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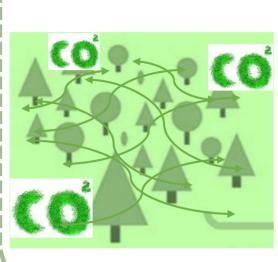
A large sponge

A carbon sink network

An energy rod

A public open park A landscape painting











Like a huge sponge, this project is used to regulate, purify, infiltrate, reuse, and safely discharge rainwater and reclaimed water

Form a carbon sink network by 40 hectares of forests and 30 hectares of wetlands with sustainable ecological benefits

Like a magic wand for renewable energy, extracts geothermal resources, makes airport building temperature control more energy-efficient

Build a large-scale comprehensive park with people-oriented functions, advanced facilities to serve the entire-age group

Draw a poetic picture of the landscape in the southern plain area of Beijing, showcase the true mountain-water landscape



Text Description of the Project 2

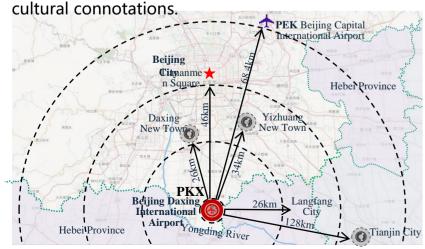
Project Statement (200words)

Beijing Daxing International Airport Landscape-Lake Park and Open Channel Greenbelt is the largest storage facility for water regulation and its associated green space in the Entire airport rainwater drainage system. It serves as an ecological green wedge connecting the airport's internal green space system with the external ecological environment. It is an important infrastructure for ensuring the safe operation of the airport during flood season.

The project covers a total area of 730644 m². Adhering to the concept of openness, sharing, and ecological priority, the design principle emphasizes safety, functionality, suitability and sustainability. While ensuring the storage capacity and protection requirements, upgrade the drainage facilities and basic greening to ecological landscape green space, and utilize excavated spoil earthworks to pile up mountains and build water-scenery, explore the diverse functions of blue-green spaces, creating a large comprehensive green open space that integrates recreation, ecological conservation, rainwater utilization, and safety protection functions.

The design organically combines **Chinese classical** natural mountain-water garden with modern gardening techniques, embracing the true meaning of the lake and mountain, drawing the elegance of the National Gate.

The multidisciplinary collaborative design has conducted effective efforts to enhance the multi values of the infrastructure include the visual and



PKX Airport Location Map

Project Narrative for Built Projects

Project Overview

Beijing Daxing International Airport (PKX) is located at the southern end of the southcentral axis extension of Beijing City. It is the second civilian airport after Beijing Capital International Airport (PEK) and currently the world's largest airport, opened in September 2019.

This project is the largest reservoir for water storage and regulation and associated green space in the entire rainwater drainage system of the airport, serving as a green wedge connecting the airport's internal green space system with the external ecological environment. It is an important infrastructure for ensuring the safe operation of the airport during flood season.

Adhering to the concept of openness, **sharing,** and **ecological priority,** the design principle emphasizes safety, functionality, suitability, and sustainability. While ensuring the storage capacity and protection requirements, upgrade the drainage facilities and their basic greening to ecological landscape green space, and utilize excavated spoil earthworks to pile up mountains and build water-scenery, explore the diverse functions of blue-green spaces, creating a large comprehensive green open space that integrates landscape recreation, ecological conservation, rainwater utilization, and safety barrier protection functions.

- 风沙治理区规划示意图

PKX LOCATED IN BEIJING WINDY SAND CONTROL AREA

Green Space System Planning of

Beijing Administrative Region

Project in PKX Regulatory PROJECT LOCATION Planning The Whole Recent-Airdrome Planning of Beijing Daxing International Airport

UPPER-LEVEL PLANNING

Main Design Content and Basic Ideas

The project covers a total area of 730644 m², including the Landscape- Lake Park with an area of 588632 m². The northern park, covering 416000 m², is the focus of the design.

The design **organically combines** Chinese classical natural mountainwater gardens with modern gardening **techniques** to create a fresh and natural, simple and atmospheric landscape style.

Revolved around the mountain-water pattern, eight major scenic areas are arranged including leisure and fitness, observation deck, lakeside sightseeing, and science education functions. showcasing a rare mountain-water landscape among Chinese airports, which becomes a major feature of the PKX Airport, embracing the true meaning of the lake and mountain.

The south park is mainly for flood control and ecological conservation, combined with wind, solar energy, and ecological water system facilities for science education on energy saving and environmental protection.

The open channel greenbelt is 2.83km long by the straight channel and is beautified by greening the waterside and the patrol road, with some waterfront rest platforms set up for leisure.

In **the core section** of the entire site landscape structure, a landmark central-axis leisure space is created, utilizing the height difference and the falling water wall and fountain elements to enhance the central-axis visual relationship.

