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Exploration on Landscape Design of Expressway Entrance and Exit

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Abstract: As the gateway of the city, the entrance and exit of expressway plays an important role in landscape effect. Under the background of the goal of "double carbon" and the construction of a park city, this work takes the expressway intersection in Baoan District, Shenzhen as the research area, puts forward the design goal and key points at the intersection, identifies the prominent environmental problems at each intersection, and puts forward the corresponding design strategies and greening measures, mainly through greening and upgrading to give play to the carbon fixation ability of plants and enhance the landscape effect, with a view to promoting the development of Baoan District. It is proposed that the landscape design of expressway intersection should be based on rational analysis, explore local culture and respond to "double carbon".

1. Research background

1.1 Garden construction is of great significance for achieving the goal of "double carbon"

On September 22, 2020, at the general debate of the 75th United Nations General Assembly, China put forward "strive to reach the peak by 2030 and strive to achieve carbon neutrality by 2060" (namely, "double carbon"). This goal is an important commitment of China to fulfill its ecological civilization and international responsibilities, which means China's firm determination to develop high-quality and low-carbon transformation [1].

Energy saving and emission reduction and carbon fixation are two important aspects to achieve the goal of double carbon. Energy saving and emission reduction need to be exerted in many aspects. Carbon reduction and carbon fixation means increasing green carbon sinks, improving environmental quality and vigorously promoting the development of ecological construction. From the perspective of landscape design, creating a high-quality urban ecological environment can not only create a beautiful living environment for residents, but also put forward strategies for green space to achieve carbon neutrality. These are the social responsibilities of landscape planners and professional education experts today. In this study, low-carbon environmental protection is conveyed as an important design concept to related design and construction.

1.2 Shenzhen's construction of a park city puts forward higher requirements for urban green space.

The Master Plan and Three-year Action Plan for Park City Construction in Shenzhen (2022-2024)

jointly organized by Shenzhen Planning and Natural Resources Bureau, Municipal Urban Management and Comprehensive Law Enforcement Bureau (draft) is in the preparation stage. This plan reflects the vision of "building a park with mountains and seas" and how to build a charming recreation skeleton with "one ridge, one belt and twenty corridors" to form the overall layout of park cities with blue-green corridors and webs.

Shenzhen Park System is planned and built from scratch. In the past, the construction standards were not uniform and there were quality differences. Now, the unified planning, layout and standards of park city construction will help to achieve the goal of more balanced layout and better quality. Shenzhen also connects the greenways with parks in series, and forms a network system by combining points, lines and planes, and gradually moves from a garden city to an ecological park city, and then to a park city. It has been found by previous studies. Urban green space has the function of relieving mental fatigue and stress, and the beneficial effect of green space on human beings has been fully confirmed. Many explorations in this field have also found that green space has a positive impact on people's perception and action [2].

1.3 The current landscape problems are outstanding, and the promotion is urgent.

The expressway entrances and exits in Bao'an District assume an important position as a gateway to the city. There are many problems in the present situation, such as chaotic surrounding environment, poor plant growth, lack of characteristics at intersections, etc., which do not match the current level of urban development and construction and need to be upgraded as soon as possible.

2. General situation of the study area

2.1 Project site selection

The landscape design project for the entrance and exit of expressway in Baoan District involves the entrance and exit of Longda Expressway-Luotian (Yanluo), Yanjiang Expressway-Xixiang Toll Station and Outer Ring Expressway-Songfu Avenue (Shajing). It involves three expressways: Longda Expressway, Yanjiang Expressway and Outer Ring Expressway.

2.2 Status Analysis

2.2.1 Ecological analysis

According to the field investigation of this project, it is found that the ecological environment of many nodes is poor. The problem of loess exposure in slope area occurs from time to time, which seriously affects the ecological environment and city appearance. In addition, according to the investigation, it is also found that plant types include invasive species, and these extremely destructive plants pose a great threat to the surrounding ecological environment. Removing invasive plants and renovating bare loess can significantly improve the urban ecological environment and greatly enhance the level of urban landscaping.

