
MONTHLY AVERAGE HUMIDITY THROUGHOUT THE YEAR
MONTHLY AVERAGE AIR QUALITY THROUGHOUT THE YEAR
Superior
Good
Mild
Moderate
AVERAGE MONTHLY PRECIPITATION FOR THE YEAR
Lower
Middle
High
Its winters are cold and dry, while summers are hot and rainy. The average annual precipitation is stably maintained at around 786 millimeters, with July and August accounting for 40% of the annual total. Luohe experiences distinct seasons with alternating cold and warm periods.
1.6 WATER LEVEL ANALYSIS
RIVER TYPE
CITY
RIVER
CITY
WATER LEVEL
LEGEND
As a seasonal river with a rainfall source, the Sha River has the function of unloading flood water from the city and at the same time provides nutrients for the city's greenery.
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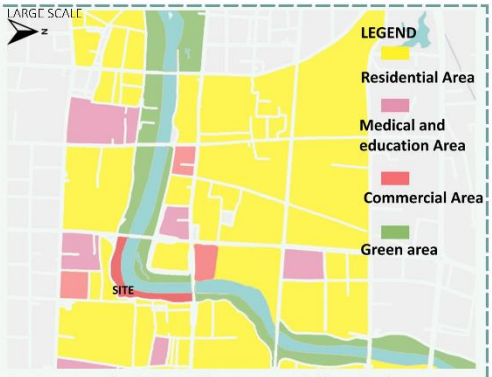
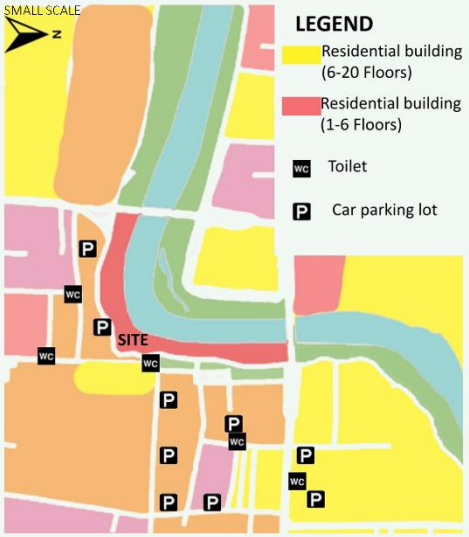
## 1.7 SURROUNDING ANALYSIS

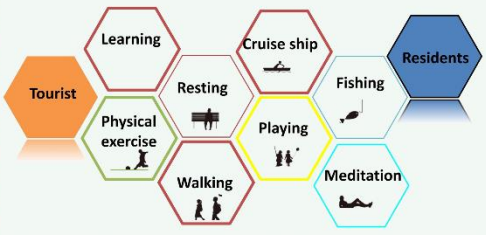



The site is situated in the heart of the city, surrounded by vital facilities such as commercial centers, medical centers, and educational institutions.



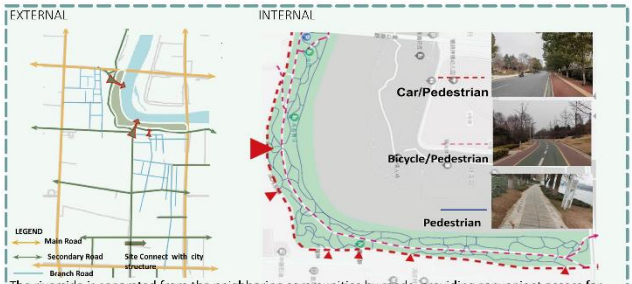

The perimeter of the site is primarily residential areas, which can be categorized into two types. One is newly developed housing estates with buildings ranging from 10 to 20 stories tall. The other is an area with lower-rise buildings, with floor heights between 3 and 6 stories. The areas adjacent to the site are mainly composed of low-rise residential districts. Furthermore, public service facilities like parking lots and public toilets are also available in the vicinity of the site, providing convenience to citizens.

## 1.8 UES AND USERS ANALYSIS




On a smaller scale, the park provides a diverse range of services as a comprehensive riverfront green space for neighboring residents. On a larger scale, the green space is an integral part of the Shalee River Scenic Area, primarily serving the general public. Both residents and visitors can freely choose and carry out their favorite activities in the venue. For example, they can choose more peaceful activities such as meditation, walking, fishing and resting, or they can participate in more lively activities such as games, sports, boat tours and learning exchanges.

