

Planning and Design of Livable Community in Nanyu Town, Fuzhou City

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Abstract—Taking New town Community of Nanyu Town, Fuzhou City as an example, the planning and design plan of Nanyu New Town community was introduced in detail, and the spatial pattern and layout of the community, the road traffic system, the slow-moving system and the layout and composition mode of the neighborhood center were planned. Through the application research in livable community planning, this paper applies the neighborhood center theory method to practice and plays a certain theoretical guiding role in improving the livable community. At the same time, it proposes new thinking directions for the planning and construction of livable communities, so that people have a better understanding of the "suitable living environment" and provide certain for the future exploration of green, ecological, scientific and humanized livable community planning models.

Keywords—Planning and Design; livable community; Fuzhou

I. INTRODUCTION

"The most suitable living environment" is an eternal topic for human beings to pursue and explore. Whether it is the Western conception of "the Garden of Eden" or the oriental yearning for "Xanadu", it is an ideal hypothesis for people to be beautiful. The demand for an ideal living environment has continued to this day. With the certain demand for material civilization being satisfied, people's consumption level and

quality of life are also increasing. People's choice of residence has gradually changed from the most basic habitat requirements to the pursuit of high-quality living standards. The quality of human settlements has a direct impact on physical, mental and spiritual life of people. A livable city is a frontier topic in today's urban planning research and a trend in the future development of the city. The Singapore Neighborhood Center model is a re-innovation of the community planning development model. It integrates residence, work, shopping, leisure and entertainment, emphasizing the relationship between neighbors, enabling residents not only to obtain convenient services and enjoyment under modern living conditions. At the same time, it also promotes the interaction between people and forms a close and harmonious traditional neighborhood relationship. This paper applies the neighborhood center model to the planning and construction of livable communities, effectively and finitely utilizes land and energy resources, improves the material and spiritual quality of life of residents, and exerts the cohesiveness of neighborhood culture to create a sense of community identity, belonging and comfort. A livable community is particularly urgent, seeking a more appropriate new community development model.

II. PLANNING BACKGROUND

A. Overview of Nanyu Town

1) Natural conditions

Nanyu Town, Fuzhou City is located at 27° north latitude and 119° East longitude. It is located in the south of Minhou County, Qishan Mountain, Datunxi West [1]. The east is opposite to Nantong Town, the northeast is opposite to Nantai Island in Fuzhou, the southwest is bordered by Tangqian Township of Yongtai County, and the north is adjacent to Shangjie Town. It is a historical and cultural town in Minhou County [2].

The area is subtropical and maritime monsoon climate, warm and humid, and abundant rainfall. The average annual temperature is 19.3°C, the average temperature in January is 10°C, and the hottest July average temperature is 28.7°C. The extreme maximum temperature is 41.7°C and the extreme minimum temperature is -1.7°C. The main rivers flowing through Nanyu Township are Minjiang River, Datun River, Xiyuan River, Suyu River, Nanjing River, Penglai River, Tunxi, Anli River and Jianglin River.

2) Location traffic

Nanyu Town is 10 kilometers away from Fuzhou Central City, 8 kilometers away from the new university campus, 30 kilometers away from Mawei Port, 44 kilometers away from Changde Airport, and 15 minutes from Nanyu to Fuzhou Outer Ring. In addition, Fuyin Expressway and 316-324 National Highway connecting lines cross the town, Jinshang Bridge, Pushang Bridge, Wanbian Bridge and Wulongjiang Avenue were completed and opened to traffic, and Fuyong Expressway will be built soon, which greatly improved the external traffic condition.

3) Administrative jurisdiction and population

The total land area of Nanyu Town is 170.5 square kilometers. Nanyu Town has jurisdiction over Gwei, Wudu, Gaochun, Zhongxi, Liuzhou, Yuanfeng, Liulang, Houshan, Nanqian, Nanjing, Jiangkou, Maotian, Zhitian and Yutian., Xinlian, Laks, Tongnan, Window Building, Jiudu, Shuanglong, Xiaolan, 60 village committees and two neighborhood committees of Nanqi and Nanyu. There are 18,919 households with 57998 people. Nanyu Town has a prosperous economy and developed culture. It is known as the "Xiaozhong Pavilion" in Fuzhou and has been included in the planning scope of downtown Fuzhou [3].