2.2.2 Analysis of Greening Landscape

The overall greening landscape quality is poor, which is embodied in the following points:

First, Improper management of plants. Although there is the construction of landscaping, it has promoted the further improvement of people's quality of life to a certain extent. However, the effect of plant conservation management is not ideal, and it has not played its due role, which has caused some negative effects on the overall landscape effect.

Second, plants are not growing well. First of all, the selection of tree species should be based on

the principle of adapting to local conditions, so that its garden function can be brought into full play, and the ecological habits of garden plants can fully adapt to the habitat conditions of garden planting sites, so that plants can grow healthily [3].

Third, there is a lack of layering in plant collocation. The choice and configuration of garden plants and the artistic level of landscape designers greatly affect the ornamental effect of the whole landscape greening.

Plant collocation should take into account the collocation of different tree types, flowering periods, colors and flowers and leaves, so as to achieve coordination and unity and avoid chaotic landscape effects. In addition, the unique ornamental value of different plants should be considered in the configuration of garden plants, so as to create a long-term and beautiful landscape effect [4].

2.2.3 Image analysis

In terms of image, most nodes are not displayed and lack characteristics.

The Logo display of the overall situation lacks culture and does not match the future development orientation of Baoan. In landscape design, we should explore local culture, and embody and emphasize humanistic characteristics in the surrounding urban landscape, which can not only protect the historical and cultural accumulation of human development, but also inherit the humanistic spirit of the site, so landscape and culture should complement each other. The landscape at the entrance and exit of expressway pays attention to exploring the cultural value and historical spirit, which can not only provide the use function, but also show the beauty of personality and bring spiritual enjoyment to people.

The nodes of the overall status quo lack characteristics. As a part of the overall road landscape, the entrance and exit of expressway should be matched with reasonable road greening, which can provide drivers with a beautiful and comfortable driving environment and effectively prevent drivers from visual fatigue [5].

3. Practice and exploration of landscape design of highway entrance and exit in Bao'an District

3.1 Design objectives

3.1.1 "Net"

"Cleanliness" is the basic requirement for the improvement of environmental quality, and we strive to create a neat, orderly and clean landscape effect. Greening should have the function of assisting traffic safety. The landscape along the line can improve the mood of drivers and passengers, reduce the driver's sight fatigue, and provide strong safety guarantee for drivers and passengers.

3.1.2 "Green"

Give priority to ecological function and give consideration to landscape function. In the design, we should emphasize the idea of green, low carbon, energy saving and environmental protection, and improve the ecological benefits of noise reduction, dust retention, pollutant adsorption and microclimate improvement through reasonable plant selection and configuration [6].

3.1.3 "Beauty"

To create a beautiful landscape effect, we need to focus on quality, make use of the original landscape resources and human resources of construction land, and optimize and upgrade on the basis of current greening. In order to highlight the characteristics of Baoan and enhance the image

of the city portal.

3.2 Overall design theme

There are four entrances and exits of Longda Expressway-Luotian (Yanluo), Yanjiang Expressway-Xixiang Toll Station, Outer Ring Expressway-Songfu Avenue (Shajing) and Outer Ring Expressway-Songgang South Entrance, with the themes of "Red Yanluo", "Dream Baoan" and "Golden Oyster Blossom" respectively.

3.3 Landscape Design of Luotian (Yanluo) Entrance and Exit

3.3.1 Status Analysis

After field investigation, it is found that there are three main problems in the present situation. First, there is a large area of hard ground and the overall image is not good. Second, the sketch lacks the focus of sight and the structure is slightly thin. Third, the traffic markings on the road surface are unclear, and there are mistakes in marking.

3.3.2 Theme concept

Red culture is the representative culture of Yanluo, which is the window to display red culture and the northwest gateway of Shenzhen, so "Red Yanluo" is taken as the theme concept of this expressway entrance.

3.3.3 Key points of design

First, the roads are blackened. The present road surface with blackened, damaged and unclear marks; Second, green the hard areas. These areas should reorganize traffic in the southern high-speed supporting building area, increase greening, and plant kapok as a whole, highlighting the hero theme in color; Third, enhance the image. We should update the shrub red beech and gold leaves on both sides of the existing sculpture to enrich the prospects; and background on the existing basis, ficus altissima and Ficus microcarpa were replanted to enrich the image.

