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Healing Urban Park Transformation: An Innovative Approach to Therapeutic Urban Design

Jiahao Fan

Abstract:
The rapid pace of urbanization has intensified global mental health challenges, with conditions such as depression and bipolar disorder on the rise. Urban landscapes often lack restorative environments, further exacerbating psychological strain. This study explores the transformation of an abandoned industrial site in Zhengzhou, China, into a healing urban park. Adjacent to the Eighth People's Hospital, the park integrates therapeutic principles from Frederick Law Olmsted, Roger Ulrich, and Jan Gehl. By combining architectural, environmental, and behavioral strategies, the design prioritizes flexibility, inclusivity, and ecological resilience. This paper provides a replicable framework for creating urban spaces that promote mental health, ecological restoration, and community well-being, positioning urban parks as vital components of sustainable and healing urban development.

Keywords: therapeutic urban design, mental health, healing landscapes, ecological resilience, participatory planning.

1. Introduction

1.1 Background

The global rise in mental health issues underscores the need for innovative urban design, [1]particularly in Henan Province, where rapid urbanization and academic pressures have heightened depression and anxiety among adolescents.

Figure 1 reveals a decline in sleep duration among Chinese students (2014-2024). Primary and middle school students lost 40 minutes of sleep on school nights, while high school students experienced reductions of 10-20 minutes on weekdays and 40-60 minutes on weekends. Figure 2 highlights rising depression rates, with nearly 40% of high school students showing symptoms and severe cases reaching 10.9%-12.5%.

Figure 3 illustrates the limitations of China's conventional mental health treatments. Acute hospitalization, typically lasting three weeks, progresses to lengthy rehabilitation phases of 4-12 months, placing significant strain on healthcare resources. This highlights the need for complementary solutions like therapeutic urban environments to promote prevention and reduce healthcare burdens.

The proposed project, located at the intersection of Hanghai and Zhengmi Roads in Zhengzhou, seeks to transform an abandoned industrial site into a therapeutic park. Integrating architectural and behavioral strategies, it aims to address adolescent mental health while benefiting the wider community.

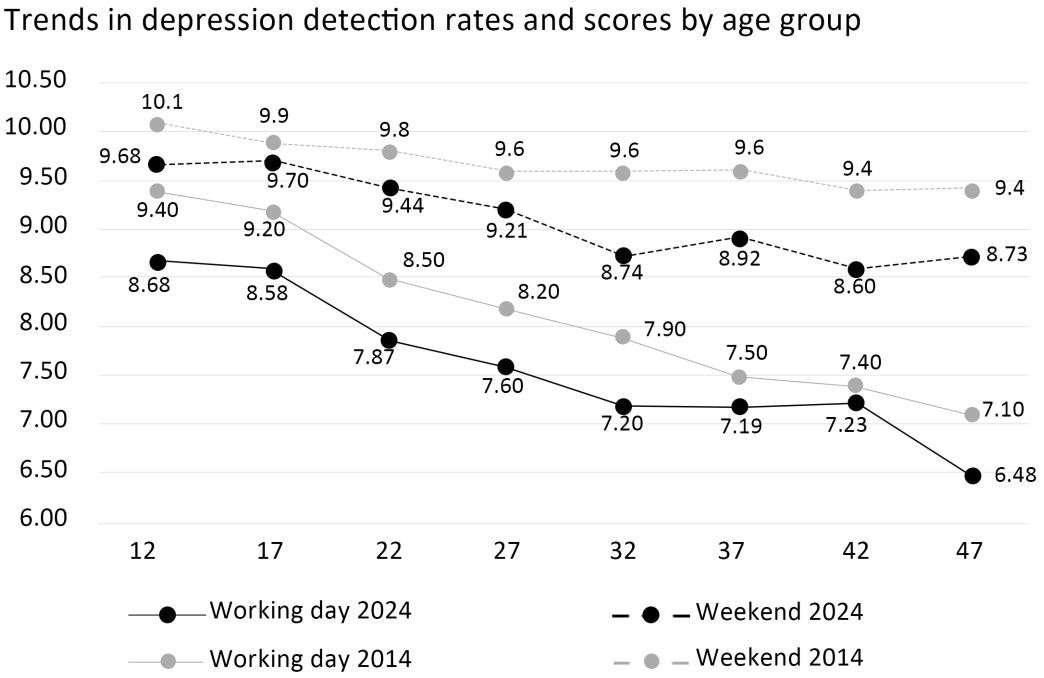

Figure 1. Year-to-year comparison of trends in sleep duration with grade level in China

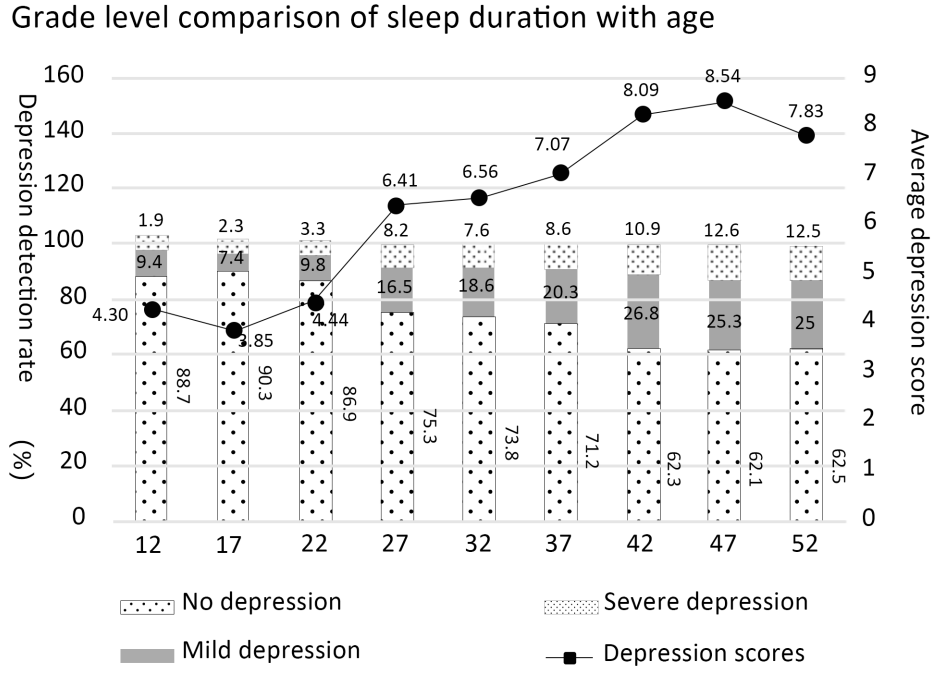

Figure 2. Trends in depression detection rates and scores by age group in China.

