Environmental and Social Impact Assessment and Management Plan

Guangzhou Smart City Infrastructure Construction Project (Phase I)

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Submitted by: Guangzhou Smart City Investment and Operation Co., Ltd.
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Executive Summary

A. Project Overview

The "Fourteenth Five-Year Plan for Urban Infrastructure Development in Guangzhou City" (2022) proposes the use of new generation information technologies to promote the development of the city's management and service system towards intelligence, standardization, and refinement. It aims to enhance the informatization, digitalization, and intelligentization of urban infrastructure and gradually achieve full coverage of a smart city. To construct the "ubiquitous IoT and integrated computing" backbone of Guangzhou's smart city, and to form a cloud and network infrastructure with continuous expansion capability and a city-wide IoT sensing system, Guangzhou Smart City Investment and Operation Co., Ltd. (hereinafter referred to as "Guangzhou Zhitou") plans to apply for a loan of 200 million USD from the Asian Infrastructure Investment Bank (AIIB) for the construction of the Guangzhou Smart City Infrastructure Project Phase 1 (hereinafter referred to as "this project"). The project mainly includes: 1) Communication network infrastructure, including city-wide dedicated networks, IoT dedicated networks; 2) Computing power infrastructure, mainly for computing centers; 3) Integrated infrastructure, including the city's new infrastructure operation and management center, smart industry incubation platform, drones and drone nests, smart light poles; 4) Spatiotemporal twin intelligent platform, including simulation deduction, digital twins, big data, service support, IoT perception, application integration; 5) Smart city applications, including economic analysis for decision-making support, fine management of streets, smart property, resilient city lifeline systems, smart energy, smart elevators; 6) Security systems, including network and data security, and standard system.

This project is located in the urban area of Guangzhou City, focusing on digital technology and innovation, including city-wide dedicated networks, IoT dedicated networks, data centers, etc., to improve city management efficiency. The project facilities will be installed in existing buildings, and the project does not involve ecosystem destruction or land requisition related environmental and social risks. Environmental and social risks related to interior decoration, equipment installation, and smart city applications during the construction and operation of the project still require environmental and social safeguard measures to manage and reduce, thus this project is classified as Category B in terms of environmental and social impact. According to AIIB's environmental and social policy requirements, it is necessary to prepare an Environmental and Social Impact Assessment and Management Plan. Guangzhou Smart City Investment and Operation Co., Ltd. (hereinafter referred to as "Guangzhou Zhitou Company") commissioned Jiangxi Bohou Environmental Protection Technology Co., Ltd. (hereinafter referred to as "ESIA unit") to carry out the environmental and social impact assessment work for this project. This report is the environmental and social impact assessment and management plan prepared for the Guangzhou Smart City Infrastructure Construction Project (Phase I).

B. Environmental and Social Benefits of the Project

Project facilities will be used for environmental management, such as patrolling of black and odorous water bodies, dust monitoring, investigation of river discharge outlets, etc., to improve environmental management efficiency.

The implementation of the project can improve the overall architecture of Guangzhou's smart city, enhance the comprehensive governance efficiency of Guangzhou's megacity, promote industrial innovation and development, be beneficial to the preservation and appreciation of smart city achievements/assets, and provide expected or even exceeded smart and practical services for city residents, enterprises, and government managers.

The implementation of the project can increase employment opportunities for residents in the project area and improve their living standards. During the construction period, the project will directly provide some non-technical positions, which will be prioritized for the local poor population and vulnerable groups such as women. The operational period of the project will provide 300-350 job positions. The implementation of the project is also conducive to promoting the development of local smart city-related industries, driving the development of industries such as IoT, monitoring and supervision, and network data applications, helping to improve the connectivity and convenience of local living, working, and especially enhancing the convenience of life for the elderly, disabled and other vulnerable groups, increasing their happiness and life experience, and improving their quality of life.

1 Potential Environmental and Social Impacts and Mitigation Measures

The project implementation site is located in the urban area of Guangzhou City, and does not belong to an ecologically sensitive area. The project's computing center, operation and management center, and smart industry incubation platform all rent existing buildings and do not involve new construction. The main environmental and social impacts during the construction period of the project are concentrated on the interior decoration construction of the computing center and operation and management center, and the excavation of foundation of smart light poles, and communication pipelines for laying optical cables. The environmental and social impacts during the construction period mainly include: (1) short-term noise and dust pollution generated by construction machinery and transportation; (2) wastewater and solid waste generated at the construction site; (3) health and safety risks for workers and inconvenience to the surrounding public caused by construction; (4) risk of insufficient public consultation and information disclosure; The environmental and social impacts during the construction period of the project are temporary and will be resolved through mitigation measures formulated in the environmental and social management plan. The environmental and social impacts during the construction period of the project are temporary and limited to the project area.

The main environmental and social impacts during the operation period of the project are: (1) energy consumption and carbon emissions from data processing at the computing center, waste heat from equipment and water resource consumption caused by cooling; (2) wastewater and household waste generated from office and living at the computing center, operation and management center, and smart industry incubation platform; (3) solid waste and electronic waste generated from scrapped and replaced equipment; (4) noise from large cooling equipment and other mechanical equipment at the computing center; (5) risk of insufficient public consultation and information disclosure; (6) network security and information leakage risk.

These impacts will be resolved through the implementation and full implementation of mitigation measures formulated in the Environmental and Social Management Plan (ESMP).

C. Environmental and Social Management Plan

This project, in accordance with the requirements of AIIB's "Environmental and Social Framework" (revised in 2022), has formulated an Environmental and Social Management Plan (ESMP), which will be included in the construction contract and various stages of operation, with Guangzhou Smart City Investment and Operation Co., Ltd. as the responsible entity for the implementation of this project's environmental and social management plan.

Guangzhou Zhitou Company will regularly monitor and report on the implementation of the ESMP. Monitoring reports will be submitted every six months, respectively before January 31 and July 31 of each year. The reports will be submitted as independent documents and included in the project implementation report for review. This process ensures that the project's implementation not only complies with domestic environmental and social regulations but also meets AIIB's environmental and social policy requirements.

D. Stakeholder Consultation and Information Disclosure

According to domestic environmental impact public participation policies and regulations and AIIB's environmental and social framework requirements, this project has publicized relevant information through the Internet and on-site postings since August 2023 and conducted questionnaire surveys and public participation symposiums. Local residents, vulnerable groups (women, disabled, elderly, low-income households), and relevant units in the affected area participated in the public participation symposium. This project has received strong support from residents in the project area and collected many constructive opinions and suggestions. The most common suggestion is to hope to expedite the implementation of the project, improve the local smart city infrastructure in Guangzhou, and let city management better serve the citizens.

E. Grievance Mechanism

This project will extend and supplement the existing grievance channels of government functional departments to form a project-level grievance mechanism to collect and address the concerns and complaints of the public, to maximize the environmental and social benefits of the project. This grievance mechanism will be open to all individuals and organizations that may be affected by the project or are interested in the project, including vulnerable groups such as women and the elderly. Zhitou Company has arranged full-time personnel to collect residents' opinions and suggestions, including grievances and complaints. Zhitou Company's grievance complaint telephone and email have been publicized at the same time as the project information disclosure, to ensure the smoothness of the grievance complaint channels.

If the public believes that this project has not implemented the environmental and social management plan and is adversely affected by this project, they can submit their opinions and suggestions to AIIB according to AIIB's Project Affected Peoples Mechanism (PPM):

https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism/how-we-assist-you/index.html.

F. Conclusion

Project facilities will be installed in existing buildings, and the project does not involve environmental and social risks related to ecosystem destruction and land requisition. The environmental and social risks related to interior decoration and equipment installation, and smart city applications during the construction and operation of the project can be effectively managed by implementing the project's environmental and social management plan (ESMP), therefore, this project is feasible from an environmental and social perspective.

I. Introduction

A. Project Background

The project aims to construct the "ubiquitous IoT and integrated computing" framework of Guangzhou's smart city, forming a cloud and network infrastructure with the capacity for continuous expansion, and a city-wide IoT sensing system. It endeavors to build a sustainable smart city ecosystem capable of precise urban management. This system will deeply integrate with the digital economy, digital government, and digital society, supporting Guangzhou's transition from a "digital government" to a comprehensive "smart city" infrastructure system.

The main construction contents of the project include:

- Communication network infrastructure, including city-wide dedicated networks and IoT dedicated networks;
- Computing power infrastructure, primarily computing centers;
- Integrated infrastructure, including the new urban infrastructure operation and management center, smart industry incubation platform, drones, and drone nests, smart light poles;
- Spatio-temporal twin intelligent platform, encompassing simulation deduction, digital twins, big data, service support, IoT perception, and application integration;
- Smart applications, such as economic analysis for decision-making support, fine management of streets, smart property, resilient city lifeline systems, smart energy, and smart elevators;
- Security systems, including network and data security.

B. Environmental and Social Impact Assessment Method

1. Identification of Environmental and Social Impact Factors

Using matrix method based on the project construction content, the potential environmental and social impacts of the project are identified.

The project will have certain impacts on the environment and society, triggering the AIIB Environmental and Social Standard 1 (ESS1): Environmental and Social Impact Assessment and Management. The project is located in the urban area of Guangzhou City and does not involve ecological environment impact assessment. The construction scope of communication network infrastructure is broad, but the installation time for individual communication base stations and gateways is short (a few hours to a few days), and optical cable laying is conducted in segments, affecting a small area. The installation time for drone nests and smart light poles is about one week, occupying a small space. The spatio-temporal twin intelligent platform and smart industry applications involve

software development and do not have construction period environmental and social impacts. Therefore, the main environmental and social impacts during the construction period of the project are concentrated on the interior decoration and equipment installation in the computing center, operation and management center, and incubation platform. The negative impacts during the operation period mainly include electricity consumption, operating noise of equipment, and proper disposal of electronic waste. The social impact scope is the service coverage area of the project facilities.

The project's computing center plans to lease existing buildings within the compound of Huaneng New Energy Co., Ltd. in University Town (planned rental area 15,000 m^2), and the Operation Management Center and Incubation Platform plans to lease Building T3 and the podium of Guangzhou Urban Investment · Future Smart City - Design Capital Phase II, which is constructed by Guangzhou Xincheng Construction Investment and Development Co., Ltd. The original designed area and capacity shall remain unchanged. The optical cables will all be laid using the existing utility tunnels of the built municipal roads or subways. The smart light poles will utilize the existing traffic facilities land, and the installation of other equipment, drones, drone nests, etc. will not involve additional land use.Both the computing center and the operation and management center's lease sites have land use permits, so the project does not involve AIIB Environmental and Social Standard 2 (ESS2): Involuntary Resettlement.

The minority population within the project construction implementation area is very small, mainly being mobile populations living there due to marriage, work, and other reasons. They do not have traditional territories, minority languages, or traditional cultures, nor do they identify as a unified minority, so the project does not involve AIIB Environmental and Social Standard 3 (ESS3): Indigenous Peoples.

Table I-1 Environmental and Social Impact Identification Matrix

SN	Construction content		Environmental impacts/risks		Social impacts/risks		Scope of impact	note
			Positive impact	negative impact	Positive impact	negative impact		
1 Communications network infrastructure								
1.1	Metro Private Network	Deployment of 7 core switches, 14 node switches, 8 security gateways and supporting fibre-optic cables	/	Noise and dust during fibre optic cable laying, solid waste	Enhancing the effectiveness of urban governance and promoting innovation and development	/	7 physical addresses connected, including the Municipal Party Committee, the City Hall, the Arithmetic Centre, the Transport Management Centre and the Industry Incubation Platform, Lianxin Road, Suiyuan District, Huaguo	/

SN	Construction content		Environmental impacts/risks		Social impacts/risks		Scope of impact	note
			Positive impact	negative impact	Positive impact	negative impact		
1 Communications network infrastructure								
							Mountain	
1.2	Internet of Things (IoT) private network	Deployment of 131 communications base station equipment and 496 gateways	/	Equipment installation noise			A total area of 220.5 square kilometres was covered by the network of network coverage	Each communication base station takes from a few hours to a few days to install, and each gateway takes a few hours to install.
2 Arithmetic infrastructure								
1	Computing centre server equipment	Construction of 830 9KW cabinets, including 125	/	Noise, solid waste, indoor air quality during interior	Providing employment opportunities and delivering	1. Traffic safety risks during construction	Direct impact: 200 m area in and around the centre of	/

SN	Construction content		Environmental impacts/risks		Social impacts/risks		Scope of impact	note
			Positive impact	negative impact	Positive impact	negative impact		
1 Communications network infrastructure								
		intelligent computer cabinets and 705 general-purpose computer cabinets. Intelligent computing power 800PFP@16 GPUs, general-purpose computing power 110,000-core CPUs, 100PB of storage and related network equipment		decoration and equipment installation; electricity consumption, heat emissions and e-waste during operation, noise during operation of large cooling equipment.	intelligent services	and site change risks 2. Occupational health and safety of construction and operational staff	arithmetic. Indirect impact: scope of services of the Arithmetic Centre.	
2	Arithmetic Centre server room support	Construction of wind, fire, water and electricity supporting						

SN	Construction content		Environmental impacts/risks		Social impacts/risks		Scope of impact	note
			Positive impact	negative impact	Positive impact	negative impact		
1 Communications network infrastructure								
	facilities	equipment to meet the 7.5MW arithmetic equipment entry.						
3 Converged infrastructure								
3.1	Centre for Operation and Management of New Urban Infrastructure	1600 m^2 of indoor decoration and halls and other supporting facilities, including video display system, audio reinforcement system, image transmission and visualisation control system, converged communication system,	/	Electricity consumption, e-waste	Providing employment opportunities and providing a platform for entrepreneurship	1. Traffic safety risks during construction; 2. Noise and visual interference from drone flights during project operations; 3. Risk of data misuse.	200 m around the OMC during construction; service coverage of the management centre and the incubation platform during the operation period	/

SN	Construction content		Environmental impacts/risks		Social impacts/risks		Scope of impact	note
			Positive impact	negative impact	Positive impact	negative impact		
1 Communications network infrastructure								
		professional seats, integrated security system, integrated cabling system and supporting equipment rooms.						
3.2	Intelligent Industry Incubation Platform and Support	Construction of an incubation platform operation and management software platform; 1700m2 interior decoration of the industrial incubation platform and supporting equipment installation and integration, etc..	/	Interior renovation-related noise, indoor air quality; electricity consumption during operation, e-waste				/

SN	Construction content		Environmental impacts/risks		Social impacts/risks		Scope of impact	note
			Positive impact	negative impact	Positive impact	negative impact		
1 Communications network infrastructure								
		The equipment includes video display system, sound reinforcement system and paperless conference system.						
3.3	Drones and nests	Deployment of drones and nests covering a total of 1105 km2 and construction of a drone management platform	The drones will be used for environmental management services, such as inspections of black-smelling water bodies, dust monitoring, and river outfall	Noise during construction of aircraft nests; electricity consumption and waste electronic equipment during use, as well as noise from drone			The service covers Yuexiu, Haizhu, Liwan, Tianhe, Baiyun, Huangpu and Nansha key areas, totalling 1,105 square	The space required for each drone nest is about a few square metres to a dozen square metres. The construction time for each nest is approximately

SN	Construction content		Environmental impacts/risks		Social impacts/risks		Scope of impact	note
			Positive impact	negative impact	Positive impact	negative impact		
1 Communications network infrastructure								
			inspections, to improve the efficiency of environmental management.	flights and waste batteries.			kilometres	one week.
4	Smart Light Pole	Construction of 10,000 intelligent light poles (including new construction and renovation) covering many areas in Guangzhou, with a reduction of about 5,000 poles.	Multi-pole integration, optimising urban management; lighting intelligent management, low carbon and energy saving; environmental monitoring sensors carried on the	Construction period: noise and dust generated by foundation excavation and installation during construction; possible damage to the status quo underground pipelines;	Integrate lighting, communication, environmental monitoring and other functions to reduce the occupation of land resources. Smart light poles can provide Wi-Fi coverage, information dissemination and other services,	Some road space will be occupied during construction, which may cause short-term adverse impact on traffic travelling	Approximately 100 kilometres of roads in several areas of Guangzhou	Smart light poles are generally arranged on both sides of existing roads or within lane partitions, such as next to green belts and pavements; the supporting integrated chassis is set up in the green

SN	Construction content		Environmental impacts/risks		Social impacts/risks		Scope of impact	note
			Positive impact	negative impact	Positive impact	negative impact		
1 Communications network infrastructure								
			intelligent integrated pole can monitor air quality, noise and other environmental data in real time, which is conducive to the management to make accurate analyses and judgments; integrated charging pile function, providing charging	solid waste generated by dismantling the status quo light poles, monitoring poles and other types of poles and ancillary facilities during the process of multi-pole unification and renovation. Operational period: energy consumption;	providing citizens with convenient Internet access and timely information to enhance their quality of life; The integrated smart charging posts and smart parking guidance can also facilitate travelling and parking for the public.			belt. Each light pole covers an area of less than 1 m2, the integrated chassis is about 8 m2, the construction time is less than a week, and the implementation period is multi-departmental co-ordination.

SN	Construction content		Environmental impacts/risks		Social impacts/risks		Scope of impact	note
			Positive impact	negative impact	Positive impact	negative impact		
1 Communications network infrastructure								
			services for new energy vehicles, which can help to reduce the use of fuel vehicles, and reduce the exhaust emissions of fuel vehicles;	internal electronic equipment and components generate e-waste if not disposed of properly at end-of-life.				
5	Space-Time Twin Intelligence Platform	Simulation and Deduction, Digital Twin, Big Data, Service Support, IoT Sensing, Application Integration	/	Electricity consumption	Optimising urban management	/	All areas where the platform is used	/
6	Intelligent Applications	Economic analysis auxiliary decision-making	/	Electricity consumption, waste	1. Improving precision urban governance	1. Equipment installation affecting	Intelligent Application Service	/

SN	Construction content		Environmental impacts/risks		Social impacts/risks		Scope of impact	note
			Positive impact	negative impact	Positive impact	negative impact		
1 Communications network infrastructure								
		system, street fine management, resilient city lifeline system, intelligent property, intelligent lift, intelligent energy and so on.		electronic equipment	2. Raising residents' awareness of environmental protection 3. Encourage residents to travel in a low-carbon manner 4. Energy savings	travelling problems 2. Data privacy 3. Information divide 4. Risk of labour substitution	Scope	

2. Environmental and Social Impact Assessment Method

The purpose of the environmental and social impact assessment is to evaluate the potential environmental and social impacts and risks of the proposed project, assess alternative options, and design appropriate mitigation, management, and monitoring measures. These measures are aimed at eliminating, offsetting, or reducing adverse environmental and social impacts while enhancing and expanding positive benefits. The environmental and social impact assessment process is conducted as follows:

(1) Document Research

Review project-related technical documents to identify key environmental and social impacts, and clarify the focus of the assessment and environmental and social protection objectives (Scoping). The data for this assessment should include three categories:

First category: Institutions, policies, regulations. For example, plans and policies formulated by departments or industries, development plans of Guangdong Province and Guangzhou City Government, and AIIB's "Environmental and Social Framework" (revised in 2022). Research the gaps between AIIB requirements and domestic requirements, and develop gap bridging plans.

Second category: Project documents and related reports. Such as project proposal, feasibility study report, and other materials provided by the Zhitou Company.

Third category: The current economic and environmental status of the project city.

These materials are collected through survey information forms, some project management documents provided by the management department, the internet, etc.