The ecological water system is constructed throughout the entire landscape water system to improve the airport's rainwater storage, regulation and purification system, achieve comprehensive utilization of rainwater resources, and promote sustainable water circulation.

Design Principles:

- 1. Functionality
- 2. Ecology
- 3. Suitability & Coordination
- 4. Saving and Economy

Design philosophy:

Openness, Sharing, Ecological Priority

(Details in latter Binder)

Design approach:

Organically combining Chinese classical natural mountain-water gardens with modern design techniques, inheriting and innovating.

Landscape style:

Beautiful and Natural, Simplicity and Modestly, Refreshing and Open-airy atmospheric. suitable for the overall airport's internal and external environment of.

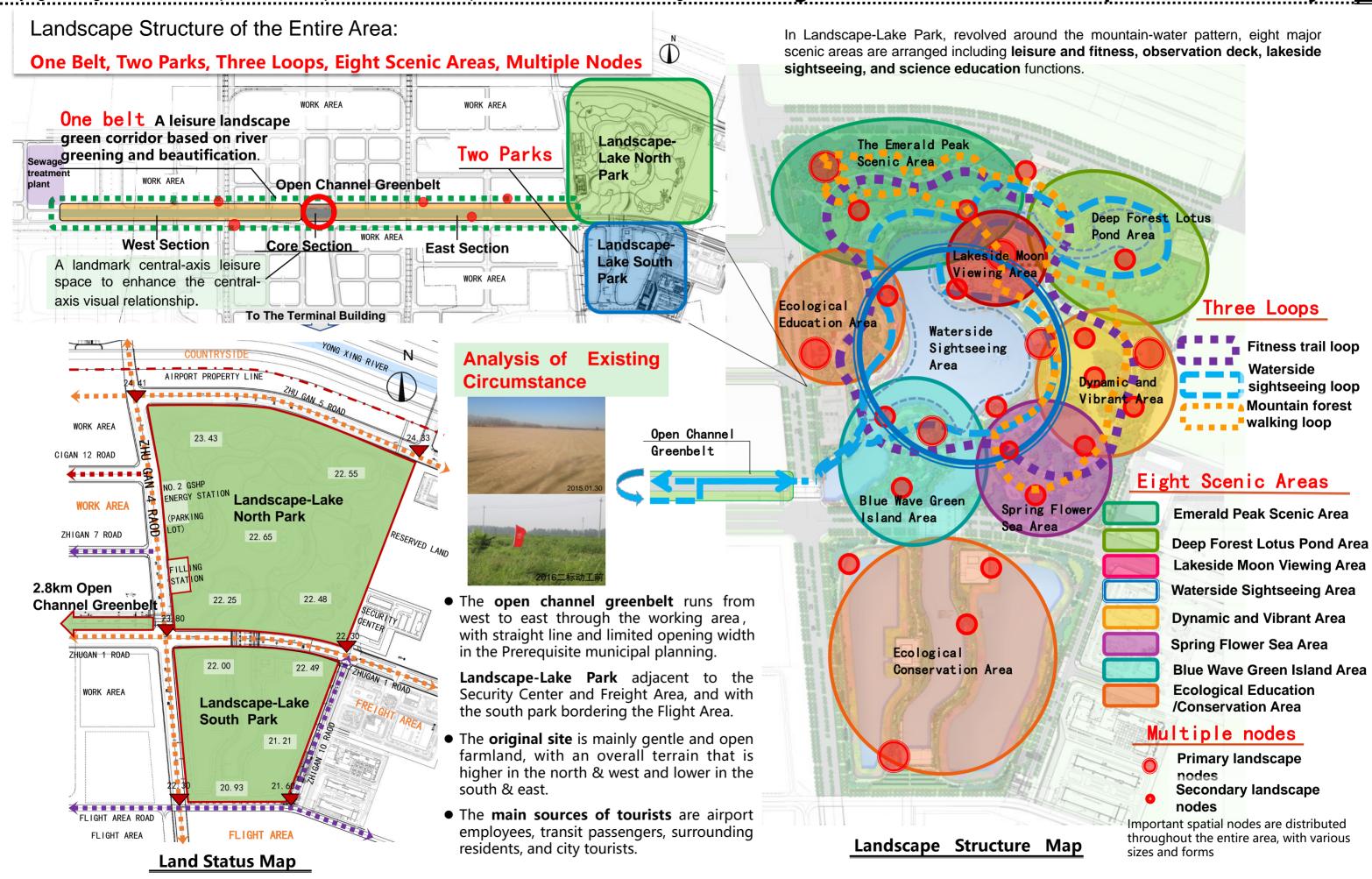
Specialized Designs (Details in latter Binder)

Project effectiveness:

This project has greatly enhanced PKX the national gate image of international hub airport with the beautiful refreshing and pleasant quality environment, under the low cost of country parks instead of urban parks.