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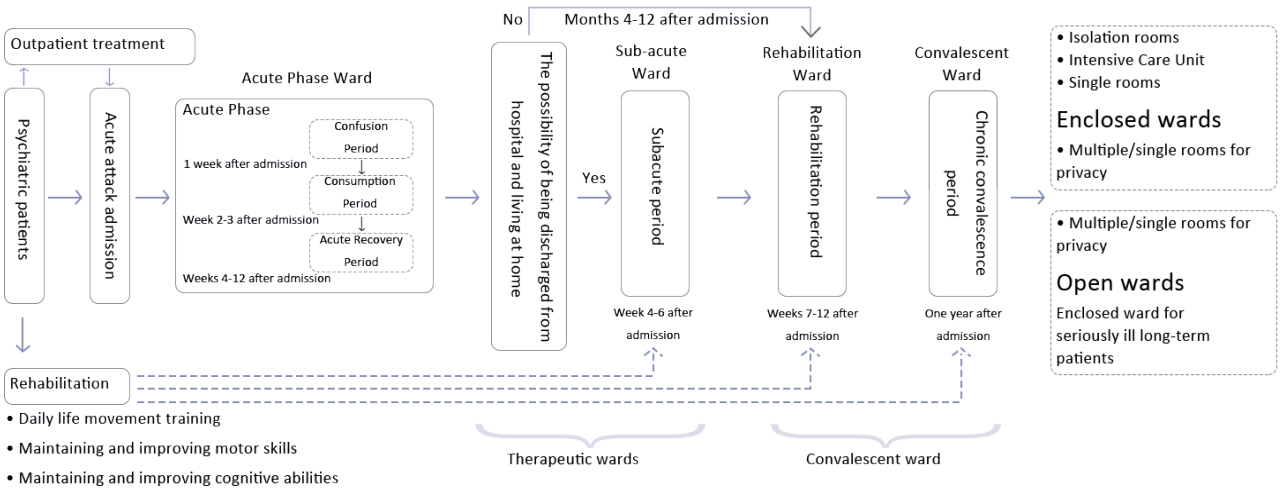

Figure 3. Traditional Chinese Psychological Disease Treatment Chart

1.2 Objectives

1. Redevelop a derelict urban site into a therapeutic urban park.
2. Establish a framework for participatory design between people with mental illness and city residents.
3. Provide a replicable model for integrating mental health considerations into urban planning.

2. Literature Review

2.1 Healing Spaces and Mental Health

Healing spaces utilize natural elements to promote psychological well-being, with research highlighting that exposure to greenery, water features, and sensory-rich environments reduces stress hormones such as cortisol and enhances cognitive function.[2] In Zhengzhou, rapid urbanization has constrained access to restorative greenspaces, elevating stress, particularly among adolescents. [3] Following Roger Ulrich's "Stress Reduction Theory," the design integrates water elements and shaded green spaces to alleviate the city's intense summer heat. Edward O. Wilson's biophilia hypothesis further supports the inclusion of natural elements, aligning with Chinese cultural values of harmony with nature.[4]

2.2 Challenges in Urban Greenspace Design

Urban greenspaces in Zhengzhou often prioritize aesthetics over functionality, leaving therapeutic needs unmet. [5] Issues such as overcrowding and fragmented parks limit accessibility for vulnerable groups, including adolescents and hospital patients. The proposed design addresses these challenges through adaptive zoning, providing both secluded areas for reflection and open spaces for social interaction. This approach aligns with Jan Gehl's human-scale design principles and integrates ecological restoration to combat environmental degradation and biodiversity loss in the urban landscape.

2.3 Innovations in Therapeutic Landscape Design

Modern therapeutic landscape design prioritizes multisensory engagement, adaptive zoning, and technology-driven interventions. In Zhengzhou's proposed healing park, multisensory features, including aromatic plants like lavender and jasmine, enhance mood and reduce anxiety. Seasonal planting variations ensure dynamic sensory stimulation year-round. Adaptive zoning caters to diverse user needs, offering spaces for physical activity, socialization, and tranquility, in line with Kaplan's Attention Restoration Theory. [6]Technological integration, such as real-time environmental monitoring and augmented reality guides, promotes user engagement while addressing pollution concerns and fostering mindfulness.

2.4 Ecological and Social Relevance

Zhengzhou's high population density and air pollution underscore the need for sustainable design. The park incorporates native plants to improve air quality and enhance local biodiversity, aligning with Ian McHarg's "Design with Nature" principles. Socially, the park addresses the lack of therapeutic and recreational spaces for adolescents and hospital patients, ensuring inclusivity through community consultation. This participatory approach reflects best practices in urban design, emphasizing the importance of user-centered, culturally sensitive interventions. [7]

