MINISTRY OF CULTURE OF UKRAINE
KHARKIV STATE ACADEMY OF DESIGN AND ARTS



# Research on Low-carbon Landscape Design of Jiashan Park in Mingguang City under the Concept of Carbon Neutrality

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## Project overview

**01** The project is on Qicang Road, Mingguang, with a prime location and convenient transport.

**02** The site is the former Jiashan City Park, which features an inner waterway with a small island (our 4.0-hectare site on the west) and a large island. It will be transformed into an innovative cultural park.

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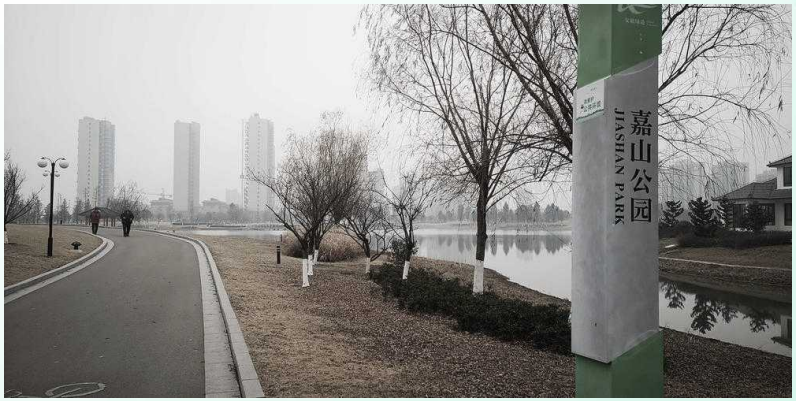




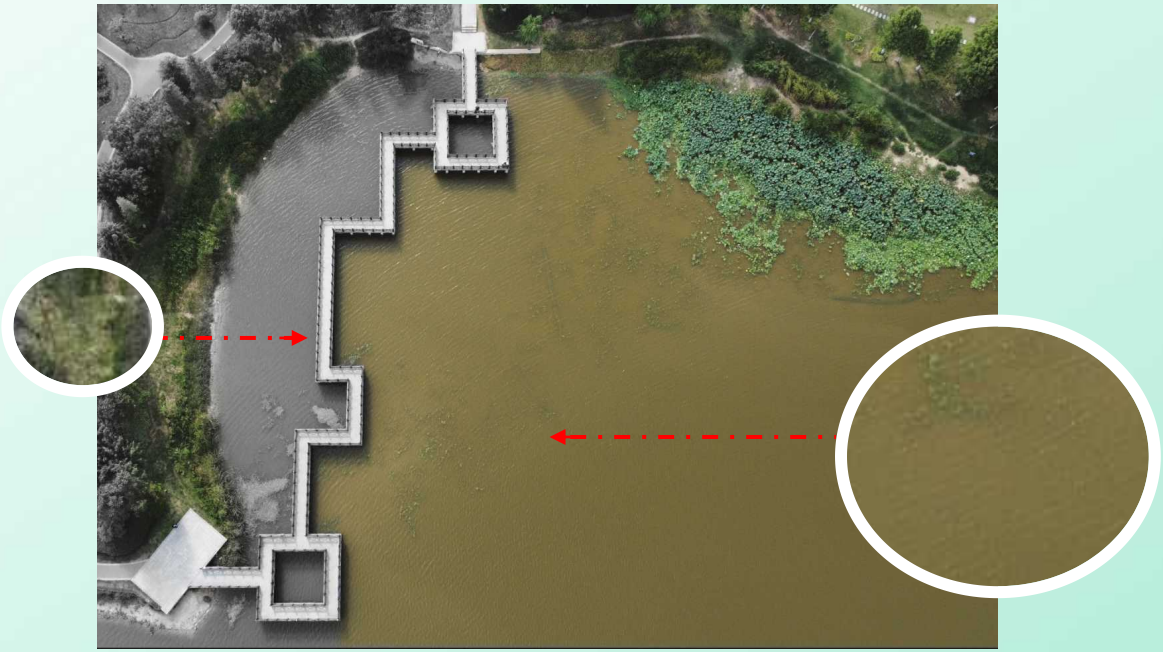



## Present situation of the base

- The planting areas within the park are unevenly distributed and unreasonably arranged. Plants along roads vary greatly in density and size, resulting in large areas of exposed soil, poor visual effect and uncomfortable experience.
- The plant layout lacks reasonable hierarchical and color collocation, with monotonous ground cover and arbor species, leading to insufficient landscape appeal. It is suggested to enrich plant layers and colors to enhance visual diversity. Meanwhile, landscape elements can be arranged around the water body to enrich vitality and ornamental value.