PKX has experienced the test of heavy rainstorms in 4 flood seasons. Sponge facilities have saved water>50,000,000m³/year. Renewable energy has also achieved significant benefits.

With the biodiversity and ecological environment capacity greatly improved, and the heat island effect < 1.50 C, PKX has won the prize of "Green Ecological Demonstration **Zone** " and some other honors. Let' s look forward to a better tomorrow for this land!



Embracing the true meaning of the lake and mountain, drawing the elegance of the national gate

Design approach: Organically combining Chinese classical natural mountain-water landscape with modern design techniques, showcasing the poetic and picturesque meanings conveyed by ancient Chinese pastoral poetry.

Design

- > Showcasing the characteristics of mountain and water garden landscape; philosophy: > Strengthening the multiple composite functions of blue and green spaces;
 - > Improving the airport's sponge system for rainwater storage, regulation and purification; >> Promoting a virtuous regional ecological cycle.



辨己忘言

The mountain air is crisp and refreshing, The birds flock back together. There is a true meaning here, but when I try to explain it, I forget my words.

——The great ancient Chinese poet Tao Yuanming's famous pastoral poem "Drinking Wine" is about the allusion of "the true meaning of the lake and mountain"

> The true meaning of the lake and mountain

意

conservancy facilities Natural streamline form of the terminal building

water

Suburbs countryside environment

Chinese Natural Mountain-water Landscape

Overlooking the lake area

from the peak platform



揽湖山真意

绘国门风采

Embracing the true meaning of the lake &

mountain, drawing the elegance of the National Gate

Aerial view of the landscape-lake park

Entire Project Function Positioning:

- ✓ Landscape Recreation
- **Ecological Conservation**
- **Rainwater Utilization**
- **Safety Barrier Protection**

The overall layout revolves around the mountain-water landscape pattern, with the north park emphasizing public tour functions while the south on the sponge system, open channel greenbelt as a greening corridor with leisure areas in the core section, creating a large comprehensive green open space with rich and colorful activity space and scenic spots.

Landscape-Lake Park Land Use Balance Sheet					
No.	Land Use Type		Area (m²)	Proportion of Land Area(%)	
1	Water Area		199756	/	
		Garden Roads	22001	5.66%	
2	Paved Areas	Paved Areas	15803	4.06%	
		Subtotal	37804	9.72%	
3	Architecture	Management Building	20	0.01%	
		Recreation and Service Buildings	395	0.10%	
		Subtotal	415	0.11%	
4	Green Space		350657	90.17%	
5	Land Area		388876	100.00%	
6	Landscape-Lake Park Total		588632	/	
7	Open Channel Greenbelt 142012/Land 88267m ²		Project Total 730644m²		

