Design Research of Pocket Parks Based on the Concept of Spatial Justice

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Abstract Pocket parks, defined as small-scale urban green spaces, have the potential to foster diverse ecological, cultural, social, and economic development in high-density cities. Under the dimension of spatial justice, pocket parks are acknowledged as a significant carrier for promoting the equitable distribution of green spaces and fostering social inclusion. The incorporation of appropriate green strategies and community participatory design methods can significantly enhance the sense of belonging and overall experience of local residents. This approach not only aligns the social values associated with pocket parks with the specific needs of the community but also fosters equitable citizen participation in both decision-making and design processes. This study proposes a comprehensive theoretical framework for the integration of pocket parks into green infrastructure networks. It aims to explore strategies for maximizing the value of pocket parks within the concept of spatial justice, emphasizing the fundamental principles of accessibility to green spaces and landscape connectivity.

Keywords Spatial justice, Accessibility to green space, Landscape connectivity
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Pocket parks, as a form of small-scale urban green space, offer a range of ecological, economic, and cultural benefits to high-density cities. Nevertheless, current research exhibits significant shortcomings in the integration of theoretical frameworks pertaining to spatial justice, accessibility to green spaces, and landscape connectivity. This study investigates the design and planning of pocket parks to simultaneously address social, ecological, and human needs, thereby integrating these three dimensions into a cohesive framework of practice. Firstly, within the dimension of spatial justice, this study examines the restricted status of low-income and disadvantaged groups concerning the allocation of green spaces in urban environments, underscoring the importance of community participatory design. Secondly, this paper examines the rationality of pocket park distribution and the extent of integration within local street networks concerning green space accessibility. It emphasizes various factors that affect accessibility, including the quality of use and the ease of pedestrian movement. Furthermore, this paper examines pocket parks within the dimension of ecological and landscape connectivity, positing them as essential 'springboards' of the urban green infrastructure network, and evaluates their role in regulating urban microclimates, facilitating species migration, and enhancing biodiversity connectivity.

1 Value and significance of pocket parks

Pocket parks, often referred to as forecourt parks, mini-parks, or corner parks, emerged during the post-World War II era of urban renewal in Europe. A defining characteristic of pocket parks is their small scale; despite variations in form, location, and boundary context, any public green space that addresses the needs of the surrounding area can be classified as a pocket park. In high-density urban areas, pocket parks serve as a vital strategy for addressing the challenges posed by complex urban environments. Their significance lies in their adaptable design, proximity to services, daily accessibility, low cost, and ease of maintenance. Pocket parks not only offer essential ecosystem services to compensate for the lack of large parks, but also provide spaces for residents to participate in outdoor recreational activities, thereby fostering diverse interactions between society and nature[1]. Consequently, they are widely recognized as a significant means for revitalizing urban communities and effectively mitigating the imbalance between the supply and demand for open space.

1.1 Achieving spatial justice and equally sharing green spaces

Pocket parks enhance urban environments through miniature green spaces and positively influence and promote spatial justice from various perspectives[2], as evidenced by distributive, procedural, and outcome equity. In terms of distributive equity, pocket parks can help mitigate inequalities in the spatial distribution of ecological services. In urban environments, certain core areas often possess abundant ecosystem services, while other regions experience significant deficits in these services. Pocket parks, due to their small and adaptable nature, can be integrated into resource-limited areas to provide ecological benefits to underserved communities. In terms of procedural equity, pocket parks can facilitate equitable design through community participation, thereby strengthening community identity. The implementation of community participatory design in the creation of pocket parks fosters a heightened sense of involvement and decision-making authority among residents. This approach not only enhances the transparency and equity in the allocation of public resources but also aligns the design of pocket parks more closely with the needs of users. Furthermore, it ensures that various social groups can benefit equitably from these communal spaces. Pocket parks can significantly contribute to outcome equity by enhancing social inclusion. By reducing the distance that residents must travel to access green spaces and promoting a more equitable experience within these areas, pocket parks facilitate interactions among individuals of varying income levels, cultural backgrounds, and age groups, thereby fostering social integration[3].