(2) Field Survey

From August 16 to 17, 2023, the ESIA preparation entity conducted field surveys, inspecting the sites involved in the project construction content. The purpose was to objectively understand the project site selection, site environment, environmental and social sensitive points, and the composition of the impacted objects. The ESIA preparation team conducted a site survey from August 16-27, 2023. From December 23-25, 2024, a supplementary site survey was conducted due to changes in the leasing location of the Operation Management Center and the Smart Industry Incubation Platform.

Table 1-2 Field Inspection Situation of Each Project Area

City Level	District Level	Project Area Street	Visited Communities/Villages
Guangzhou City	Panyu District	Nancun Town	Yongda Community, Shitou Village
	Haizhu District	Pazhou Street	Nanyuanju Community
		Guanzhou Street	Xibei Yue Community, Dongnan Yue Community
		Huangshi Street	Jiangxia Village

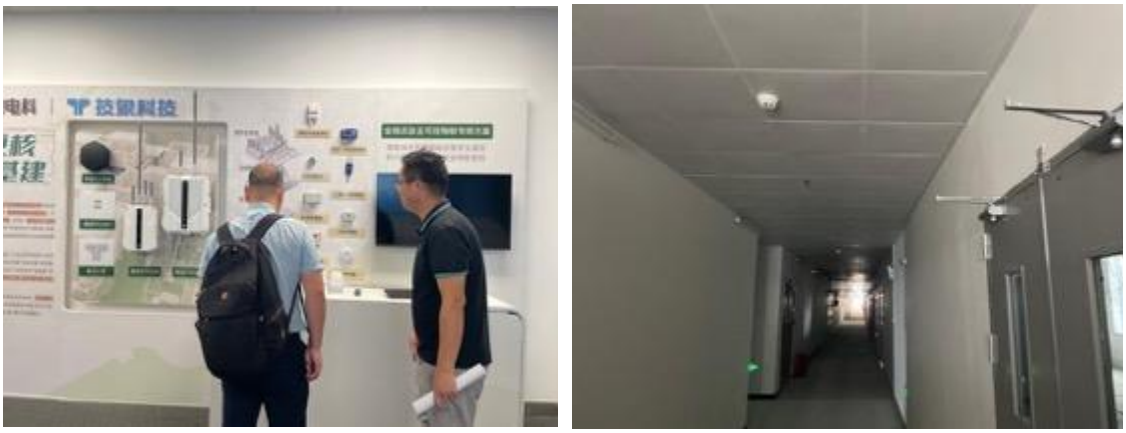


Figure 1-2 Field Survey Map by the Investigation Team

(3) Symposiums, Field Research, and Interviews

The ESIA entity, in close cooperation with the Guangzhou City Project Working Leadership Group, AIIB PMO, Guangzhou Urban Construction Investment Group Co., Ltd., Guangzhou Smart City Operation Co., Ltd., relevant government departments, street offices, communities/villages, and individuals, conducted public surveys from August 16 to August 27, 2023, in 1 township, 2 streets, surrounding communities, schools, and related project points within the project implementation area. Supplementary survey was conducted during 23-25 December 2024 in Huangshi street.

Institutional Interviews. Interviews and symposiums were held with the Guangzhou City Project Working Leadership Group, AIIB PMO, Guangzhou Urban Construction Investment Group Co., Ltd., Guangzhou Smart City Operation Co., Ltd., Bureau of Natural Resources and Planning, Municipal Industry and Information Bureau, Municipal Data Bureau, Municipal Urban Management Bureau, Municipal Ecology and Environment Bureau, Municipal Emergency Bureau, Agriculture Bureaus of Panyu and Haizhu Districts, Human Resources and Social Security Bureau, Civil Affairs Bureau, Women's Federation, Ethnic and Religious Affairs Bureau, and other agencies and departments. A total of 16 sessions of institutional interviews and discussions were conducted, and basic data and literature closely related to the project were collected.

Focus Group Discussions. To more comprehensively understand the needs and suggestions of the affected population in the project area (including urban and rural residents, women, low-income groups, and vulnerable groups), and their evaluation of the social environmental impact in their current residential areas, expectations for smart city construction, and concerns and suggestions brought about by the project implementation, focus group discussions were used. The ESIA entity conducted 13 focus group discussions with residents in different streets and communities of the project counties and districts, with a total of 25 participants. Among them, 59 were women, accounting for 42.7%; 16 were elderly, accounting for 12.8%.

(4) Key Informant Interviews. The ESIA entity conducted individual interviews with key informants at the county/district, township/street, and village/community levels, including affected workers, street and community cadres, residents, women, elderly, and vulnerable groups, to fully understand stakeholders' attitudes towards the project and provide better suggestions for project design and implementation. Interviews were conducted with 36 key informants in the project area.

Figure 1-3 Focus Group Discussions

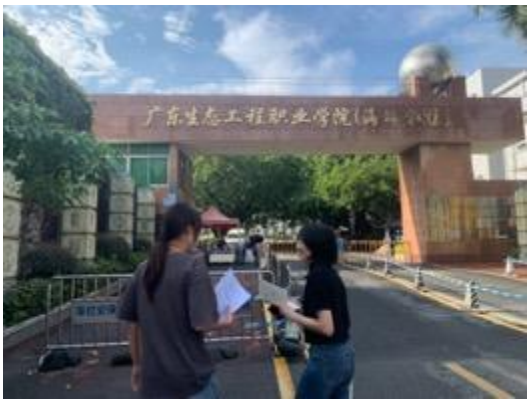



Figure 1-4 Key Informant Interview Situations

(5) Questionnaire Survey. Using the Probability Proportional to Size (PPS) sampling method, with a 95% confidence level and a maximum absolute error (d) of 5%, the ESIA entity estimated that about 300 survey samples were needed for this project. A total of 300 surveys were actually completed, meeting statistical requirements. During the field investigation, 320 questionnaires were completed in 2 streets within the project implementation range. After statistical testing and screening, 300 of these were valid, resulting in a questionnaire effectiveness rate of 93.8%. Respondents covered different age groups, education levels, and professions, including 159 males and 141 females.



Figure 1-5 Questionnaire Survey

(6) On the basis of engineering analysis, symposiums, and field research, conduct the environmental and social impact assessment according to relevant technical guidelines and assessment methods, and draft the "Environmental and Social Impact Assessment and Management Plan".

(7) Solicit public and expert opinions on the draft "Environmental and Social Impact Assessment and Management Plan" and revise and improve it.

C. Report Structure

The structure of this project's report is as follows:

Chapter 1 Introduction: Includes project overview, environmental and social impact assessment methods, and a description of the report structure.

Chapter 2 Policy, Legal, and Regulatory Framework: Discusses national laws, regulations, policies applicable to this project, AIIB's environmental and social framework requirements, international best practices, and standards.

Chapter 3 Project Description: Explains the project background, construction content, engineering design and construction plan, and associated facilities.

Chapter 4 Environmental and Social Baseline Data: Introduces the relevant geographic, ecological, and socio-economic conditions of the project area.

Chapter 5 Potential Environmental Impact Analysis and Mitigation Measures: Predicts and assesses potential positive and negative impacts of the project on the environment and society, proposing mitigation measures.

Chapter 6 Climate Change Risk Assessment: Analyzes climate change, identifies potential risks, and ensures the project facilities can operate continuously and stably in the face of climate change challenges.

Chapter 7 Environmental and Social Management Plan: Detailed explanation of: (a) mitigation and management measures taken during project implementation and operation to reduce, mitigate, and/or offset adverse environmental and social impacts and enhance positive impacts; (b) environmental and social monitoring and reporting requirements; (c) relevant institutional or organizational arrangements; (d) capacity development and training measures; (e) cost estimation for the implementation of the environmental and social management plan.

Chapter 8 Stakeholder Consultation and Information Disclosure.

Chapter 9 Grievance Mechanism: Describes the approach and methods for handling complaints.

II. Policy, Legal and Administrative Framework

A. Summary of Legislation/Policy and Its Applicability to the Proposed Project

1. Summary of Legislation/Policy

In recent years, the national government, Guangdong Province, and Guangzhou City have issued several policy documents supporting the construction of smart cities. The key policies are presented as follows:

Table 2-1 Analysis of Policies Related to Smart City Development

No.	Release Date	Policy Name	Released by	Key Contents
1	February 2023	"Digital China Construction Overall Layout Plan"	Central Committee of the Communist Party of China, State Council	Promote deep integration of digital technology and the real economy, accelerate digital technology innovation and application in key areas such as agriculture, industry, finance, education, medical, transportation, energy. Accelerate institutional and rule innovation, improve regulations in line with digital government construction. Strengthen digital capacity building, promote interconnectivity of information systems, data sharing on demand, efficient business collaboration. Enhance digital service levels, promote "one thing, one-time handling", integrate online and offline services, strengthen and regulate the management of government mobile Internet applications. Build a green and smart digital ecological civilization. Promote smart governance of the ecological environment, accelerate the construction of a smart and efficient ecological environment informatization system, use digital technology to promote integrated protection and systematic management of mountains, waters, forests, fields, lakes, and sands, improve the three-dimensional "one map" of natural resources and the basic information platform of national territory space, and

No.	Release Date	Policy Name	Released by	Key Contents
				build a smart water conservancy system centered on digital twin basins. Accelerate digital and green transformation. Advocate a green and smart lifestyle.
2	July 2021	"Three-Year Action Plan for New Data Center Development (2021-2023)" (Ministry of Industry and Information Technology Communication [2021] No. 76)	Ministry of Industry and Information Technology	New data centers support economic and social digital transformation, intelligent upgrading, and integrated innovation, driven by applications such as 5G, industrial internet, cloud computing, artificial intelligence, etc., and characterized by high technology, high computing power, high energy efficiency, and high security. Promote the coordinated development of new data centers and technologies such as artificial intelligence and construct a complete new smart computing power ecosystem.
3	July 2021	"5G Application 'Sailing' Action Plan (2021-2023)" (Ministry of Industry and Information Technology Communication [2021] No. 77)	Ministry of Industry and Information Technology, Cyberspace Administration of China, National Development and Reform Commission, Ministry of Education, Ministry of Finance, Ministry of Housing and Urban-Rural Development, Ministry of Culture and Tourism, National Health Commission,	5G+ Smart City. Increase the application of ultra-high-definition video surveillance, patrol robots, smart police terminals, smart emergency terminals, etc., in urban security and emergency management, building a real-time and accurate security control system. Accelerate the deployment of smart meters and other products in municipal management, environmental monitoring, and other fields, explore the construction of digital twin cities, and improve urban perception capabilities. Focus on information benefiting and facilitating the public, and accelerate the promotion of smart government services based on 5G technology. Accelerate digital transformation in communities, parks, and blocks as basic units, forming a batch of 5G smart community comprehensive solutions, providing a full range of digital community life new services. Promote the innovative application of 5G technology in the

No.	Release Date	Policy Name	Released by	Key Contents
			State-owned Assets Supervision and Administration Commission of the State Council, National Energy Administration	construction of new urban infrastructure based on digitalization, networking, and intelligence, comprehensively improving the level of urban construction and operational efficiency.
4	June 2021	"Guidance on Accelerating the Application and Industrial Development of Blockchain Technology" (Ministry of Industry and Information Technology [2021] No. 62)	Ministry of Industry and Information Technology, Cyberspace Administration of China	Smart City. Use blockchain to promote interconnectivity and orderly flow of information, funds, talents, credit, etc., between cities. Deepen the application of blockchain in the field of information infrastructure construction, achieve intensive deployment and co-construction and sharing across departments and industries, and support smart city construction.
5	May 2021	"Implementation Plan for Collaborative Innovation System of National Integrated Big Data Center Computing Hub" (National Development and Reform Commission [2021] No. 709)	National Development and Reform Commission, Cyberspace Administration of China, Ministry of Industry and Information Technology, National Energy Administration	Deepen data intelligence applications. Carry out integrated urban data brain construction to provide big data support for urban industrial structure adjustment, economic operation monitoring, social services and governance, transportation, ecological environment, and other fields. Select public health, natural disasters, market supervision, and other emergency scenarios for "data shooting range" construction, exploring data utilization rules and coordination mechanisms under different emergency states.
6	April 2021	"Notice on Promoting and Learning from the Innovative	National Development and Reform Commission	Sorted out a batch of reform and innovation measures and experiences, totaling 3 categories, 25 items, and 51 clauses, including reform system integration,

No.	Release Date	Policy Name	Released by	Key Contents
		Measures and Experiences of Shanghai Pudong New Area" (National Development and Reform Commission [2021] No. 345)		institutional opening, and high-efficiency governance. In the aspect of high-efficiency governance, 8 items and 17 innovative measures are listed, including: creating a "city brain" to promote "one network management" of city operation.
7	April 2021	"Key Tasks of New Urbanization and Urban-Rural Integration Development in 2021" (National Development and Reform Commission [2021] No. 493)	National Development and Reform Commission	Build new smart cities. Promote the intelligent upgrade of municipal public utilities, transform terminal systems in key areas such as transportation, public security, and water and electricity, and construct "urban data brains" and other digital smart management platforms. Promote data integration and sharing, improve city operation management, and emergency handling capabilities. Fully implement "one network integrated management" for city operation, expanding and enriching smart city application scenarios.
8	March 2021	"Outline of the Fourteenth Five-Year Plan for National Economic and Social Development and the Long-Range Objectives Through the Year 2035 of the People's Republic of China"	State Council	Use digitalization to promote urban and rural development and governance model innovation, comprehensively improve operational efficiency and livability. Promote the construction of new smart cities at different levels and categories, incorporate IoT sensing facilities, communication systems, etc., into the unified planning and construction of public infrastructure, promote IoT applications and intelligent transformation in municipal public utilities, buildings, etc. Improve urban information model platforms and operation management service platforms, build urban data resource systems, and promote the construction of urban data brains. Explore

No.	Release Date	Policy Name	Released by	Key Contents
				the construction of digital twin cities.
9	March 2021	"Opinions of the State Council on Implementing the Key Work of the Government Work Report" (State Council [2021] No. 6)	State Council	Consolidate the foundation of grassroots social governance, improve urban and rural community governance and service systems, and promote modernization of urban social governance pilots. Vigorously promote "Internet + regulation", establish and improve the government data sharing coordination mechanism, realize more government service matters online, on mobile, and one-time handling. Strengthen digital government construction. Business and public service matters that enterprises and the public often handle should basically achieve "cross-provincial handling" this year.
10	December 2020	"Guidance on Accelerating the Construction of a National Integrated Big Data Center Collaborative Innovation System" (National Development and Reform Commission [2020] No. 1922)	National Development and Reform Commission, Cyberspace Administration of China, Ministry of Industry and Information Technology, National Energy Administration	By 2025, the effect of big data collaborative application will be prominent, forming a number of industry data brains, city data brains nationwide, the trend of efficient transformation of computing power resources and data resources into intellectual resources will be basically formed, and data security assurance capability will be steadily improved. Promote industry digital transformation and upgrading. Support the creation of "industry data brains", promote the integrated application of big data in various industry fields. Guide and support industries to go on the cloud and use the cloud, enrich cloud application supply, accelerate digital transformation. Promote new formats and models driven by big data and cloud services, support enterprises to integrate online and offline businesses, cultivate data-driven enterprises. Accelerate the innovative application of big data in cities. Support the creation of "city data brains",

No.	Release Date	Policy Name	Released by	Key Contents
				improve the government-society collaborative governance mechanism, accelerate the formation of a unified and standardized, interconnected and secure urban data supply chain, provide data support for city governance, public services, industrial development. Accelerate the construction of city-level big data comprehensive application platforms, connect city data perception, analysis, decision-making, and execution links, and promote the improvement of urban governance and service capabilities.
11	May 2020	"2020 Government Work Report"	State Council	Focus on supporting "two new and one heavy" construction that both stimulates consumption and benefits people's livelihood and adjusts the structure and increases potential, mainly including: strengthening the construction of new infrastructure, developing a new generation of information networks, expanding 5G applications, building data centers, increasing facilities such as charging stations and battery swapping stations, promoting new energy vehicles, stimulating new consumer demand, and helping industrial upgrading.
12	April 2020	"Implementation Plan for the Action of 'Going to the Cloud, Using Numbers, and Empowering Wisdom' to Cultivate the Development of the New Economy"	National Development and Reform Commission, Cyberspace Administration of China	Lay the foundation, solidify the technological support for digital transformation. Support exploration of big data, artificial intelligence, cloud computing, digital twin, 5G, IoT, blockchain, and other new generation digital technology applications and integrated innovation in eligible industries and enterprises. Increase support for common development platforms, open-source communities, common solutions, and basic software and hardware, encouraging the open-source development of related codes,

No.	Release Date	Policy Name	Released by	Key Contents
		(NDRC High Tech [2020] No. 552)		standards, and platforms.
13	April 2020	"Key Tasks of New Urbanization Construction and Urban-Rural Integration Development in 2020" (NDRC Planning [2020] No. 532)	National Development and Reform Commission	Implement a new smart city initiative. Improve city digital management platforms and sensing systems, connect community terminals, weave dense data grids, integrate information systems and data resources
14	March 2020	Opinions on Building a More Perfect System and Mechanism for the Market-based Allocation of Factors	Central Committee of the Communist Party of China, State Council	For the first time, data is recognized as a new type of production factor. It proposes to promote the open sharing of government data, enhance the value of social data resources, strengthen the integration and security protection of data resources.
15	December 2019	Opinions on Promoting the Development of "Internet+ Social Services"	National Development and Reform Commission, Ministry of Education, Ministry of Civil Affairs, Ministry of Commerce, Ministry of Culture and Tourism, National Health Commission, General Administration of Sport	It further expands the convenient, intelligent, personalized, and fashionable consumption space of social services, accelerates the construction of new digital infrastructure, promotes product and application innovation through technological innovation, effectively cultivates new business forms and energizes the economy, and better meets the public's demand for high-quality social services.

No.	Release Date	Policy Name	Released by	Key Contents
16	August 2019	Guiding Opinions on Promoting the Standardized and Healthy Development of the Platform Economy	General Office of the State Council	Strengthen data sharing between government departments and platforms. Facilitate the two-way flow of data between the government and enterprises, develop a government data opening list, explore establishing rules and processes for data resource rights, circulation, trading, and application development, and strengthen data privacy protection and security management.
17	June 2019	National Key R&D Program "IoT and Smart City Key Technologies and Demonstration" Key Special Project Application Guide for 2019	Ministry of Science and Technology	Focuses on the basic theory and key technologies of smart cities "Sense-Link-Know-Use-Integrate", based on self-developed technology and products to build an integrated service system of IoT and smart cities; promote the scale development of IoT and smart cities, forming a complete industrial ecosystem.
18	March 2019	Guidelines on Promoting the Deep Integration of Artificial Intelligence and the Real Economy	Central Comprehensive Deepening Reform Committee Seventh Meeting	Build a data-driven, human-machine collaborative, cross-border integration, co-creation, and sharing intelligent economic form.
19	May 2021	Opinions of Guangdong Provincial People's Government on Accelerating Digital Development	Guangdong Provincial People's Government	Seize the opportunity to build the Guangdong-Hong Kong-Macao Greater Bay Area and Shenzhen's demonstration area of socialism with Chinese characteristics, focusing on key areas of digital development such as the digital economy, digital society, and digital government. It emphasizes digital technology innovation, the construction of new infrastructure systems, efficient

No.	Release Date	Policy Name	Released by	Key Contents
				allocation of data elements, core industry development, and digital transformation of industries.
20	August 2022	"14th Five-Year" Plan for Digital Government Reform and Construction in Guangzhou	Guangzhou Municipal People's Government	By 2025, a digital government that is "good governance, beneficial to enterprises and people, with outstanding highlights" and a smart city that is "all-domain twin, self-driving evolution" will be basically built, making Guangzhou a leader in innovative smart city development and a pioneer in comprehensive digital development.
21	February 2020	Overall Plan for the Construction of Guangzhou Artificial Intelligence and Digital Economy Pilot Zone	Guangzhou Municipal People's Government	Accelerate the innovative development of Guangzhou's digital economy, build a new ecosystem of the digital economy with data as a key element, and provide policy guidance for accelerating Guangzhou's transformation into a digital element circulation test field in the Guangdong-Hong Kong-Macao Greater Bay Area, a national source of digital core technology, and a new benchmark for global digital industry transformation.

