Planning exploration of the transition from "waste landfill" to "circular economy industrial park"-Take Guangzhou Xingfeng Domestic Waste Landfill Site Closure and Reconstruction Plan as an Example

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Abstract: Under the background of high-level protection of the ecological environment and the promotion of economic "green recovery" and high-quality development after the epidemic, we will do a good job in the "14th Five-Year" ecological environment protection work, correctly handle the relationship between development and protection, and develop an environmental protection culture. It will definitely become the main line of work during the "14th Five-Year Plan" period. This article takes the closure and renovation plan of the Xingfeng domestic waste landfill in Guangzhou as an example, studies and draws on successful cases at home and abroad, and explores the planning and design of the renovation of the landfill after the closure, combined with the domestic waste landfill Advanced waste treatment technology and the unique natural ecological environment of Jinkeng National Forest Park will transform the Guangzhou Xingfeng Domestic Waste Landfill into a circular economy industrial park with the function of ecological recycling of domestic waste. This transformation plan can guide the public to actively participate in the environment. Cultural construction is of great significance to the construction of ecological civilization; at the same time, it is also an exploration of green recycling, low-carbon, and sustainable planning methods.

1. Introduction
In recent years, with the continuous development of my country’s society and economy, the process of urbanization has accelerated significantly. With the rapid growth of city size, number of cities and urban population, urban domestic waste has also increased day by day. At the same time, the composition of domestic waste has become more and more complex. Urban waste has become a major problem worldwide. According to statistics, the stock of urban waste in my country over the years has reached 6 billion tons, occupying 50,000 km² of arable land. 200 out of 660 cities across the country are surrounded by garbage. The “2020 Annual Report on the Prevention and Control of Solid Waste Pollution in Large and Medium Cities in China” issued by the Ministry of Environmental Protection...
shows that in 2020, there will be a total of 196 large and medium cities in the country. Information on the prevention and control of environmental pollution by solid waste in 2019. According to statistics, the amount of municipal solid waste generated in large and medium-sized cities that released the information this time was 23.602 million tons. And currently, urban waste is mainly disposed of in simple landfill, which not only affects the beauty of the city, but also brings certain negative effects to the environment. In this context, the Chinese government has issued a series of policies to regulate and guide. It is proposed that by the end of 2020, qualified municipalities, cities under separate state planning and provincial capitals (built-up areas) should achieve "zero landfill" of primary waste. The waste incineration treatment capacity of cities in cities nationwide accounts for more than 50% of the total treatment capacity, all of which meet the clean incineration standards.

In order to actively respond to the country’s active development of low-carbon energy, adjust and optimize the energy structure, Guangzhou City, in line with its own urban development needs, plans to close the domestic waste landfill area of the emergency landfill by 2023 to achieve full incineration of domestic waste deal with. In order to actively respond to the country’s active development of low-carbon energy, adjust and optimize the energy structure, and promote clean utilization of coal, encourage the development and utilization of coal-bed methane and natural gas, and vigorously develop non-fossil energy such as wind power, solar energy, biomass energy, landfill gas, and geothermal energy according to local conditions In combination with the development plan of Guangzhou Xingfeng Domestic Waste Landfill Site, it is planned to comprehensively recycle the landfill gas from Guangzhou Xingfeng Domestic Waste Landfill.

This article draws on the advanced cases at home and abroad, from the perspective of ecological restoration and environmental protection education, proposes new ideas for the reconstruction and development of the Guangzhou Xingfeng domestic waste landfill area after closure, and builds it into a service for Guangzhou, based on Guangdong. Facing the whole country, it includes the ecological recycling treatment of domestic waste and the promotion of environmental protection knowledge, industrial machinery display, comprehensive experience, ecological leisure, scenery tour and unique knowledge, science, fun, education, and tour. Economic Industrial Park.

2. Practice of closure and renovation of domestic and foreign landfills

2.1. Nantong City’s landfill becomes the Riverbank Park
The No. 1-6 pools of the Nantong Municipal Waste Landfill Site were built in 1997 and are located in Changjiang Town, Rugao City. It covers an area of about 320,000 square meters. It is the only emergency landfill for domestic waste in Nantong City. Buried task. In 2018, the landfill was close to the designed landfill load. As the project is close to the Yangtze River, in order to solve the increasingly prominent environmental risks, in accordance with the provincial environmental protection supervision requirements, Nantong City decided to close the No. 1-6 landfill. In the past, the “environmentally friendly and late-entering” waste landfill with flies flying and foul-smelling was turned into a garden-like park along the river through engineering measures such as vertical seepage prevention, rain and sewage diversion, solid cover, waste gas collection and combustion, and greening and beautification. Meet the needs of urban residents for fitness activities, leisure and entertainment. This is the latest case of domestic garbage dump renovation.