3. Methodology

3.1 Site Analysis

Figures 4 and 5 collectively present a comprehensive site analysis, incorporating GIS mapping, behavioral surveys, spatial analysis, and functional evaluations. The project site, with a functional influence radius of approximately 1,500 meters, demonstrates an increasing gradient of activity from northwest to southeast. Strategically located northeast of the Eighth People's Hospital of Zhengzhou and adjacent to the eastern edge of Jinhai Reservoir, the site experiences high accessibility and visitation by individuals managing mental health conditions, highlighting its potential for integrating therapeutic urban landscapes with healthcare services. [8]The "Traffic Analysis" emphasizes the site's location in the core area of Erqi District, characterized by convenient transportation networks, while the "Functional Analysis" identifies diverse surrounding land uses, predominantly residential and service-oriented zones, which enhance its suitability for community-focused interventions.[9] Additionally, the "Density Analysis" visualizes high pedestrian flow during both weekdays and weekends, underscoring the site's strategic relevance for developing an inclusive and functional therapeutic park that caters to a diverse demographic, including individuals with mild to moderate mental health conditions and urban residents of all ages.[10]

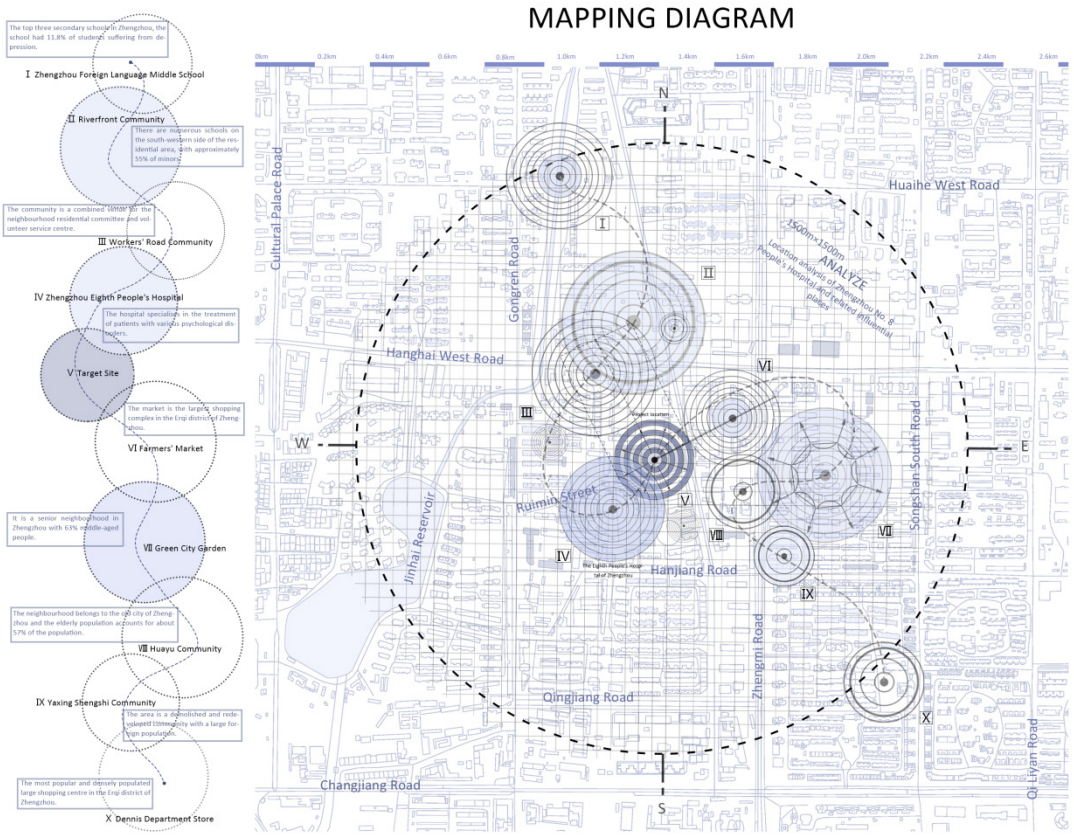

Figure 4. Analysis of the current status of the site

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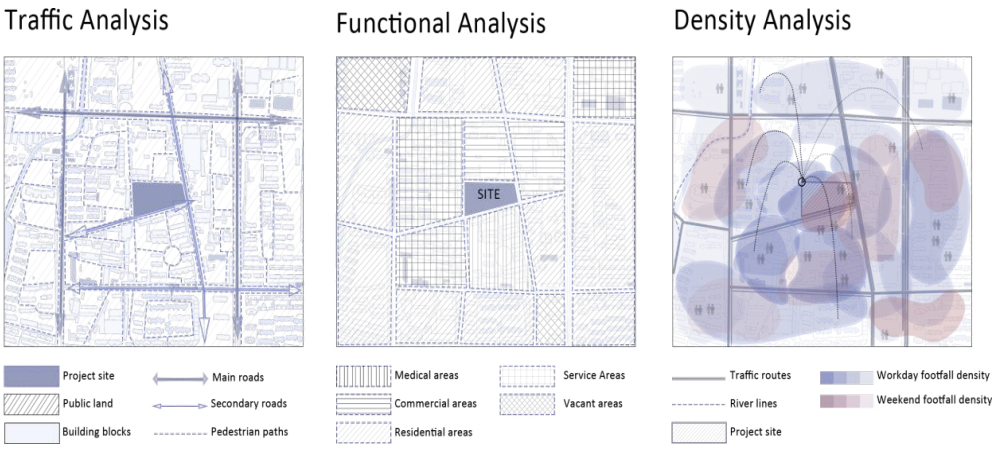

Figure 5. Site environmental analysis

3.2 Integrated Design Framework

Figure 6 illustrates an integrated approach emphasising the synergy between architectural, environmental, social and sensory elements to create a holistic therapeutic landscape aligned with evidence-based practice in mental health design. [11]The framework consists of four key components:

1. “Direct Treatment - Architectural Design”: The design includes the application of scientific, standardised processes for the treatment of mental illness within a purpose-built healing centre, ensuring a structured environment for clinical interventions. [12]

2. “Indirect Treatment - Environmental Interventions”: Recovery is promoted through a diverse therapeutic landscape that allows patients access to natural elements such as greenery, water features, and sensory-rich environments, thereby contributing to psychological recovery and stress relief.[13]

3. “Indirect Therapy - Communication Design”: Interactive landscapes and organised activities within the park are designed to complement conventional mental health treatment by facilitating social interaction and increasing patient participation in the treatment process.[14]