2. Applicability of National and Local Policies to the Proposed Project

The national government strongly promotes the construction of smart cities, providing a policy foundation for the development of smart city infrastructure. Policies such as the "Overall Plan for the Construction of Digital China," "National Integrated Big Data Center Collaborative Innovation System Computing Hub Implementation Plan," "Opinions of the Guangdong Provincial People's Government on Accelerating Digital Development," and "Guangzhou's '14th Five-Year' Plan for Digital Government Reform and Construction" are fully applicable to the "Guangzhou Smart City Infrastructure Construction Project (Phase I)."

B. Applicable National Legislative Framework

1. Chinese Environmental Protection Laws, Policies, and Plans

According to the "National Development and Reform Commission, Ministry of Finance

Notice on Issuing the List of Alternative Projects for China to Use Asian Infrastructure Investment Bank Loans 2022–2024," this project has been approved by the State Council and included in the list of alternative projects for AIIB loan use 2022-2024. As per the "Guangzhou Municipal Development and Reform Commission Notice on Issuing the Special Working Group Plan for Major New Infrastructure Projects in Guangzhou," this project is listed as a major new infrastructure project in Guangzhou, ranked first on the list, with the Executive Deputy Mayor leading the coordination and promotion of the project's construction.

The project implementation is in line with the city's planning and relevant industrial policies. The social objectives of the project are well aligned with the social development goals of Guangzhou's urban planning. The project construction will be carried out strictly in accordance with relevant policies and regulations, and the necessary approvals are detailed in the annex. Below are the legal requirements that the project must meet:

1 Environmental Protection Law of the People's Republic of China (Effective Jan 1, 2015)
2 Air Pollution Prevention and Control Law of the People's Republic of China (Revised Oct 26, 2018)
3 Water Pollution Prevention and Control Law of the People's Republic of China (Effective Jan 1, 2018)
4 Solid Waste Pollution Environmental Prevention Law of the People's Republic of China (Effective Sep 1, 2020)
5 Noise Pollution Control Law of the People's Republic of China (Effective June 5, 2022)
6 Environmental Impact Assessment Law of the People's Republic of China (Effective Dec 29, 2018)
7 Land Administration Law of the People's Republic of China (Effective Jan 1, 2020)
8 Regulations on Environmental Protection Management of Construction Projects (State Council Order No. 682, Jul 16, 2017)
9 Industrial Structure Adjustment Guidance Catalog (2019 Edition) (Revised in 2021, Effective Jan 1, 2020)
10 Catalogue for the Guidance of Environmental Impact Assessment Classification of Construction Projects (2021 Edition) (Effective Jan 1, 2021)
11 Environmental Impact Assessment Public Participation Methods (Effective Jan 1, 2019)
12. National Catalogue of Hazardous Wastes (2025 Edition) (Issued on November 26, 2024, by the Ministry of Ecology and Environment, National Development and Reform Commission, Ministry of Public Security, Ministry of Transport, and National Health Commission, Order No. 36, effective from January 1, 2025).
13 Opinion of the CPC Central Committee and the State Council on Fighting Pollution Prevention and Control Battle (Nov 2, 2021)
14 Catalogue for the Guidance of Environmental Impact Assessment Classification of

Construction Projects (2021 Edition)
15 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives Through the Year 2035 of the People's Republic of China (Approved Mar 11, 2021)
16 Guangdong Province Environmental Protection Regulations (Amended Nov 29, 2019)
17 14th Five-Year Plan for National Economic and Social Development of Guangdong Province Through the Year 2035 (Approved Apr 6, 2021)
18 Notification of the People's Government of Guangdong Province on the Ecological Environmental Zoning Control Plan (Issued Jan 5, 2021)
19 Guangdong Province Construction Project Environmental Protection Management Norms (Trial)
20 Guangdong Province Solid Waste Pollution Environmental Prevention Regulations (Revised Nov 29, 2018, Effective Mar 1, 2019)
21 Guangdong Province Air Pollution Prevention Regulations (Effective Mar 1, 2019)
22 Guangdong Province Water Pollution Prevention Regulations (Effective Sep 29, 2021)
23 Measures for the Implementation of the Soil Pollution Prevention and Control Law of Guangdong Province (Effective Mar 1, 2019)
24 Notification of the People's Government of Guangdong Province on the Implementation Plan of the Guangdong Province Water Pollution Prevention Action Plan (Issued Dec 31, 2015)
25 14th Five-Year Plan for National Economic and Social Development of Guangzhou City Through the Year 2035 (Issued May 19, 2021)
26 Guangdong Province Ecological Environment Protection "14th Five-Year" Plan
27 Overall Urban Environmental Plan of Guangzhou City (2014-2030)
28 Ecological Environment Protection Regulations of Guangzhou City (Effective June 5, 2022)
29 Notification on Implementing Carbon Peak and Carbon Neutrality Targets to Promote Green High-Quality Development of New Infrastructure such as Data Centers and 5G (Issued Nov 30, 2021)
30 Green Data Center Government Procurement Demand Standards (Trial) (Effective Jun 1, 2023)

2. Policy and Plans for the Development of China's Smart City Industry

1 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives Through the Year 2035 of the People's Republic of China (Approved Mar 11, 2021)
2 Overall Plan for the Construction of Digital China (Feb 2023)
3 "14th Five-Year" Digital Economy Development Plan
4 "14th Five-Year" National Informatization Plan
5 Development Plan Outline for the Guangdong-Hong Kong-Macao Greater Bay Area

(Feb 2019)
6 Guiding Opinions on Accelerating the Construction of New Smart City Infrastructure
7 Three-Year Action Plan for the Construction of IoT New Infrastructure (2021-2023)
8 14th Five-Year Plan for National Economic and Social Development of Guangdong Province Through the Year 2035 (Approved Jan 26, 2021)
9 Opinions of Guangdong Provincial People's Government on Accelerating Digital Development
10 Overall Layout Plan for 5G Base Stations and Data Centers in Guangdong Province (2021-2025)
11 Opinions on Strengthening the Layout and Construction of Data Centers by Guangdong Development and Reform Commission and Guangdong Industry and Information Technology Department
12 "14th Five-Year" Plan for Urban Infrastructure Development in Guangzhou City
13 "14th Five-Year" Plan for Digital Government Reform and Construction in Guangzhou City
14 Work Plan for Further Accelerating the Construction of Smart Cities and Promoting Digital Development in Guangzhou City (May 2021)
These laws, regulations, and policies provide a comprehensive framework governing environmental protection, social assessment, and the development of smart city infrastructure in China, particularly relevant to projects like the Guangzhou Smart City Infrastructure Construction Project.

3. China's Social-Related Laws, Policies, and Plans

a) Major Social Policies

The social policy system in the project impact area consists of national-level laws, regulations, policies, and local-level laws, regulations, and policies. The main laws, regulations, and policies include:

1. Constitution of the People's Republic of China (Amended in 2018);
2. Civil Code of the People's Republic of China (May 28, 2020);
3. Law of the People's Republic of China on the Protection of Women's Rights and Interests (January 1, 2023);
4. Special Provisions on the Labor Protection of Female Employees (October 26, 2018);
5. Notice of the Office of the National Development and Reform Commission on Issuing the Chapter on Social Stability Risk Analysis of Major Fixed Asset Investment Projects and the Outline for the Preparation of Evaluation Reports (Trial) (NDRC Investment [2013] No. 428);
6. Law of the People's Republic of China on Prevention and Treatment of Occupational Diseases (December 2018);
7. Labor Law of the People's Republic of China (December 2018);

8. Opinions on Strengthening Risk Management of Major Project Decision-Making in Urban Construction (Sui Development and Reform [2021] No. 98).

b) Summary of Policies on the Protection of Women's Rights and Interests

Implementing gender equality is a basic state policy of China. The Constitution stipulates, "Women in the People's Republic of China enjoy equal rights with men in political, economic, cultural, social, and family life." The Civil Code of the People's Republic of China, established in 2020, sets forth the basic principle of gender equality. The Law of the People's Republic of China on the Protection of Women's Rights and Interests, passed in 1992 and revised in 2022, also explicitly stipulates equal rights for women in all aspects of family and social life. Furthermore, the state fully recognizes that women, as mothers, not only undertake social production functions but also bear the function of population reproduction. They have special physiological needs and unique rights, and the state's laws have established provisions to protect these special rights of women.

(1) Women enjoy equal rights with men in political, economic, cultural, social, and family life (Article 2 of the Law on the Protection of Women's Rights and Interests);
(2) Units should not refuse to employ women or raise employment standards for women, except for jobs or positions unsuitable for women (Article 23 of the Law on the Protection of Women's Rights and Interests);
(3) Implement equal pay for equal work for men and women. Women have equal rights to benefits and welfare as men (Article 24 of the Law on the Protection of Women's Rights and Interests);
(4) All units should protect the safety and health of women in work and labor according to their characteristics and should not arrange work or labor unsuitable for women (Article 26 of the Law on the Protection of Women's Rights and Interests);
(5) Women have equal rights to occupy, use, benefit from, and dispose of marital property according to the law, regardless of the income status of either party (Article 47 of the Law on the Protection of Women's Rights and Interests);
(6) Employers should not reduce the wages of female employees, dismiss them, or terminate or dismiss their labor or employment contracts due to pregnancy, childbirth, or breastfeeding (Article 5 of the Special Provisions on the Labor Protection of Female Employees);
(7) Employers should reduce the workload of female employees who cannot adapt to their original labor during pregnancy or arrange other suitable labor, according to medical certification. For pregnant women over 7 months, employers should not extend working hours or arrange night shifts and should provide rest time during working hours. Time spent on prenatal examinations during working hours should be counted as working time (Article 9 of the Special Provisions on the Labor Protection of Female Employees).
(8) In the workplace, employers should prevent and stop sexual harassment against

female employees (Article 11 of the Special Provisions on the Labor Protection of Female Employees).

C. Applicable AIIB Environmental and Social Framework, Environmental and Social Standards

Since this project will apply for a loan from the AIIB, the AIIB's Environmental and Social Framework (ESF) will apply to this project. (1) Environmental and Social Policy (ESP), Environmental and Social Standards (ESSs), and Environmental and Social Exclusion List. The ESP prescribes mandatory requirements for identifying, assessing, and managing the environmental and social risks and impacts of projects supported by the AIIB. (2) Environmental and Social Standard 1 (ESS1) - Environmental and Social Assessment and Management: Aimed at ensuring the robustness and sustainability of the project in environmental and social aspects, and integrating environmental and social factors into the decision-making process and implementation of the project. If a project is likely to have adverse environmental risks and impacts or social risks and impacts (or both), ESS 1 applies. ESS1 provides high-quality environmental and social assessments and management of risks and impacts during project implementation through effective mitigation and monitoring measures. This project has certain environmental and social impacts but can be effectively managed through mitigation measures, thus it involves ESS1, categorized as a Category B project in environmental and social aspects. (3) Environmental and Social Standard 2: Land Acquisition and Involuntary Resettlement (ESS2). The computational infrastructure and integration infrastructure projects will be carried out within existing buildings for the installation and decoration of equipment in the computing center and operation management center, not involving additional land acquisition and resettlement activities. Each of the other proposed projects does not involve requirements related to ESS2. The identification and due diligence of resettlement impacts are detailed in Table 3-4, Annex 5, and a separate due diligence report. (4) Environmental and Social Standard 3: The population of ethnic minorities within the project construction scope area is very small, mainly consisting of mobile populations who have settled there due to marriage, work, etc. They do not have traditional territories, minority languages and traditional cultures, nor do they consider themselves as a distinct ethnic minority. Therefore, this project does not involve ESS3. (5) Environmental and Social Exclusion List. The AIIB will not finance activities or projects involving the activities listed in the Environmental and Social Exclusion List (ESEL). This project involves smart city construction and does not involve any items in the AIIB's Environmental and Social Exclusion List.

D. Comparative Analysis of Environmental and Social Requirements of China and the AIIB

To ensure that the project meets both Chinese and AIIB environmental and social requirements, the following table compares the differences between the two and proposes project-level measures to bridge the gaps.

Table 2-2: A Comparison of Environmental and Social Requirements between China and the Asian Infrastructure Investment Bank (AIIB)

Elements	AIIB Requirements	Chinese Requirements	Comparative Analysis and Gap-Closure Measures
Environmental and Social Policies and Regulations	AIIB requires the adoption of AIIB's environmental and social framework for projects seeking AIIB loans, with projects needing to adhere to environmental and social policies and standards. AIIB's "Environmental and Social Framework" requires projects to conform to internationally recognized pollution prevention techniques and practices, such as the World Bank Group's "Environmental, Health, and Safety Guidelines - General" (2017), and other globally acknowledged standards.	Construction projects should conduct environmental impact assessments and implement environmental protection measures based on the "Environmental Protection Law of the People's Republic of China," "Environmental Impact Assessment Law of the People's Republic of China," and the "List of Categories for Environmental Impact Assessment of Construction Projects (2021 Edition)," while adhering to environmental quality standards and local environmental laws and regulations. China does not have specific laws and administrative regulations for social impact assessment, but project construction should be based on administrative regulations or rules related to social impact assessment, such as the "Interim Provisions on Major Administrative Decision-Making Procedures," "Interim Measures for Social Stability Risk Assessment of Major Fixed Asset Investment Projects of the National Development and Reform Commission," and the "Implementation Regulations of the Land Administration Law of the People's Republic of China." The National Development and Reform Commission's "Outline for the Feasibility Study of Government Investment	

Elements	AIIB Requirements	Chinese Requirements	Comparative Analysis and Gap-Closure Measures
		Projects" (2023) includes requirements for social evaluation and social stability risk assessment and must also comply with relevant local requirements. Domestic environmental policies and regulations in China are generally similar to AIIB's environmental and social policies, but domestic policies focus more on mitigating adverse environmental impacts of construction projects, while AIIB emphasizes a comprehensive assessment of environmental and social impacts. There is no specific legal provision for social impact assessment domestically, but it is required in the project feasibility study, and social stability risk assessment must go through review and filing. Social stability risk assessment is a unique feature of China's social risk governance system. Projects should meet both domestic and AIIB requirements by adopting more stringent provisions to comply with domestic laws, regulations, and relevant policies while also adhering to AIIB's ESF policy requirements.	
Environmental and Social Categorization	AIIB classifies projects based on the highest environmental and social risks and potential impacts exhibited by the project, including direct, indirect, cumulative, and induced impacts on the project site. AIIB categorizes projects	According to the "List of Categories for Environmental Impact Assessment of Construction Projects (2021 Edition)," projects are categorized based on project characteristics and the environmental sensitivity of the project location. It classifies environmental impact assessments for 55 industries and 173 sub-industries into	

Elements	AIIB Requirements	Chinese Requirements	Comparative Analysis and Gap-Closure Measures
	into four classes: (1) Category A, (2) Category B, (3) Category C, and (4) Financial Intermediary (FI) Category. Different categories have different requirements for environmental and social impact assessment.	three main categories: (1) preparation of environmental impact assessment reports, (2) preparation of environmental impact assessment reports, and (3) preparation of environmental impact registration forms. This project requires the preparation of an environmental impact registration form. In accordance with AIIB requirements, this project falls under the environmental and social Category B.	
Preparation of Environmental and Social Impact Assessment Reports	According to environmental and social policies, Category A projects require the preparation of environmental and social impact assessment reports, environmental and social management plans, and resettlement plans. The content of the environmental and social impact assessment report includes: (1) project description, including a map of the project area; (2) policies, laws, and administrative frameworks, including domestic and international legal frameworks applicable to the project; (3) project scope, including stakeholder identification and consultation plans; (4) alternative analysis; (5)	According to the "List of Categories for Environmental Impact Assessment of Construction Projects (2021 Edition)," this project requires the submission of an environmental impact registration form, and there is no need to prepare an environmental and social impact assessment report. There are no definitions related to associated facilities and management methods. In accordance with AIIB requirements, the environmental and social impact assessment report and management plan must be prepared, including the identification and analysis of associated facilities.	

Elements	AIIB Requirements	Chinese Requirements	Comparative Analysis and Gap-Closure Measures
	environmental and social baseline data; (6) environmental and social risk and impact assessment; (7) climate change risk and impact analysis; (8) public consultation and information disclosure; (9) formulation of mitigation, monitoring, and management measures and actions in the form of an environmental management plan or environmental impact assessment. Additionally, AIIB's environmental and social framework requires the identification and assessment of environmental and social risks and impacts that associated facilities[1] may bring in the environmental and social assessment.		
Public Consultation	AIIB requires meaningful consultations for all Category A, B, and C projects,	No specific requirements for such projects	As per AIIB and domestic policy and regulatory

[1] The para 35 of the "Environmental and Social Framework" defines associated facilities as activities that are not explicitly included in the project's legal agreements but are identified by the bank as: (a) directly and significantly related to the project, (b) occurring concurrently with the project or planned to occur concurrently, and (c) critical to the feasibility of the project, meaning that if the project does not exist, these activities would also not take place.

Elements	AIIB Requirements	Chinese Requirements	Comparative Analysis and Gap-Closure Measures
	with consultations conducted at all stages of project development to solicit the views of affected people and stakeholders. Feedback received during project preparation and implementation must be considered in project design, preparation, and implementation. Continuous consultation mechanisms are needed throughout the project lifecycle to disclose information and seek feedback, with the results of public consultations documented in the ES document.		requirements, consultations have already been conducted with stakeholders and affected groups, and the feedback obtained from public consultations is reflected in the environmental and social impact assessment.
Appeals	AIIB requires the establishment of a Grievance Redress Mechanism (GRM) to receive, assess, and facilitate the resolution of concerns, complaints, and grievances from affected people regarding the social and environmental performance of the borrower/client in the project. GRM is crucial for development projects with ongoing or	Consistent with government appeals channels, a project-level GRM mechanism has been strengthened and included in this report. AIIB has established a Project Affected People's Mechanism (PPM). When project-affected people believe that AIIB projects have not implemented their environmental and social policies (ESP) or have the potential to adversely affect them, and their concerns cannot be satisfactorily resolved through the Project Appeals Mechanism (GRM) or AIIB's management mechanisms, the	

Elements	AIIB Requirements	Chinese Requirements	Comparative Analysis and Gap-Closure Measures
	anticipated adverse impacts or risks. It also includes information on AIIB's Project Affected Peoples Mechanism, including how to access the mechanism, which must be included in project and sub-project environmental and social documents and disseminated by GRM. Complaints can be resolved through the environmental complaints hotline established by the Environmental Protection Department (e.g., 12369 hotline, 12369 WeChat platform, and www.12369.gov.cn).	PPM provides an independent and impartial review opportunity. Relevant information on PPM can be accessed at the following link: https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism/how-we-assist-you/index.html.	
Information Disclosure	AIIB requires the disclosure of project information to allow stakeholders to understand project risks and impacts, as well as potential opportunities. For Category A projects, the environmental and social impact assessment report must be publicly displayed for a minimum of 60 days before loan approval, while Category B projects require a minimum of 30 days.	No specific requirements for such projects	This report includes a stakeholder engagement section, and the report (in both Chinese and English) must be publicly displayed on the Guangzhou Zhitou website for a minimum of 30 days before AIIB loan approval.