2.2. Hiriya, Israel: From Garbage Hill to "Urban Green Lung"
Hiriya, located in the southeast of Tel Aviv, Israel, has built a landfill since 1952. Over the years, tens of millions of tons of garbage have been buried here, and it once became a garbage hill over 80 meters high. Garbage hills pollute groundwater and release toxic gases. Birds inhabiting and foraging around may also endanger the takeoff and landing of aircraft at nearby Ben Gurion International Airport. In the rainy season, polluted rainwater flows from the mountains to low-lying places. Therefore, this landfill was closed in 1998. The Israeli government made a decision in 2005 to build a park on a total of 2,000 acres (8.1 square kilometers) of land in Hiriya and its surrounding areas to form an ecologically
regulated "urban green lung". In 2007, this piece of land was named Ariel Sharon Park and is scheduled to be completed in 2020. At present, most of the land has been covered by green vegetation. Some facilities of the park, such as the environmental education exhibition hall, bicycle fitness track, and small zoo are now open to visitors. This case exports solutions and waste treatment technologies to other countries and regions in the world that are "garbage besieged".

2.3. Summary
These successful cases of landfill transformation at home and abroad have contributed to this Guangzhou Xingfeng domestic waste landfill in terms of ecological restoration technology, rainwater recycling, biogas collection and power generation, and landscape design, plant configuration, and tour content. The renovation plan of the farm has good reference significance. On the basis of these successful cases, this paper proposes a reconstruction plan that is suitable for the development of the domestic waste landfill by combining with the actual situation of Guangzhou Xingfeng Domestic Waste Landfill near Jinkeng Forest Park.

3. Overview of Guangzhou Xingfeng Domestic Waste Landfill Site

3.1. Location and surrounding environment
Located at the southern foot of Maofeng Mountain, Baiyun District, Guangzhou City, about 30 kilometers from the city center, Guangzhou Xingfeng Domestic Waste Landfill, including Xingfeng Landfill, Xingfeng Emergency Landfill, and supporting leachate and landfill gas treatment and other facilities. The park covers a total area of 2,400 acres, of which the landfill area is about 1,600 acres. The north side of the site is Guanghe Expressway, the north side is connected to Xingtai Third Road, facing a part of small villages, surrounded by woodland, and the southeast side is about one kilometer away from the garbage dump is Jinkeng Forest Park.

Jinkeng Forest Park is located on the southeast side of Guangzhou Xingfeng Domestic Waste Landfill. It has been in operation since 1964. It has continuous green hills, rippling blue waves, fresh air and pleasant climate. The water catchment area of Jinkeng Reservoir is 41 square kilometers. A group of rare Australian tree species such as lucky trees and flame trees settled here; brown-winged cuckoos, owls, rock eagles, spoon chickens, and bar-headed owls settled here. However, the surrounding Xingfeng garbage landfill poses a certain threat to Jinkeng Forest Park.

3.2. Status of the field
The construction of Xingfeng Landfill started in 2000 and was put into operation in August 2002, with a total of 42.85 million tons of landfilled waste. It was awarded the first place in the 2007 national harmless landfill evaluation and was assessed as a first-class landfill The National Quality Engineering Award in 2007, the 8th China Civil Engineering Zhan Tianyou Award in 2008, and the 100 Classic and Excellent Projects of the 60th Anniversary of the Founding of New China in 2009. The Xingfeng emergency landfill started construction in December 2017 and was put into operation in June 2018, with a design storage capacity of 15.8 million cubic meters. The park is also equipped with a fully quantified and full-process leachate treatment system, as well as various landfill gas utilization facilities such as landfill gas power generation and liquefied natural gas production. The current site area is mainly divided into living office area, operational landfill area, landfill gas treatment area and leachate treatment area.

| Serial number | Name                          | Processing capacity            | Land area  |
|---------------|-------------------------------|--------------------------------|------------|
| 1             | Landfill treatment area        | Xingfeng Old Field             | 42.85 million tons of landfilled waste | 0.685km²  |
| 2             | Xingfeng emergency field area | The volume is about 3.26 million m³ | 0.665km² |
3.3. Status Problem
In recent years, the collapse of waste at the Siergou landfill in Lanzhou City and the collapse of the receiving site where muck and construction waste in Shenzhen Guangming New District collapsed have caused public safety accidents, which have aroused great concern and reflection from all walks of life. The height of the domestic waste landfill in Guangzhou Xingfeng Domestic Waste Landfill Site is staggering, and there are significant safety hazards. Although the domestic waste landfill aims to achieve "reduction, resource utilization, and harmlessness" as the goal, at this stage The sanitary landfill technology used in the treatment of domestic waste has inevitably brought some impact on the surrounding area. In recent years, the surrounding people have reacted strongly, and garbage trucks have been blocked from time to time, and the smell of garbage has been transmitted from time to time, which has also affected Jinkeng. The tourism image of the Forest Park has a potential impact on the water quality of Jinkeng Reservoir. In order to better solve the relevant demands of the surrounding people and maintain the harmonious and stable development of the surrounding society, the domestic waste landfill must be upgraded from the domestic waste treatment method. Minimize the impact on the surrounding environment and residents' lives.