4. “Indirect Treatment - Behavioural Interventions”: Sensory interventions targeting hearing, touch, taste and smell are used to encourage specific behaviours to optimise treatment outcomes and improve overall health.[15]

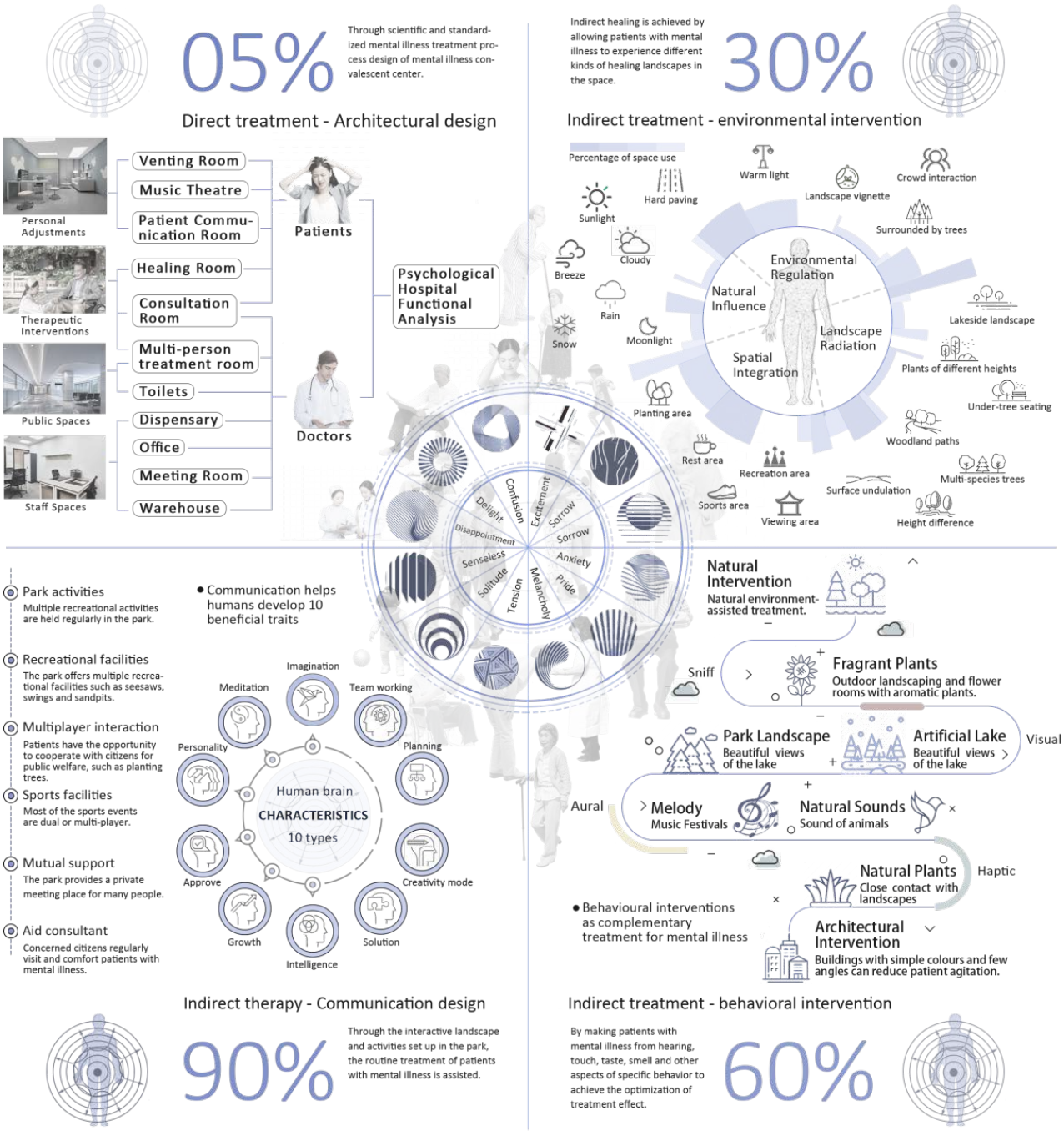

Figure 6. Framework of four design strategies

3.3 Participatory Research

The participatory research framework employed structured interviews with medical staff, patients, and local residents, facilitating iterative refinements in spatial planning to meet diverse user needs. As shown in Figure 7, the design is structured around three core objectives: “enhancing recreational participation” through high-quality facilities that promote physical and mental well-being; “providing a restorative environment” with designated rest areas that integrate built and natural landscapes; and “fostering social interaction”, reinforcing the park’s role in community cohesion and well-being.[16] Behavioral analysis revealed distinct “temporal usage patterns” among demographic groups, while “contextual analysis of Zhengzhou’s urban dynamics” highlighted the city’s fast-paced lifestyle, where most residents are occupied during the day. Adolescents visit primarily in the evening, middle-aged

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individuals frequent the park post-work and after dinner, and older adults exhibit a bifurcated pattern, engaging in early morning and evening activities. This insight shaped the "spatial programming", prioritizing "patient-oriented spaces during the day" and optimizing "comfort and functionality for peak evening usage", ensuring "balanced temporal and spatial allocation" for an optimal user experience.[17]