The project will adhere to the following environmental standards:

Table 2-3: Environmental Standards and Pollutant Emission Standards for the Project

Category	Standard	Standard Category
Environmental Quality Standards	"Environmental Air Quality Standards" (GB3095-2012)	Level 2
	"Sound Environmental Quality Standards" (GB3096-2008)	Category 2
Pollutant Emission Standards	"Atmospheric Pollutant Emission Limits" (DB44/27-2001)	Second stage unorganized emission monitoring concentration limit
	"Water Pollutant Emission Limits" (DB44/26-2001)	Second stage Level 3 standard (other pollution units)
	"Environmental Noise Emission Standards for Construction Sites" (GB12523-2011)	Category 2
	"Environmental Noise Emission Standards for Industrial Enterprises" (GB 12348-2008)	Category 2
	"General Industrial Solid Waste Storage and Landfill Pollution Control Standards" (GB18599-2020)	
	"Hazardous Waste Storage Pollution Control Standards" (GB18597-2023)	
International Best Practices	World Bank Group EHS Guidelines	

III. Project Description

A. Background

The "14th Five-Year Plan" Outline for Guangzhou sets out major goals, including significant achievements in smart city construction, sustained improvement in government efficiency, accelerated modernization of urban social governance, and becoming a new model of modern governance for mega-cities. Guangzhou aims to accelerate its digital development, align with the Digital China strategy, adhere to comprehensive transformation, all-encompassing empowerment, and revolutionary reshaping. It aims to expedite the construction of a digital economy, digital society, and digital government. This digital transformation will drive overall changes in production methods, lifestyles, and governance methods and establish an internationally renowned smart city.

The main objectives of Guangzhou's smart city construction are as follows:

Build a leading city in the digital economy and create a benchmark city for the integration of industries and digitalization. Artificial intelligence and the digital economy are considered strategic engines, leveraging the advantages of massive data and diverse application scenarios. This will promote the deep integration of digital technology with the real economy, accelerate industrial digitization, and create a benchmark city for the integration of industries and digitalization.

Accelerate the pace of building a digital society and create a digital life accessible to all. Adapting to the new trend of comprehensive integration of digital technology into social interactions and daily life, this initiative will promote the widespread application of digital technology in public services, urban and rural development, and reshape lifestyles and social operation modes with the empowerment of digital technology, creating a digital life accessible to all.

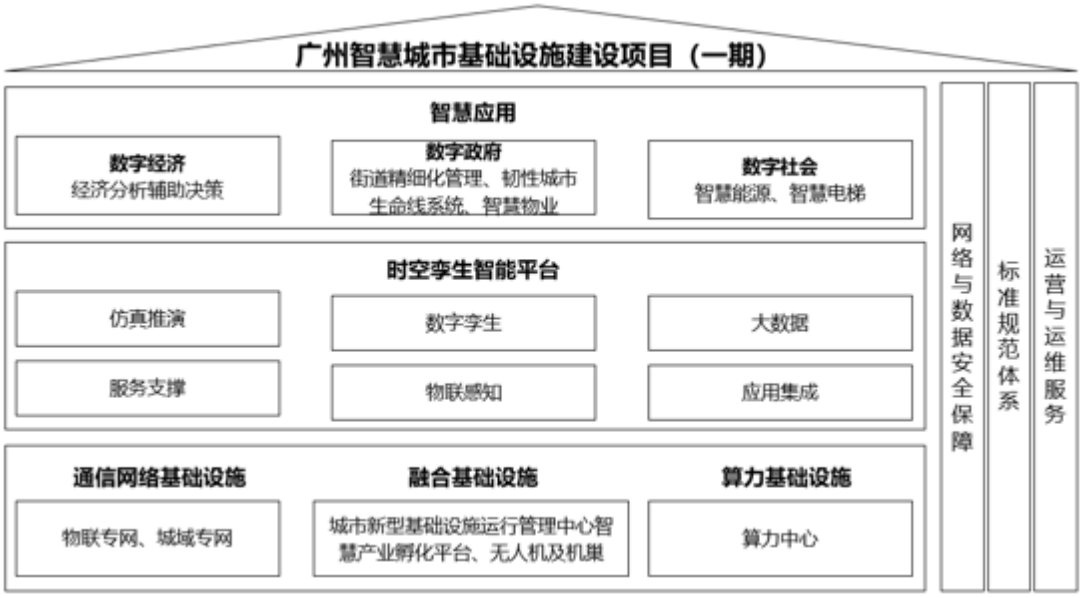
Enhance the level of digital government construction and explore new paths for digital governance in mega-cities. Focusing on digital transformation and branding of government affairs services, digital technology will be widely applied to government management and services. This will drive the reformation of government governance processes and optimization of models, continuously improve decision-making scientificity and service efficiency, and explore new paths for digital governance in mega-cities.

To establish a solid foundation for the development of a smart city and achieve Guangzhou's long-term goals in smart city development, this project will focus on the construction of the smart city infrastructure in Guangzhou. It aims to establish the "ubiquitous IoT, data-analytics fusion" framework for Guangzhou's smart city, create a cloud-network infrastructure and urban IoT sensing system with continuous expansion

capabilities, and build a smart city ecosystem for sustainable operation and precise urban management. This project has been approved by the State Council and has been selected as one of the alternative projects for China's utilization of loans from the Asian Infrastructure Investment Bank for the years 2022-2024.

B. Construction Contents

This chapter is based on the "Feasibility Study of Guangzhou Smart City Infrastructure Construction Project (Phase I)" (December 2024). The overall construction framework of this project is as follows:



Source: Feasibility Study Report of This Project (December 2024).

Figure 3-1 Overall Project Framework

The overall framework of this project consists of communication network infrastructure, integrated infrastructure, computing power infrastructure, spatio-temporal twin intelligent platform, smart applications, and a security system. The construction content and scale are shown in Table 3-1.

Communication Network Infrastructure. The communication network infrastructure includes a metropolitan area network (MAN) and an IoT (Internet of Things) dedicated network. The metropolitan area network is established by constructing a new network that provides core switching and network access services with large bandwidth, high reliability, and network security for 2 computing nodes (computing center, operation management center), 2 government external network access nodes (Suiyuan Community, Lianxin Road), and 4 user nodes (Municipal Committee, Municipal Government, Huaguoshan, Industrial Incubation Platform) built in this phase of the project. It supports network long-term smooth evolution and expansion. By constructing the metropolitan area network, multi-service integration is realized, laying a network

foundation for city perception, governance, and service capability enhancement. The IoT dedicated network establishes a unified infrastructure IoT network to provide low-power, wide-coverage narrowband wireless network access for IoT terminals.

Integrated Infrastructure. The integrated infrastructure includes operation management centers, industrial incubation platforms, unmanned aerial vehicles (UAVs), and nests, and smart lamp posts etc. A 1600 square meters operation management center is planned to be constructed to physically operate dynamic monitoring of new infrastructure facilities, as well as risk warning, smart empowerment, decision support, and other operational tasks. A 1700 square meters industrial incubation platform is planned to be constructed to create the digital capability of the industrial incubation platform, realize the smart construction outcomes of the industrial incubation platform with data access, and provide full-chain services from industrial incubation to industry aggregation.

Computing Power Infrastructure. The computing power infrastructure mainly consists of a computing center, providing computing services to meet the future smart city development computing needs of Guangzhou.

Spatio-Temporal Twin Intelligent Platform. The spatio-temporal twin intelligent platform includes core software capabilities like simulation and deduction, digital twin, big data, service support, IoT perception, and application integration.

Smart Applications. Smart applications include urban business application scenarios such as economic analysis and decision-making support, refined street management, smart property, resilient urban lifeline systems, smart energy, and smart elevators.

Security System. The security system includes network and data security, and standard system etc.

Table 3-1: Project Construction Content and Scale

No.	Name	Main Construction Content	Project Land Impact Identification	Preparation Documents
1	Communication Network Infrastructure	Hardware entities	/	/
1.1	Metropolitan Private Network	Deploy 14 switches, matching security gateways, and optical cables (connecting 7 physical addresses, including the municipal party committee, municipal government, computing center, operation management center, and industrial incubation platform, Lianxin Road, Suiyuan Community, Huaguo Mountain).	Communication network infrastructure is planned to be deployed using existing urban construction corridors (pipes) combined with fiber optics. Guangzhou Zhitu Company can use the existing pipe holes of the three major telecom operators and the underground pipe corridors (holes) along the Guangzhou Metro, or directly lease the fiber optics owned by the telecom operators.	No temporary land occupation or permanent land compensation involved.
1.2	Internet of Things Private Network	Deploy 131 communication base station devices and 496 gateways, covering a total area of 220.5 square kilometers.	/	/
2	Computing Infrastructure	Hardware entities	/	/
2.1	Computing Center Server Equipment	Build intelligent computing with 800P@FP16, general computing with 110,000 CPU cores, 100PB storage, and related network equipment.	The computing center involves building and leasing. Guangzhou Zhitu plans to select a site located within the campus of Guangzhou University Town in Panyu District, including an existing 8-story building (intended for data center	No land acquisition or building demolition impacts. A due diligence survey on the existing building's land and lease is

No.	Name	Main Construction Content	Project Land Impact Identification	Preparation Documents
			construction). The computing center plans to lease three floors of the building (two office floors, and the 7th and 8th floors for equipment installation).	conducted (DDR, completed).
2.2	Computing Center Supporting Facilities	Build supporting equipment for the computing center, including two municipal power sources, power distribution systems, renovation, fire and water electrical systems, lighting and rack systems, fire safety, security and environmental systems, power backup systems, etc.	/	/
3	Integrated Infrastructure	Hardware entities	/	/
3.1	Urban New-Type Infrastructure Operation Management Center	1600 ㎡ indoor renovation and related equipment procurement, installation, and integration, including video display systems, audio amplification systems, image transmission and visualization control systems, integrated communication systems, professional seating, comprehensive security systems, and wiring systems.	The construction of the operation management center involves building and leasing. The planned site for leasing is in the Guangzhou City Investment and Development Co., Ltd.'s completed Phase 2 T3 building of Guangzhou Design City, which includes 2-3 floors (around 2600 ㎡) and the basement floor (about 700 ㎡).	No land acquisition or building demolition impacts. A due diligence survey on the existing building's land and lease is conducted (DDR, updated).

No.	Name	Main Construction Content	Project Land Impact Identification	Preparation Documents
3.2	Smart Industry Incubation Platform and Supporting Facilities	Build a platform for operations management software; 1700 ㎡ indoor renovation for the incubation platform, including video display systems, audio amplification systems, and paperless meeting systems.	/	/
3.3	Drones and Drone Nest	Deploy drones and nests covering 1105 square kilometers and build a drone management platform.	Drone nests will be built on unused rooftops or open spaces of government and public facilities, such as government offices and public service units.	No temporary or permanent land compensation involved.
3.4	Smart Lamp Posts	Build 10,000 smart lamp posts (including new and renovated), reducing the number by 5000 posts.	Integrating and renovating existing lamp post infrastructure. The construction period may involve temporary occupation of national land along road edges or in median strips.	No temporary land compensation or permanent land compensation involved.
4	Space-Time Twin Intelligent Platform	Software system	/	/
4.1	Simulation and Deduction	Elemental model, quality diagnosis enhancement, pattern recognition, strategy learning, behavior prediction, etc.	Utilize the existing office space of Zhitu Company, involving only the purchase, installation, and application of equipment.	No temporary land or permanent land compensation involved.
4.2	Digital Twin	Build and integrate various data types, such as new infrastructure data, CIM basic data, BIM model data, detailed spatial modeling, high-	/	/

No.	Name	Main Construction Content	Project Land Impact Identification	Preparation Documents
		precision map data, and semantic address data, and provide visualization, external service windows, and necessary components.		
4.3	Service Support	Operation and maintenance system, microservices, unified basic support, etc.	/	/
4.4	IoT Sensing	Management of IoT devices (sensors, cameras, etc.), including multi-protocol access, equipment monitoring, asset management, IoT supermarkets, etc.	/	/
4.5	Big Data	Big data storage, aggregation, asset management, application, and governance to enable efficient sharing, distribution, and safe management of multi-source city data.	/	/
4.6	Application Integration	Coordinate and manage all software systems and software development activities, control project progress and quality, including big screen content, integration with existing platforms, and related data governance and analysis work.	/	/
5	Smart City Applications	Client applications (e.g., PC, mobile, etc.)	/	/

No.	Name	Main Construction Content	Project Land Impact Identification	Preparation Documents
5.1	Economic Analysis Decision Support	Build business and decision support applications, draw clear and intuitive industrial chain standard maps and spatial maps, and set up economic perception and business monitoring and analysis models.	Install smart devices in existing facilities, no temporary or permanent land compensation involved.	/
5.2	Street Fine Management	Build applications for street management such as sanitation, greening, city appearance inspection, and digital city management, covering pilot streets with perception control terminals for comprehensive governance (e.g., vehicle-mounted terminals, intelligent delivery point sensors, public restroom sensors, unmanned sweeping vehicles, etc.).	/	/
5.3	Smart Property Management	Provide applications for property services and community convenience services for municipal, district housing departments, streets, communities, and small-to-medium property management companies.	/	/
5.4	Resilient City Lifeline System	Focus on urban risks such as road flooding, water pipe leakage, underground pipe	/	/

No.	Name	Main Construction Content	Project Land Impact Identification	Preparation Documents
		corridors, electric vehicle charging piles, gas pipelines, dilapidated buildings, road subsidence, etc., and set up a risk monitoring and early warning system.		
5.5	Smart Energy	Build applications for safe electricity management, intelligent lighting, air conditioning management, energy consumption monitoring, flexible load regulation, substation monitoring, electric vehicle charging management, carbon asset management, and user mobile apps.	Install energy perception and control terminals (e.g., air conditioning monitoring devices, lighting monitoring devices, etc.).	/
5.6	Smart Elevators	Build a smart elevator management system for lifecycle big data management, operation monitoring, service interfaces, etc., and build perception terminals for 5000 old elevators.	/	/
6	Security System	/	/	
6.1	Network and Data Security	Use encryption, trust, blockchain, cybersecurity, and data security measures to build a systematic and layered security guarantee system for city infrastructure and intelligent city network security.	Soft power construction, no temporary or permanent land compensation involved.	/

No.	Name	Main Construction Content	Project Land Impact Identification	Preparation Documents
6.2	Data Procurement	Includes procurement of various types of social data (e.g., satellite data).	/	/
6.3	Lease Services during Construction	Includes bandwidth, traffic cards, etc.	/	/

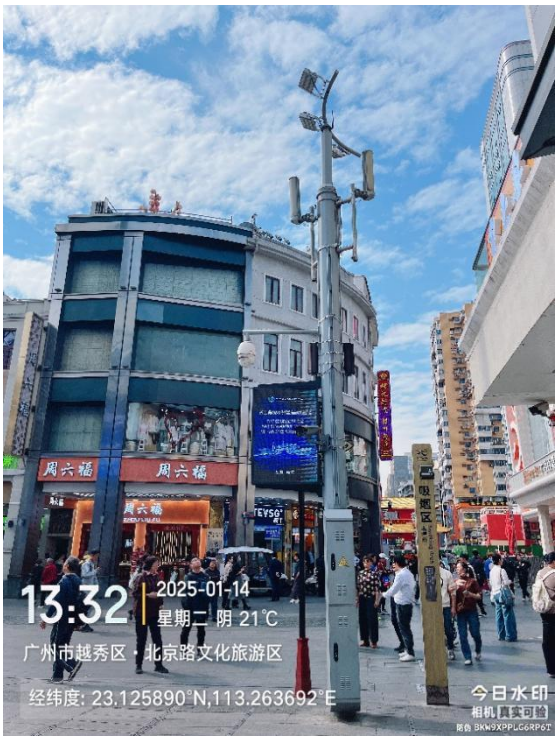
Source: Feasibility Study Report, December 2024.

Table 3-2: Summary of Major Construction Quantities

Serial Number	Construction Content	Project Description	Quantity	Unit	Remarks
I. Urban Area Network					
1	Fiber Optic Cable Installation	244-core core ring fiber optic cable and 48-core access fiber optic cable, including associated facilities and construction costs	54.3	kilometers	
2	Pipeline Excavation	6-hole communication pipeline	2.4	kilometers	
II. Data Center Facilities					
1	Data Center Facilities Construction	Planning for 830 9kW server cabinets, including 125 intelligent algorithm server cabinets and 705 general-purpose server cabinets. Data center facilities include 2-way municipal power introduction and distribution systems, uninterruptible power supply systems, air conditioning systems, server cabinet accessories, data center decoration, lightning protection and grounding, and gas fire protection systems.	15000	square meters	Lease
III. Urban New Infrastructure Operation and Management Center					
1	Renovation Construction	Includes soft and hard decoration, interior decoration, and furniture. This includes demolition of the renovation area, interior decoration, electromechanical renovation, and custom furniture procurement.	1600	square meters	Lease
IV. Smart Industrial Incubation Platform and Supporting Facilities					

Serial Number	Construction Content	Project Description	Quantity	Unit	Remarks
1	Innovation Research and Development Center Soft and Hard Decoration and Infrastructure	With a building area of approximately 1100 square meters, it mainly includes soft and hard decoration and infrastructure.	1100	square meters	Lease
2	Industrial Exchange Center Soft and Hard Decoration and Infrastructure	With a building area of approximately 600 square meters, it mainly includes soft and hard decoration and infrastructure.	600	square meters	

Source: Feasibility Study Report, December 2024.