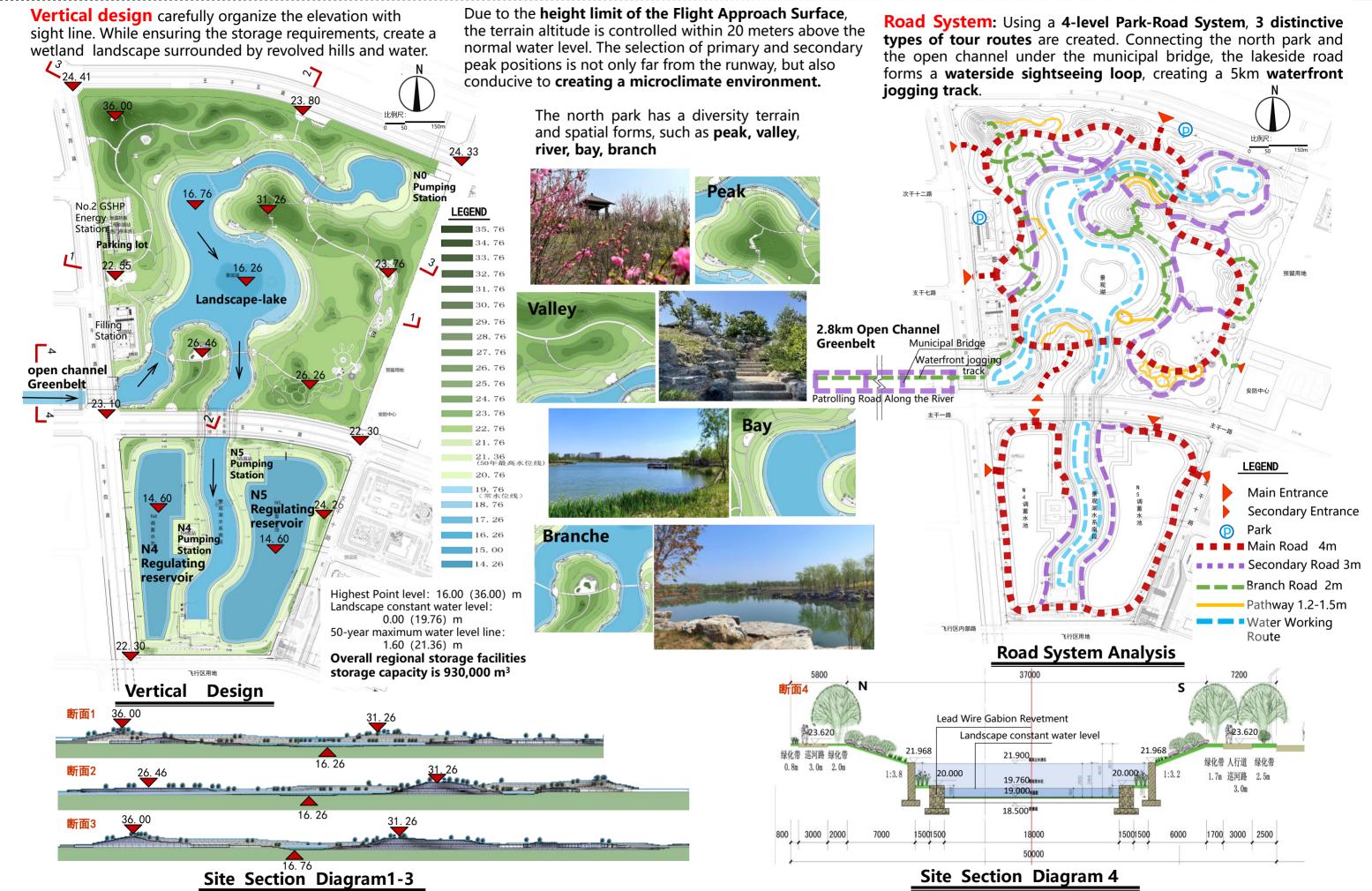


Main Attractions in the Park

- West Entrance
- 2 Gatehouse
- Main Ring Road
- 4 Fragrance Collecting Pavilion
- Chess and Games Square
- 6 North Entrance
- **7** Beauty Embracing Pavilion
- **8** Waterside Station
- Waterside Boardwalk
- Children's Activity Area
- Sports and Fitness Area
- **13** East Entrance Area
- Spring Flower Sea
- Cloud Shadow Platform Sightseeing Green
- South Entrance
- Dandelion Square
- West Water Bank Flower Terrace
- Central Music Fountain
- 20 Giraffe Habitat
- Multifunctional Lawn
- 22 South Park Entrance
- Willow and Flower Embankment
- Wind-Powered Water Lifting Show
- Solar Station Exhibition
- Flower-covered Slope Protection
- Cloud Ladder Flower Field
- Moon-Waiting Bridge
- Lotus-Maple Bridge
- Rainbow Bridge
- Green Wave Bridge

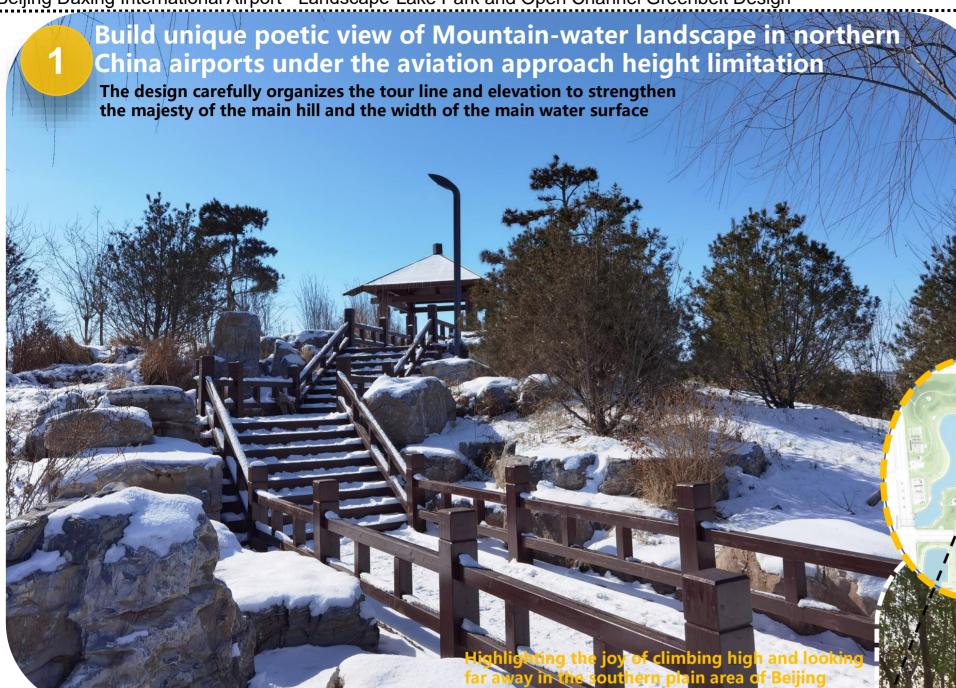
- Wooden House Pier (Management)
- **34** Public Restrooms
- 35 Deep Forest and Tranquil Lotus
- Ruyi Lake
- Scenic Forest (reserved for future development)