3.3.4 Tree Species Planning

The key tree species is kapok (flowering March-April), the backbone tree species are Flammulina (flowering October-May of the following year), Ilex mandshurica (fruiting August-December), Ficus altissima, Ficus microcarpa and Sorbus mandshurica, and the shrubs and ground cover are selected from Acer truncatum, Pseudoforsythia suspensa, Celastrus japonicus and oil grass. The planning color of the tree species at the entrance and exit of Luotian (Yanluo) focuses on red, which is consistent with the concept of "red Yanluo" that highlights red culture.

3.4 Landscape Design of Xixiang Toll Station

3.4.1 Status Analysis

After field investigation, it is found that there are three main problems in the present situation. First, the north entrance has a wide bandwidth but a small amount of green, and the vegetation is messy and lacks characteristics. Second, the guardrail of the south entrance and the north exit underpasses is damaged, the vegetation is messy, and the entrance image is lacking. Third, the vegetation on both sides of the north exit slope is messy and the surrounding environment is not good.

3.4.2 Theme concept

Xixiang Toll Station is adjacent to Dachanwan Science and Technology Island. In the future, with the basic completion of Tencent's "internet plus" future science and technology city, "Tencent Department" enterprises and related upstream and downstream enterprises will settle in one after another, and digital technology and advanced manufacturing industry will be fully infiltrated and deeply integrated in Xixiang.

Taking "Dream Baoan" as the theme concept of this high-speed entrance and exit mainly highlights its intelligent technology and dream future entrance and exit image.

3.4.3 Design points

This part introduces the space under the North Exit Bridge, the North Exit Ramp and the North Entrance in detail. The main design points are as follows: first, clean up the site. Clean up the messy and aging shrub ground cover, clean up the old fence under the passage and rebuild the damaged road surface; Second, do a good job in greening. In the aspect of tree species planning, Lagerstroemia speciosa is used as the keynote tree species, and the surrounding areas of the entrance and exit are beautified and colored with key tree species such as phoenix tree, Nanyang Zelkova and Ficus altissima. Third, the overall image is improved. Intelligent lighting is set in the underpass of the north and south entrances and exits, and it is lightened by digital technology, which is matched with pink and purple arbor and shrub plants to create a romantic and dreamy entrance atmosphere.

The length of the underpass between the north and south entrances and exits is about 800 meters, which mainly adds scientific and technological elements in landscape construction to create a dreamy portal image. The main work includes: dismantling one side fence; After the fence on the other side is moved to the plant; Install LED soft strip lights on the viaduct column and bottom to create a digital intelligent pattern change effect at night.

3.4.4 Tree Species Planning

The keynote tree species are Lagerstroemia speciosa (flowering period may-July), the backbone tree species are Flammulina (flowering period October-May of the following year), Ficus altissima, Ficus microcarpa and Sorbus mandshurica, and the shrubs and ground covers are mainly blue-purple oleander, Rhododendron ledebouriensis, Paeonia lactiflora, Eupatorium odoratum and Allium fistulosum. The planned colors of tree species at the entrance and exit of Luotian (Yanluo) are mainly pink and purple, which is in line with the concept of "Dream Baoan" that highlights wisdom and technology and dreams of the future.

4. Conclusion

The social benefit of this project is obvious, and the entrance and exit environment of Bao 'an Expressway is related to the portal image of Shenzhen. The implementation of this environmental quality improvement project is of great significance to further create a beautiful urban environment, enhance the urban image of Bao 'an District and even Shenzhen, and accelerate the construction of a park city. The implementation of this project will fully show the high-quality urban landscape of Shenzhen as a national economic center city and an international metropolis. At the same time, it is in line with the spirit of promoting the construction of ecological civilization and building a beautiful Shenzhen, which is conducive to establishing the brand image of the capital of ecological civilization.

Landscape workers should consider the differences of environmental resources and economic development in different regions, explore local culture on the premise of rational analysis, respond

to the goal of "double carbon", and put forward design points and greening measures with remarkable benefits.

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