4) Travel resources

Nanyu is rich in tourism resources and is famous in Qishan Mountain. It is known as the "Left Flag and the Right Dumb" [1]. The peaks on the mountains, the strange rocks, the magical heavenly chessboard stones, the fairy tales, the fairy footprints, and the sideways caves, the Liquan Cave, the bat caves and other scenic spots. There are Jiuyi 18 Temples in the whole territory, including the Jishan Temple in Qishan, which was built in Tang and destroyed in Ming Dynasty. It once had more than 500 people. Up to now, there are Shisong Temple, Anyuan Temple, Hongen Temple, Xianyu Temple and Long'an Temple. Shisong Temple is named after the temple after the Song Dynasty, and the inscription on the tree remains. The Longquan Bowl Yaoshan has the porcelain site of the "rabbits of the rabbits" in the Song Dynasty. The water Xilin has the former residence of Lin Chunze, which is relatively intact in the Ming Dynasty. Tourism resources are mainly divided into six categories: humanities, natural ecology, rural areas, hot springs, folk customs, and tourism goods. The statistics are as follows: (See "Table I"):

TABLE I. STATISTICS OF TOURISM RESOURCE IN NANYU TOWN

Serial number	Resource category	Travel Resources
1	Humanities tourism resources	Qishan Wanfo Temple
		Shuixilin Ming Dynasty Ancient Street
		Fulu Temple
		Bowl Yaoshan Ruins
		Qiyun Bridge
		Minjiang people
2	Natural ecotourism resources	Qishan National Forest Park
		Rabbit ear mountain
		Lijiang River and Datun River Scene
3	Rural tourism resources	Chessboard village
4	Hot spring tourism resources	Shuangyong Hot Spring
5	Folk customs tourism resources	Country festival
		Untouchable cultural customs

B. Planning Scope

The base is located in the northwest of Nanyu Town. The area surrounded by Qishan and Huxiu Mountain is the location of the planned new city of Nanyu Town. The total planned area is 275.35 hectares (See "Fig. 1").

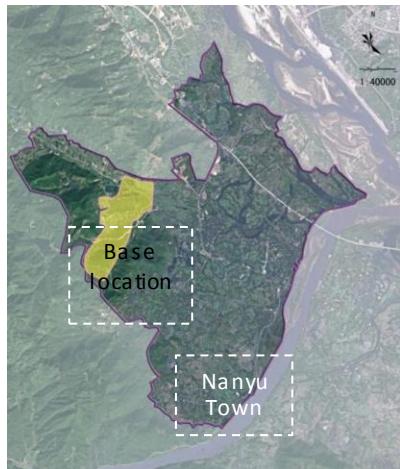


Fig. 1. Location map.

C. Overall Development Goals

Maintain ecological environment, cultural customs and sustainable development of urban and rural construction, strengthen the integration of Nanyu culture and livable communities, extract elements such as Qishan, valley, landscape, etc., and build the community through 3-5 years of development and construction. The overall development goals of the surrounding mountains are the flagship Funan, the Yiyou livable, and the Nanyu New City.

Social development goals: Actively develop various social undertakings such as education, culture, health, sports, radio and television, popularize compulsory education in primary and secondary schools, improve various cultural and sports facilities, and promote the development of mass cultural and sports activities. The level of health care has been greatly improved, so that everyone in the township enjoys primary health care. Improve the social security system. Strengthen environmental protection and build a good ecological environment. Promote social justice, security, civilized and healthy development, and comprehensive improvement of the quality of the whole people.

Urban and rural construction goals: During the planning period, it's necessary to attach great importance to the construction of new-type communities, gradually realize the concentration of farmers to new-type communities; strengthen the comprehensive management of urban and rural environment, effectively control and protect urban and rural environmental quality, and thoroughly improve the living environment of urban and rural residents.

III. ANALYSIS OF THE PRESENT SITUATION OF THE BASE

A. Current Terrain Conditions

The surrounding area of the base is undulating, the flag mountain is higher, the highest point is located on the south side of the base, 530m above sea level, Huxiu Mountain is slightly lower, and the highest point is 154 m above sea level; the internal terrain of the base is relatively flat, the whole north is low and the south is high, and the southern end is

slightly up and down, forming a On the hill, the summit is 76 m above sea level (See "Fig. 2").