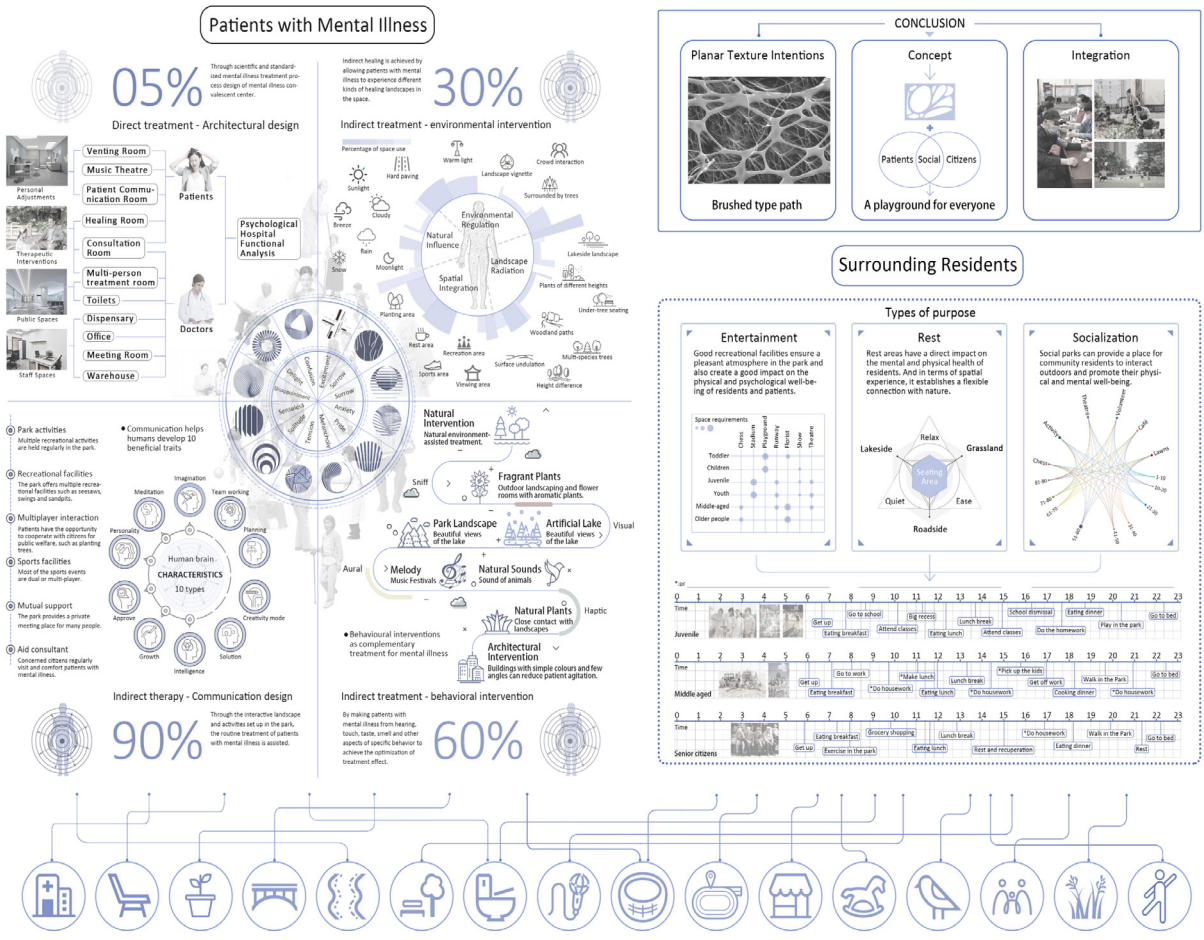

Figure 7. Participatory Analysis

4. Design Innovations

4.1 Transparency and Boundaries

As shown in Figure 8, the "masterplan" emphasizes spatial fluidity and ecological integration, replacing rigid boundaries with natural partitions such as shrubs and plant communities. This enhances visual connectivity, fosters exploration,[18] and ensures privacy and safety. Elevated walkways further integrate distinct zones, balancing functionality with aesthetic appeal. The park's "functional zoning" is structured into three key areas: "Therapeutic Zones", including the Psychological Clinic, sensory gardens, and meditation groves to support mental well-being; "Community Areas", featuring amphitheaters, open-air stages, and public lawns to foster social interaction;[19] and "Recreational Nodes", incorporating walking trails, fitness areas, and sports facilities to promote holistic health. A "sensory-driven planting strategy" prioritizes native species with psychological benefits, such as lavender and jasmine, ensuring seasonal variation for year-round engagement while enhancing biodiversity and ecological resilience.[20]

"Spatial analysis" identifies seven primary functional zones, with circulation centered around a "main loop", reinforced by a "three-tiered pathway system" for accessibility and diverse user experiences. Pedestrian flow is highest near the "Psychological Clinic" and "Public Lawn", underscoring their role in user engagement. The integration of varied green spaces and strategically posi-

tioned landscape nodes establishes a cohesive ecological network, optimizing both usability and environmental sustainability.[21]