▲The plant configuration is monotonous.



▲The vegetation along the water and the water body configuration are scarce

# VISION

With ecological sustainability as the core, Jiashan Park integrates cutting-edge technologies to achieve low-carbon goals. Adopting the "Smart Green" concept, it highlights the harmonious integration of natural ecosystems and intelligent technologies. Closely aligned with the 2030 Sustainable Development Goals, the park strives to build an eco-friendly, technology-enabled and vibrant public space, pioneering the future development of urban parks.

The park adopts sustainable design to build an eco-friendly, cost-effective and socially inclusive space.

It focuses on ecological protection and restoration, native plant application and resource efficiency, using eco-friendly materials while limiting motor vehicles to cut pollution and noise.




▲Principles of Smart City



▲Sustainable design

## Design strategy

By 2030, Jiashan Park will emerge as the green heart of Mingguang City, showcasing a futuristic landscape blending natural beauty and modern technology. More than a recreational venue for citizens, it will serve as a demonstration and educational base for sustainable living.

### Design element:

**Intelligent Ecosystem:**IoT monitors vegetation, water quality and energy consumption; a mobile APP provides park ecological and cultural information.

**Sustainable Energy:**Solar and wind facilities power park facilities while serving as landscape landmarks.

**Ecological Water System:**Rainwater recycling and natural wetland purification supply irrigation and aquatic maintenance.

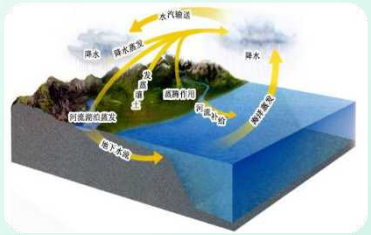
**Green Mobility:**Cycling and pedestrian routes with e-bike rental encourage low-carbon travel.