Vertical & Road System Design Analysis 6









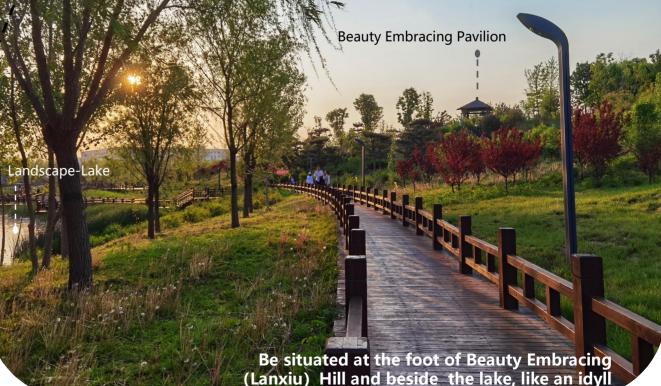
3. Taking advantage of the rare earthwork convenience of excavating, the Landscape-Lake North Park is designed with rich and diverse / natural water forms to create a wetland park / revolved around the mountain-water pattern.

the landscape and topography are rich in changes and distinctive





- 1. The landscape and topography are rich in changes and distinctive, form a rich tour space.
- 2. Visitors can experience the pleasure of climbing high and looking far away in the southern plain area of Beijing, inviting the moon by the lake, making it a highlight of PKX airport.





YONGXING River/

N5

Landscape drainage facilities

(with anti-seepage measures)

Off-site urban waterways

Rainwater outlet into the new Paradise River

(infiltration tanks)

Non-landscape drainage facilities

Recent primary rainwater pumping station

Standby secondary rainwater pumping

Build ecological sustainable water systems and promote a virtuous cycle of regional ecology

The water body of this project bears the rainwater collection of four catchment areas (N1, N4, N5, and N6), 14km² construction area of PKX, and the treated wastewater discharged from the sewage treatment plant.

Faced with such a large-scale water system, the initial design includes planning for the entire rainwater drainage system and establishing a whole-site zoning and grading rainwater sponge storage, drainage, regulation and smart control system.

As China's first pilot project for the construction of a civil aviation sponge city, it has a total sponge volume of over 2.8 million m³ and a landscape storage capacity of 930,000m³

Cooperated with the municipal and water conservancy authority, the ecological water systems throughout the entire basin is

The design focuses on water quantity control, water quality control, and sponge facilities

YONGXING River/

New paradise river

New paradise river

(present)

ecological Through green treatment of the entire water system process,

Treatment N1 Rainwater

pumping station and regulating pool

N6

Section A drainage open channel

N2

Plan for Distribution of Drainage Facilities

(Greenbelt)

N4

PKX Termina

Building/

are achieved

rainwater & reclaimed water

collection and storage, deep purification, reuse, enhanced infiltration, and safely discharge

~						
Mainly achieving sponge indicators	PKX	Beijing Local Standards				
Total runoff control rate	90%	85%				
Runoff coefficient	0.15	0.40				
Storage capacity	1800m³/ha	500m ³ /ha				
Rainwater discharge rate	decreased from over 400 m3/s to 30m3/s					
Annual runoff pollution	reduced by more than 68%					

Mainly design achieved sponge indicators

New Paradise Rive Lift Recycled water from Section A drainage sewage treatment plant + cirdulate channel (200,000m3) rainwater along the line **N0 Pumping** sation N4 regulation infiltration Rainwater in the souther tank and pumping station working area (500,000 m³) (80,000 m³) B section open N5 regulation infiltration channel belt tank and pumping Rainwater in the cargo area station (150,000 m³) Secondary pumping station **Primary drainage system** Secondary drainage system

N3

Drainage Flow Chart for Drainage Facilities

Zoning and grading of the whole recentairdrome rainwater drainage system layout plan

pumping station

Secondary pumping station

Standby secondary pumping station for off-peak hours

System Construction of Ecological Water System

Key Technologies of Ecological water System

- focus on drainage safety,
- reduce the impact of construction
- improve flood control capacity
- supplement with ecological cycle,
- intelligent management and control

Design principles

Design drainage zoning and grading system according to verification of once-in-50-year rainfall.