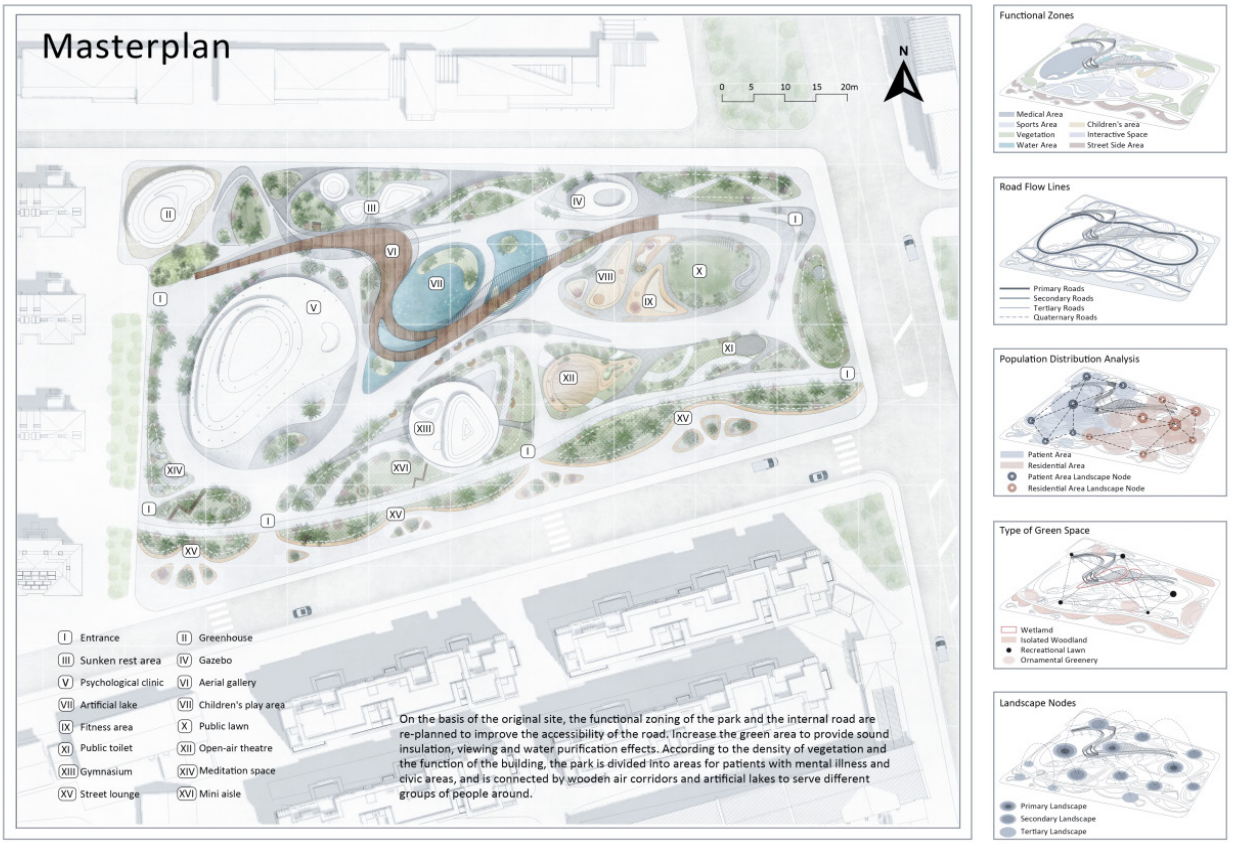

Figure 8. Masterplan and spatial analysis of the park

5. Results and Analysis

5.1 Spatial and Functional Integration

The “Psychological Clinic”, as the park’s core facility, seamlessly integrates “therapeutic and recreational functions” within a spatially optimized framework.[22] As shown in Figure 8, its “multi-level design” enhances both functionality and user experience. The “first floor” serves medical staff with offices and conference rooms, ensuring an efficient work environment. The “second level”, designed for patient privacy, houses consultation rooms and pharmacies, with a “10-degree inclined slab” enabling direct patient access while integrating landscape elements. Beneath this slope, curated landscape ornaments enhance aesthetics and immersion. The “third leve” features a “multipurpose auditorium” for cultural activities, reinforcing the park’s holistic wellness approach.[23]

Complementary facilities further enrich the “therapeutic landscape”. A “music room” and “library” offer cognitive and emotional enrichment, while “tree-lined seating, a greenhouse, and a Sports Room” encourage interaction with nature and physical activity. These elements balance “privacy, accessibility, and engagement**, supporting “mental and physical rehabilitation” while fostering a diverse and inclusive experience for both patients and community residents.[24]

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Figure 9. Psychological clinics and spatial integration analysis

5.2 Plant adaptation analysis

The selection of “native healing and aromatic plants”, such as “lavender and jasmine”, reinforces the park’s psychological benefits through “scent, color, and texture”, fostering a multisensory therapeutic environment.[25] “Spatial analysis” reveals a “higher density of trees and shrubs in patient-designated areas”, enhancing privacy, while community zones feature “open landscapes” conducive to social interaction.

As shown in Figure 10, tree species were selected based on “Zhengzhou’s temperate monsoon climate”, characterized by “hot, humid summers, cold, dry winters, and moderate rainfall”. “Salix spp. (willows)”, with high “moisture tolerance”, stabilize soil and regulate microclimates near water bodies. “Sophora japonica (Japanese pagoda tree)”, valued for its “drought tolerance, pollution resistance, and dense canopy”, provides shade and air purification. “Ginkgo biloba”, exceptionally resilient to “pests, pollution, and climate stress”, adds seasonal visual interest with its autumn foliage. “Robinia pseudoacacia (black locust)”, a nitrogen-fixing species, improves “soil fertility” and adapts well to “drought-prone urban environments”. These species collectively enhance “biodiversity, air quality, and microclimatic regulation”, aligning with an “adaptive planting strategy” that mitigates “urban heat island effects”.

