Landscape Planning and Design of Zhanggongdi City Park Based on Human Ecology

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Abstract: One of the most important functions taken by a Urban ecological park is to protect and improve the urban environment, which is the green space of the city. Integrating ecology and humanity into the park makes the park have the dual significance of protecting the ecological environment and inheriting the history and culture. From the macro and micro perspectives, this paper makes a systematic analysis of the base, explores the regional culture, takes ecology as an important attribute, and designs the park with nine provincial thoroughfares as the theme culture, so as to realize the design goal of "integrating humanity into ecology, building landscape context" and promote the green development of human and nature.

1.Introduction
In the process of rapid urban development, residents are increasingly eager for both material and psychological needs. Based on this background, the research of urban parks is developing in the direction of ecological protection and historical and cultural heritage, and shows two strong attributes of ecology and humanity. In the planning and construction of the park, the use of modern ideas and techniques, the combination of traditional cultural elements and ecological ideas, is a recreation of traditional culture and artistic landscape process [1]. The value brought by the integration of culture into ecology makes the park "the heart of the city", and forms a good landscape effect, so as to meet the physical and mental needs of residents and promote the green development of the city.

2.Current situation analysis

2.1 General situation of the base
Zhanggongdi urban ecological park is located in Dongxihu District of Wuhan City, south of phase IV of Huasheng Hankou city square, close to Zhanggongdi greenway, belonging to the edge of the main urban area, surrounded by industrial park and residential land, and adjacent to Zhuyehai Wetland Park, which has a good development prospect. (Figure 1.)

The park as a whole is banded, with residential areas distributed around, and the transportation is convenient. Along the dike, the length is about 1600 meters, the average width is about 120 meters, and the area is about 200000 square meters. The park is adjacent to Zhuyehai Wetland Park, and the surrounding roads tend to be perfect. The water body in the base is strip, the narrowest part is about 5 meters, and the widest part is more than 10 meters. It is covered by green duckweed, and is located in the
south of the base. The existing plants are rich in species and grow well. There are some abandoned buildings in the base, most of which are dilapidated single-layer factories, arranged in order, with dilapidated interior but well preserved walls. It is located in a flat place in the northeast of the base.

Figure 1. Location analysis chart and Current situation analysis chart

2.2 Analysis of base culture

The base is located in Wuhan, the thoroughfare of nine provinces, on the North Bank of Hanjiang River. Its superior geographical features benefit from the convenience of the Yangtze River waterway. Zhang Quhuo in the Song Dynasty wrote in his poem Rebuilding the temple of marquis Yang and the sentence of Wang Yuanshu: "The Han River dissolves thousands of miles, but this is where the South Xia dynasty laid its foundation.". It is the convenience of the river thoroughfare that brings Wuhan historical and humanistic atmosphere. The thoroughfare culture of nine provinces is actually a kind of River culture. The river has become the root of Wuhan's cultural and historical impression. As an external form of urban culture, it highlights the profound connotation of urban culture, and also affects the residents living in the city[2]. This design will use this cultural feature to design the park.

2.3 Advantages and disadvantages of the base

The residential areas around the base are widely distributed and the flow of people is large. Industrial parks and commercial complexes provide favorable conditions for the gathering of all kinds of people. The park base is rich in landscape resources, and the geographical environment is full of changes. There are two large wetland parks around. The excellent surrounding environment provides a good foundation for the ecological construction of the park.

In the middle of the base, the terrain height difference is large, up to 9 meters. The overall terrain is high in the north and low in the south, and the sight of the South landscape is blocked. It is difficult to distinguish the shoreline because of the lack of water treatment and the density of shoreline plants. The flat area is overgrown with weeds and single vegetation. In the eastern region, there are side-by-side waste factories with high building density and single-layer brick wall structure, which are dilapidated and difficult to use. The overall narrow and long base is not conducive to the distribution of landscape axis.

3. Planning and design of Zhanggongdi urban ecological park

3.1 Design concept

The park is based on the design concept of "integration of ecology and humanity, supplemented by landscape". The park as a patch, through the greenway and other ecological corridor, will be connected with the surrounding environment, constitute a large ecological whole. In the overall planning and design, based on the concept of human ecology, the content of the design is combined with the design ideas such as landscape construction and historical context, and the feasibility of combining culture and experience is deeply explored to promote the construction of human ecosystem services, so as to ensure the sustainability of ecosystem services, so as to achieve the concept of sustainable development [3].
3.2 Theme design
This design will take the nine province thoroughfare culture as the theme, extract the Yangtze River diagram to carry on the plan design. The strip flower beds in the Yangtze River are compared to merchant ships. The coming and going of merchant ships has brought vigorous development to the economy of Wuhan and made it the historical title of the thoroughfare of nine provinces in Wuhan. The integration of river elements increases the humanistic theme of the park and makes people form cultural memory of the park.

On the whole, it emphasizes the ecology and humanity in landscape design, so that they complement each other in the process of design, so as to enhance the rationality of their mutual integration[4]. Integrating the ecological concept into the whole park, using modern ecological technology and design methods, the park can not only meet the leisure and entertainment functions, but also not interfere with each other, and can work together to promote the diversified development of the park. (Figure 2.)

![Figure 2. Theme design chart](image)

3.3 Planning layout

Using theme and main landscape design techniques, around the two main nodes, combined with ecology, humanities, leisure and other aspects, an east-west landscape axis is formed. Six secondary nodes are distributed around the landscape axis in turn, forming three landscape secondary axes. Through the design of the corresponding area to meet the physiological needs of the public, emotional needs, security needs, self realization needs[5]. From the cultural square roaming, through the four functional areas, and then to the waterfront landscape area, forming a dynamic viewing route. The staggered distribution of paths in the park complements the main garden routes to create a static sense of experience. (Figure 3.)