1.2 Improving accessibility and creating available green spaces

Accessibility to urban green space is a multifaceted concept that assesses the ease and equity with which urban residents can access green spaces within urban environments. Accessibility is typically characterized by three primary dimensions in the existing literature: the spatial dimension, which pertains to the reasonableness of the distance from residents to green spaces, as well as the availability of

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coherent pathways or modes of transportation—such as walking, cycling, or public transit—that provide direct access to these areas; the temporal dimension, which concerns the efficiency of time spent by residents, exemplified by the ability to reach a specific green space within a 10–15 min walk; and the social and economic dimension, which addresses the socio-economic backgrounds of various resident groups, thereby highlighting issues of resource equity across different neighborhoods. This dimension examines whether low-income populations have comparable access to green resources as their middle- and high-income counterparts. Accessibility to green spaces is essential for promoting health, psychological well-being, and community cohesion, serving as a significant indicator of the extent to which green space planning aligns with principles of social equity[4].

The establishment of pocket parks serves as a significant strategy for enhancing the accessibility to urban green spaces and improving the urban ecological environment. Pocket parks function as a micro-complement to urban accessibility. While large urban parks are often concentrated in specific areas, pocket parks help to fill the 'blank space' of green space in regions with limited land resources. These smaller parks are especially significant in offering accessible green space services within walking distance. Secondly, pocket parks can significantly augment the overall availability of green resources for disadvantaged populations. They enhance the accessibility of urban green spaces for individuals who may face challenges in traveling long distances, such as children and the elderly, particularly in high-density cities. Furthermore, pocket parks can help mitigate the issue of unequal resource distribution and improve the breadth and balance of green accessibility.

1.3 Improving landscape connectivity and avoiding fragmentation

Urban landscape continuity pertains to the sustained ecological processes and the preservation of environmental functions that exist between urban, peri-urban, and natural areas. This continuity is achieved through the strategic design and safeguarding of interconnected green spaces. This initiative seeks to promote biodiversity, enhance ecosystem services, and improve the quality of life for urban residents in response to the ecological fragmentation resulting from rapid urbanization. Landscape continuity is frequently attained through the strategic planning and management of green infrastructure. These systems serve to mitigate ecological fragmentation and enhance ecological resilience, while simultaneously providing cultural, social, and health benefits. The 'patch-corridor-matrix' model in landscape ecology underscores the interrelatedness of landscape structure and its influence on functional ecological networks[5]. The tangible manifestation of the pocket park within the broader landscape continuity serves to enhance ecological connectivity. These small green spaces, strategically located within urban centers, serve as 'stepping stones' within an 'ecological network'. They assist in linking fragmented landscape patches and offer migration pathways for various species. Despite their limited area and ecological service capacity, multiple pocket parks situated at short intervals from one another can substantially enhance localized ecological connectivity and improve conditions for migratory species through a high-density distribution. Furthermore, pocket parks offer a viable solution for highly urbanized environments, as their minimal land requirements facilitate their integration into existing urban frameworks. These parks serve as ecological connectors between urban streets or function as 'microecological corridors'[6].

2 Site selection for pocket parks

Pocket parks are typically located on small parcels of land within urban areas that are either underutilized or not optimally developed. Regarding accessibility, it is common to consider proximity to neighborhoods, transportation hubs, and other high-traffic locations to ensure that residents can reach these parks within a reasonable walking distance, generally within 50 m. From the perspective of the service scope of the park, an analysis is conducted on the overlap between the service areas of the selected site and those of existing large parks or community green spaces. The selection of locations for pocket parks should prioritize addressing the service needs of 'green space blind zones'. In the context of natural and ecological conditions, priority in site selection should be accorded to areas that require enhancement of their ecological functions. This includes regions where there is an urgent need to optimize microclimate, biodiversity, or ecological connectivity. In terms of connectivity, it is essential to prioritize sites located at easily accessible nodes within the pedestrian and low-carbon transport network. This approach will facilitate connectivity to adjacent urban functions while enabling the flexible integration of the site into the green space network. In considering the positive social benefits, priority in site selection should be accorded to areas that have the potential to enhance neighborhood interaction. Such areas may include community centers, school perimeters, or street intersections. The policing conditions within the neighborhood, along with the residents' acceptance, will significantly influence the utilization rates of pocket parks.