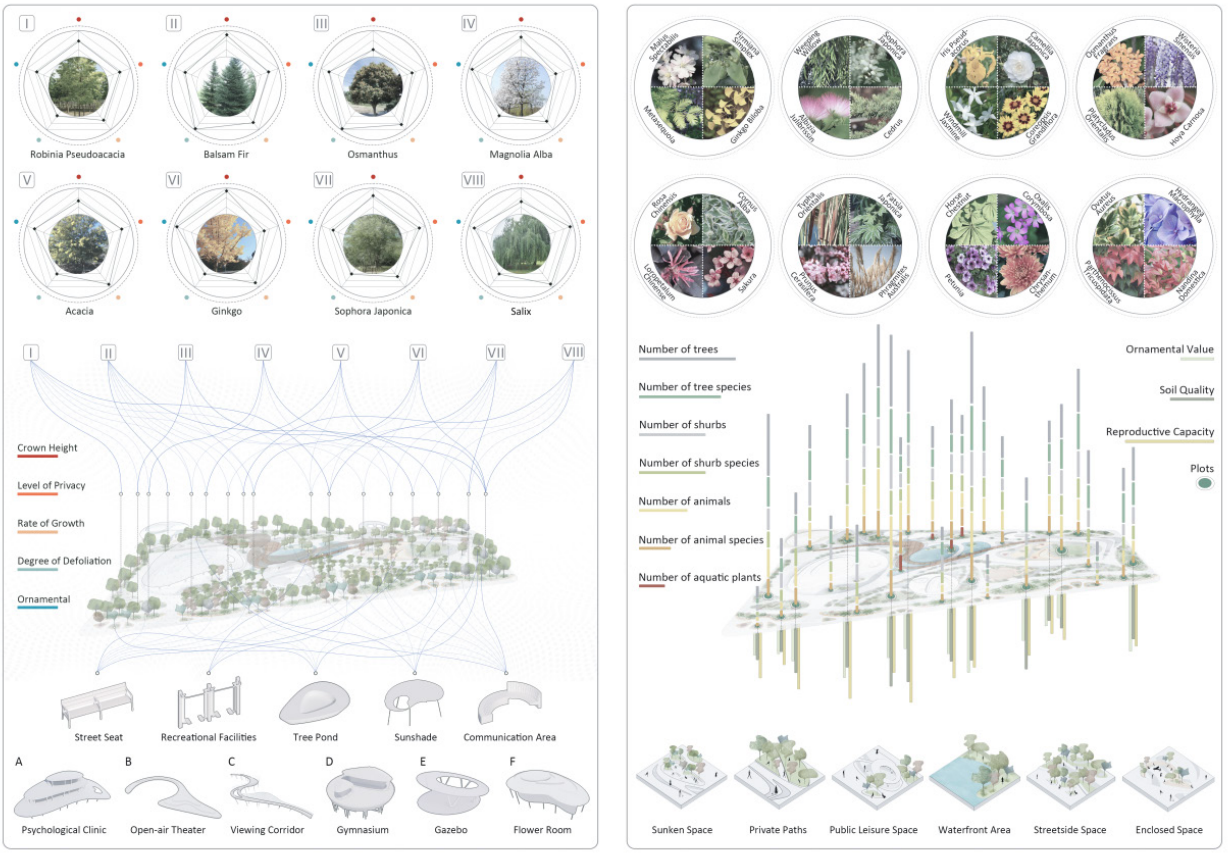

Figure 10. Plant analysis in relation to the environment

5.3 Spatial Coherence and Visual Hierarchy

The park's spatial design balances "architectural scale, visual permeability, and ecological integration". As shown in Figure 11,"Building heights are limited to 13 meters", preserving sightlines while ensuring "privacy through tall vegetation". Taller structures on the "west side" accommodate patient-oriented spaces, while the "east side" remains lower and open for community use,[26] reinforcing functional and experiential contrast. The "Aerial Gallery's curved design" aligns with the park's aesthetic, while its "double-layer armrests" enhance "safety and comfort". The "vegetation strategy" prioritizes "cold- and drought-resistant trees" averaging "15 meters in height", including "Salix spp., Sophora japonica, Ginkgo biloba, and Robinia pseudoacaciac, selected for "climate adaptability, biodiversity, and microclimatic benefits". [27] These plantings mitigate "urban heat island effects", improve "air quality", and integrate seamlessly with the architecture. This "strategic fusion of buildings and vegetation" creates a "healing environment that balances openness and privacy", reinforcing the park as a "multifunctional therapeutic and recreational space" that optimizes user experience for both patients and the community.[28]

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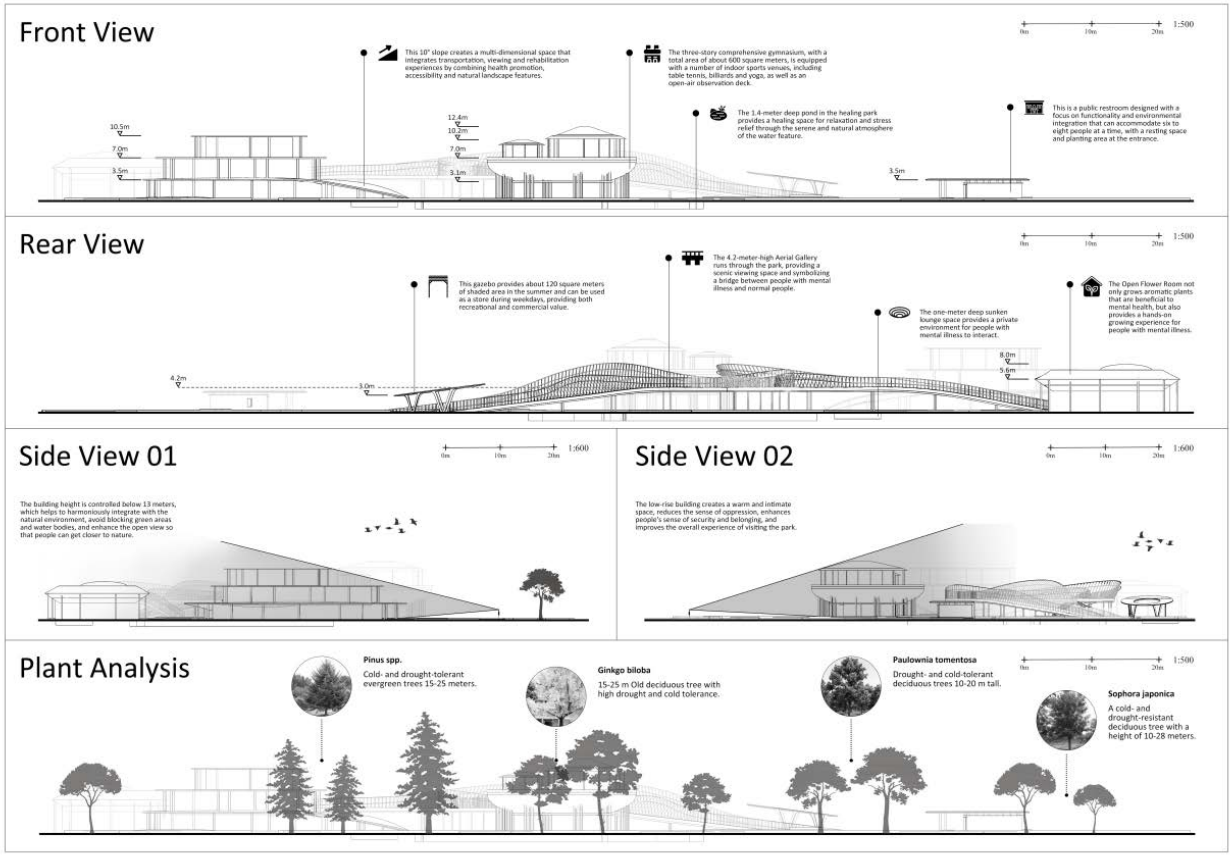

Figure 11. Multi-angle elevation analysis of the park

5.3 Spatial Coherence and Visual Hierarchy

The "bird's-eye view of the park" (Figure 12) provides a comprehensive visualization of the spatial organization, illustrating the distribution of functional areas and their integration with the surrounding environment. Grounded in extensive "offline research and user analysis",[29] the design strategically accommodates the distinct needs of "doctors, patients, and community residents", reinforcing the park's role as a "multifunctional urban spacev.