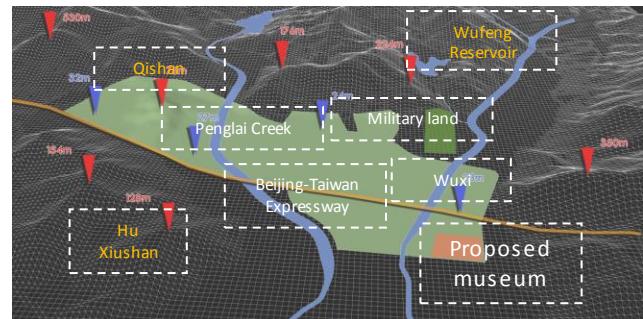


Fig. 2. Status map of topographic conditions.

B. Status Quo Construction and Determination of Conditions

The base is west of Qishan and the east is Huxiu Mountain. Wuxi and Penglai River flow from the west to the east. The current situation of land use is relatively simple, mainly including construction land and vacant land in villages and towns; Wudu Road passes through the northern end of the base, and the remaining roads are mainly village roads; there are large artificial waters south of Wudu Road, which are used internally for pig farms; There are two 500KV high voltage lines and two 220KV high voltage lines running through the base from north to south (See "Fig. 3").

Determining the construction land: one military land on the south side of Wudu Road and one northeast corner museum;

Determining the road: The Beijing-Taiwan Expressway traverses from the middle to the north of the base;

Determination of municipal infrastructure: The current status of 4 high-voltage lines moved to the outside of the base.



Fig. 3. Site photos.

IV. MASTER PLAN

A. Design Concept

1) Axis series connection, group development: Constructing the life axis of three unique residential groups in series: the whole base is divided into three groups: mountain residential area, water residential area and noble residential area according to the landscape and development characteristics of each part. Three neighborhood centers are arranged north to south and the entire living area is

connected in series by the living axis to enable organic development.

2) *Multi-level center, near service*: A tourist service center and two neighborhood centers are located. The tourist service center includes the neighborhood business center, hotel, tourist distribution center and central square. It is also an important tourist distribution center and service center in the neighborhood center for the residents. The neighborhood center includes the neighborhood living service building and the neighborhood park. The service radius is 500m. The community center includes community clubs and group green spaces with a service radius of 200m (See "Fig. 4").

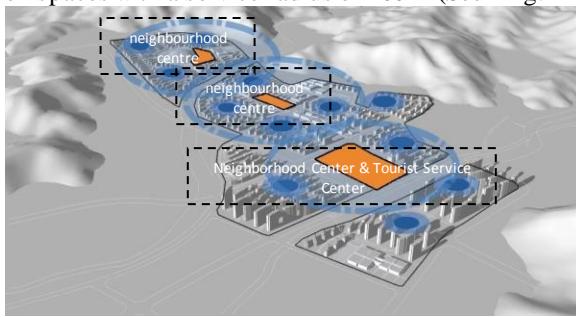


Fig. 4. Schematic diagram 2 of design concept.

3) *Green transportation, low carbon travel*: The green transportation system is constructed, which includes a vehicle system and a slow system: the vehicle system is a green bus system in the form of an internal loop; the slow system includes a bicycle greenway system and a walking system. The whole system is in tod mode, which is not only led by public transportation, but also promotes the speed of travel, and advocates green slowness and pays attention to the quality of travel (See "Fig. 5").



Fig. 5. Schematic diagram 3 of design concept.

4) *Inner ring outside, convenient community*: Construct a two-level bus system with an inner ring: the outbound line is the first line, which is the contact line between the block and the outer area; the inner ring line is composed of two lines of No.1 and No.2, which is the level 2 of the internal traffic of the block. The line; the transfer station is located at the center of the most popular tourist service center, and the distance between the stations on the inner ring is 400-600m.

5) *Characteristic living areas, diverse spaces*: A comfortable community needs to have a good development space system as a basis. In the base, there are neighborhood

parks, community parks, and open space systems with three levels of green space. The community parks and group green spaces have their own characteristics. They are based on the different characteristics of the three groups of the mountain group, the water group and the noble residential area.

B. Planning Structure

Planning to form a two-axis, multi-center, three-group structure:

Two-axis: a vertical axis of the north and south, that is, the axis of life, mainly composed of commercial streets, residential buildings, schools and other living facilities, showing a comfortable and elegant urban living atmosphere; the external axis of the east-west axis is the image axis, mainly by large-scale commercial services. The facilities and waterfront space are formed to accumulate the commercial atmosphere of the city and enhance the image of the tourism portal;

Multi-center: two neighborhood centers and a tourist service center that includes the function of a neighborhood center;

Three residential groups: the residential area of the mountain, the residential area of the water and the noble residential area.