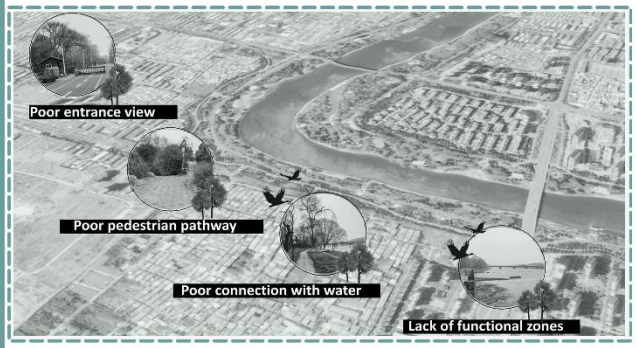
## 1.9 TRAFFIC ANALYSIS




The riverside is separated from the neighboring communities by roads, providing convenient access for residents living nearby. Other citizens, however, would need to take a detour to the bridge entrance to enter the area. The road design within the region primarily focuses on scenic routes, with a particularly long waterfront viewing pedestrain .

## 1.10 EXISTING FUNCTIONS/ZONES ANALYSIS


## 1.11 VALUE ANALYSIS




## 1.12 CONFLICTS ANALYSIS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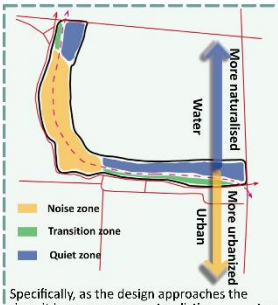
diploma 2025 Sha-Li River Scenic Area Landscape Design---Section from Jinshan Road to Huanghe Road

## 2.DESIGN CONCEPT

### 2.1 DESIGN STRATEGY

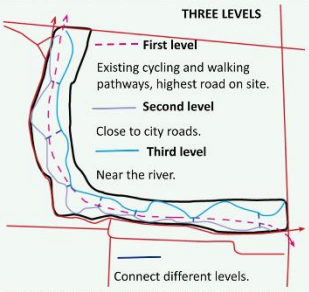
| Connection between city and waterfront | Connection between man and nature | Plant science education theme |
|---|---|---|
|  |  |  |
| Strengthen the connection between the waterfront and adjacent land, and create a variety of recreational spaces to establish a connection between the city and the waterfront. | Build a natural and harmonious water ecological environment and establish a connection between man and nature. | Design several groups of gardens with different themes, stimulate tourists' curiosity and exploration through game design, and gain popular science knowledge. |

### 2.3 FUNCTIONS STRATEGY




Specifically, as the design approaches the river, it becomes more naturalistic; whereas, nearer to the city, it adopts a more urbanized style.

### 2.4 ROADSYSTEM STRATEGY

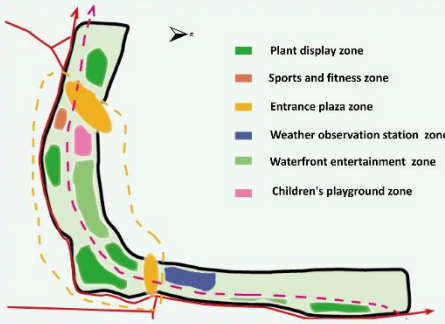



In order o to meet the needs of different people using the site, the road design is divided into three main levels of hierarchy.

### 2.2 DESIGN CONCEPT


In the functional areas are mainly plant species that have been artificially selected and planted for ornamental purposes. Other areas are native, low-maintenance plant species with ecological functions.

### 2.5BUBBLE DIAGRAM




The core area between the two entrances is set to be the main focus of pedestrian activity, with relatively little consideration of its natural attributes. Therefore, activities of a more athletic nature that may generate noise, such as a waterside theater, children's area and outdoor fitness area, are located in this area. These areas near the water are more natural and ecological in nature.

## 3.DESIGN

### 3.1 MASTERPLAN



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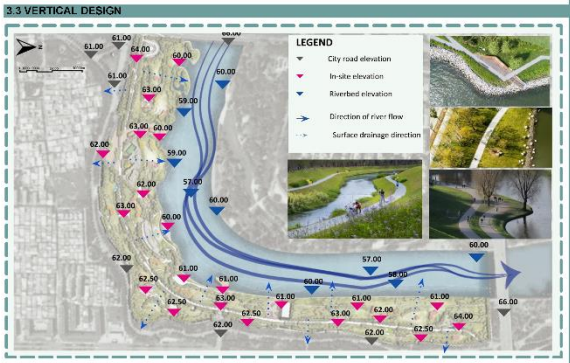
# Sha-Li River Scenic Area Landscape Design---Section from Jinshan Road to Huanghe Road