**Eco-Education Space:**Indoor and outdoor areas hold regular environmental and sustainability workshops.

**Multifunctional Open Space:**Flexible venues support markets, exhibitions, events and outdoor performances.





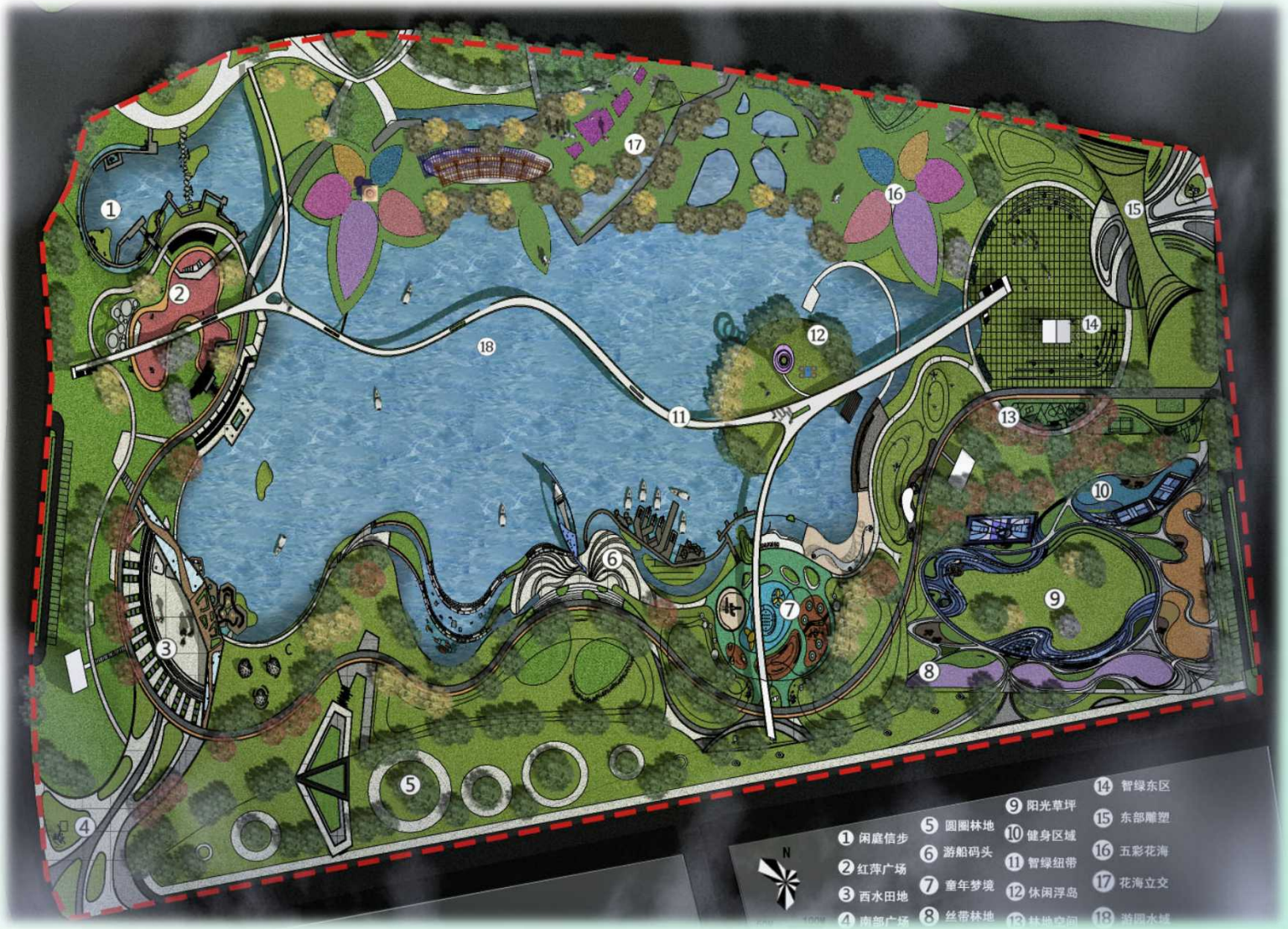









## Plan




**Design Statement**

This design explores and practices the concept of low-carbon and intelligent urban park design. Taking Jiashan Park in Mingguang City as the carrier, it aims to create a low-carbon urban park that meets urban ecological needs and provides high-quality public space.

**Objectives:**

Optimize park energy and resource management through smart technology.

Enhance ecological functions via sustainable design strategies.

Promote community participation, making the park a venue for leisure, education and cultural activities.

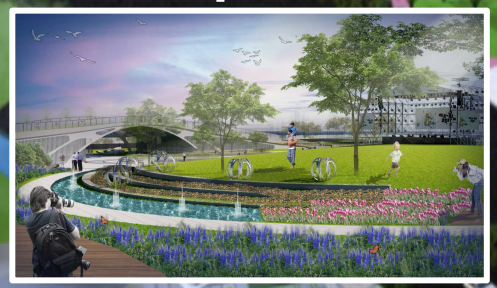
Landscape node index

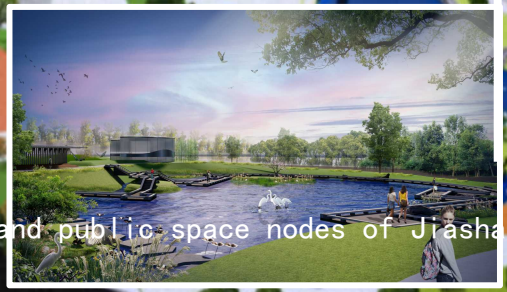












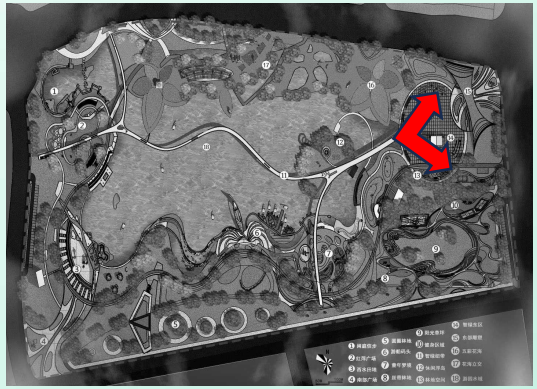
This design mainly includes the design of the waterfront landscape belt and public space nodes of Jiashan Park

## Effect drawing display: Smart stage area at the entrance square

This area features a barrier-free viewing platform. Around 60 square meters of solar photovoltaic panels in the corridor generate about 9,070 kWh of electricity annually, cutting carbon emissions by approximately 5,300 kg. Built with eco-friendly materials, the platform is equipped with recreational facilities and popular science displays. It offers fine views for visitors while enriching their low-carbon experience.




Green Square






△A multi-level and rich plant configuration can reduce carbon emissions

## Rendering display: Intelligent waterfront coastline landscape node

Jiashan Park focuses on immersive waterfront landscape construction. Waterfront bridges, stepping stones and shoreline cruise services deliver an intimate water-contact experience for visitors. An AR system is integrated along the circular runway, with AI facial recognition robots serving as start and finish check-in points. After registration, visitors can complete check-in via facial recognition before and after exercise.