The placement of pocket parks must consider social needs, ecological conditions, service scope, and economic viability. It is essential to utilize surplus urban land flexibly and to ensure the integration of ecological benefits with social functions through participatory design. At present, pocket parks can be categorized into several types based on their spatial characteristics and geographical locations. These categories include street corner pocket parks, public transport station pocket parks, road setback pocket parks, community edge pocket parks, and temporary space pocket parks.

2.1 Street corner pocket parks

2.1.1 Characteristics of street corner pocket parks. Street corner pocket parks are typically situated at street intersections, in proximity to communities, schools, commercial centers, and other areas with high foot traffic. This strategic placement aims to facilitate a convenient '10-min walk' for residents. Additionally, their location near major thoroughfares or intersections allows for seamless integration into the pedes-trian and bicycle networks. Street corner pocket parks facilitate community engagement and provide ecological services, which are particularly important for enhancing accessibility to green spaces. These pocket parks serve as significant 'transitional spaces' within the urban environment, situated at the convergence of pedestrian and vehicular pathways. Their transitional nature, characterized by the concept of 'stopping-walking', facilitates brief pauses for individuals traversing these areas. In terms of landscape connectivity, these parks, despite their relatively small size, can function as 'ecological nodes' that enhance the structural connectivity of the landscape ecological network by filling ecological gaps between larger green spaces and serving as mobile bridgeheads for urban wildlife. Street corner pocket parks should prioritize edge transitions and openness in their design. It is essential to minimize the use of excessive fences and barriers, ensuring that these parks connect harmoniously with their surroundings. The design should foster open and inviting spaces that accommodate diverse needs, promote community engagement and inclusivity, facilitate community events, and enhance social interaction.

2.1.2 Representative case: Culver Steps and Main Plaza (California, USA). Completed in 2020, the

Culver Steps and Main Plaza in California, USA, encompasses an area of approximately 5,100 m^2 and is located in the heart of a downtown area characterized by heavy automobile traffic. This development has effectively transformed a previously deserted parking lot into a pedestrian-friendly urban center (Fig.1). The development integrates stores, restaurants, and office space with nearby subway stations. This area offers residents and visitors a diverse range of experiences within an outdoor environment that remains accessible throughout the year, whether by foot, bicycle, or subway (Fig.2).

The civic leaders of Culver City endeavored to revitalize the downtown area by collaborating with various departments in a progressive and innovative manner to reimagine a civic event space situated at the heart of the city's downtown. The incorporation of creative paving in design details enables the street to function simultaneously as a public square and a performance space for terrace activities. The open space was meticulously designed to accommodate the needs and habits of the local community, with the designers drawing inspiration from the site's topography. The grand staircase is strategically positioned to offer views of the lateral mountain ranges of Southern California that encircle the city, including the foothills of the Santa Monica Mountains, the San Gabriel Mountains, and the Baldwin Hills, which are in close proximity to the city. On a clear day, individuals standing on the steps are afforded a breathtaking vista of the mountains that surround the Los Angeles basin.

The establishment of the Culver Steps and Main Plaza addresses the citizen's aspiration for a livable urban community. This plaza operates under a public-private partnership, with the government overseeing its maintenance and operation. The Culver Steps and Main Plaza functions as an urban gathering space for all residents, attracting daily workers to its merchants and drawing local residents to government-sponsored special events. It serves as a new social venue, hosting community events and providing essential services on a daily basis. Additionally, the plaza can be adapted for special events and seasonal programs, transforming into an outdoor theater for music and dance performances, thereby functioning as a comprehensive urban community stage (Fig.3).