Sponsors

### 3.2 FUNCTION

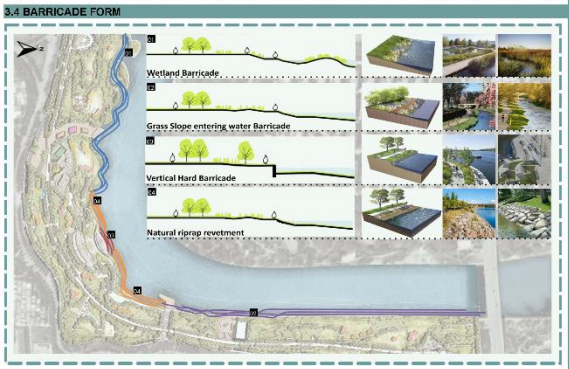

### 3.5 ROADSYSTEM---PEDESTRIANS


### 3.3 VERTICAL DESIGN




### 3.6 PEDESTRIAN AGGREGATION

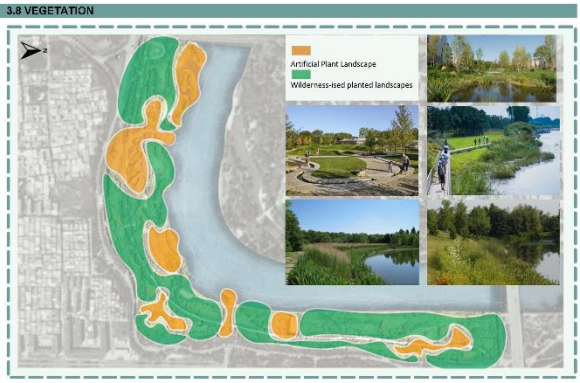

### 3.4 BARRICADE FORM




### 3.7 PUBLIC SERVICE


### 3.5 ROAD SYSTEM---CAR/BICYCLE


### 3.8 VEGETATION





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Sponsors

## 3.8 VEGETATION

The proportion of the green area after design is 91.8%, which is much higher than the current situation. And the proportion of built-in area is reduced to 8.2%. In the tree felling map, although I tried to keep most of the trees in the park, there are still some trees I need to remove because of the design. I will cut the trees which are old or diseased, and for the young and healthy trees I would like to transplant them to other places .


## 4. ZONING DESIGN

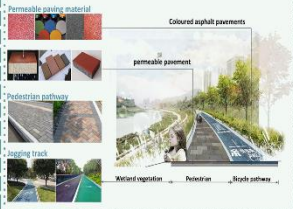
### 4.1 WATERFRONT THEATRE PERFORMANCE ZONE