C. Land Use Planning

Reasonable adjustment and refinement of the land for Nanyu New City: Considering the need to serve the tourist resort on the west side and the residential land on the east side, the neighborhood center on the north side of the plot and the tourist service center will be placed at the north end of the base. On the roadside, the image of the tourist portal is formed and there is a tourist distribution; according to the requirements of the service radius, a neighborhood center is set up in the central and southern parts of the base, and primary and complete middle school land is set beside it; the preserved mountain in the south is combined with the neighborhood. Center is used as a neighborhood park. (See "Fig. 6").

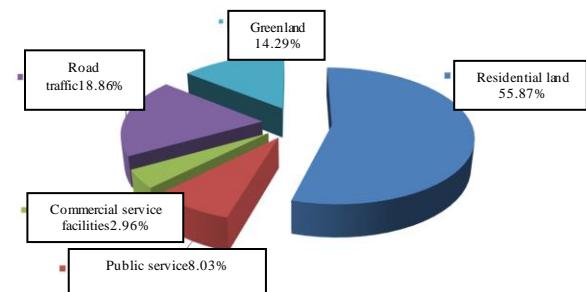


Fig. 6. Pie chart with construction land.

D. Spatial Form and Layout

A tourist service center is set up at the entrance of the tourist area, and an 80m high regional landmark building is set here to guide the spatial form of the entire area while taking into account the entrance image of the tourist area.

Higher-strength development is carried out along areas with good public service resources and landscape resources on both sides of the vertical living axis, and small high-rise (11-story) residential buildings are set up, while the rest of the land is multi-storey (6-story) residential buildings. The three plots at the northern end of the base will be commercialized in the future, with small high-rises (11-story) as the mainstay and high-rises (18-story) in the north (See "Fig. 7").

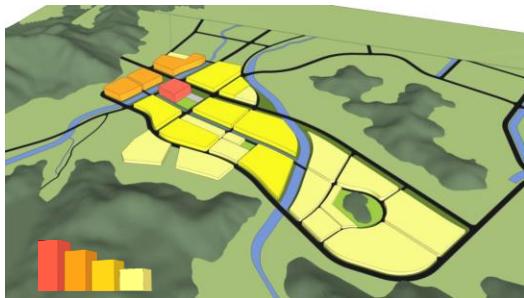


Fig. 7. Overall spatial form.

E. Road System Planning

The road system in the base is divided into four types: expressway, trunk road, secondary trunk road, urban branch road and community internal road.

- Expressway: the Beijing-Taiwan Expressway that crosses the base from north to south.
- Main road: parallel to the expressway and as the main channel for inter-regional contact, the horizontal Wudu Road is in contact with the regional center.
- Secondary trunk road: The sub-trunk network of four horizontal and one vertical is planned in the base, which is mainly distributed on the periphery of the base and carries a large number of traffic.
- Urban branch road: The urban branch road is planned inside the base, and the longitudinal branch road in the middle and north and south carries the life axis.
- Internal roads of the group: Internal roads are planned within each residential group, and the traffic lines within the group are carried.

F. Architectural Features and Intentions

The architectural style division control follows the overall unification principle, and the style is coordinated with the local architecture. According to the needs of different functional buildings, combined with the location conditions, the planned architectural features are divided into: comprehensive commercial building style control area, residential building style control area, large-scale cultural and architectural style control area, medical and educational building style control area.

1) Integrated commercial buildings: The comprehensive commercial building is mainly based on modern and simple style. It emphasizes everything from function to function. The proportion of the facade is moderate, and the

appearance is bright, simple and full of vitality. The color of the facade should be mainly cold gray, supplemented by yellowish and reddish warm colors.

2) Residential buildings: The style of the residential building is dominated by modern minimalist style, reflecting the modern and facade. The main color of the building should be low-color, and the color of the roof and other embellishments can be moderately high-color warm colors.

3) Large-scale cultural architecture: Cultural and sports buildings generally have a large volume. They use a large-area glass curtain wall combined with some exposed steel structures to reflect the simplicity, atmosphere and solemnity. The architectural color is mainly light-colored, supplemented by the gray color of modern metal materials, representing the large-scale depth of the space.

4) Medical and educational buildings: The school building uses a simple and generous form to reflect a vibrant learning atmosphere; the hospital building creates a patient-centered and welcoming environment. The architectural color of the school building is dominated by warm tones, supplemented by cool tones; hospital buildings use pure, high-light colors.