2.2 Public transport station pocket parks

2.2.1 Characteristics of public transport station pocket parks. Public transport station pocket parks are typically located adjacent to transport hubs and are characterized by high pedestrian traffic and immediate accessibility. These parks are often situated in predominantly high-density residential or commercial areas, serving as spaces where commuters and residents can take brief recreational breaks. By integrating with public transportation stations, such spaces provide accessibility to green areas directly at the travel nodes frequented by a high volume of daily commuters. This integration effectively reduces both the time and spatial costs associated with accessing green spaces and offers significant improvements to the microenvironment in fast-paced and high-density urban areas, thereby enhancing individuals' mental health experiences. In terms of landscape connectivity, pocket parks serve a crucial socio-ecological function by acting as mitigation patches for ecological fracture zones. These areas enhance the connectivity between economic or residential zones and green buffers. The design must exhibit adaptability and flexibility, as the transport hub is significantly influenced by traffic patterns, pedestrian flow, and environmental disturbances, necessitating a focus on rapid adaptive management. Furthermore, the design should be versatile in its application and possess the capacity for updates, allowing for both temporary implementations and integration with the urbanization process to ensure long-term functionality.

2.2.2 Representative case: Gigantium Urban Space (Aalborg, Denmark). Gigantium Urban Space represents the redevelopment of a former loading area and is an integral component of the new 'Plusbus' project in Aalborg, Denmark. The 'Plusbus' is an environmentally sustainable local bus route that enhances the integration of transportation and urban development. The design of the Gigantium Urban Space integrates bus stops, green areas, and facilities for sports activities, with the objective of establishing an engaging bus stop that encourages commuters to participate in sports and recreational pursuits (Fig.4).

The 'Plusbus' system in Aalborg represents a novel, environmentally sustainable bus rapid transit system that fosters a synergistic relationship between transportation and urban development. The Gigantium station serves as a pivotal stop within the 'Plusbus' system, aiming to cultivate an appealing destination that encourages individuals to adopt more eco-friendly travel practices, enhance their engagement with nature, and participate in outdoor activities. The red square at Gigantium is strategically situated within a landscaped lawn, featuring a bicycle path that traverses the grass to connect with the red square. This red 'carpet' effectively directs visitors to the urban square, inviting them to pause, stroll, relax, or engage in recreational activities (Fig.5).

The interesting white lines on the floor delineate various shapes, effectively partitioning the vestibule area into distinct zones. These lines and patterns serve dual purposes: they can function as training elements for athletic activities or as road markers and decorative features that enhance the street ambiance, thereby infusing vitality and interest into an otherwise drab and monotonous concrete environment. The graphic design extends to the adjacent façades and connects outward to pedestrian pathways, cycling routes, and bus stops. Accompanying these lines are railings, platforms, and steps that facilitate movement, as well as greenery that directs individuals towards a range of sports and recreational activities. The Gigantium Urban Space integrates multiple expressions to render bus stations both ecological and interactive.

2.3 Road setback pocket parks

2.3.1 Characteristics of road setback pocket parks. These pocket parks are typically situated between roadways and buildings, and their linear configuration results in a design that is predominantly characterized as 'striped' or 'panelled'. They are intended for use as pedestrian thoroughfares, community gathering spaces, or green buffers along roadways. As both active and open spaces, these pocket parks are designed to integrate pedestrian walkways, cycling paths, and areas for residential activities, facilitating rapid and spontaneous access for both pedestrians and motorists, thereby offering 'quick access stops'. In terms of landscape connectivity, pocket parks play a significant role in regulating microclimates, mitigating dust, absorbing noise, and serving as ecological corridor restoration points. Furthermore, they function as fragmented ecological patches that connect scattered corridors or larger green spaces. The design of these parks must be both compatible and continuous, integrating seamlessly into the urban green space system. It is essential that the design harmonizes with the surrounding vegetation, transportation infrastructure, streetscapes, and architectural elements to avoid disrupting building access or traffic flow. Additionally, it is imperative that these parks incorporate low-maintenance, weather-resistant plant species to minimize the need for irrigation and pruning in the future.