4. Guangzhou Xingfeng Domestic Waste Landfill Planning Concept
This article aims to analyze the development ideas of the entire domestic waste landfill after the closure of the domestic waste landfill, and propose a new planning concept of "ecological safety, circular economy, environmental protection science, and a harmonious society", from ecological environment restoration, infrastructure From the perspective of transformation, transform the original waste landfill plan into a recycling economy industrial park that is in harmony with the surrounding environment and has first-class environmental treatment technology to turn waste into treasure, so as to achieve the popularization of environmental protection knowledge among citizens and coordinate surrounding residents The purpose of conflict and harmonious social relations. In addition, due to its close proximity to Jinkeng Forest Park, the development after closure should also be considered in conjunction with the

| 3 | Xingfeng Emergency Field 2nd District | The volume is about 8.64 million m³ |
|---|--------------------------------------|-----------------------------------|
| 4 | Xingfeng Emergency Field Three District | The volume is about 3.9 million m³ |
| 5 | Leachate Treatment Plant No. 1 | The processing scale is 1400m³/d 9080m² |
| 6 | Leachate Treatment Plant No. 2 | The processing scale is 1400m³/d 15000m² |
| 7 | Leachate Treatment Plant No. 3 | The processing scale is 2000m³/d 7700m² |
| 8 | Fifth Submerged Combustion Concentrate Treatment Plant | The processing scale is 200m³/d 1860m² |
| 9 | Low concentration treatment plant | The processing scale is 500m³/d 290m² |
| 10 | No. 2 regulating tank | The volume is 120,000 m³ 12592m² |
| 11 | No. 7 regulating tank | The volume is 8000m³ 2219m² |
| 12 | No. 8 regulating tank | The volume is 20,000 m³ 5735m² |
| 13 | No. 10 conditioning tank | The volume is about 60,000 m³ 8245m² |
| 14 | Xingfeng Emergency Field Adjustment Pool | The volume is about 60,000 m³ 20000m² |
| 15 | Liquefied Natural Gas Project (LNG) | Gas production volume is about 100,000 m³/d 6000m² |
| 16 | Veolia Landfill Gas Power Plant | 9.27MW 5627m² |
| 17 | Environmental service landfill gas power plant | 6MW 1016m² |
| 18 | New Cody Landfill Gas Power Plant | 19MW 1000m² |
| 19 | Landfill gas deep collection project | Landfill gas collection capacity is 20000Nm³/h; 710m² |
location advantages of the adjacent Jinkeng Forest Park and developed in conjunction with Jinkeng Forest Park.

5. Guangzhou Xingfeng Domestic Waste Landfill Reconstruction Plan

5.1. Planning philosophy and principles

5.1.1. Follow ecology
The plan emphasizes the harmonious coexistence of man and nature. The park will design a colorful flower belt and photovoltaic power generation belt along Huanchang Road to build an ecological landscape system based on natural ecological landscape, leisure and environmental protection as the theme.

5.1.2. Highlight popular science
In the planning and design, the concept of environmental protection and sustainable development is reflected in the way of popular science, and a popular science and environmental protection space is constructed in the form of visit experience, technological multimedia, environmental protection display, and interaction.

5.1.3. Reflecting mutual integration
It is hoped that the Jinkeng Forest Park's unique landscape resource advantages will be fully utilized in the later period, and the ecological landscape, tourism system, service facilities and other aspects of the circular economy industrial park and the forest park will be mutually integrated and shared.

5.1.4. Focus on timing
On the one hand, considering the status quo of domestic waste treatment in Guangzhou, the landfill site of domestic waste will be closed in phases, which will not affect the comprehensive treatment of urban domestic waste; The road is constructed in stages to reduce the difficulty of initial construction and investment costs.

