

Landscape Planning and Design in Ecological Exploration of Old Residential Areas

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Abstract: The old community is an indispensable part in the process of urban development, which truly records the development of local social economy and construction in different historical periods, and carries people's deep memories. However, due to the acceleration of the urban development process, some old residential areas in the city began to gradually keep up with the development trend of the city, the housing is in disrepair, the walls are aging, and the public facilities left in the early construction process of the community are also seriously aging and basically no use. This paper analyzes the current appearance of Zhengtie Sanbei Community by questionnaire survey and field investigation, and combines the regional cultural characteristics of Zhengzhou city with the current situation of Zhengtie Sanbei community to carry out landscape planning and design. Integrate the problems existing in the public space of the community, integrate the concept of ecological exploration of the community for planning and design, and solve the problem of unreasonable use of public space in the community. When re-planning the landscape of the community, this paper fully considers the needs of local residents and increases feasible green space and public facilities, so that the existing problems of the Sanbei community can be solved to some extent, so that the community can burst out new vitality, promote the ecological development of the community and realize sustainable development.

Keywords: old residential areas; housing renovation; ecological community

1. Introduction

1.1 Introduction to the subject

In recent years, the development of the city has entered a new stage, and people living in the city have greatly improved their living standards with the increase of work income, and they have constantly put forward new requirements in housing. However, in the rapidly developing cities, the problem of village in the city will always exist with the widening gap of housing level. Due to the long construction period, the management of public facilities and greening in the old community is very poor, and various aging problems are constantly exposed with the passage of time.

Target tasks for the renovation of old residential communities in provinces across China in 2021

| Province | 2021 Renovation Plan |
|----------------------------------|--|
| Shandong Province | 649,700 units are planned to start construction in 2021 |
| Shaanxi Province | 3,622 urban old - and - dilapidated neighborhoods are newly started for renovation |
| Jiangsu Province | 1,000 old neighborhoods are to be renovated |
| Guangxi Zhuang Autonomous Region | 1,572 old neighborhoods are to be renovated |
| Zhejiang Province | No less than 800 old neighborhoods are to be renovated |
| Anhui Province | 1,247 old neighborhoods are to be renovated |
| Jilin Province | 1,623 old neighborhoods are planned to be renovated |
| Liaoning Province | 1,000 old neighborhoods are to be renovated |
| Fujian Province | 150,000 households are completed for renovation |
| Guizhou Province | 168,000 households are implemented for urban old - and - dilapidated neighborhood renovation |
| Henan Province | No less than 600,000 households are completed for renovation |
| Guangdong Province | 1,300 old neighborhoods are started for renovation |
| Sichuan Province | 6,000 old neighborhoods are newly started for renovation |

Figure 1. Network research

Based on the Sanbei Community of Zhengtie City, Zhengzhou City, this paper starts from the transformation of the old community, takes ecology as the main design starting point, combines the design concept of harmonious coexistence between man and nature, man and man, and man and architecture, focuses on the landscape planning of the old community, and considers how the public space of the community can meet the different behavioral needs of the residents. It deduces the different forms and functions of the space required by residents, summarizes how the public space should meet the needs of different people and the problems faced in the transformation process of old residential areas, and finally makes effective design[1].

1.2 Background to the selection of the topic

In the Outline of the Fourteenth Five-Year Plan for National Economic and Social Development and the Vision for 2035, higher standards are set for the quality of urban development and the quality of development, and the pursuit of happiness is to be met through the implementation of livelihood initiatives for urban renewal, so that the living standards of residents can be raised substantially. In this Outline, the emphasis is placed on the transformation of old neighborhoods to put forward higher requirements, so as to make them in line with the development process of the existing city. In this day and age, the pursuit of economic growth is no longer the centerpiece of China's development; high-quality, sustainable development is the new goal for China in this new era. In this context, the exploration of community ecology is accompanied by the concept of low-carbon sustainable development[2]. The ecological exploration of the community is tutored by the idea of sustainable development, aiming at the harmonious and unified development of man and man, man and nature, man and architecture.