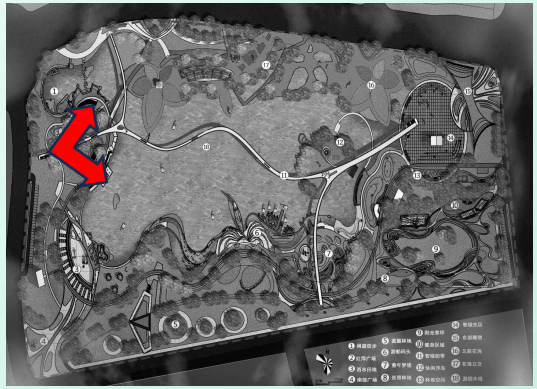
coastline

## Rendering display: Landscape node of the riverside bridge abutment

The southern area of Jiashan Park features open water surfaces. Combined with Huizhou architectural style, two characteristic branch water-crossing bridges and a rainwater recycling system are built between the Cultural Square and the southern zone. Modern design blends with historical heritage, creating a unique spatial charm and artistic tension.




Spiegel Square






△Wetlands have an excellent carbon sequestration capacity

## Rendering display: Landscape nodes of the leisure activity space

Designed as a lively children's playground with modern and low-carbon techniques, this area offers entertainment for kids and accompanying spaces for guardians. Supported by a mobile application, visitors can enjoy smart park services including sightseeing, management and information inquiry. Users can exchange low-carbon credits for access to intelligent interactive facilities, effectively boosting the pleasure of park visits.









Genius Space

## Rendering display: Landscape nodes of the leisure activity space

Residents, tourists, students and children can enjoy flying kites, chatting, sketching and sightseeing here in their spare time. Adhering to green design concepts, this space meets people's physical and mental entertainment needs.









低碳草场

Low carbon grassland

## Effect drawing display: Smart stage area at the entrance square

The west entrance adopts low-carbon and eco-design concepts and energy-saving green composite materials to create a scenic green area. It provides tourists with three distinctive recreational experiences, enriching their leisure time and enhancing their sightseeing enjoyment.




West square





## Rendering display: Landscape nodes of the leisure activity space

The expansive water area and waterfront gardens embody low-carbon eco-design ideas. Aquatic plants and landscape stones are arranged alongside wooden bridges with milky white decks that represent low-carbon concepts, forming a natural space where humans, flora and fauna coexist harmoniously.









Genius Space

## Rendering display: Landscape nodes of the leisure activity space

The low-carbon birdhouse creates a comfortable space for visitors while minimizing environmental impacts. Constructed from certified renewable materials such as bamboo and reclaimed timber, the building makes full use of natural light and ventilation to cut energy consumption. Solar panels on the roof supply power, and an on-site rainwater collection system helps preserve the natural landscape and avoid ecological damage. These practices improve visitor experience and contribute to biodiversity conservation.









Low carbon space

## Rendering display: Landscape nodes of the intelligent fitness space

This low-carbon running track supports physical exercise while delivering an eco-friendly and smart sports experience. Built with renewable materials and energy-saving technologies for long-term safety, it is equipped with an intelligent shopping system. Visitors can purchase eco-friendly goods via mobile apps, and runners can earn carbon points to redeem environmental gifts or coupons, encouraging greater engagement in low-carbon activities.









低碳跑道
Low-carbon runway

## Rendering display: Landscape nodes of the leisure activity space

This area serves as a cozy resting space for visitors to unwind and embrace nature. It features waterfront paths, sunlit lawns and camping zones, where people can stroll, jog, take part in leisure activities, or relax and read in tents. Following eco-friendly design principles, the whole area adopts green materials and energy-saving facilities, encouraging visitors to protect nature and build a sustainable future.




Free Space







## Shortcomings and future prospects

Due to time and resource constraints, the collected data is insufficient, which undermines the accuracy and reliability of analysis results. The methodology has logical defects and deficiencies, making the analysis process ambiguous and conclusion derivation inaccurate. In addition, immature technologies and tools also lead to unsatisfactory operation and unconvincing outcomes.

From this design practice, I realize landscape designers must fully consider projects' value to ecology, greenhouse gas reduction and green resource utilization throughout the whole process. More refined carbon-neutral measures will bring remarkable environmental benefits. Plant selection is a vital decision in landscape design, as it affects not only landscape beautification but also the entire ecosystem. Integrating environmental protection and functional improvement in design fulfills our environmental responsibilities, and actively responds to the national carbon neutrality goals and global sustainable development.



# THANK YOU!

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