1, water quantity control

Remote monitor pumping stations, sluice gates, hydrology and water quality by the Intelligent Platform of Rainwater Management Center, to regulate the water quantity of water storage system in time

2, water quality control

improve the natural restoration capacity of the water body by make use of the constituent elements such as ecological bank, slope, surface and subsurface wetland areas, bottom surface, water surface,

Aquatic ecosystem: including sedimentimprove engineering design, microbial system, submerged vegetation system and aquatic animal system. Specifically, high-efficient microbial preparation and related auxiliary water treatment measures, submerged vegetation and advanced aquatic animals such as filter-feeding fish (controllable species), snails and shellfish

Winter

3. construction of ecological bank and bottom

Ecological slope and lake bottom engineering:

- Flexible honeycomb **restraint system** is used at Landscape-lake' s grassslope revetment and bottom, and open channel bottom.
- Lead wire gabion is used for open channel revetment, which takes into account the rigidity of hardened revetment and the ecological compatibility of grass slope revetment



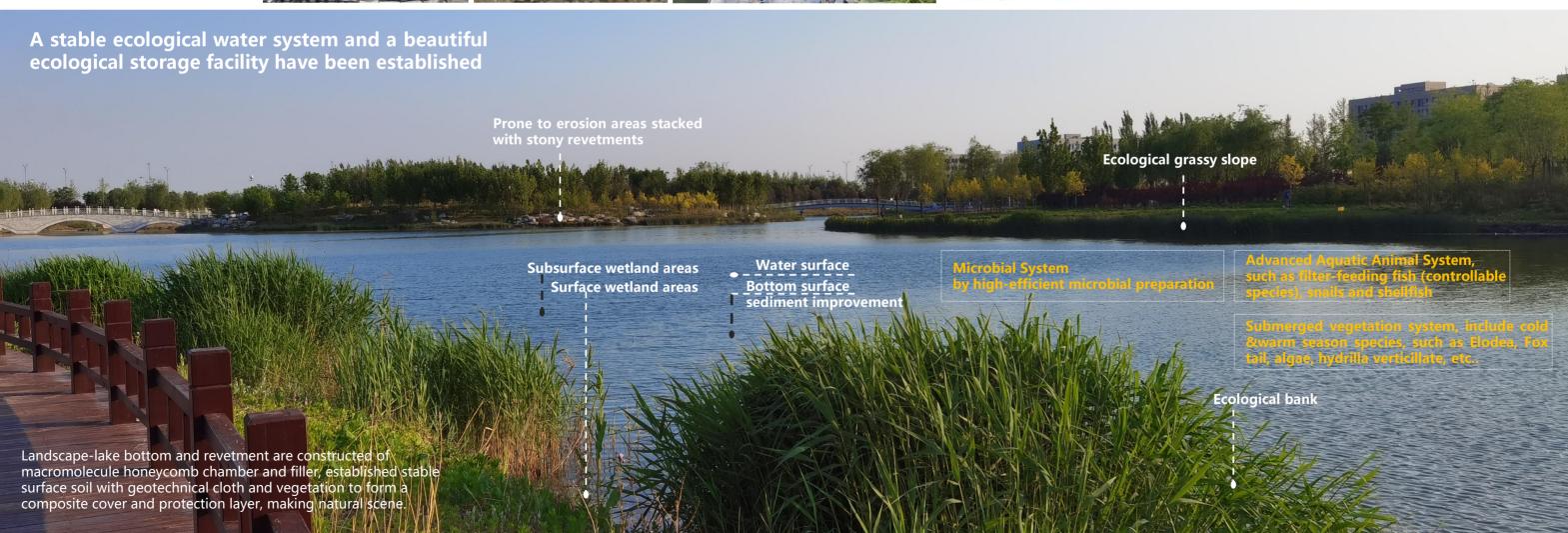








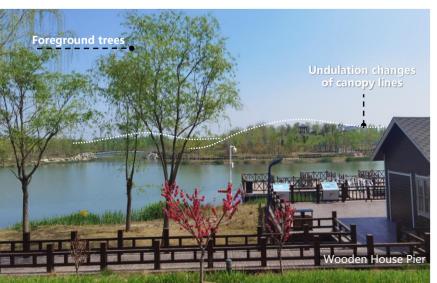




Highlight plant landscaping, create a colorful four-season landscape

in the diverse site environments **Emerald** Shade Peak Scenery 翠峰揽胜 **Deep Forest** Lotus Pond **Green Grass** and Trees **Green Willow** and Pink Spring Peach Flowers Flower Sea **Orioles Singing** Colorful Autumn Charm

Zoning Planning of Plant Scenic Spots





The entire design mainly based on plant landscaping. All plants are arranged according to different site conditions.

The whole Landscape-Lake Park adopts natural planting approach to create quasi-natural forests and wetlands, combined with undulating terrain to form large-scale spatial clusters and changes in canopy lines, presenting a natural mountainwater landscape and idyllic scenery with elegant woods.

The north park mainly utilizes tall deciduous trees, evergreen coniferous trees to form different spatial combinations together with shrubs and herbaceous plants.