2.3.2 Representative case: Capitol Plaza (New York, USA). The Capitol Plaza is situated in Chelsea Heights, New York, and is encircled by antique markets, art galleries, hip-hop stores, and residential buildings. This narrow strip

Fig.1 Aerial view of the Culver Steps and Main Plaza

Fig.2 Daily use status of the Culver Steps and Main Plaza

Fig.3 Use status of the Culver Steps and Main Plaza during festivals

Fig.4 Gigantium Urban Space and surroundings

traverses a block located east of Sixth Avenue, among numerous such spaces in the most densely populated area of Manhattan. It provides a venue where the millions of New Yorkers who reside and work in this vicinity can enjoy a moment of respite and engage in social interactions. The plaza's verdant ornamental plantings, distinctive contemporary seating, and nearby cafes and shops create an environment conducive to relaxation within a bustling urban setting (Fig.6). This space resonates with the community, evolving with the transitions of day and night as well as the progression of the seasons.

The success of the plaza can be attributed primarily to the designer's thorough analysis of the site and the provision of diverse seating options. The curved, notched wall of flower beds traverses the plaza, effectively delineating the space into distinct zones characterized by varying degrees of social intimacy and spatial enclosure. The east side features a series of short steps that lead to a secluded, curved terrace area. Behind this terrace lies the central element of the plaza: a 90-foot-long, two-story-high orange wall adorned with a sequence of rhythmically arranged elliptical apertures. These openings provide glimpses of a bamboo grove, with one of the cut-outs functioning as the spout for the fountain. The vibrant panel, as observed from Sixth Avenue, is both visually appealing and creatively striking (Fig.7).

The diverse seating arrangements in the Capitol Plaza are consistently occupied on pleasant days. Custom-designed stainless steel swivel stools encircle the bar, complemented by warm, thick rocks, low concrete walls, benches accompanied by coffee tables, oval chess tables, and steel mesh chairs, all of which reach full capacity. This inviting environment attracts residents of all ages, fostering social connections in a relaxed atmosphere (Fig.8). The design processes, forms, materials, and furnishings are all informed by the character and culture of the Chelsea Heights community. This approach cultivates a spatial language that profoundly aligns with public sentiment by considering individuals' behavioral patterns and daily requirements. The Capitol Plaza serves not only as a compact oasis that optimizes spatial resources but also as a significant catalyst for social interaction. It facilitates the convergence of residents from diverse backgrounds through a humane design, thereby promoting community cohesion and a sense of belonging.

2.4 Community edge pocket parks

2.4.1 Characteristics of community edge pocket parks. These pocket parks are typically situated on undeveloped or neglected sites within the community, including vacant lots between buildings, abandoned parking areas, or land that remains after demolition activities. Due to their limited dimensions, pocket parks are frequently designed with flexibility to accommodate the surrounding environment. In relation to the accessibility of green spaces, these parks directly benefit community residents by offering enhanced access to social, activity and wellness functions, particularly for vulnerable groups such as children, the elderly, and individuals with limited mobility. This significantly contributes to the promotion of equitable accessibility. In terms of landscape connectivity, these parks can serve as localized core nodes within the urban ecological network, thereby providing essential support for peripheral endemic species. Furthermore, they offer substantial benefits for small-scale urban flora and fauna, including avian species and pollinators. The design of such parks must ensure that the space is seamlessly integrated into the daily life of the community, while

simultaneously reflecting local characteristics and incorporating innovative elements that align with the historical and cultural context of the area. To promote community participation, a participatory design approach can be implemented, encouraging residents to express their opinions during the planning and construction phases. This involvement is intended to enhance the project's relevance and foster a sense of belonging among community members.

2.4.2 Representative case: Gibbon Pocket Park (London, UK). The project is situated in the central area of the City of London, adjacent to a bustling commercial and residential district, and is a modest green space embedded within the urban landscape. The project, conceived by the design firm Architectural Collaborations, seeks to optimize a previously underutilized narrow urban boundary site in order to establish a green sanctuary for the community. In an urban environment characterized by numerous high-rise buildings and elevated land prices, the Gibbon Pocket Park serves as a successful illustration of resource allocation and ecological design, achieved through the effective utilization of a narrow, elongated open space (Fig.9). The park is distinguished by its innovative design and models of community participation. This case exemplifies the potential of pocket parks to integrate ecological benefits with cultural exchange, thereby improving green accessibility and fostering interactive experiences for residents.