Findings from the "user behavior analysis" confirm that the park's "zoning strategy effectively prevents long-term crowd accumulation", ensuring a balanced spatial distribution of activity areas. The "temporal dispersion of user groups"—with distinct visitation patterns among patients, medical staff, and local residents—minimizes spatial conflicts and enhances accessibility. This adaptive planning "optimizes user experience" while maintaining the park's therapeutic and social functions, demonstrating its "significant contribution to urban well-being and public health infrastructure".

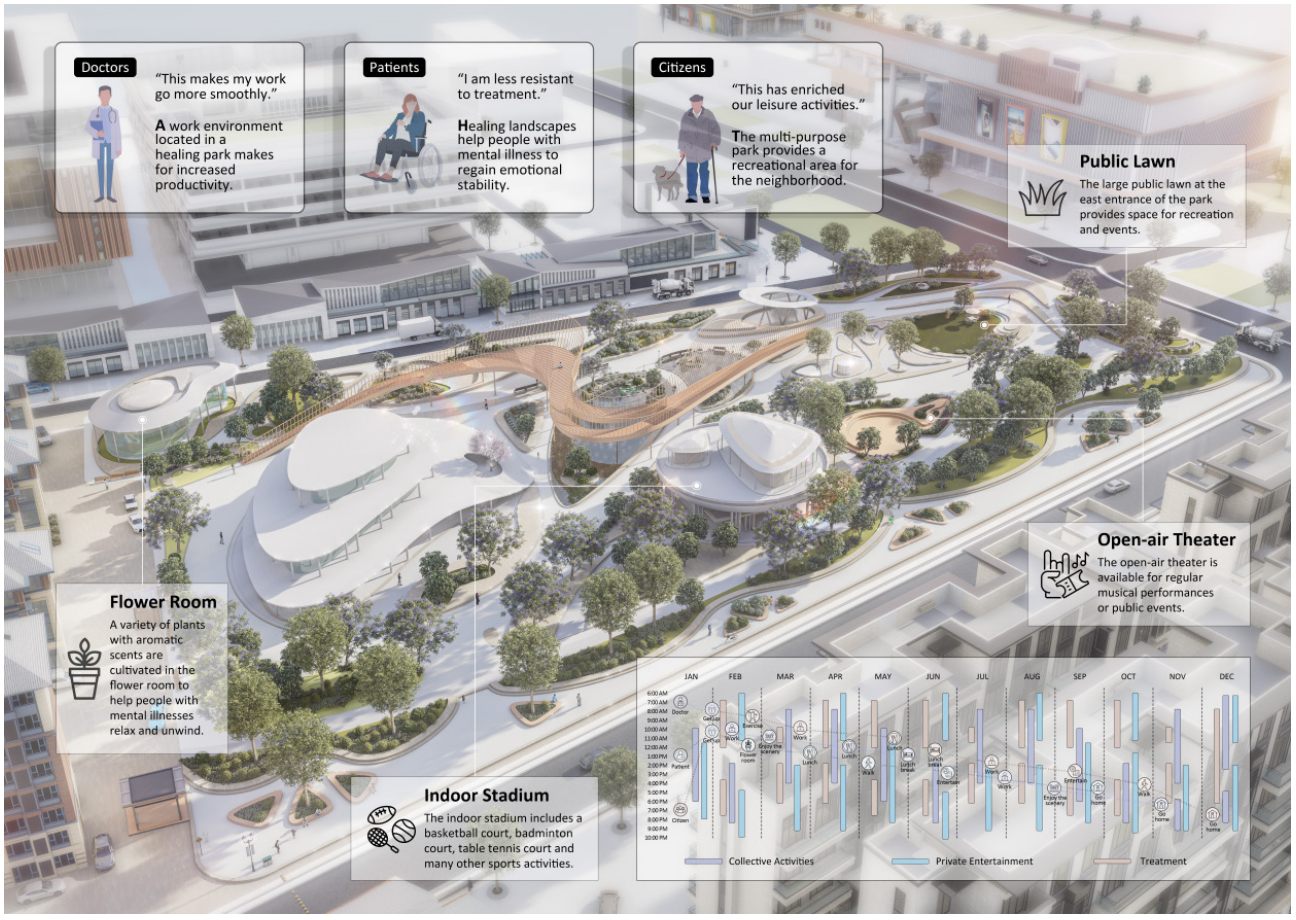

Figure 12. Aerial view of the park and user analysis

6. Conclusion

This project underscores the critical role of "therapeutic urban landscapes" in addressing contemporary mental health and environmental challenges.[30] The transformation of an abandoned industrial site into a "healing park" exemplifies how "spatial design, ecological strategies, and behavioral insights" can converge to create restorative environments that extend beyond aesthetic or recreational functions.[31]

A key reflection from this research is the necessity of "human-centered, evidence-based approachesv in urban planning. The integration of "therapeutic zoning, participatory design, and biophilic elements" not only enhances individual well-being but also fosters "social cohesion and ecological resilience". However, the project also highlights persistent challenges in "balancing accessibility with privacy, ecological sustainability with urban density, and structured healthcare interventions with informal therapeutic experiences". These complexities reinforce the need for "flexible, adaptive frameworks" that respond to evolving urban and demographic conditions.[32]

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