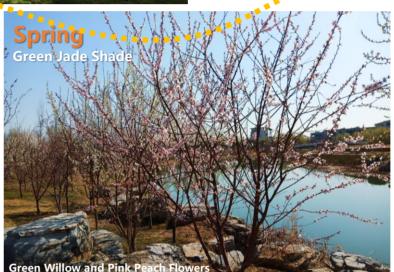






With spring flowers and summer shade, autumn leaves and winter branches. beautiful scenery is presented in the region throughout the four seasons.

> Seasonal **Change Axis**





In the open channel greenbelt, trees, shrubs and ground cover clusters are clearly arranged, maintaining a certain rhythm.

The streamline ground boundary and the quasi-natural planting clusters have greatly broken the rigidity of the straight channel.



Adhering to the principle of suitable trees for the right place, preferably superior varieties and shade-tolerant, drought- tolerant and water-resistant varieties, promote drought- and shade-tolerant wild ground cover combinations.







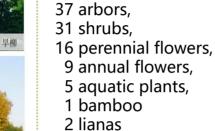


















The south lake park is mainly based on basic greening to ensure the ecological function of the storage pond site. Waterand drought-resistant plants, composed of 9 types of grass flower are planted on the slope, which not only enriches the plant landscape, but also plays a certain role in soil consolidation of the hydrofluctuation Belt.

The planting design considers convenient maintenance and management, and controllable costs with most of the species basically utilized in country parks.

In plant varieties selection, attention should be paid to bird avoidance needs, and key foodborne varieties such as crabapple and honeysuckle are limited in the landscape-lake park, which is on the north of Flight Area.