5.2. Functional positioning and goals
Scientific planning and positioning are the basis for the transformation and development of domestic waste landfills. The text combines the experience of similar domestic and foreign waste treatment plant transformations, and under the premise of meeting the original functions of domestic waste landfills, the domestic waste landfill area is transformed. In accordance with the latest environmental protection policies of the country, province, and city, we strive to create a circular economy industrial park that serves Guangzhou, is based in Guangdong, and faces the whole country, and has the function of recycling domestic waste. The development of the park incorporates the concepts of ecological civilization and leisure and environmental protection culture promotion. On the basis of properly handling domestic waste and municipal sludge in the original District, Guangzhou, we will demonstrate environmental protection in an all-round way to achieve a win-win situation for social, ecological, environmental and economic benefits. This model is the first to create Guangdong’s first environmental education theme demonstration park has good reference and demonstration significance for the same industry at home and abroad.

5.3. Overall layout planning

5.3.1. Space function layout
The layout of the circular economy industrial park planned for this time follows the principle of “land intensive, resource rationalization, minimizing earthwork, and organic integration with Jinkeng Forest Park in the future”, with complete functional zoning, unobstructed traffic organization, and ecological resources Use reasonable advantages. The overall plan is divided into 4 major functional areas:
(1) Machinery exhibition area. The machinery exhibition area is located on the north side of the site, and it is mainly used to store machinery tools related to the construction of the dump site, such as garbage trucks, excavators, bulldozers and other machinery. Show the operation process of the garbage dump through physical display, model demonstration, explanation and understanding, and learning environmental protection knowledge.

(2) Biomass biogas production demonstration area. After the garbage is landfilled, its bottom is suitable for microbial production of biogas. The gas produced by the biogas well is collected and transported to the computer room through pipelines. The advanced technology is used to show the citizens the arduous process of garbage disposal and turning waste into treasure. To meet the needs of citizens for exploration and learning, citizens can have a perceptual and in-depth understanding of environmental protection and participate in environmental protection.

(3) Demonstration area for resource utilization of "urban minerals". Urban minerals are available resources for major waste. Its utilization is equivalent to primary mineral resources. Carrying out the construction of "urban minerals" resource-based demonstration bases is an effective way to alleviate resource bottlenecks and reduce environmental pollution. Through the creation of the environmental protection experience zone, the aim is to allow tourists to understand environmental protection undertakings with a relaxed attitude, participate in environmental protection undertakings, and achieve a place for tourists to comprehensively experience environmental protection undertakings.

(4) Demonstration area for soil remediation and resource utilization of stable solidified materials. Through the implementation of environmental protection treatments such as closure and ecological restoration of the domestic waste landfill area of the domestic waste landfill, it will be transformed into an environmentally friendly ecological recreation area to provide tourists with recreation and sports a place for health preservation..

5.3.2. Transportation system
The circular economy industrial park follows the principles of "smooth and convenient, adaptable to local conditions, organic integration, and reasonable diversion" in traffic organization, and comprehensively considers the traffic connection with the outside world. It is mainly divided into two transportation systems: operation flow line and visit flow line.

The operation flow line is for office use of operating vehicles, and the visit flow line is for tourists to understand the general situation of the entire industrial park..

5.3.3. Integration of regional tourism resources
Tourism cooperation in the region is one of the important means to pursue mutual benefit and win-win. The southeast side of Guangzhou Xingfeng Domestic Waste Landfill is Jinkeng Forest Park, a forest park with rare tree species and large reservoirs in Guangzhou. Relying on the undeveloped tourism resources and tourism market of Jinkeng Forest Park, the transformation of the circular economy industrial park should minimize the impact on the surrounding environment, pay attention to ecological restoration, and make it a new functional block in the Jinkeng Forest Park tour system. Enriching the tour content of Jinkeng Forest Park, the two together contribute to the social and economic development of Guangzhou.

6. Conclusion
After the opening of the window of reform and opening up, China has entered the road of rapid development. However, development is a double-edged sword. While enjoying economic development, it also faces negative effects such as ecological environmental pollution and resource waste. The main disposal sites of urban domestic waste have already had a serious impact on the ecological environment and residents' lives. For this reason, the state no longer advocates the construction of new landfills, and encourages the use of clean incineration to treat domestic waste to minimize waste. Deal with the impact on the environment. By then, the domestic waste landfill will gradually withdraw from the historical stage. The transformation of the closed waste landfill is a new lesson that every city builder must face.
This article combines the closure of the Guangzhou municipal domestic waste landfill. The opportunity of the field is proposed to turn the entire domestic waste landfill into a circular economy industrial park with the function of ecological recycling treatment of domestic waste, to maximize social, economic and environmental benefits, and to be a domestic waste landfill of the same kind. The transformation and transformation of the company provide practical reference.

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