The Gibbon Pocket Park has demonstrated significant success in enhancing urban ecological conditions and improving landscape connectivity. Through meticulous selection of plant species and thoughtful design of the layout, the park contributes to the regulation of the microclimate within the surrounding area. The verdant vertical green walls and floral plantings not only create a cooling 'cold island effect' for the surrounding area during the hot summer months, but also enhance air humidity and quality through the process of transpiration (Fig.10). Furthermore, the park's capacity to attract various species, including birds and insects, contributes to the biodiversity of the city center, thereby establishing it as an ecological oasis. As an integral component of the city's green space network, the park serves as a mitigation strategy for the fragmentation of urban green spaces by enhancing the connectivity of green corridors and linking them to adjacent parks and open areas.

The Gibbon Pocket Park serves as both an effectively landscaped area and a significant venue for community activities, developed through a community-oriented design approach. The design process of the park integrated feedback from a diverse array of local residents and workers. This participatory planning model has enhanced the community's sense of identity and fostered a commitment to the maintenance of the park. The inclusion of movable seating and adaptable public spaces within the park creates an environment conducive to relaxation, social interaction, and the hosting of small events for local residents and office workers (Fig.11). Importantly, the park improves accessibility to green spaces and fosters social equity for individuals who may not have the opportunity to frequently access larger urban green areas. Consequently, parks represent more than a mere superficial application of greenery within compact areas; they function as a central element in fostering emotional connections within the community and promoting the dissemination of green culture. This, in turn, contributes to the development of a more humane and communal green infrastructure within urban environments.

2.5 Temporary space pocket parks

2.5.1 Characteristics of temporary space pocket parks. The transient nature of temporary pocket parks allows for greater flexibility in their location and form. These parks can be situated along roadways, in underutilized parking lots, and in other open areas that are not used to their full potential. These pocket parks facilitate opportunities for spontaneous and frequent social interactions. With regard to the accessibility of green spaces, these parks are especially well-suited for brief, transient experiences in urban environments where green space is critically needed, yet planning efforts may be inconsistent. In terms of landscape connectivity, its effectiveness is primarily influenced by its proximity to significant ecological corridors and node locations. When situated in regions characterized by substantial ecological fragmentation, it can function as a crucial temporary connectivity patch. However, the long-term ecological impact may be diminished, necessitating dynamic planning to support the establishment of permanent green spaces. The design prioritizes variability in response to the uncertain duration of the temporary space, allowing for adaptation to functional requirements and changes in the site. This approach employs 'tactical urbanism' to facilitate short-term transformations of the space, assess the feasibility of long-term utilization through tentative micro-interventions, and evaluate community acceptance and functionality with minimal investment[7-8].

2.5.2 Representative case: Mobile Botanical Gardens (London, UK). The Mobile Botanical Garden was established at two locations within the financial district of the City of London: one in Cheapside and the other in Aldgate. The design seeks to address the themes of urban greening, rewilding, sustainability, and recreation, while also drawing upon the historical context of the selected site to develop an engaging and immersive experience. Additionally, it aims to create a diverse array of urban living spaces. A flash mob approach is employed to establish green spaces that offer novel experiences. Furthermore, the design aspires to investigate methods for the care and enhancement of biodiversity within urban environments.

The design of the Mobile Botanical Garden by Wayward emphasizes the historical significance of markets at both locations. Cheapside was known for selling produce and poultry during the Middle Ages, while Aldgate was recognized for its fabric sales originating from Petticoat Lane market. These historical elements have significantly influenced the framework design of the Mobile Botanical Garden. These installations underscore the historical significance of each site as a trading center by incorporating saplings and other young plants within frames designed to resemble market trolleys (Fig.12). In addition to accentuating the distinctive history of each location, Wayward has conceived the Mobile Botanical Garden with a forward-looking perspective. The selection of young seedlings, as opposed to mature plants, in each planter serves as a symbol of the aspiration and commitment to enhancing the greening of urban environments.