V. SPECIAL PLANNING

A. Residential Planning

1) Mountain Residence: The mountainous area is located at the southern end of the base, surrounded by the preserved mountain, west of Qishan Mountain and east of Huxiu Mountain, forming a unique landscape pattern surrounded by mountains and mountains. Therefore, it has been built into a residential group featuring mountains. The elementary school and the neighborhood center are located in the center of the group, and the service is convenient. The group creates a "green belt" inside, and combines the internal landscape with the external natural mountain to form an ecological penetration (See "Fig. 8").



Fig. 8. Landscape structure and index plan.

2) Water residential area: The water settlement is located in the middle of the base, between Wuxi and Penglai Creek. As the two water systems flow through, they are built into residential group featuring water: the Wuxi and Penglai water systems are opened along the north-south axis of life, creating a characteristic of hard and ecological reef coexistence and twists and turns. Waterfront space; at

the same time, water is introduced into the center of the tourism service center, the neighborhood park and the interior of each community to form a plurality of water space nodes that are interconnected, combined with service functions and recreation functions (See "Fig. 9").



Fig. 9. Landscape structure and Index of the waterresidential.

3) Noble living area: The noble residential area is located at the northern end of the base, facing the Qingshan Mountain and facing Wuxi. It is close to the Wudu Road leading to the tourist resort and Qishan Forest Park. It also has a museum to enhance the overall cultural taste of the area and has good feng shui. Relying on the tourism portal, the high-end residential area is planned for high-intensity development, reflecting the value of the plot (See "Fig. 10").

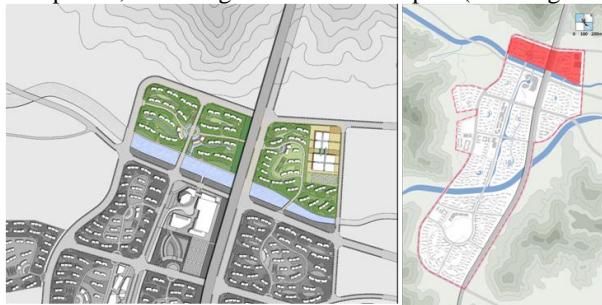


Fig. 10. Distribution and index plan.

B. Slow System Planning

1) Walking system planning

The pedestrian streamline is divided into two levels, three types, of which the main commercial pedestrian flow line is arranged along the life axis of the city. The main landscape walking axis is arranged along the important landscape resources in the planning area, commercial pedestrian flow lines and landscape walking flow. The line constitutes the framework of the entire walking system, and the secondary walking streamlines inside each block are loop lines and are connected with the main walking stream line.

The central square in the north of the base and the southern mountain park are the two most important pedestrian resting nodes in the area. The green parks in the central neighborhood park and the north side of Penglai Creek and the museum square are three secondary walking rest nodes, and the three-level leisure nodes are even. It is distributed in the core landscape and main landscape walking stream of each group. The rest points on the commercial

pedestrian stream are mainly solved by the rest areas supported by various commercial facilities.

2) Motor vehicle entrance and exit planning

The entrance and exit of the motor vehicle should be arranged on the branch road as much as possible. In principle, the main road is not allowed to directly set the entrance and exit of the motor vehicle;

The red line of the intersection of the motor vehicle entrance and exit is not less than 80 meters from the intersection of the main roads of the city, the red line of the intersection of the urban secondary roads is not less than 50 meters, and the red line of the intersection of the branch road and the main road is not less than 20 meters;

The land area is less than 2 hectares, only one motor vehicle entrance and exit is set up. When the land area is more than 2 hectares, more than one motor vehicle entrance and exit can be set up;

The width of the motor vehicle entrance and exit is generally 6 to 10 meters, and in special cases it can be relaxed to 12 meters.

3) Walking landscape

According to the terrain conditions, residential layout and pedestrian flow direction, the pedestrian zone is planned to be placed on the living axis in the north-south direction of the community, and is connected with the central neighborhood of the center to form a composite pedestrian street integrating functions of business, service, leisure and fitness. The width of the street is set to 6m, and the pedestrian street can be built to survive by changing the volume of the building, the fluctuation of the ground height, the twists and turns of the tour route, the changes of the ground pavement, and the setting of special features and service facilities. Pedestrians, spaces is worthy of pedestrians to enjoy.