2. Research and research analysis

2.1 Present situation of Zhengtie Sanbei Community

Zhengzhou is a central city of Henan province pulled by the train, and Zhengtie Sanbei small area is also accompanied by the arrival of the railway, the community covers an area of about 30,000 square meters, due to the long development cycle of community construction, the new buildings inside the community and the old buildings of red brick and tile mix as one, forming a strange landscape. In the 1950s, the earliest "aborigines" in the Sanbei Community appeared, and some railway employees spontaneously raised land near Zhengzhou North Railway Station, cleared part of the land and planted food crops to meet the basic needs of life[3]. Today, there are many buildings, a large population, and vendors are also close to each other, and the night market culture in the Sanbei small district of Zhengtie is also quite famous. Entering the Zhengtie Sanbei community, the eye is a strong fireworks gas, residents' daily activities are concentrated on the main road, there are businesses everywhere in the sale of goods.



Figure 2. Field research

This paper takes Zhengtie Sanbei Community as the research object, selects the most representative plots from multiple angles of the site and conducts field research on the community as a whole. The three-day field research will be conducted from December 27 to 29, 2021. Through investigation and analysis of residents' use of community public space, differentiated behavior activities and local characteristic culture in Zhengtie Sanbei Community, this paper mainly studies and analyzes the status quo of community public space[4]. In the overall landscape design planning part, I used the following research methods: First, I extensively read the domestic and foreign literature on the renewal of old residential areas, and improved my understanding of the construction process of the renewal of old residential areas and related theoretical knowledge. Secondly, I consulted the normative literature, mainly collected the required data by means of Pulse and related databases, including the design norms of residential renovation, theories related to urban planning of Zhengzhou city, and relevant reports on Sanbei Residential District by local people in Zhengzhou City[5]. Then the relevant characteristics of Zhengtie Sanbei Community were objectively recorded through field investigation, sketch drawing and measurement, and the design

ideas of how to carry out reasonable space planning and ecologicalization in the renewal of the old community were analyzed to carry out research, and the resident residents and foreign tourists in the community were surveyed and the data were statistically analyzed.

2.2 Site analysis

The research base is Zhengtie Sanbei Community, Shakou Road, Jinshui District, Zhengzhou City, Henan Province. There is a main road on each side of the community, and Sanbei Street runs through it in the middle. The surrounding area is rich in business, the nearby traffic is very convenient, and the ecological environment near the park is good. In Zhengtie Sanbei small district, the residential buildings are arranged more compact, the buildings are east-west, and the spacing of the buildings is different. The public space available for use is large, but it is chaotic and disorderly, and there are many residents' behaviors of placing objects arbitrarily, resulting in serious waste of space[6]. Most of the public space in the community is occupied by residents' planting activities and private cars in the community, so residents generally do activities on the sidewalk along the two main roads of the community, such as setting up stalls, walking birds, chatting with friends and so on. Like most old communities, the traffic of Zhengtie Sanbei Community also has a big problem, because the parking area of the community is not clearly planned, so most of the vehicles in the community are parked in disorder, causing great interference to the traffic system, often causing road congestion[7].

2.3 Analysis of groups

According to the field investigation of the base, there are 2,446 households in Sanbei Community, where residents have a strong sense of life and a close relationship between residents, but as an old community for residents to use the activity space and basic facilities are insufficient supply[8]. Usually, the organization and order of residents are served by residents' committees as community media. The new farmers' market in Sanbei District, together with the vendors, captures the consumption points of residents and customers within the radiation range. The Internet celebrity snack, which has become famous through various news, has also attracted a lot of foreign and local tourists.

After a questionnaire survey of local residents, we found that residents in the community were not very satisfied with the traffic conditions and environmental health in the area[9]. The elderly and children account for more than half of the local residents. The activities of the elderly are mainly buying vegetables in the morning, walking after meals, exercising and picking up children from school, etc. They are the main users of activity space in the community. In contrast, employees spend more time in the community when they only get off work every day.

2.4 Existing problem of base

Leisure and entertainment facilities are seriously old and damaged, mostly placed by residents at will, lack of humanistic care, imperfect facilities and few people use[10]. The debris in the community is placed in disorder and the quality of itself is poor, and there is a long-term security risk, which also causes obstacles to the important fire lanes, and seriously threatens the fire safety of the community. Daily activities in the community, such as meeting neighbors, talking, sunbathing, can only be done on the street. The community can not meet the basic leisure needs of residents can only put idle tables, chairs and benches for leisure activities such as playing chess and drinking tea.