The narrative of Aldgate and Cheapside is reflected in the design of the botanical garden, which has been meticulously crafted to align with the historical significance and utilization of each location. The Mobile Botanical Garden in Cheapside features saplings of substantial deciduous trees, including oaks, which offer cool shade and are reminiscent of the ancient sycamore tree located at the center of St. Mary-le-Bow Church. The Mobile Botanical Garden in Aldgate additionally showcases drought-tolerant plants, providing visitors with a natural spatial experience reminiscent of the Mediterranean. This unique spatial experience further connects the plantation to the international food market located on Middlesex Street. The flora within the Mobile Botanical Garden is maintained by local community members. Wayward conducted three drawing and writing workshops entitled

'Tall Tale Trees', which focused on the interplay between residents and the trees of London. These sessions incorporated writing, as well as emotional and auditory drawing on paper utilizing natural materials.

3 Key points of pocket park design

Pocket parks are constrained in size, making it essential to enhance their environmental capacity. To optimize visibility and space utilization, the interior of the park is typically designed with hard paving, complemented by

Fig.5 Individuals engaging in physical exercise in the Gigantium Urban Space

Fig.6 Relationship of the Capitol Plaza to the street

Fig.7 Orange wall and bamboo grove

Fig.8 Various seating facilities at the Capitol Plaza

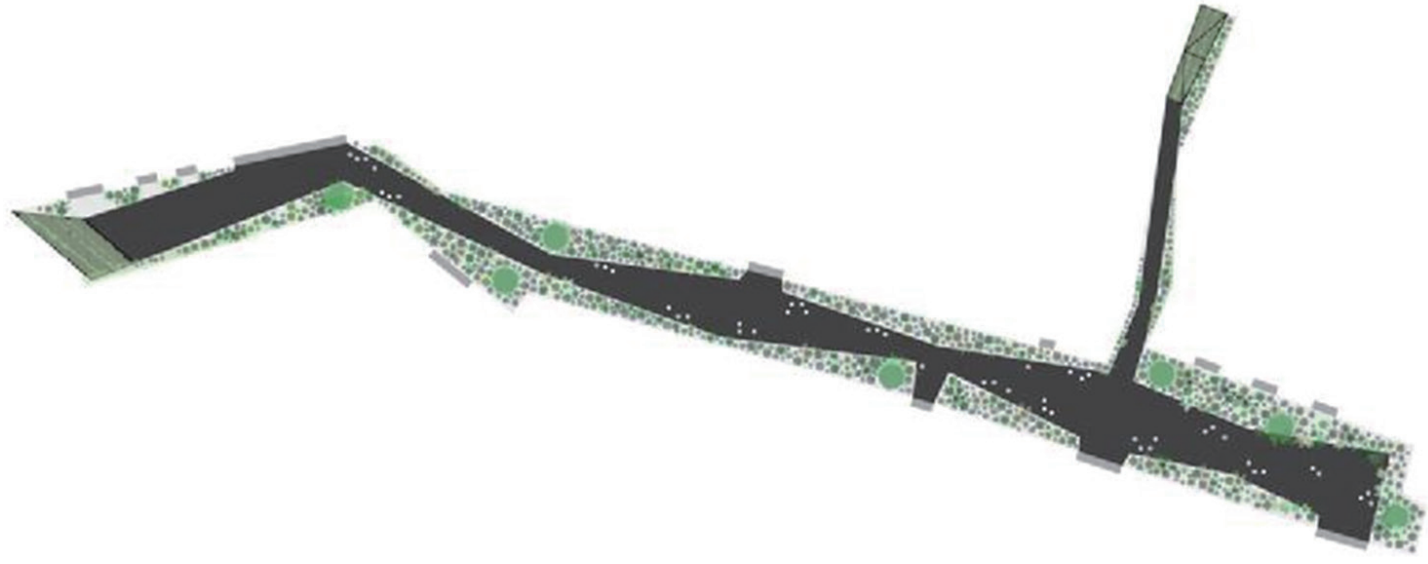

Fig.9 Gibbon Pocket Park at the community edge

Fig.10 Verdant Gibbon Pocket Park

Fig.11 Residents mingle at the Gibbon Pocket Park

Fig.12 Mobile Botanical Garden in Cheapside

the strategic placement of trees. Additionally, small evergreen trees and shrubs can be suitably positioned along the margins or against walls. The deciduous trees in the central area are strategically arranged in various configurations to allow for flexible spatial division. This design approach not only enables future functional modifications or upgrades without altering the overall layout but also promotes a profound integration of long-term utilization of space and urban development.