In addition, through the green space system, the walking landscapes are connected in series, and the landscape nodes are set in the walking distance of 600m, providing rest facilities for people to stop and stay, thus perfecting the slow-moving system and satisfying the needs of residents to relax and enjoy the aesthetics. The green space system is divided into two types: protective green space and public green space. The public green space includes park green space, group green space and street green space. It is planned to set up protective green space on the left side of the Jingtai Expressway, mainly to isolate, eliminate noise and safety protection. The neighborhood park and the waterfront park green space provide public and open space for people to enjoy entertainment and rest, and arrange green groups in the residential area. To meet people's needs for life and leisure (See "Fig. 11")



Fig. 11. Intention to landscape (Left picture: Right side of the waterfront walkway; group green walk).

C. Community Planning

According to the service radius requirements, the population size of the community, and the natural topography, it is planned to set up three neighborhood centers in the community, which are located in the north, middle and south of the base. The layout mode of the neighborhood center is mainly centralized. The service radius of each neighborhood center is less than 800m, and residents can walk to the nearest neighbor center within 10 minutes. The Northern Neighborhood Center is the most important complex neighborhood in the community, with a large multi-functional commercial complex, high-grade, full-featured services and cultural and recreational activities. At the same time, the Northern Neighborhood Center also has a tourism service function. In addition to meeting the daily needs of residents, there is also the role of tourism portal image and tourism distribution. There are schools located next to the central and southern neighborhoods to meet the needs of residents in the community for education, work, shopping, leisure, entertainment, etc., combining business and public services with 12 essential functions, including: supermarkets, banks, postal, catering, pharmacies, fresh food, cultural and sports centers, stationery, beauty salons, repair shops, health service centers, etc., and supplemented by jewelry stores, gift shops, flower shops and other services. In addition, neighborhood stores are set up in each residential group to meet the most basic needs of residents.

VI. CONCLUSION

In the case practice of Xincheng Community Planning in Nanyu Town, Fuzhou City, the characteristics of livable community theory and Singapore's neighborhood center model are highlighted. The planning and design strategies are fully applied in the design, and based on the livable theory. The advantage of the neighborhood center model is in community planning. The main research points include:

- The rational layout of the residential group and the relationship with the axis;
- The multi-level distribution and functional complex of the neighborhood center;
- The convenience and network of the internal communication within the community;
- The diversity of transportation modes and the promotion of green travel modes;
- The establishment and improvement of slow-moving systems.

The starting point of the livable community focuses on two aspects of nature and humanity. The Nancheng Town New Town Community Planning Case emphasizes the versatility of the neighborhood center and the accessibility of the transportation. It also pays attention to humanistic care and advocates a green ecological slow-moving attitude. Create a livable community with a sense of belonging, place,

neighborhood and awkwardness, and reflect the humanity and comfort of the community.

The community is the most basic component of society, and it is also the place where social contradictions are most concentrated. With the development and construction of a large number of residential communities, China's urban planning faces new challenges, is it to continue the urban expansion and population expansion of developing countries, or is it the same as the decline of the centers of developed countries in Europe and America? The construction of communities is closely linked to urban development. The development of the city is inseparable from the construction of the community. This paper considers macro-planning from micro-units and integrates actual planning cases, which can provide a certain reference for the development of the city.

On the basis of fully understanding the relationship between Singapore's neighborhood center model and China's community theory, it has sufficient understanding of its background, characteristics, structural models and practical experience, and applies its successful experience to the construction of livable communities in China. On the basis of the research on the theory of livable community planning, the planning and design of the new city community in Nanyu Town, Fuzhou City is practiced, and the theory combined with practice makes the theoretical research more applicable. From a theoretical perspective, it provides a scientific theoretical basis for exploring new livable community models, and has great significance for enriching and developing the theory of livable communities. From a practical perspective, it is necessary to explore the neighborhood center model in livable community planning. The specific strategies and methods of design can provide valuable design methods and reference examples for the construction of neighborhood communities in the future. It is of great practical significance to promote the construction of livable communities and promote the construction of livable cities. The background of planning and community building, seeking a scientific, rational, operability, and humane livable community planning guiding strategy, exploring community planning methods that efficiently integrate resources, improve land use efficiency, improve the ecological environment, and improve the quality of life, It further inherits traditional culture and saves the disappearing neighborhood atmosphere, thus providing reasonable opinions and suggestions for building a harmonious and livable community.

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