In terms of transportation, vehicles were not a necessity when the Sanbei Community was built in the early days, so traffic and parking planning were not well considered. Nowadays, there are many vehicles in the community, and these problems left over from the early days are gradually exposed. Each family in the community park their own car, vehicles placed at will and more chaotic, not only hinder the corridor traffic will affect the perception. The various types of vehicles in the cell are grouped together and are not classified. There are also a lot of covers on the road, which occupy the open space, causing the waste of space in the community and making the available space less. In terms of health, the facilities placed early in the Sanbei community are old and are mostly abandoned by residents. The garbage can in the community is old, the use experience is poor, and the guide system is also placed in confusion with the garbage can. The waste management system is poor, the environmental atmosphere is weak, the garbage blocks the road and affects the beauty, and the garbage classification is not realized[11]. In terms of green ecology, due to the early construction of Zhengtie Sanbei Community, the greening of the community is not complete. There are no patches of grass or bushes in the community, and quite a few trees are not surrounded by tree pools, but are dug out of the hardened ground and put into them. Community residents mostly use the combination of foam box modules to plant green plants, which are mostly edible plants. Different from other old communities, Sanbei Community builds a variety of sheds in the community, which is a unique spontaneous behavior, starting from the serial effect of one household causing multi-household use, and most of them are derived sheds against the wall, independent sheds and umbrella sheds.

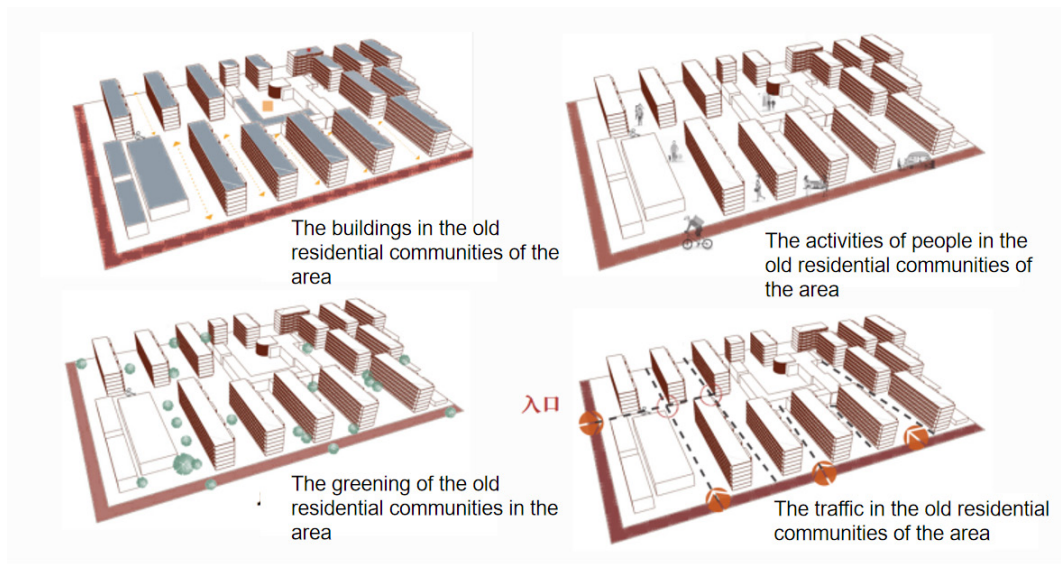


Figure 3. Field research

3. Design idea and design orientation

3.1 The idea of ecological exploration of old community

The idea of ecological community has originated for a long time. Since ancient times, people have advocated the combination of living environment and nature. For example, the idea of “harmony between heaven and man” comes from the House Classic. Feng shui, which has a long history in China, is also one of the embodiment of harmony between man and nature, reflecting ancient people’s thinking about ecological living environment. In 1898, the British sociologist Howard proposed the “Garden city” theory [Kenneth Powell, “Transformation and Reconstruction of Old Buildings”. Dalian University of Technology Press.2001.], at that time, he proposed that man and nature should coexist in harmony, and on the road of pursuing economic prosperity, the natural environment is also an indispensable material condition for human growth and development. With the proposal of this theory, people began to seriously think about how to live in harmony with nature[12].