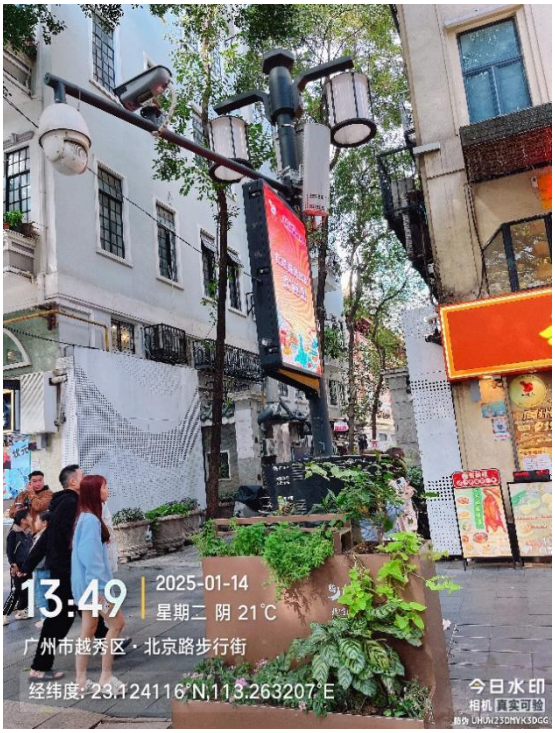


Figure 3-2: Existing smart lamp posts

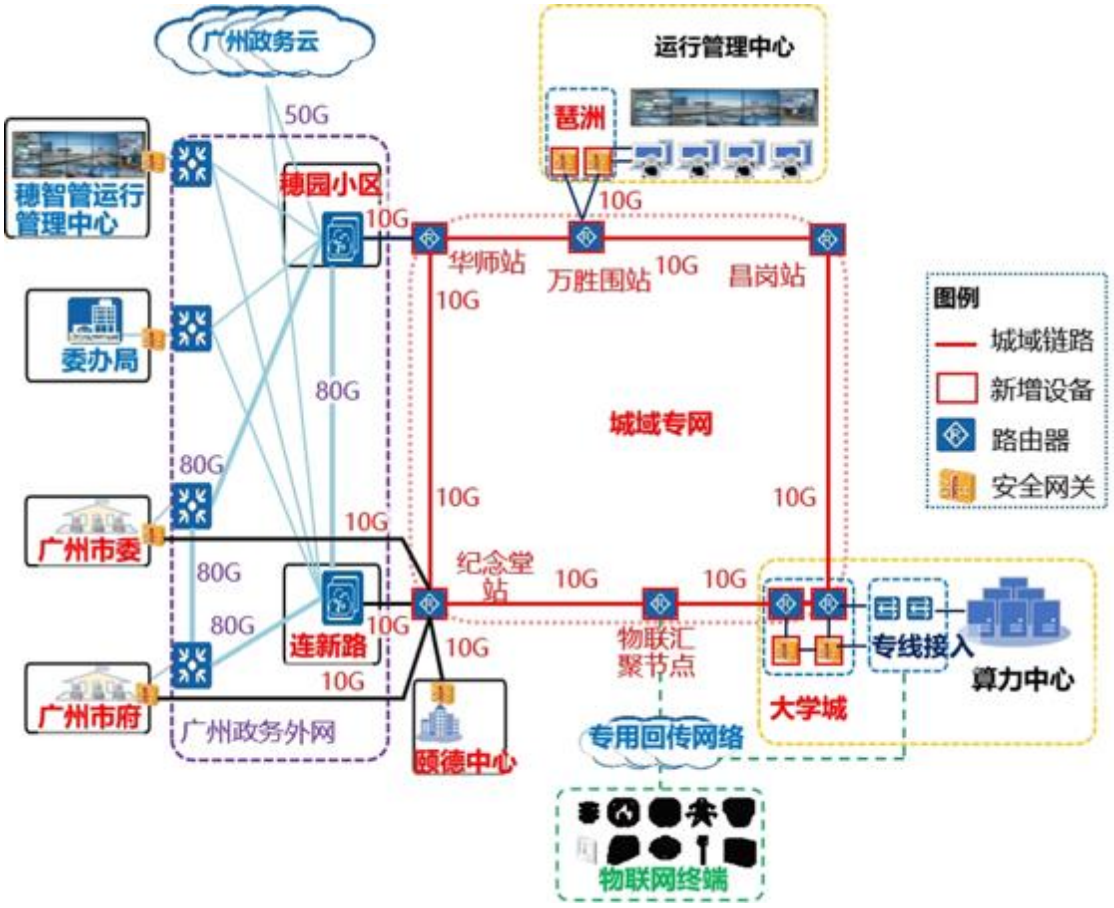
C. Construction Sites

The Time-Space Twin Intelligent Platform, Smart Applications, and Support System for this project are software-based activities and do not involve construction sites.

1. Communication Network Infrastructure

(1) Citywide Area Network (CAN)

The CAN construction includes 2 nodes located at the Computing Center and the Operation Management Center; 2 government extranet access nodes located at Suiyuan Community and Lianxin Road; 4 user nodes located at the Municipal Committee, Municipal Government, Yide Building, and Pazhou.

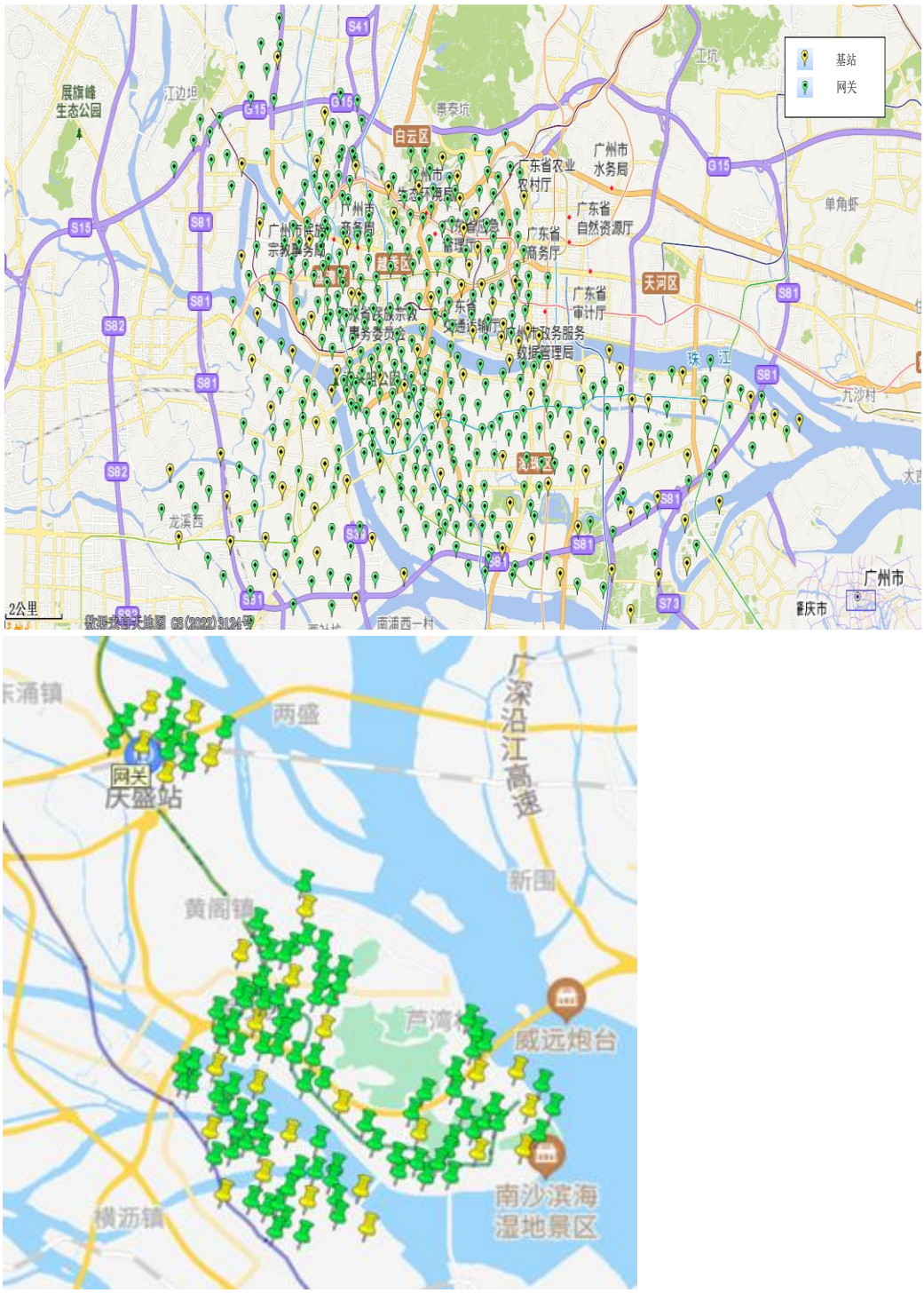


Source: Feasibility Study Report, December 2024.

Figure 3-3: Urban Area Network Location and Physical Network Topology

(2) IoT Network

In the initial phase, the IoT network plans to achieve full coverage of Yuexiu District, Liwan District, Haizhu District, and Nansha, prioritizing the use of equipment on Guangzhou Tower Company's sites. The construction will involve 131 communication base stations, 496 communication gateways, and a domestically produced LPWAN network element management system, with a network coverage area of 220.5 square kilometers.



Source: Feasibility Study Report, December 2024.

Figure 3-4: Distribution Map of IoT Network Locations

2. Computational Infrastructure

Computing Center The proposed site for the computing center is located at 1689 Xinbei Road, Nancun Town, Panyu District, Guangzhou (northeast corner of Guangzhou University City Distributed Energy Station), within the premises of Guangzhou University

City Huaneng New Energy Co., Ltd. The existing building has 8 floors and is planned for the construction of a data center building with a total floor area of 42,000 square meters. The building consists of one underground level and 8 above-ground levels. The height of the underground level is approximately 7 meters, while the above-ground building height is 4.3 meters. The current condition of the building is unfinished, and interior architectural modifications are required. This project plans to lease the 2nd, 7th, and 8th floors of this building, with a planned rental area of approximately 15,000 square meters.

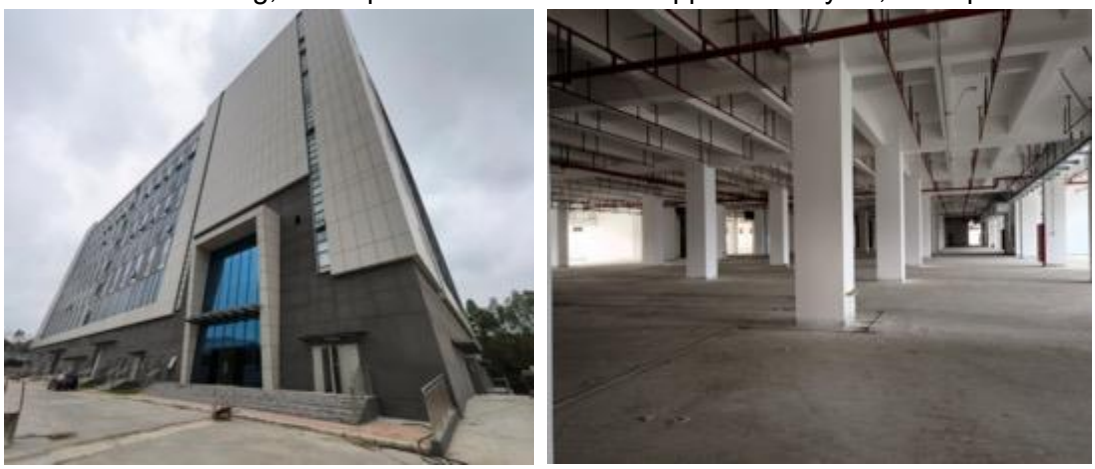


Figure 3-5: Current Site Conditions of the Computational Center

This project commissioned Guangzhou Panyu Environmental Engineering Co., Ltd. in February 2019 to complete the "Environmental Impact Assessment Report for University City Distributed Energy Station No. 1 Chilled Water Plant and Its Computer Room Project." In March 2019, it obtained the approval from the Environmental Protection Bureau of Panyu District, Guangzhou, regarding the "Environmental Impact Assessment Report for University City Distributed Energy Station No. 1 Chilled Water Plant and Its Computer Room Construction Project," with approval document number: Sui (Fan) Huan Guan Ying [2019] No. 101 (see Attachment 1).

The construction of this building complies with land use planning, as indicated in the Construction Land Planning Permit with the number: Sui Gui Di Zheng [2006] No. 467. The land is designated for public facilities and has been allocated as state-owned construction land. It has also obtained a real estate certificate with the number: Yue (2019) Guangzhou Real Estate Certificate No. 07800354. For details on the recognition and due diligence of immigration impact, please refer to Table 3-1 and the Immigration Due Diligence Report.

3. Integrated Infrastructure

(1) Operation Management Center and Smart Industry Incubation Platform

In early November 2023, the preliminary planned site for the Operation Management Center and Smart Industry Incubation Platform was "Chengtou Pazhou Center West Tower" — Pazhou Logistics Waiting Building (refer to the DDR in November 2023). However, according to the latest feasibility report submitted for approval to the Guangdong Provincial Development and Reform Commission in December 2024, the

site selection has changed to better align with the overall planning of Guangzhou's smart city layout.

The original planned lease site in the Guangzhou Chengtou Property's Panyu District, "Chengtou Pazhou Center West Tower" — Pazhou Logistics Waiting Building, has now been changed to the new site: the New City Construction Demonstration and Smart Building Industrial Park (Phase I), which is also owned by Guangzhou Chengtou Property and built by Guangzhou New City Construction Investment and Development Co., Ltd. The New City Construction Demonstration and Smart Building Industrial Park (Phase I) is located in the southern plot of the Design City Phase II in Jiangxia Village, Huangshi Street, Baiyun District, Guangzhou. This project consists of seven buildings above ground, and the project will lease 2-3 floors of the T3 building (about 2600 ㎡) and the podium (Academic Exchange Center, about 700 ㎡) (see Figure 3-6).

The "Future Smart City" site for the Operation Management Center and Smart Industry Incubation Platform covers 40.44 acres (26,959 ㎡). Initially, this land was designated for collective industrial development in Jiangxia Community. In December 2019, collective land acquisition compensation was completed in accordance with Guangzhou's comprehensive district price compensation standards, covering 46.224 acres (including 5.784 acres of surrounding corner land). The land acquisition compensation funds of 13.199356 million yuan were fully paid to the Jiangxia Community Committee (see Figure 2-7), and the land was subsequently stored as state-owned construction land.

Through field interviews with Jiangxia Community, it was found that the affected collective industries were relocated and resumed operations on the remaining collective public industrial land in Jiangxia Community. Currently, the community's industrial operations are normal, and there are no resettlement or unemployment issues. There are no unresolved issues or complaints. The main structure of the Design City Phase II building has been completed and is now awaiting internal decoration. In 2024, Guangzhou Zhitu Company, a subsidiary of Guangzhou Chengtou, and Guangzhou New City Construction Investment and Development Co., Ltd. reached a preliminary agreement on leasing the corresponding floors of the T3 building in the Design City Phase II. Based on the expected completion and acceptance of Phase II by the end of December 2025 and the issuance of the property ownership certificate for the building, both parties will sign the building lease agreement by December 2026. According to relevant legal provisions, the proposed building for the Operation Management Center has a 50-year usage term (2022-2072), which meets the 30-year operational requirement for the Operation Management Center. No new land acquisition, building demolition, or resettlement impacts are involved.

The New City Construction Demonstration and Smart Building Industrial Park (Phase I) project belongs to the real estate industry. According to the "Environmental Impact Assessment Classification Management Catalogue for Construction Projects (2021 Edition)," this project is not located in an environmentally sensitive area and does not require environmental impact assessment procedures. The project commenced construction in March 2022, and it has now reached full completion, with expected use

starting in early 2025. This project only involves internal renovation work. The outer enclosure used during construction can continue to be used during the project construction period.

Source: Guangzhou Smart Investment Company

Figure 3-6:Proposed Site for the Operation Management Center and Smart Industry Incubation Platform

The New City Construction Demonstration and Smart Building Industrial Park (Phase I) project integrates technologies such as photovoltaic integration, full electrification, building DC flexible technology systems, photovoltaic charging infrastructure, and energy storage direct current flexible systems, to create a near-zero energy consumption green low-carbon building demonstration project. The project maximizes the use of photovoltaic resources, taking into account factors such as mutual shading between buildings, architectural design, and appearance. The entire roof can accommodate a

total photovoltaic installed capacity of 1,016.82 kW, with an estimated annual electricity generation of approximately 850,000 kWh. Upon completion, the project will form a replicable and scalable bundle of green technology solutions. In March 2024, the project was selected as a National Development and Reform Commission (NDRC) Green Low-Carbon Advanced Technology Demonstration Project (first batch).

Another highlight of the New City Construction Demonstration and Smart Building Industrial Park (Phase I) project is its intelligent management. The park is the first in the country to be developed based on a city-level CIM (City Information Modeling) platform, enabling smart park management. The park achieves data interoperability and has established a full lifecycle digital management system from design to operation and maintenance.

(1)CIM Platform Empowering Smart Management:
Through the combination of domestic BIM (Building Information Modeling) and CIM platforms, the park can monitor real-time data on building energy consumption, equipment operation, and personnel management. The CIM platform not only connects various data silos but also uses 3D visualization technology to allow park managers to view the operational status in real-time and make quick decisions.

(2)Seamless Integration of Smart Facilities and Intelligent Operations:
The park features various smart facilities, such as smart roadways, intelligent parking, and smart security systems, significantly enhancing management efficiency and owner experience. The IoT and big data analysis enable the management platform to optimize energy consumption in real-time, improving resource utilization. The green low-carbon management system also accurately monitors carbon emissions, providing data support for achieving carbon neutrality goals.

(3)Multi-Dimensional Digital Twin Technology for Operational Platform:
The park uses digital twin technology, which combines virtual and real-world management modes. For example, by using IoT sensors and the CIM digital foundation, the park can test and simulate future operational scenarios in a virtual environment, adjusting strategies based on actual data to ensure optimal performance. *(Source: Guangzhou Ecological Environment Bureau Website)*

This project represents a significant advancement in integrating green, low-carbon technologies with smart management systems, creating a model for sustainable urban development.

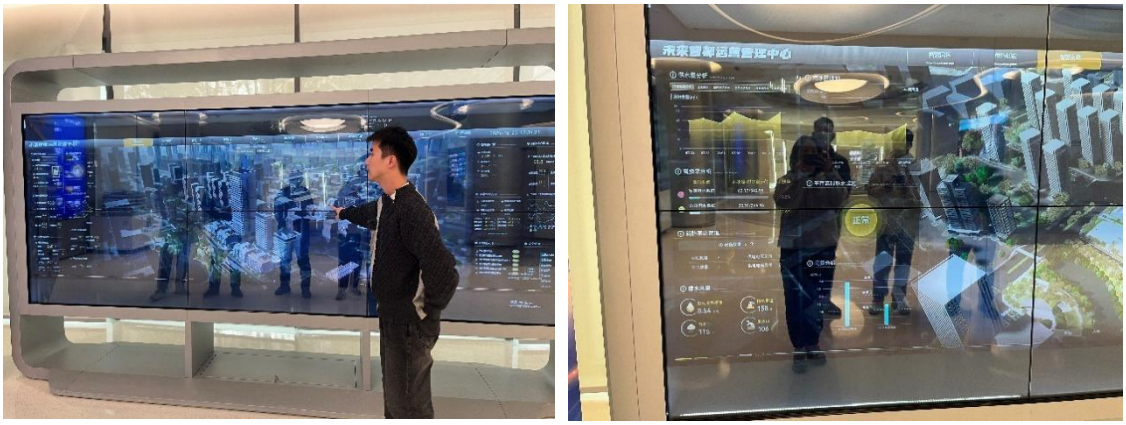


Figure 3-7: Operational Management System Display for the Proposed Site of the Operation and Management Center and Smart Industrial Incubation Platform

In summary, based on the characteristics and advantages of the New City Construction Industrial Park, the proposed leasing site for the Operation and Management Center and Smart Industrial Incubation Platform is reasonable.

(2) Drones and Drone Nests

The main coverage area includes key regions in Yuexiu, Haizhu, Liwan, Tianhe, Baiyun, Huangpu, and Nansha districts. In the diagram, the green circles represent the coverage area of each drone nest. Currently, Guangzhou does not have a unified drone nest plan; only a few pilot installations have been made in some areas based on the operational needs of drone companies. The sites for smart drone nests are chosen from rooftops of government offices, public institutions, and other unused spaces in public facilities, such as open areas or rooftops of government and service buildings. Each drone nest occupies an area ranging from several square meters to over ten square meters, depending on the function.