3.1 Expansion of hardened areas to improve environmental capacity

In the design of pocket parks, a judicious increase in hardened paved areas, coupled with a reduction in the ratio of lawn to shrubs, can significantly enhance both environmental capacity and utility. Lawns and low shrubs typically incur high maintenance costs and serve a single function, thereby constraining the potential for diverse activities within the space. The implementation of permeable paving tiles and hard surface platforms not only expands the area available for various activities but also alleviates management challenges during periods of high pedestrian traffic. Furthermore, these hardened surfaces can be integrated with design elements such as small-scale greenery, vertical green walls, or the installation of flower boxes. This approach enables the park to maintain functionality while simultaneously incorporating a degree of greenery and aesthetic appeal.

3.2 Strategic planting of tree species to integrate both functionality and aes–thetics

Pocket parks should be designed with a predominance of deciduous trees to establish comfortable shaded areas that mitigate the impacts of climate extremes. Deciduous trees play a crucial role in regulating the microclimate and enhancing thermal comfort; they provide cooling effects during the summer months through shade and allow for increased sunlight penetration in the winter due to leaf abscission. The canopy structure additionally establishes an open space conducive to various activities, rendering it an appropriate location for individuals to relax and engage in social interactions. The inclusion of benches or small facilities can further enhance the user experience of the site. Deciduous trees contribute not only by absorbing rainwater and improving air quality but also by offering habitats for avian and insect species. By selecting appropriate species, deciduous trees can effectively combine functionality and aesthetics within a constrained area, thereby addressing both ecological requirements and the recreational activities of individuals in the park setting.

3.3 Reducing terrain height differences to improve space utility

In the design of pocket parks, flat terrain enhances the functionality of the space. While elevated designs may serve an ornamental purpose, they occupy limited area, which restricts the efficient utilization of the site and

(To be continued in P26)

chairs, swings, children's amusement facilities are set up to provide tourists with rest and relaxation space between tours. A variety of night leisure and entertainment projects are developed, such as the bonfire party and folk culture night market with Yao characteristics, so as to enrich tourist experience and effectively extend the stay of tourists.

5.5.4 Health facilities. Public toilets, garbage cans and other sanitation facilities are reasonably distributed to ensure sufficient quantity and reasonable distribution. The design of public toilets should pay attention to coordination with the surrounding environment, and adopt sewage treatment technology for ecological and environmental protection. The daily maintenance and management of health facilities should be strengthened to make the environment clean.

6 Conclusion

With the vigorous development of global tourism, the planning and design of rural tourism landscape in Libo Yaoshan Ancient Village is particularly important. Based on the analysis of the current resources and characteristics of the ancient village, as well as the planning and design principles of cultural inheritance and innovation, ecological protection and sustainable development, and the ingenious integration of landscape diversity and tourists' experience, the functional zoning planning of the ancient village was carried out, and unique landscape nodes were designed; traffic routes were optimized, and tourism service facilities were improved. It is expected to realize the comprehensive upgrade of rural tourism landscape of Yaoshan Ancient Village, so that its tourism attraction and competitiveness can be significantly improved to promote the sustainable development of local rural tourism, contribute to the protection and utilization of world natural heritage sites, and provide reference and inspiration for other regions to carry out rural tourism landscape planning under the background of global tourism. It is helpful to promote the prosperity of rural tourism in China.

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escalates both construction and maintenance costs. Conversely, flat terrain provides greater opportunities for the arrangement of activity zones and the integration of green spaces with hardscaping, making it particularly conducive to multi-functional layouts. Furthermore, the flat design promotes barrier-free access for children, the elderly, and individuals with mobility impairments. Additionally, the flat surface supports effective rainwater management by enabling the incorporation of ecological modifications, such as permeable paving and rain gardens, which further enhance the environmental carrying capacity.

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