In general, the ecological exploration of the community emphasizes the concept of harmonious coexistence between people and nature and architecture, and the realization of sustainable development. This paper holds that the most important thing for the construction of community ecological exploration is that it should be able to meet multiple functional needs, not only a building in the physical sense, but also an organism that can fully embody the harmony and unity of people, architecture and environment. Therefore, I believe that in the exploration and construction of community ecology, we should guarantee the harmony between the witness and nature, organically combine the basic public facilities in the community and the functions necessary for residents’ life, so that the community can become a reasonable structure and perfect function of the human settlement ecosystem.

3.2 Landscape planning and design strategy of Zhengtie Sanbei community

We had to design and plan an outdoor space for a community whose members had different lifestyles. The elders in the community have lived here for a long time and are close to their neighbors. They meet and communicate with acquaintances every day. In contrast, employees stay in the community only after work hours every day. Therefore, a spacious space that can not only be used for the gathering of residents in the community, but also can accommodate social activities of different ages has become a must for the design. Due to the different lifestyles, ages and needs of each member of the family, we need to create different forms of space that can meet various requirements. Flexible communication Spaces that can be opened and closed are important, and these Spaces can also effectively connect with the natural surroundings of the house, including ground-level verandas and landscape pieces and sunken “shelters”.

The “shelter” can meet all the outdoor activity needs of the residents of the community. In terms of spatial planning, the space is divided into the leisure and conversation area and the activity area, which serves as the main communication space and can connect with all other areas. In terms of architectural design, we have been considering how to design a complete spatial structure and make it smoothly integrate into the surrounding environment without affecting the original daily activi-

ties of the residents of the community. From a distance, people can only see the vegetation on the ground, the space is hidden underground, there will be no obvious visual impact. In addition, in the post-epidemic period, these devices will also play a richer role, such as guiding the nucleic acid queue flow line and providing a certain shelter in bad weather. The main body of the design is a sunken structure, and according to our previous functional zoning, different devices are placed in the sunken space in front of each building to achieve different functions.

In the design planning, we should also integrate the local cultural characteristics of Zhengzhou city and the outstanding characteristics of the community in order to meet the local residents' sense of belonging and identity. In this renovation of the Sanbei Community, we also fully consider the ideas and needs of the residents of the community, and use multiple practical renewal methods to provide a comfortable and convenient public space environment for the residents of the Sanbei community, and truly design a "people-oriented" green space. For example, along with the idea of the shed that appears repeatedly in the community, our team designed the corridor and overhead design that fully integrated its original functions to better meet the growing needs of local residents, fully extend the life cycle of the Sanbei Community, make full use of existing resources, and realize its sustainable development.

4. Design process

4.1 Overall design idea

As an important urban unit, the resolution of the contradiction between the old district and the city and the solution of the renewal of the district play an important role in realizing the sustainable development of the city. The original functional space of the Sanbei Community is divided and reorganized, and the internal relationship between the various parts is found again. The existing spatial planning of the community is broken down and a new functional space is formed, so as to stimulate the vitality of the Sanbei community and make it achieve sustainable development.

After the investigation and analysis of Sanbei Community, we sorted out the characteristics of Sanbei Community. There are many spontaneous behaviors of residents in the community. First of all, the early leisure facilities used by residents in the community are seriously aging, and residents will carry their own tables, chairs and benches to the remaining open space to play chess and drink tea. Secondly, it is because the residents of the community generally retained the living habit of railway workers in the early days, that is, planting activities are carried out in the community with arranged and combined foam boxes, mainly edible and ornamental plants, which occupy public space but meet the basic needs of residents for planting. Finally, residents of the community will use various forms of sheds, such as wall sheds, independent sheds and umbrella sheds, to meet the needs of shading and parking vehicles. These spontaneous behaviors deeply triggered our thinking, that is, how to combine functionality, practicality and appreciation to make public space planning and design to meet the needs of residents in Sanbei Community.