![Figure 3. General layout](image)

3.4 Functional distinction design

3.4.1 Cultural Square
The cultural square is located in the northeast corner of the base, which is transformed from the original buildings of the base. The Yangtze River elements are extracted to design the historical and cultural museum and related supporting buildings. The renovation adopts a simple style, using gravel, wood, glass and green plants to decorate the building, creating a sense of cultural identity. (Figure 4.)
3.4.2 Leisure square area
The leisure square area is located along the northern part of the base. The large and small boat shaped landscape pool is derived from the image of a merchant ship. It integrates cultural elements into columns, columns, lamps, chairs and other sketches, and combines with plants with high and low levels to enrich the visual experience, making it seem to be in a prosperous business scene. The bottom of landscape pool combined with rainwater collection technology can reduce the transformation of the original environment by taking advantage of high terrain. (Figure 4.)

![Figure 4. cultural square and leisure square](image_url)

![Figure 5. Waterfront landscape renderings](image_url)

3.4.3 Waterfront landscape area
Waterfront landscape area is located in the south of the base, waterfront space can provide a natural green space for urban residents, in order to get rid of the pressure brought by the rapid development of the city [6]. In the process of shoreline design, various landscape methods are adopted, such as Di, stone landscape, stone steps, wooden piles, small bridges, flora, wooden plank road, hydrophilic platform, natural revetment and so on. In the open place, plants are used to make landscape, which can form a semi sheltered visual effect, limit the range of people’s activities and line of sight, and deal with the problem of rigid coastline. In the steep place, stone scenery and wooden piles are used to fix the shoreline, so as to meet the landscape effect and ensure its ecological effect. (Figure 5.)

The design of footpath and three-dimensional traffic around the lake provides a good view for the crowd. The design of hydrophilic platform is helpful for tourists to experience nature directly and stimulate the awareness of ecological environment protection. The design of whetstone, stone steps and small bridge maximizes the visual and playful experience, and maximizes the utilization of landscape.

3.4.4 Design of children’s entertainment area
Children’s entertainment area is located on the gentle slope of the waterfront, and the overall space is open. Different from other spaces, colorful paving and structures are set up in this area to increase the liveliness of the environment and make children feel more fun when playing. The placement of swing, seesaw, plastic ramp, slide and so on can bring children different ways to play. The entertainment project of parent-child interaction can promote children’s physical and mental health development. There are small rest booths on the east and west sides of the children’s entertainment area. Under the premise of not producing sight occlusion, the accompanying parents can have rest space and increase the safety of nursing. (Figure 6.)

3.5 Traffic flow line design
According to the analysis of the surrounding environment, the park has a small entrance square, four main entrances and three secondary entrances and exits. In order to ensure the accessibility, the roads in the site are divided into three levels according to their functions.

The main road of the first class road is mainly made of granite, with a width of 6.8m-7.8m. It is a mixed road of working vehicles and people in the park, mainly providing dynamic lines for residents’ leisure activities.

The secondary trunk road of the secondary road is mainly made of marble leftover materials and granite, with a width of 3.2-4.5 meters. It is a mixed road of operation vehicles and people in the park, and its main function is to guide the flow and facilitate the rapid access of residents.

The material of the three-level roads in the park is relatively rich, including wood, pebbles, permeable bricks, grass planting bricks, etc. the width is between 1.2 m and 1.8 m. It is a pedestrian trail for residents to walk and view. It is an important path for residents to feel the ecology of the park.
3.6 Plant design
In the process of plant configuration, the park should respect people’s new aesthetic needs for the landscape, so that plant populations and plants and the natural environment can complement each other and coordinate with each other, so as to meet its ornamental characteristics and ensure its ecological functional properties[7]. In the design, local tree species are mostly used, and the trees in good growth condition in the park are retained. On this basis, plants with other colors and beautiful shapes are used to design the plant landscape in the park.

At the same time, different plant landscape effects can be created by the way of virtual reality in the near and far. For example, in the way of color or shape contrast, highlight the foreground, weaken the mid view, weaken the perspective, so that the space has a sense of extension, and create a multi-level landscape experience for visitors through the smell of aromatic plants.

3.7 Vertical design
The water body is located in the lowest position in the park. The south bank is a gentle slope with less undulation, while the north bank has a larger slope with dense plants. Taking advantage of the elevation difference of the terrain, the three-dimensional traffic trail is designed to form a terraced flower viewing area and form a good visual experience. (Figure 7.)

4. Conclusion
Urban ecological park has the significance of inheriting the past and creating the future. It affects both nature and human beings. It is a city park that combines ecological concept, historical culture and regional characteristics to create coexistence of ecology and humanity. At the same time, it protects ecology and disseminates ideas through its own characteristics, so as to give back to human and nature. The design of Zhanggongdi city park uses the relevant ecological concepts, grasps the characteristics of regional culture, plans the layout of the park from the macro and micro directions, forms five functional zones, and designs reasonable traffic flow lines based on the zones. From the perspective of landscape ecology, the four main elements of node, plant, road and water are designed to form a three-dimensional and vivid landscape effect. It tries its best to meet the balance between ecology and humanity, in order to create a pleasant landscape environment, for people’s physical and mental needs and contribute to the development of urban ecology.

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