SECTION

VISUALIZATIONS

VEGETATION


PAVEMENTS




### 4.2 ECOLOGICAL WETLAND SCIENCE POPULARIZATION ZONE


SECTION

VISUALIZATIONS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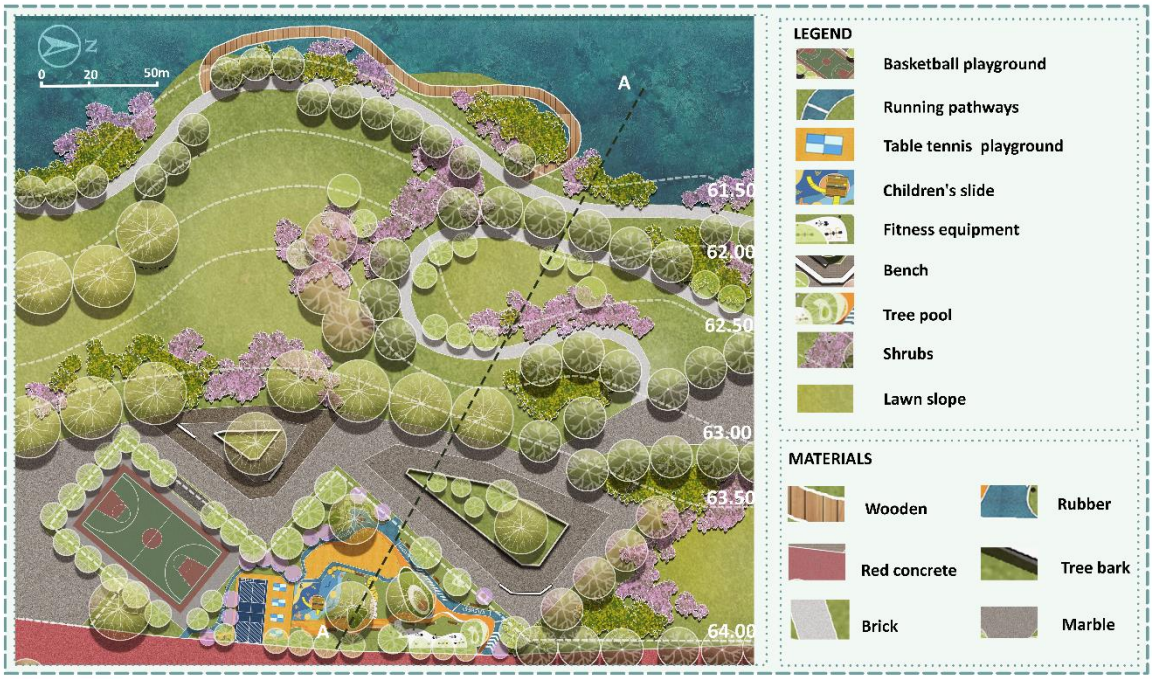
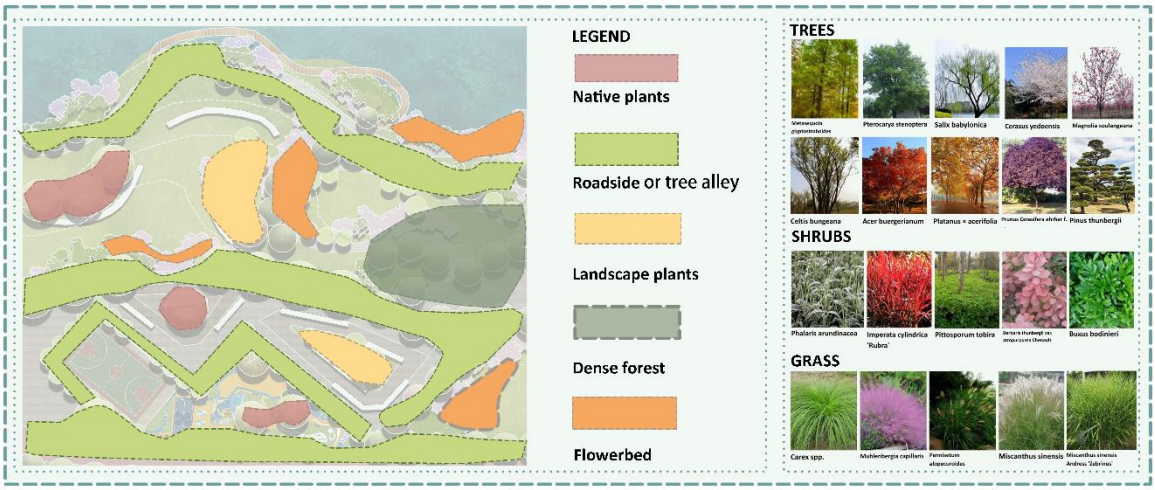
## 5. DETAIL PLAN

DETAIL MASTERPLAN 1:500




VEGETATION DESIGN




SECTIONA-A 1:500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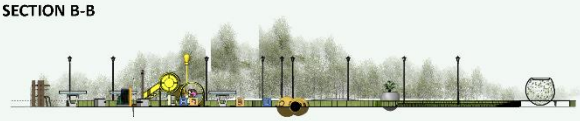
DESIGN REFINEMENT PLAN



Landscape trees
Flowering trees
Lawn
Street trees
Shrubs
flower

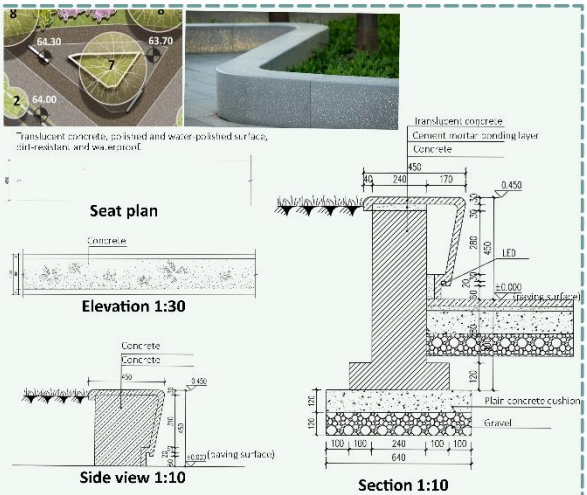
1.Acer buergerianum
2.Metasequoia glyptostroboides
3.Pterocarya stenoptera
4.Cerasus yedoensis
5.Prunus cerasifera ehrhar f. atropurpurea
6.Platanus acerifolia
7.Pinus thunbergii
8.Magnolia soulangeana
9.Malus micromalus Makino
10.Pittosporum tobira
11.Rosa chinensis

SECTION B-B



VISUALIZATION


TECHNICAL DETAIL(BENCH)

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