After fully thinking and planning, our group decided to take the shed that can be seen everywhere in Sanbei Community as the source of inspiration for the design. As a shelter for residents' life, "shed" is well recognized, and the design is combined with the characteristics of large gray space area. Select the community gray space with strong plasticity, transform the use of old sheds into forms of recycling, and aggregate residents' spontaneous behaviors and daily activities.

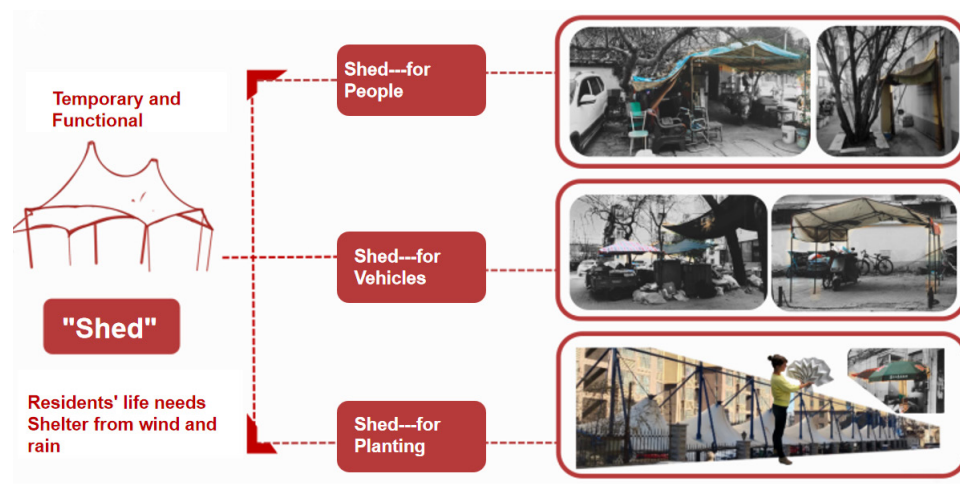


Figure 4. Drawing by team members

4.2 Public space design planning

In the residential environment landscape design, the use of clear limits and enclosures can create an effective space to meet the needs of residents. Classifying functions and connecting different levels of space is the layout principle of community renewal. Properly handling the connecting points of each space level should not only ensure the relative privacy and independence of each level of space, but also use different levels of space to build different spatial characteristics, and make them interact with each other to become an organic whole.

In the community landscape planning and design, different confining methods can be used to create different levels of space. In the Sanbei community, the relationship between residents is relatively close, in order to protect the social activities between residents, semi-private courtyard space is more appropriate. The landscape planning in the old community should have most of the outdoor rest and activity venues and public green Spaces to provide places for the daily social interaction of the elderly and create a comfortable residential landscape. The outdoor landscape of the old residential area should meet the requirements of residents for comfort, and create an outdoor activity venue with good lighting and ventilation conditions and no air pollution, water pollution and noise pollution for residents.

Due to the early construction of the Sanbei Community, most of the vegetation has been degraded. In the landscape transformation, a large area of green space should be added to improve the local climate of the community and play a role in purifying the air and reducing noise. In this design, the green areas in the community are divided into different levels according to different functional needs, and the greening inside the three North small area is formed into different layout forms of points, lines and surfaces. In this community, the proportion of the elderly and children is large, while taking into account the necessary social space for the elderly, children's outdoor activity space is also essential. In the early stage of construction, old communities lack consideration of fire safety issues. Therefore, the outdoor public space planned for the new renovation must be rationally planned for the fire safety of the outdoor public space of Sanbei Community in accordance with the relevant regulations of the state, so as to create a safe and feasible outdoor environment for residents.