Exerting the purifying role of subsurface flow vegetation and microorgani

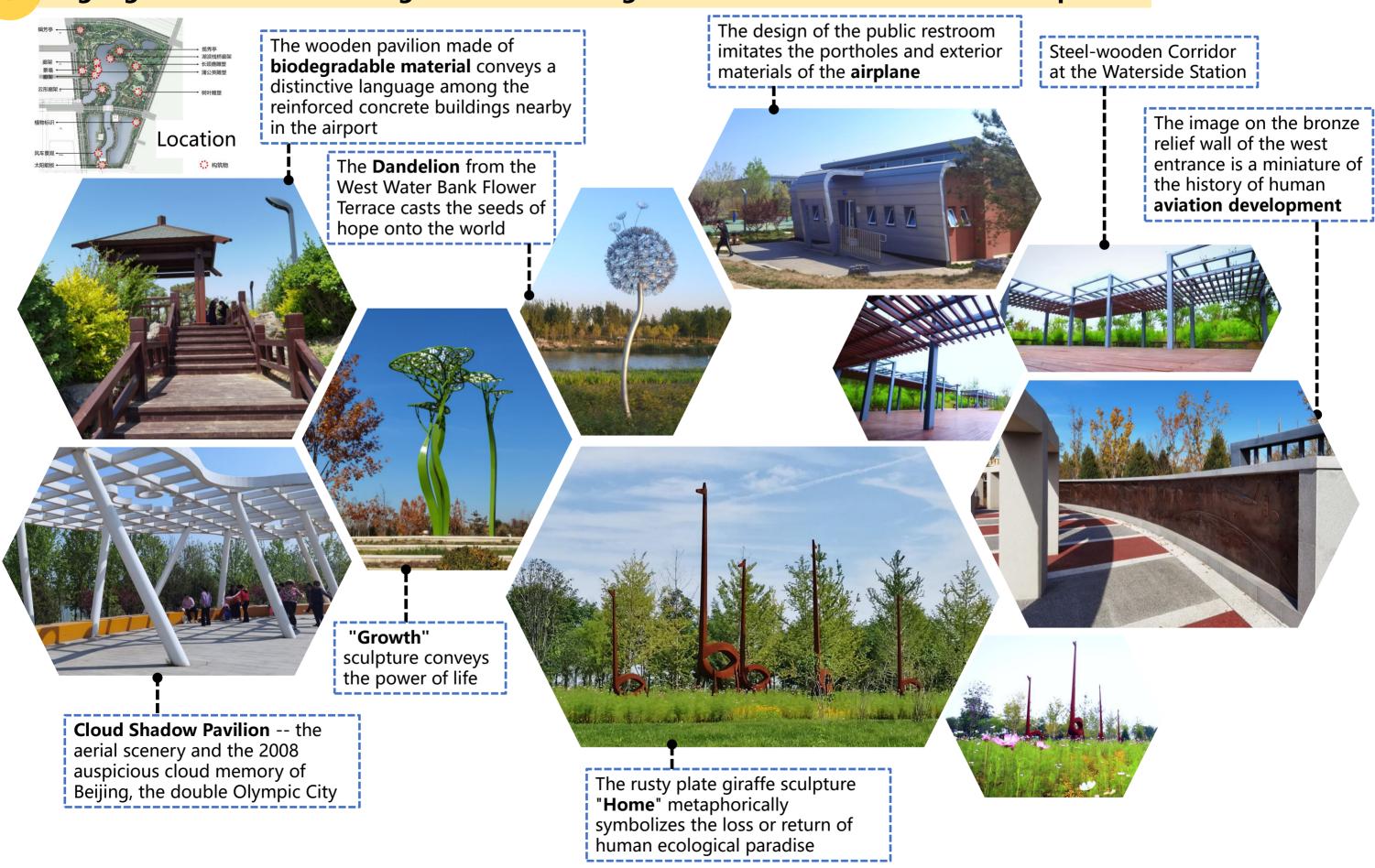






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Highlight aviation and ecological themes with garden architecture and sketch sculptures



Explore diverse functions and areas for residents & passengers with the people-oriented philosophy

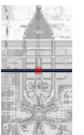
Full consideration is given to accessibility, aging and full-aging requirements. The project provides various of leisure and fitness venue for transit passengers, airport staffs, and surrounding residents.

The open channel greenbelt corn section is especially the typical important node.



Create a landmark centralaxis leisure space at the limit of site width & deep ditch

In the core section, utilize the 4.6m height difference to make the scattered waterfront deck and water fountain wall, tree pond benches, strip planting, etc., to enhance the airport's central axis visual relationship.



A visual center



ACTIVITY areas for leisure, fitness and ecological science education











ACTIVITY area for youth in Dynamic and Vibrant Scenic Area











Promote application of new technologies and new process materials, achieve low-carbon & low-impact construction

Green Lighting

Based on basic lighting, supplemented by local landscape lighting. Adopt energysaving lamps and lanterns, automatically control by stages and time periods, with low light pollution and low energy consumption.



Left: Garden Path Right Upper: Green Wave (Bibo) Bridge Right Lower: Garden Lamp lighting on secondary road near the Moon Waiting Bridge

Eco-friendly Road & Square Paving Technology

The road system: Reasonable and convenient distribution of road networks, mostly using permeable and environmentally friendly paving, such as permeable concrete and permeable bricks, and degradable materials such as wooden plank roads.





Exposed permeable concrete Permeable pavement Overhead climbing road to protect habitat corridor

Application of Smart Park Technology

This project system has been integrated into the Smart

System of PKX Airport for unified management

Through video monitoring, radio frequency

identification, infrared sensing, laser scanning

• Intelligent monitoring and security system

plastic cement jogging track of the secondary road



Study on measures to avoid birds to ensure flight safety

Because the plot is located on the north side of the flight area, in order to cooperate to ensure flight safety, we should focus on preventing clustered passing-through waterfowl & high-altitude I large birds, reducing I foodborne organisms.



Pneumatic aluminum-plastic sheet to repel birds cluster

Utilization of Renewable Energy

 Wind energy and solar energy With wind and solar energy in the downstream of the water system used in combination for the circulating water lifting system, transport water to the beginning of the A-section open channel to further ensure the water quality, can save probably 80,000 kilowatt hours of electricity can I l I be saved annually.





GSHP

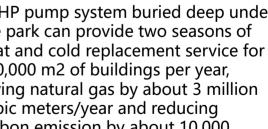
The heat exchange buried pipe of ground source heat pump project is deeply buried under the park, and I the main body of its No.2 Energy I Station is built under the West Entrance parking lot.





GSHP pump system buried deep under the park can provide two seasons of heat and cold replacement service for 970,000 m2 of buildings per year, saving natural gas by about 3 million I cubic meters/year and reducing I carbon emission by about 10,000

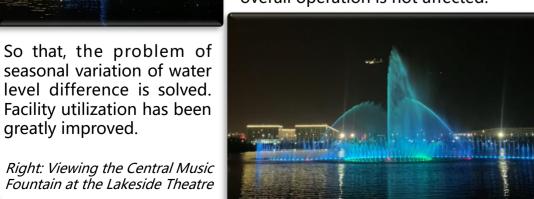
Distribution of the heat exchange pipes buried under the park, a total 10680 buried holes, 140~120m depth underground



I tons/year.

Although the north park has water replenishment as a minimum water level guarantee, the theoretical drop can also reach 1.5 meters.

We install the pipeline equipment on a floating tank, which can rise and fall with the water level variation, while the overall operation is not affected.



and other sensing technologies, real-time perception of park facilities and tourist flow data.

Wisdom maintenance

Including precision irrigation, intelligent music fountain, green intelligent lighting system, and pest monitoring, etc., to realize the informationization and intelligence of the maintenance process.

• Building a digital park

Park information management into the unified management of the new airport intelligent system.

• Intelligent rainwater drainage sponge system (Details in Previous P10 Water System)





seasonal variation of water level difference is solved. Facility utilization has been