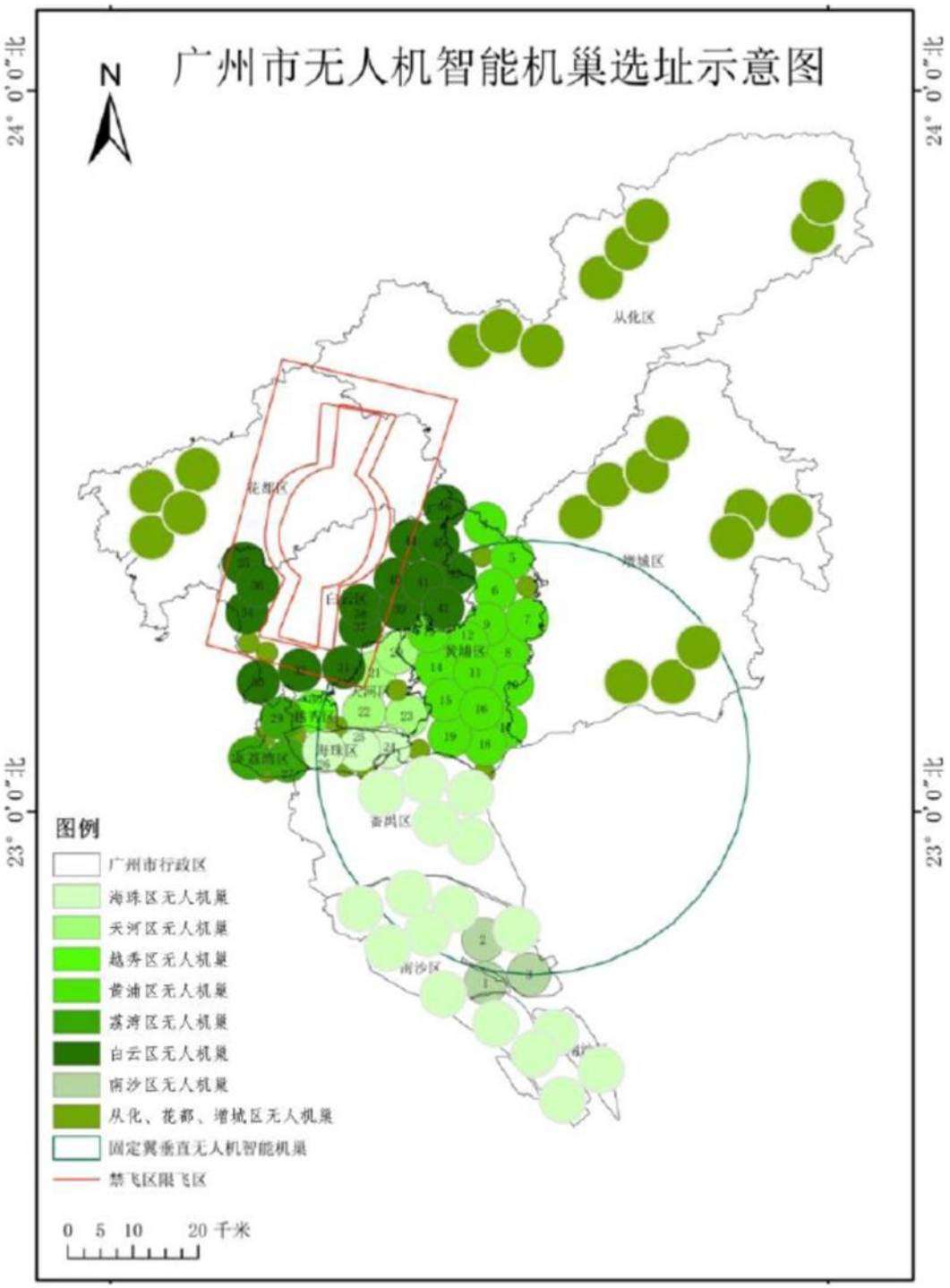
Table 3-4 Project UAV and UAV Nest Specifications and Functional Description

No.	Name	Hardware Specifications/Software Function Description	Quantity	Remarks
1	Small UAV Intelligent Base Station 1	Functions should support: 1. Battery hot swapping, allowing UAVs to continue operations without shutdown, with re-flight time less than 4 minutes, and battery replacement interval not exceeding 120s. 2. Power management capabilities. 3. Constant temperature system, maintaining optimal internal conditions for UAVs, batteries, and other equipment to extend their lifespan. 4. Monitoring capabilities, including internal and external surveillance cameras; various sensors for	5 units	UAV Nest

No.	Name	Hardware Specifications/Software Function Description	Quantity	Remarks
		weather, temperature, humidity, etc. 5. Support for RTK positioning and visual recognition system integrated landing technology. 6. Built-in UPS, backup time of at least 4 hours during power outages. 7. Support for remote command issuance, controlling the mechanical structure in the UAV intelligent base station, and manual remote operation of UAVs during task execution.		
2	Small UAV Intelligent Base Station 2	Functions should support: 1. UAV automatic charging. 2. Constant temperature system, maintaining optimal internal conditions for UAVs, batteries, and other equipment. 3. Monitoring capabilities, including internal and external surveillance cameras; various sensors for weather, temperature, humidity, etc. 4. Support for RTK positioning and visual recognition system integrated landing technology. 5. Built-in UPS, backup time of at least 2 hours during power outages. 6. Support for remote command issuance, controlling the mechanical structure in the UAV intelligent base station, and manual remote operation of UAVs during task execution.	17 units	UAV Nest
3	Light UAV Intelligent Base Station	Functions should support: 1. Automatic charging, UAVs automatically return to the base station for charging after completing tasks, without the need for manual battery replacement. 2. Constant temperature system, maintaining optimal internal conditions for UAVs, batteries, and other equipment. 3. Monitoring capabilities, including internal and external surveillance cameras; various sensors for weather, temperature, humidity, etc. 4. RTK positioning and visual recognition system integrated landing technology. 5. Support for remote command issuance, controlling the mechanical structure in the UAV intelligent base station, and manual remote operation of UAVs during task execution.	100 units	UAV Nest
4	VTOL Fixed-Wing UAV Base Station	Adapted for fixed-wing UAVs, supporting functions include: 1. Automatic charging, UAVs automatically charge after completing tasks, with charging duration not exceeding 90 minutes. 2. Constant temperature system, maintaining optimal internal conditions for UAVs, batteries, and other equipment. 3. Monitoring capabilities, including internal and external surveillance	1 unit	UAV Nest

No.	Name	Hardware Specifications/Software Function Description	Quantity	Remarks
		cameras; various sensors for weather, temperature, humidity, etc. 4. Support for RTK positioning and visual recognition system integrated landing technology. 5. Built-in UPS, backup time of at least 4 hours during power outages. 6. Automatic firefighting system, activating automatically in case of internal fire, performing firefighting and power cut-off. 7. Support for remote command issuance, controlling the mechanical structure in the UAV intelligent base station, and manual remote operation of UAVs during task execution. 8. Open SDK.		
5	Small UAV	For scanning and inspection of areas to collect orthoimagery data, supports carrying multiple sensory devices for data collection; endurance not less than 55 minutes, flight radius and image transmission distance not less than 8 kilometers, protection grade not less than IP45, supports six-directional positioning and obstacle avoidance, capable of carrying at least three payloads simultaneously.	22 units	UAV
6	Light UAV	Required to carry a zoomable visible light camera, resolution not less than 48 million pixels; maximum flight time not less than 30 minutes, flight radius and image transmission distance not less than 5 kilometers.	100 units	UAV
7	VTOL Fixed-Wing UAV	Capable of carrying various payloads. Applicable in fields like mapping, monitoring, public safety, inspection, etc. Endurance not less than 120 minutes, support for various functional mounts and high-performance imaging systems, wind resistance capability not less than grade 6, effective payload not less than 3 kilograms. Includes fixed-wing pod and camera.	1 unit	UAV

Source: Feasibility Study Report, December 2024.



Source: Feasibility Study Report, December 2024.

Figure 3-8 UAV Nest Site Distribution Map

Improper location selection of UAV nests can result in insufficient space, signal interference, inadequate infrastructure, and risks affecting the normal operation and maintenance of UAVs. Theft prevention and wind protection must also be considered. The site selection and deployment of UAV nests should meet the following conditions:

(1) Space Requirement UAVs require sufficient space for automatic takeoff and landing, charging, maintenance, etc. Therefore, it is necessary to select locations with enough space, either on the ground or on rooftops of buildings, for deployment.

(2) Environmental Choice UAV nests can be deployed on rooftops. The installation site should be open and clear of obstructions such as buildings and mountains, away from telecom base stations, high-voltage power lines, and other sources of strong interference signals.

(3) Infrastructure Automated airfields require stable electricity and network support to ensure their normal operation. Generally, automated airfields need to provide 220V/16A AC power and reliable grounding, and require a wired network of more than 20Mbps, with symmetric upload and download bandwidth.

(4) Safety Choices Preferably, sites should be chosen on unobstructed rooftops or open spaces of government functional departments, public institutions, etc., to ensure the safety of UAV intelligent nests, avoiding contact with unrelated persons, and reducing the possibility of human damage. Avoid residential areas, cultural heritage protection areas, etc., to minimize adverse effects on residents and protected areas.

(5) Testing for Stability and Safety To ensure the stability and safety of the airfield, various tests need to be conducted. Firstly, magnetic field anomaly detection is required to confirm the absence of magnetic field abnormalities at the airfield site. Additionally, signal quality tests are necessary, including manually controlling the remote control for flight route testing to ensure signal quality meets requirements over communication distances. Furthermore, navigation signal testing is required to check satellite signal strength and interference on the flight route, as well as obstacle detection around the airfield, to ensure no obstacles exceed the height of the UAV nest. By conducting tests on the magnetic field, signal quality, navigation positioning, and surrounding obstacles, and based on relevant requirements and environmental conditions, the airfield can be properly sited and deployed, ensuring normal operation, reducing the likelihood of UAV crashes, and improving application efficiency and flight safety.

(5) Protection Preparations When deploying UAV nests, to prevent problems like ground tilting and flooding during heavy rain, basic foundations can be provided for the UAV nests. The automated airfield can be placed directly on a platform. If increased theft and wind protection are considered, the UAV nest base can be bolted to the ground and welded, and anti-theft fences can be installed around the nest for enhanced protection.

Through consideration of the above points and on-site testing, appropriate locations for UAV nest siting and deployment can be chosen to ensure the normal operation and safety of the nests.

(6) Acceptance and Testing After completing the site selection and deployment, acceptance and testing work needs to be carried out, including: ① Appearance and hardware acceptance to confirm the completeness and proper functioning of the hardware; ② Software functionality testing, covering flight testing, including automatic route flight, manual control, real-time monitoring, and automatic return and landing; ③ Functionality testing, including checking the airfield's battery charging, emergency stop function, emergency stop reset function, and emergency landing function for UAVs at designated points. Acceptance and testing ensure the safe, efficient, and stable operation of the installation, deployment, and entire system.

(3) Smart light poles

Following a pilot-first, then expansion approach, and in alignment with Guangzhou's key quality improvement areas, the scope of the pole integration and renovation pilot project includes: key roads at the city level, key venues for the National Games, important reception areas, both traditional and new city axes, major business districts, and other significant locations. The project will cover approximately 100 kilometers of roads, with the construction of about 10,000 smart integrated poles (including new builds and retrofits), and a reduction of approximately 5,000 existing poles.

Source: Feasibility Study Report, December 2024.

Figure 3-9 Pilot area of smart light poles

The resettlement impact identification table is as below:

Table 3-4: Overview of Project Resettlement Impact Identification Results

SN	Project Construction Content	Area of the Leased Site (Mu)	Building Area (m²)	Project's Land and Building Area (m²)	Land Original Ownership	Land Acquisition and Relocation	Land Allocation, Transfer	Construction Land Approval	Real Estate Certificate	Project Leasing Status	Resettlement Impact Identification	Due Diligence Report
1	Computational Center	135.89	42,000 m²	15,000 m²	Prior to 2003, it was collectively owned village land belonging to Shitou Village in Yongda Community, Nancun Town, Panyu District	In 2003, compensation for land acquisition was completed for this portion of collective land	In 2007, Guangzhou Municipal Bureau of Land Resources and Housing Management issued a decision to allocate state-owned land to Guangzhou University City Energy	In 2006, Guangzhou University City Huaneng New Energy Co., Ltd. obtained the "Construction Land Planning Permit"	In 2019, Guangzhou University City Energy Development Co., Ltd. obtained the "Real Estate Certificate"	Preliminary leasing agreement for the computational center on corresponding floors has been reached between Guangzhou Smart Investment Company and Guangzhou University	The project land is state-owned land allocation, and there is currently no maximum time limit for use according to relevant laws and regulations. The building has an estimated usage period of about 70	No resettlement impacts, land acquisition, or relocation involved; no outstanding issues or complaint appeals.

SN	Project Construction Content	Area of the Leased Site (Mu)	Building Area (m²)	Project's Land and Building Area (m²)	Land Original Ownership	Land Acquisition and Relocation	Land Allocation, Transfer	Construction Land Approval	Real Estate Certificate	Project Leasing Status	Resettlement Impact Identification	Due Diligence Report
							Development Co., Ltd., and the land transfer procedures were completed			City Energy Development Co., Ltd.	years, which can meet the operational needs of the computational center for 30 years.	
2	Operations and Management Center	40.44	122,564 m² (T3: 12,547m²)	T3 2nd floor: 1,600 m² + 3rd floor: 1,600 m², Academic Exchange Center:	Before 2018, the land was used for collective industrial development in Jiangxia Community, Huangshi Street,	No land acquisition or relocation involved	In 2021, Guangzhou Xinchengjian Investment and Development Co., Ltd. obtained the land use rights for this	In 2022, Guangzhou Xinchengjian Investment and Development Co., Ltd. obtained the "Construction Land Planning	In 2023, the company received the property rights certificate (Certificate No. 04005855, issued by the	Preliminary leasing agreement for corresponding floors of Pazhou Logistics Waiting Building has been reached	No land acquisition or demolition involved, with no outstanding issues or complaints.	Update DDR

SN	Project Construction Content	Area of the Leased Site (Mu)	Building Area (m²)	Project's Land and Building Area (m²)	Land Original Ownership	Land Acquisition and Relocation	Land Allocation, Transfer	Construction Land Approval	Real Estate Certificate	Project Leasing Status	Resettlement Impact Identification	Due Diligence Report
				700 m²	Baiyun District. In 2019, the Baiyun District government reserved the land and converted it to state-owned construction land.		state-owned land parcel through public bidding.	Permit".	Guangzhou Municipal Bureau of Land Resources). By December 2025, the building property rights certificate is expected to be issued.	between Guangzhou Smart Investment Company and Guangzhou Convention and Exhibition Center Investment and Development Co., Ltd.		
3	Unmanned Aerial Vehicle	-	-	-	Unmanned aerial	No additional	-					

SN	Project Construction Content	Area of the Leased Site (Mu)	Building Area (m²)	Project's Land and Building Area (m²)	Land Original Ownership	Land Acquisition and Relocation	Land Allocation, Transfer	Construction Land Approval	Real Estate Certificate	Project Leasing Status	Resettlement Impact Identification	Due Diligence Report
	(UAV) Nest				vehicle (UAV) intelligent nests will be constructed using unused spaces on rooftops or open areas of government functional departments, public facilities, etc.	temporary or permanent land occupation or compensation involved in resettlement impacts.						
4	Smart light poles	/	/	/						The integration	No additional temporary or	

SN	Project Construction Content	Area of the Leased Site (Mu)	Building Area (m²)	Project's Land and Building Area (m²)	Land Original Ownership	Land Acquisition and Relocation	Land Allocation, Transfer	Construction Land Approval	Real Estate Certificate	Project Leasing Status	Resettlement Impact Identification	Due Diligence Report
										and renovation of existing streetlight pole facilities will involve temporary use of the existing state-owned land along or within road boundaries during the construction period.	permanent land occupation or compensation.	
5	Communication Network	/	/	/	/	/	/	/	/	The plan is to deploy the	No additional temporary or	/

SN	Project Construction Content	Area of the Leased Site (Mu)	Building Area (m²)	Project's Land and Building Area (m²)	Land Original Ownership	Land Acquisition and Relocation	Land Allocation, Transfer	Construction Land Approval	Real Estate Certificate	Project Leasing Status	Resettlement Impact Identification	Due Diligence Report
	Infrastructure									facilities using the existing urban construction utility corridors (pipes) combined with fiber optics. This will involve utilizing the pipeline spaces of the three major telecom operators and the	permanent land occupation or compensation.	

SN	Project Construction Content	Area of the Leased Site (Mu)	Building Area (m²)	Project's Land and Building Area (m²)	Land Original Ownership	Land Acquisition and Relocation	Land Allocation, Transfer	Construction Land Approval	Real Estate Certificate	Project Leasing Status	Resettlement Impact Identification	Due Diligence Report
										utility corridors (pipes) along Guangzhou's metro lines to lay fiber optic cables, or alternatively, directly leasing fiber optics from the three major telecom operators.		

Source: Guangzhou Smart Investment Company

D. Project Investment

The total investment of this project is estimated at 287838.16 ten thousand yuan, of which a loan of 200 million US dollars is planned to be applied for from the AIIB.

E. Construction Period

The overall construction period of this project is 5 years (including a core construction period of 3 years), starting from the initial design approval. The construction period plan is laid out from the 1st to the 60th month, which includes:

First Phase (Preliminary Construction Stage, 1st to 18th Month): This phase involves comprehensive construction from the underlying new-type infrastructure and the mid-layer spatio-temporal twin intelligent platform, to the upper-layer smart applications and security system. It focuses on constructing necessary infrastructure and capability platforms, prioritizing the construction of smart applications with clear demands, such as certain computing facilities, metropolitan area networks, IoT networks, refined street management, smart energy, etc.

Second Phase (Supplementary Completion Stage, 19th to 36th Month): This phase involves completing most of the infrastructure construction, including metropolitan area networks, IoT networks, operation management centers, spatio-temporal twin intelligent platforms, network and data security, digital society applications (smart energy, smart elevators), etc.

Third Phase (Upgrade and Update Stage, 37th to 60th Month): Based on further demand and practical application progress, this phase involves completing the full construction of IoT sensing devices and computing infrastructure, as well as corresponding software integration and smart application upgrades.

F. Construction Method

Explanation Equipment Procurement: The procurement process strictly follows relevant laws and regulations of China and the procedures and regulations of the AIIB.

Equipment Installation: Installation of smart light poles, base station equipment, switches, security gateways, servers, UAV nests, intelligent terminal equipment, etc., is carried out by qualified professional technicians strictly according to standards.

Fiber Optic Cable Laying: Utilizing metro bridges and existing urban communication pipelines for fiber optic cable laying, involving only 2.4 kilometers of 6-hole pipeline excavation. Internal Decoration of Computing Centers and Operation Management Centers: Renting existing buildings, not involving site leveling, foundation construction, main building construction, etc. The main content includes internal decoration and ornamentation of buildings, strictly following relevant laws and regulations of China and

AIIB's procedures and regulations, and completed by professional construction companies.

G. Associated Facilities

According to the definition of "associated facilities" in the AIIB's "Environmental and Social Framework" (Revised 2022), associated facilities are activities not included in the project legal agreement, but intrinsically linked to the project. The main defining principles are: (a) directly and substantially related to the project; (b) concurrent or planned with the project; and (c) necessary for the project's feasibility, which would not be built or expanded if the project did not exist. The computing center, operation management center, and incubation platform buildings rented for this project are existing facilities already connected to municipal electricity, water supply, and sewage systems, so this project has no associated facilities.