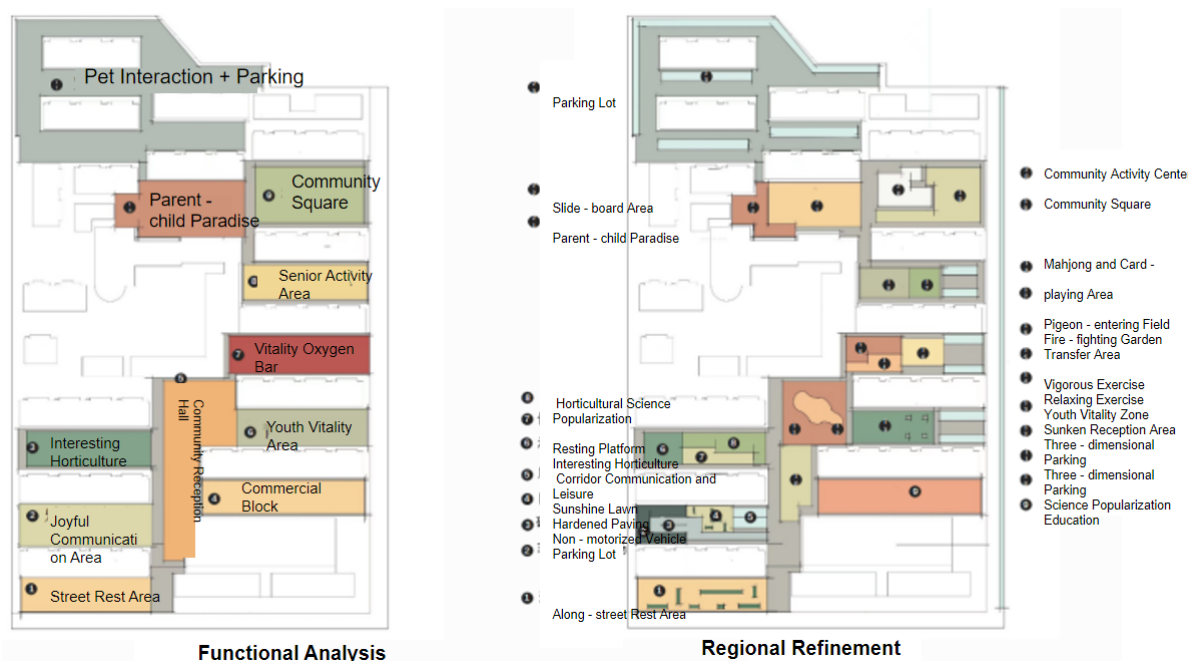


Figure 5. Functional partitioning

4.3 Streamline planning

In the early stage of construction of Zhengtie Sanbei Community, the road planning was not perfect, but the road system is an important part of the community public space, and the road and the landscape complement each other. The road inside the community determines the action track of local residents and vehicles, which will directly affect the residents' travel feelings[13]. In the road planning of the community, we re-planned the overall traffic system of the Sanbei Community in accordance with the principle of people-vehicle separation, barrier-free access and suitable for various vehicle forms, so as to solve the problems of mixed people and vehicles and low traffic efficiency before the community.

At the same time, the smoothness of the road in the community also needs to be met, so that the community residents

can go to any place in the community through the road, and it is convenient enough, and there will be no dead end or dead-end situation. When planning the road, the separation of people and vehicles is a more important design index, because there are more private cars in the community, the traffic is very congested and dangerous. At present, when planning, the flow line of vehicles in Sanbei District and the life flow line of residents are separated to ensure the smooth traffic and ensure the safety of community residents. At the same time, in order to ensure the smooth entry of special vehicles, the fire channel is also rationally planned in accordance with the relevant national safety standards.

5. Conclusion

Old neighborhoods play a vital role in urban development, precipitating the culture and history of the city. This paper takes Zheng Tie Sanbei District as the main research object, refers to a large number of related literature and draws on it, summarizes and summarizes the existing problems through field research, analyzes the needs of the crowd, puts forward reasonable design strategies and design methods for the current problems, and hopes that the concept of community ecology will be promoted. In this design program, there are some limitations in the collection of preliminary information, there are still some imperfections in the research methodology and research data, in the process of analyzing the needs of the population, it is not possible to consider all the use of the population and the type of activity comprehensively, and there are certain errors in the acquisition of data and quantitative analysis, in view of these shortcomings, we will pay attention to these shortcomings in the future design, and make corrections and breakthroughs based on the current study. In view of these shortcomings, we will pay attention to them in the future design and make corrections and breakthroughs based on this study.



Figure 6. Renderings

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