H. Alternative Analysis

1. No Project Alternative

The no-project alternative, i.e., not constructing the project and maintaining the status quo, presents several issues:

(1) The digital infrastructure system needs improvement: ① Ineffective utilization of government cloud platforms and data centers. Government cloud services struggle to meet the diverse business needs of various departments. Government cloud capabilities rely on leasing resources from the three major operators, and the cloud platform service catalog is based on the 2017 design, limited to IAAS resources and a few databases, middleware services, unable to cope with current and progressive demands like containers, big data, etc. ② Low utilization of data center and government cloud resources. City direct departments and districts have their own data centers or computer rooms, scattered and unevenly developed, leading to resource wastage. Overall resource utilization is not high, with the "chimney effect" still prevalent, forming new information swamps. In addition, multi-cloud resource management capabilities also need further improvement. Although unified monitoring of multi-cloud resource usage has been achieved, there is a lack of unified distribution and adjustment capabilities for multi-cloud resources to support various departments' demands for on-demand, elastic, dynamic, flexible cloud resource use, and improve overall cloud resource utilization. ③ In terms of IoT sensing terminals, overall, Guangzhou has insufficient number and coverage of IoT sensing terminals. According to research, the satisfaction rate of existing urban video surveillance equipment is only 61%, and sensor detection equipment is only 27.8%, with huge room for improvement in quantity, variety, and coverage. For non-video IoT sensing terminals, as of October 2021, Guangzhou has about 180 types and over 180,000 units, compared to Shanghai's "one network management" municipal IoT operation center launched in October 2020, which included about 360 types and over

510,000 shareable data IoT sensing terminals, indicating significant differences in construction type and quantity. For video IoT sensing terminals, compared to other cities in the province like Shenzhen and Dongguan, Guangzhou's video construction scale, square coverage rate, and per capita coverage rate in 2020 were all lower. Additionally, there is insufficient data sharing and reuse, with multiple departments redundantly constructing sensing devices. Some IoT terminals have weak sensing capabilities, with outdated collection equipment and sites, outdated transmission technology, difficult spare parts procurement, data transmission delays, and data loss issues. ④ In specific business scenarios, Guangzhou lacks IoT sensing in fields like drones, comprehensive governance, energy monitoring, elevator monitoring, etc. According to research, there's a lack of drone equipment among terminal types, yet drones play an increasingly important role in urban planning and construction, dynamic supervision, safety control, and ecological management in government governance applications. In the field of public management sensing facilities, they mainly focus on vehicle supervision and water quality and flow monitoring, accounting for 95.89%, lacking energy-sensing control terminals, lacking sensing facilities for underground pipelines, bridges, tunnels, comprehensive utility tunnels, and other city real-time dynamic perception governance, with only 1,693 elevator facility monitoring units, far from covering Guangzhou's 168,000 elevators. ⑤ Artificial intelligence applications need to be expanded. By combining artificial intelligence technology with government services, urban governance, and public services, Guangzhou has completed smart application pilot constructions in industries like elderly care, medical care, education, etc., and has achieved initial results. However, Guangzhou's overall development and application of artificial intelligence are still in the early stages, urgently needing to improve Guangzhou's artificial intelligence construction, lower the barrier to artificial intelligence use, and promote the application of artificial intelligence in serving the public and other fields. ⑥ Computing services need to be strengthened. Currently, Guangzhou's computing centers are mainly occupied by operators like China Telecom, China Unicom, China Mobile, Radio and Television Group, etc., all profit-oriented computing centers with high energy consumption indicators due to their long construction years. Guangzhou lacks quasi-public city computing centers that support government and various types of state-owned enterprises and the general public, which are necessary to provide new types of informatization technologies like cloud computing and AI for the comprehensive development of Guangzhou's smart city. According to IDC's "2022-2023 China Artificial Intelligence Computing Power Development Evaluation Report," in the ranking of Chinese cities in AI computing power development evaluation, Guangzhou returned to the first-tier echelon after four years (but only ranked 5th), indicating that Guangzhou's AI computing power has limited the development of Guangzhou's artificial intelligence industry.

(2) The level of data empowerment in city governance needs to be raised. The city's ability to predict and warn of operational safety risks is insufficient. As the city's scale continues to expand, efficient handling of urban operational safety risks becomes an important standard for measuring the modernization of governance capabilities in mega-

cities. The intelligent coverage rate of the "Urban Lifeline" project needs to be improved. Due to the high investment cost and long construction period of comprehensive utility tunnels, Guangzhou's tunnels mainly include power supply, water supply, and communication, with low comprehensive tunnel coverage. Also, due to historical issues such as city-wide unified planning and direct burial installation methods, the degree of intelligent construction of the pipeline network is not high, and the intelligent monitoring coverage and utilization rate of underground pipelines are still insufficient, with gas leaks still a prominent issue in Guangzhou's "Urban Lifeline" project. There are still shortcomings in the informatization construction of key areas of social governance. Currently, there's a significant gap between Guangzhou and advanced cities like Shanghai and Beijing in terms of social governance effectiveness. As the "last mile" of urban governance, grassroots governance urgently needs to solve the problem of inefficient data backflow, breaking away from the original path dependency is urgent. In addition, data support for city economic operation analysis is insufficient, with issues like incomplete data, inconsistent sources, low freshness, etc., prominent; digital processing capabilities in fields like urban management and city services need to be improved.

(3) Green and Low-Carbon Construction Still Needs Further Practice In general construction, the construction of new infrastructure is the foundation support for smart cities. However, due to the decentralized digital construction model of different government departments in the early stage, there are problems of repeated construction of computing power facilities and intelligent perception terminals such as video. There is an urgent need to strengthen overall planning and integration, carry out intensive construction, and enhance the green and low-carbon level of the overall construction of smart cities. In specific business scenarios, Guangzhou city lacks the construction of a smart energy perception system and scientific monitoring of energy use. This hinders the optimization of energy utilization, energy saving, and emission reduction, and smart energy management. There is still significant room for improvement in strengthening the scientific, informational, and digital management of energy. In the context of carbon emissions and carbon neutrality, smart energy is particularly important in smart cities. Through continuous technological upgrades and improvements, it can achieve effective governance of energy conservation, emission reduction, and city management, further realizing the sustainable development of the city and promoting high-quality urban development.

Thus, it is evident that the impact of not implementing the project plan on the urban development of Guangzhou city is obvious. On the contrary, if the project is completed, it will inevitably build a perfect smart city infrastructure system, construct a smart city industry ecosystem, and promote the deep integration of the digital economy, digital government, and digital society, thereby enhancing the smart living experience of citizens.

2. Technical Solution

The computing center proposed in this project includes 830 9KW cabinets, with a total

data center load reaching 7.47MW, which demands a substantial cooling system. Moreover, the intensive operations of GPUs and CPUs will generate a large amount of heat. Therefore, from an environmental perspective, the selection of equipment mainly considers the comparative selection of cooling systems. PUE (Power Usage Effectiveness) is commonly used to measure the energy efficiency of data centers. Traditional air-cooling systems have relatively lower initial investment and are simpler to maintain, but they have higher PUE values, especially in Guangzhou's hot and humid environment. Water cooling and liquid cooling systems, although having higher initial construction and maintenance costs, have lower PUE values, are less affected by external temperature fluctuations, and occupy less space. Therefore, considering Guangzhou's specific climatic conditions, despite higher initial investment costs, water cooling and liquid cooling systems have greater advantages in terms of operational efficiency and long-term energy cost savings. The project ultimately selects water cooling and liquid cooling systems.

IV. Environmental and Social Baseline

A. Physical Setting

1. Geographic Location

Guangzhou City is located in the south of mainland China, in the central and southern part of Guangdong Province, on the northern edge of the Pearl River Delta, close to the downstream estuary of the Pearl River Basin. It is situated between longitude 112°57′ to 114°3′E and latitude 22°26′ to 23°56′N, covering a total area of 7434.4 km². It is bordered by Boluo and Longmen counties of Huizhou City to the east, Sanshui, Nanhai, and Shunde districts of Foshan City to the west, the urban area and Fogang County of Qingyuan City, and Xinfeng County of Shaoguan City to the north, and Dongguan City and Zhongshan City to the south, facing the special administrative regions of Hong Kong and Macau across the sea.

Panyu District is located in the southern part of Guangzhou City, in the central area of the Pearl River Delta river network, between latitude 22°26′ to 23°05′N and longitude 113°14′ to 113°42′E. It is bordered by the Lion Sea to the east, facing Dongguan City across the sea; bounded by the Chencun Waterway to the west, adjacent to Nanhai and Shunde districts of Foshan City; separated by the Lijiao Waterway to the north, connecting with Haizhu and Huangpu districts; and borders Nansha District to the south across the Shawan Waterway. Panyu District covers a total area of 530 km².

Haizhu District, the central urban area of Guangzhou City, is named after the ancient "Sea Pearl Stone" in the Pearl River of Guangzhou. It is located in the central and southern part of Guangzhou's urban area, between longitude 113°14’ to 113°23’E and latitude 23°3’ to 23°16’N, covering a total area of 90.45 km². It is adjacent to Liwan, Yuexiu, and Tianhe districts across the Pearl River to the north, and respectively faces Huangpu, Liwan, and Panyu districts to the east, west, and south. The main body of the district includes Haizhu Island, Henan Island, and also encompasses Guanzhou Island and Yaji Sand Island.

Baiyun District is located in the north-central part of Guangzhou City, between 113°08′36″~113°34′52″ east longitude and 23°07′03″~23°25′53″ north latitude. It is bordered by Tianhe District and Huangpu District to the east, Nanhai District of Foshan City to the west, Huadu District and Conghua District to the north, and Liwan District, Yuexiu District and Tianhe District to the south. Baiyun District, with a total area of 795.79 km^2.

2. Meteorological Climate

Guangzhou City has a South Asian subtropical monsoon maritime climate, characterized by warmth, abundant rainfall, and humidity, with long summers and short winters, where the summer season lasts for over 6 months. The four seasons can be summarized as

cool summers, mild winters, frequently rainy springs, and clear autumns. The annual average temperature in Guangzhou is 22.2°C, with a difference of 14.7°C between the hottest and coldest months. The annual average rainfall is 1646.9mm, with April to September as the rainy season, and October to March as the dry season. The annual average relative humidity is 79%, and the average wind speed is 2.2 m/s.

3. Topography and Landform

Guangzhou City is located in a hilly area, with high terrain in the northeast and low in the southwest, backed by mountains and facing the sea. The northern part is a hilly mountainous area concentrated with forests, with the highest peak being Tianlu Top at the junction of Conghua District and Longmen County in the north, with an altitude of 1210m. The northeastern part consists of low and medium mountains, including Baiyun Mountain, known as the "lung of the city"; the central part is a hilly basin, and the southern part is a coastal alluvial plain, which is part of the Pearl River Delta.

4. River System and Hydrology

Guangzhou City is located downstream of the East River, North River, and West River, in the central and northern part of the Pearl River Delta. The rivers in the city belong to the Pearl River system, with mountainous rivers in the northeastern part, including the Liuxi River flowing through Conghua City, Huadu District, and Baiyun District, the Zengjiang and Baini Rivers originating from Longmen County and flowing through Zengcheng City; and the southern part is the river network area of the Pearl River Delta, mainly consisting of the lower waterways of the West, North, and East Rivers and the intertwining river network of the front and rear channels of the Pearl River. The city has rivers with a catchment area of over 2000 square kilometers, including the Pearl River Guangzhou channel, Liuxi River, and Zengjiang; and 18 small rivers or tributaries with a catchment area of 100 to 1000 square kilometers.

The main waterways in the river network area total 416 km in length, with the front and rear channels running through the urban area of Guangzhou City. Three of the eight major river mouths of the Pearl River – Humen, Jiaomen, and Hongqili – flow into the Lingding Ocean. The river network area of the Delta is subject to tidal influence. The river sections above the central part of Panyu District belong to the flood-tide mixed area, facing both flood and storm surge threats. The southern river sections belong to the tidal area, focusing on tide prevention.

B. Current Status of Environmental Quality

1. Ambient Air Quality

According to the 2023 Guangzhou Environmental Quality Status Bulletin, the comprehensive index of Guangzhou's ambient air in 2023 was 3.28, a year-on-year decrease of 3.0%, and air quality improved year-on-year; air quality met standards for

330 days, an increase of 24 days year-on-year; the AQI compliance rate was 90.4%, an increase of 6.6 percentage points year-on-year. All six indicators of ambient air quality – PM2.5, PM10, nitrogen dioxide, ozone, sulphur dioxide and carbon monoxide – met standards, The average value of PM2.5 was 23μg/m3, reaching the World Health Organization's Stage II standard value; the average value of PM10 was 41μg/m3, which is better than the national standard; the average value of nitrogen dioxide was 29μg/m3, which is better than the national standard; the average value of sulfur dioxide was 6μg/m3, which is much better than the national standard; the average value of ozone (90th percentile concentration, the same below) was 159μg/m3, which met the standard; carbon monoxide (95th percentile concentration, the same below) was 0.9mg/m3, which was far better than the national standard. The ambient air quality in Guangzhou in 2023 is shown in Table 4-1.

Since the full implementation of the national "Environmental Air Quality Standards" (GB3095-2012) secondary standards in 2013, the ambient air quality in Guangzhou City has continuously improved (see Figure 4-1). In 2022, except for the exceeding ozone concentration, the other five indicators in Guangzhou City met the standards.

Table 4-1 Main Pollutant Concentrations and Comprehensive Index of Ambient Air Quality in Guangzhou City in 2022 Unit: μg/m^3

(CO: mg/m^3, Comprehensive Index is dimensionless)

Statistical Period	$PM_{2.5}$	PM_{10}	NO_2	SO_2	O_3	CO	Comprehensive Index
2023	23	41	29	6	159	0.9	3.28
Standard	35	70	40	60	160	4.0	——
Compliance Status	Met	Met	Met	Met	Met	Met	——

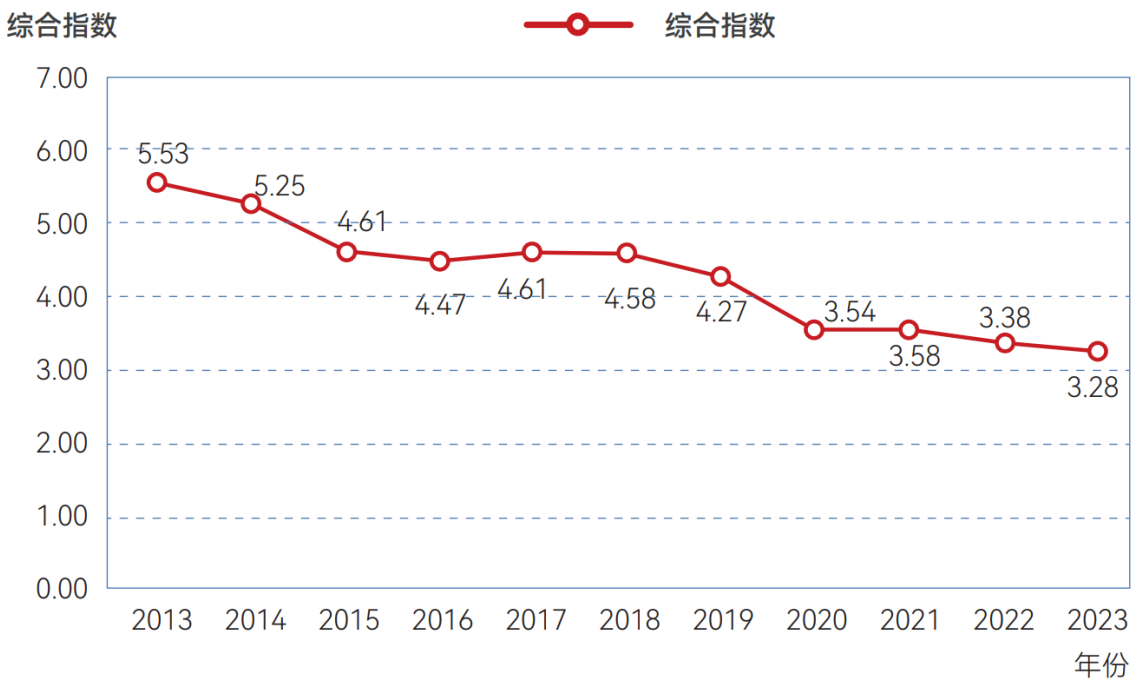


Figure 4-1 Air Quality Comprehensive Index of Guangzhou City from 2013 to 2023
Note: The lower the comprehensive index value, the better the air quality.

2. Current Status of Sound Environmental Quality

According to the 2023 Guangzhou Environmental Quality Status Bulletin, in 2023, the average daytime and nighttime equivalent sound levels of the sound environment in functional areas of Guangzhou were 56.3 dB(A) and 50.7 dB(A), respectively, and the compliance rates of the total number of daytime and nighttime monitoring points were 93.8% and 86.2%, respectively. The nighttime compliance rate of the urban sound environment functional area is better than the requirements for assessment of national civilized cities; the daytime average equivalent sound level of the urban area sound environment is 56.0 decibels, which is a level 3 level (corresponding to an average rating); the daytime average equivalent sound level of urban road traffic noise is 69.4 decibels, which is a level 2 level (corresponding to a better rating).

3. Water Environmental Quality

According to the 2023 Guangzhou Environmental Quality Status Bulletin, the water quality of major rivers such as the upper and middle reaches of the Liuxi River, the back channel of the Pearl River Guangzhou section, the Huangpu channel, the Lion Ocean, the Zengjiang, the main stream of the Dongjiang North, the Shiqiao waterway, the Shawan waterway, the Jiaomen waterway, the Hongqili waterway, and the Humen waterway is excellent; the water quality of the west channel of the Pearl River Guangzhou section, the Baini River, and the Shijing River is lightly polluted. In 2023, the top three districts in terms of surface water environmental quality index will be Conghua District, Zengcheng District, and Nansha District, while the bottom three will be Baiyun District, Yuexiu District, and Liwan District. Among them, the water environment quality

of Nansha District has declined compared to the same period, while the water environment quality of the remaining 10 districts has improved year-on-year.

This project does not involve protected areas for drinking water sources.

C. Ecological Environment

The project plans to use existing buildings on a lease basis. Specifically: The computing center is proposed to be located in the courtyard of Huaneng New Energy Co., Ltd. in Guangzhou University City, Shabian Street, Panyu District, Guangzhou City, where an 8-story building has already been constructed (planned for a data center). The proposed site for the operation management center and incubation platform, the "Xinchengjian Lingjian Park," is located within Guangzhou's "Design City Phase II" project, in the Jiangxia Village of Huangshi Street, Baiyun District. The surrounding land use within the evaluation scope is mainly industrial, corporate, educational, and residential areas. The primary vegetation within the evaluation scope consists of artificial vegetation, formed by landscaping. No national or provincial-level key protected wild plants are present within the evaluation range.

There are no national or provincial key protected animal species or other rare and endangered species within the project evaluation range, no ecologically sensitive areas, and the regional ecosystem sensitivity is relatively low.

D. Social Baseline

The geographic scope of the project's impact is Guangzhou City, affecting the urban area of Guangzhou and some suburban areas. The sites involved in the project construction are mainly located in Nancun Town of Panyu District, Guanzhou Street and Pazhou Street of Haizhu District, and Huangshi street of Baiyun District.

1. Population Baseline of the Project Area

Based on the 2023 Guangdong Provincial National Economic and Social Development Statistical Bulletin, as of the end of 2023, Guangdong Province had a registered population of 99.47 million and a permanent population of 127.06 million. Among these, the male population was 60.17 million (47.36%) and the female population was 66.89 million (52.64%). The agricultural population was 31.23 million (24.58%), while the non-agricultural population was 95.83 million (75.42%). The minority population was 4.42 million (3.48%).

According to the 2023 Guangzhou National Economic and Social Development Statistical Bulletin, Guangzhou had a registered population of 10.57 million and a permanent population of 18.83 million. Among these, the male population was 5.21 million (49.29%) and the female population was 5.36 million (50.71%). The agricultural population was 2.49 million (13.24%), while the non-agricultural population was 16.33

million (86.76%). The minority population was 827,000 (4.39%).

In Panyu District, the registered population was 1.21 million and the permanent population was 2.82 million. Among these, the male population was 591,600 (49.09%) and the female population was 613,600 (50.91%). The agricultural population was 259,400 (9.19%), while the non-agricultural population was 2.56 million (90.81%). The minority population was 118,000 (4.18%).

In Baiyun District, the registered population was 1.23 million and the permanent population was 3.67 million. Among these, the male population was 598,200 (48.68%) and the female population was 630,700 (51.32%). The agricultural population was 362,200 (29.47%), while the non-agricultural population was 866,700 (70.53%). The minority population was 131,000 (3.57%).

In Nancun Town, the registered population was 116,200 and the permanent population was 340,000. Among these, the male population was 56,700 (48.79%) and the female population was 59,500 (51.20%). The agricultural population was 10,100 (2.97%), while the non-agricultural population was 106,000 (91.22%). The minority population was 13,400 (3.94%).

In Huangshi Street, the registered population was 39,600 and the permanent population was 170,000. Among these, the male population was 18,000 (45.45%) and the female population was 21,600 (54.55%). The agricultural population was 0 (0%), while the non-agricultural population was 39,500 (100%). The minority population was 5,400 (3.18%).

Table 4-2 Overview of Population in the Project Counties and Districts in 2023 (Unit: 10,000 People)

Population Statistic	Guangdong Province	Guangzhou City	Panyu District	Baiyun District	Nancun Town	Huangshi Street
Permanent Population (10,000)	12,706.00	1,882.70	282.29	366.68	34.00	17
Registered Population (10,000)	9,946.95	1,056.61	120.52	122.89	11.62	3.96
Male Population (10,000)	6,689	520.78	59.16	59.82	5.67	1.80
Female Population (10,000)	6,017	535.83	61.36	63.07	5.95	2.16
Agricultural Population (10,000)	3,123.13	249.27	25.94	36.22	1.01	0

Population Statistic	Guangdong Province	Guangzhou City	Panyu District	Baiyun District	Nancun Town	Huangshi Street
Urban Population (10,000)	9,582.87	1,633.43	256.35	86.67	10.60	3.95
Minority Population (10,000)	441.71	82.7	11.8	13.1	1.34	0.54

Source: Population data from the 2023 Statistical Yearbook and National Economic and Social Development Statistical Report of the project area.

2. Baseline Situation of Vulnerable Groups in the Project Area

According to the statistical data, the total population of people aged 65 and above in the project area is 20,200. The population in this age group is 16% in Huangshi Street and 13.25% in Nancun Town. These figures indicate that with the increasing trend of population aging, the construction of the smart city project will require more attention and support to meet the needs of the elderly.

Additionally, women represent a significant proportion of the population in these areas, totaling 75,700 (51.78%). This suggests that the smart city project should also pay attention to the needs of women and provide equal employment opportunities.

Table 4-3: Vulnerable Group Population Overview in the Project Area

Project Area	Panyu District	Baiyun District	Total
Nancun Town	Huangshi Street		
Registered Population (10,000)	11.62	3	14.62
65+ Population (10,000)	1.54	0.48	2.02
65+ Population Percentage (%)	13.25	16	13.82
Female Population (10,000)	5.95	1.62	7.57
Female Percentage (%)	51.20	54.54	51.78
Low-Income Population (people)	107	23	130
Low-Income Percentage (%)	0.00092	0.00077	0.00089

Source: Population data from the Project Area Rural Revitalization Bureau.

3. Residents' Awareness of the Project

According to statistical analysis of survey questionnaires, the positive impacts of the project are primarily as follows: (1) 89% of residents believe that the project's implementation can increase employment opportunities. During the project construction period, it is expected to create 300 new jobs in computing infrastructure and integrated infrastructure, covering technology, decoration, electricity, etc., including some non-

technical temporary positions, with an additional 50 jobs expected during the operational phase. (2) 96% of residents say that smart city projects can improve urban governance; (3) 92% believe the project will promote urban innovation and development; (4) 56% think the project implementation will provide intelligent services; (5) 82% indicate that the project will provide entrepreneurial platforms; (6) 95.3% believe the project will enhance precise urban governance; (7) 96.7% think the project will increase residents' environmental awareness; (8) 81% believe the project will help save energy; (9) 77% think the project will improve network security; (10) 70.7% believe the project will protect data privacy.

Table 4-4 Residents' Evaluation of the Project

Specific Options	Sample Size	Proportion (%)
Increase employment opportunities	267	89.0%
Improve urban governance effectiveness	288	96.0%
Promote innovation and development	276	92.0%
Provide intelligent services	258	86.0%
Provide entrepreneurial platform	246	82.0%
Enhance precise urban governance	286	95.3%
Increase residents' environmental awareness	290	96.7%
Save energy	243	81.0%
Enhance network security	231	77.0%
Protect data privacy	212	70.7%

4. Economic Baseline Situation of the Project Area

Table 4-5 Overview of the Economic Situation in the Counties and Districts of the Project (2023)

Indicator	Guangdong Province	Guangzhou City	Panyu District	Baiyun District
Economic Total	GDP: 13,567.316 billion yuan, 4.8% growth	GDP: 3,035.573 billion yuan, 4.6% growth	GDP: 286.695 billion yuan, 4.6% growth	GDP: 281.201 billion yuan, 8.1% growth
Per Capita Income	Average disposable income: 49,327 yuan, 4.8% growth	Urban: 80,501 yuan (4.8% growth), Rural: 38,607 yuan (6.4% growth)	Urban: 76,705 yuan (5.7% growth), Rural: 51,569 yuan (5.9% growth)	Urban: 81,805 yuan (5.5% growth), Rural: 39,120 yuan (7.6% growth)
Industry Development	Primary Industry: 5,540.70 billion	Primary: 317.78 billion yuan (3.5% growth),	Primary: 37.67 billion yuan (-1.0% decline),	Primary: 36.96 billion yuan (6.6% growth),

	yuan, 4.8% growth	Secondary: 7,775.71 billion yuan (2.6% growth), Tertiary: 22,262.24 billion yuan (5.3% growth)	Secondary: 1,050.83 billion yuan (6.5% growth), Tertiary: 1,778.45 billion yuan (3.6% growth)	Secondary: 589.33 billion yuan (6.9% growth), Tertiary: 2,185.73 billion yuan (8.4% growth)
Employment	1.39 million new urban jobs, urban unemployment rate: 5.3%	330,100 new urban jobs, helped 120,900 unemployed find work	--	37,000 new urban jobs, 13,300 people helped with reemployment, 7,000 job challenges addressed
Poverty Alleviation	No national or provincial poverty counties or villages	No national or provincial poverty counties or villages	No poverty-stricken villages or households	No poverty-stricken villages or households

Data source: Derived from the 2023 National Economic and Social Development Statistical Report of the project area.

5. Ethnic Minority Baseline in the Project Area

Guangzhou, with over 2,200 years of history, is one of China's first historical and

Guangzhou, with a history spanning over 2,200 years, is one of China's first historical and cultural cities. Since the Qin and Han dynasties, it has been the political, economic, and cultural center of Lingnan. For centuries, various ethnic groups have thrived here, living in harmony and working together for mutual development, making significant contributions to the formation of a diverse and unified Chinese nation. Currently, Guangzhou is home to 56 ethnic groups, with a permanent population of approximately 18.82 million, of which over 820,000 are ethnic minorities. The floating population accounts for about 80%, making it one of the cities in China with the largest and fastest-growing influx of ethnic minority populations. Among them, the registered ethnic minority population is about 118,000, with the largest groups being the Zhuang, Manchu, Hui, Tujia, and Yao peoples. The non-registered ethnic minority population is about 709,000, with the largest groups being the Zhuang, Manchu, Hui, Tujia, Yao, Miao, Mongolian, Korean, Dong, and She peoples. Guangzhou has been awarded the title of “National Model City for Ethnic Unity and Progress” three times and was designated as one of the first "National Demonstration Cities for Service and Management of Migrant Ethnic Populations" by the National Ethnic Affairs Commission in 2016.

According to the AIIB's Environmental and Social Framework ESS3—Ethnic Minority Guidelines, the ethnic composition of the population in the project areas was carefully reviewed, including the identification of ethnic minority villages and whether these groups are concentrated in the area. The project area, which includes Nancun Town and Huangshi Street, has a total resident population of 510,000, with 18,800 ethnic minorities,

accounting for 3.69% of the total population. The main ethnic groups include Zhuang, Yao, Tujia, Miao, and Dong, primarily due to marriage, work, and other reasons, with many being floating populations.

Thus, the identification results are as follows: (1) The project area does not trigger the ESS3 guidelines for ethnic minority groups. (2) There is a very small number of ethnic minorities in the construction area, and these populations are mostly floating populations dispersed due to marriage, work, and other reasons. They do not have traditional territories, ethnic languages, or traditional cultures, nor do they consider themselves a unified ethnic group.

Table 4-6: Ethnic Minority Population in the Project Area (2022)

Project Area	Resident Population (Ten Thousand)	Ethnic Minority Population (Ten Thousand)	Percentage of Ethnic Minority Population (%)	Ethnic Composition
Guangdong	12,706.00	441.71	3.48%	Zhuang, Yao, She, Hui, Manchu, etc.
Guangzhou	1,882.70	82.70	4.39%	Zhuang, Hui, Tujia, Miao, Yao, Dong, etc.
Panyu District	282.29	11.8	4.18%	Zhuang, Tujia, Yao, Miao, etc.
Baiyun District	366.68	13.1	3.57%	Tujia, Zhuang, Yao, Miao, Manchu, Hui, etc.
Nancun Town	34.00	1.34	3.90%	Zhuang, Tujia, Yao, Miao, etc.
Huangshi Street	17	0.54	3.18%	Tujia, Zhuang, Yao, Miao, Manchu, Hui, etc.

Source: Population data from the information provided by the Ethnic Affairs Bureau and the 2023 National Economic and Social Development Statistical Report for each project area.

E. Municipal Infrastructure

The project is located in the urban area of Guangzhou City, within the service coverage of the city's municipal infrastructure.

1. Energy

According to the "2023 Guangzhou Statistical Yearbook," the production and consumption situation in Guangzhou City for the years 2021 and 2022 is detailed in Tables 4-7 and 4-8.

Table 4-7 Energy production of Guangzhou City

Item	2021	2022
Crude Oil Processing	1171.81	1138.29
Gasoline	294.05	266.81
Kerosene	148.13	128.04
Diesel Oil	282.74	325.42
Fuel Oil	58.04	50.62
Liquefied Petroleum	51.20	50.62
Electricity Production	4110449	3982169
Heating Power	36388520	34483551

Table 4-8 Total Consumption of Energy

Unit: 10000 tons of SCE

Item	2021	2022
Consumption Volume	6575.64	100.00
Total	5384.46	81.88
Production Consumption	40.03	0.61
Primary Industry	2596.09	39.48
Secondary Industry	2748.34	41.79
Tertiary Industry		
In Production consumption	2424.77	36.88
Industry	1191.18	18.12
Residential Consumption	6575.64	100.00
Urban Areas	5384.46	81.88
Rural Areas	40.03	0.61

2. Power Generation

Guangzhou Statistical Yearbook 2023," the total electricity generation and heat supply in Guangzhou for the years 2021 and 2022 are provided in Table 4-9.

Table 4-9 Guangzhou City Electricity Supply Situation

Item	2021	2022
Electricity Production (10000 kWh)	4110449	3982169
Thermal Power Generation	3754197	3600851
Fossil Fired Power Generation	2207461	2055411
Waste Heat and Pressure Power Generation	7645	5958
Gas Power Generation	1268269	1161299
Waste Incineration Power Generation	245348	354671
Biomass Power Generation	25474	23512
Hydroelectric Generation	223872	221343
Pumped Storage Power Generation	204839	176738
Solar Power Generation	132380	159975
Heating Power (MkJ)	36388520	34483551
Biomass Heating	3705307	4163791
Fossil Fuel Heating	32683213	29804706
Excess Heat and Pressure Heating		515054

3. Water Supply

According to the "Guangzhou Statistical Yearbook 2023," the information on water supply in Guangzhou for the years 2021 and 2022 is provided in Table 4-9.

Table 4-10 Water Supply Capacity of Guangzhou City

Item	2021	2022
Overall Production Capacity (10000 m^3/d)	841.67	848.27
Length of Water Supply Pipelines (km)	41507.84	42669.07
Total Volume of Water Supply (10000 m3/d))	273942.82	265139.72
Sales Volume of Tap Water	224045.63	219325.72
For Production Use	43062.61	42933.76
For Public Services	54290.71	52809.22
For Household Use	117407.42	115895.01
Others	9270.79	7687.73
Number of Households with Access to Tap Water (unit)	4045744	4363338
Number of Families with Access to Tap Water	3744512	4016401
Number of Residents with Access to Tap Water (10000 persons)	1867.66	1873.41
Per Capita Daily Consumption of Tap Water for Residential Use (liter)	265.47	257.96
Coverage Rate of Urban Population with Access to Tap Water (%)	100.00	100.00

4. Wastewater Collection and Treatment

According to the 2023 Guangzhou Statistical Yearbook, in 2022, the total length of drainage pipelines in Guangzhou was 43,249 km. The total sewage discharge was 257,831 million m^3, with 62 sewage treatment plants in the city. The sewage treatment plants have a treatment capacity of 8 million m^3/day, and the total sewage treated was 256,186 million m^3, resulting in a sewage treatment rate of 98.9%.

5. Urban Urban Environment and Sanitation

The urban urban environment and sanitation situation in Guangzhou, as per the "Guangzhou Statistical Yearbook 2023," can be found in Table 4-11.

Table 4-11 City Appearance and Environmental Sanitation

Item	2021	2022
Area of Roads under Cleaning Program(10000 m2)	22362	21556

Item	2021	2022
By Mechanization	15515	14629
Volume of Living Garbage Disposal(10000t)	587.38	604.89
Garbage Treatment(10000t)	587.38	604.89
Number of Garbage Harmless Disposal Factories(unit)	25	24
Volume of Garbage Harmless Disposal(10000t)	587.38	604.89
Rate of Garbage Harmless Disposal (%)	100.00	100.00
Number of Public Lavatories (unit)	1756	1816
Number of Special Vehicles for Environmental Sanitation (unit)	6806	6958

6. Solid Waste

According to the "Guangzhou Statistical Yearbook 2023," the information on solid waste in Guangzhou is presented in Table 4-12.

Table 4-12 City Solid Wastes

Item	2021	2022
Volume of General Industrial Solid Wastes Produced (10000t)	613.98	693.22
Volume of Comprehensive Utilization of General Industrial Solid Wastes (10000t)	578.27	661.21
Comprehensive Utilization Rate of General Industrial Solid Wastes(%)	94.10	95.23
Volume of Hazardous Wastes Produced(10000t)	62.97	65.23

During the operational period of this project, the replacement or maintenance of equipment will generate a certain amount of electronic waste. According to the "People's Republic of China Solid Waste Pollution Prevention and Control Law" and the "Regulations on the Recycling and Treatment of Waste Electrical and Electronic Products" (promulgated by the State Council of the People's Republic of China with Decree No. 551 on February 25, 2009, and revised according to the decision of the State Council on March 2, 2019, regarding the amendment of certain administrative regulations), the electronic waste generated by this project will be handed over to companies with qualifications for the disposal of waste electrical and electronic products.

According to relevant announcements from the Guangdong Provincial Department of Ecology and Environment, as of October 30, 2023, there are currently nine enterprises in Guangdong Province that hold qualifications for dismantling and disposing of waste electrical and electronic products. The annual processing capacity and permitted total quantities are detailed in Table 4-13.

Table 4-13: Issuance of Qualification Certificates for Disassembly and

Processing of Waste Electrical and Electronic Products in Guangdong Province

No.	Company Name	Annual Processing Capacity	Annual Disassembly License Volume	Certificate Number
1	Guangdong Huaqing Waste Appliance Treatment Co., Ltd.	Waste CRT TVs and computers: 1.2 million units/year, Waste refrigerators: 400,000 units/year, Waste washing machines: 500,000 units/year, Waste air conditioners: 400,000 units/year, Waste LCD TVs and monitors: 500,000 units/year.	3 million units	E4418022
2	Shantou TCL Deqing Environmental Protection Development Co., Ltd.	Waste CRT TVs & computers: 1 million units/year, Refrigerators: 240,000 units/year, Washing machines: 500,000 units/year, Air conditioners: 350,000 units/year.	2.09 million units	E4405131
3	Qingyuan Dongjiang Environmental Protection Technology Co., Ltd.	Waste TVs: 1.2 million units/year, Waste computers: 1 million units/year, Waste refrigerators: 250,000 units/year, Waste washing machines: 400,000 units/year, Waste air conditioners: 400,000 units/year.	3.25 million units/year	E4418021
4	Foshan Shunde Xinhuibao Resource Utilization Co., Ltd.	Waste TVs: 500,000 units/year, Waste refrigerators: 500,000 units/year, Waste washing machines: 240,000 units/year, Waste air conditioners: 300,000 units/year, Waste computers: 50,000 units/year.	1.59 million units	E4406061
5	Maoming Tianbao Renewable Resources Development Co., Ltd.	TVs (including LCDs): 550,000 units/year, Mini calculators (including LCDs): 350,000 units/year, Refrigerators (including freezers): 400,000 units/year, Washing machines: 300,000 units/year, Air conditioners: 40 units/year.	2 million units	E4409021
6	Yangjiang Xinqimei Technology Co., Ltd.	50,000 tons/year.	50,000 tons/year	E4417021

No.	Company Name	Annual Processing Capacity	Annual Disassembly License Volume	Certificate Number
7	Jiangmen Litong Environmental Protection Technology Co., Ltd.	TVs: 3,000 tons/year, Mini computers: 8,000 tons/year, Refrigerators: 4,000 tons/year, Air conditioners: 3,000 tons/year, Washing machines: 6,000 tons/year, Mobile phones: 2,000 tons/year, Landline phones: 300 tons/year, Printers/copiers: 1,500 tons/year, Other small appliances: 2,200 tons/year.	30,000 tons/year	E4407051
8	Lifoo (Jiangmen) Environmental Protection Technology Co., Ltd.	Mini computers, telephone sets, mobile communication handsets: 5,000 tons/year, Small appliances, smart electronic devices: 5,000 tons/year.	10,000 tons/year	E4407041
9	Guangdong Hummingbird Resource Recycling Technology Co., Ltd.	CRT TVs: 100,000 units/year, CRT desktop mini computers: 50,000 units/year.	3,800 tons/year	E4412041

Source: Guangdong Province Ecology and Environment Department

V. Potential Environmental and Social Impacts and Mitigation Measures

A. Environmental Impact Assessment and Mitigation

1. Environmental Protection Objectives

The main construction activities of this project are primarily focused on the interior decoration of the Computational Center, Operations and Management Center, and Smart Industry Incubation Platform. The laying of communication infrastructure optical cables, smart light poles, and the installation of UAV nests have a broader scope but shorter impact duration; therefore, specific environmental protection objectives are not separately listed.

Table 5-1: Project Environmental Protection Objectives

Component	S/N	Name	Type	Direction	Distance (m)	Population	Environmental Functional Area
Computational Center	1	Shabian Village	Residential Area	Northwest of the Computational Center	135	200 HH	Grade II Standard of "Environmental Air Quality Standards" (GB3095-2012); Class 2 of "Standards for Environmental Noise Quality" (GB3096-2008)
	2	Yongda Group Company Residential Building	Residential Area	West of the Computational Center	135	300 HH	
Operations and Management Center and Smart	3	Guangdong University of Finance	School	South of the Operations and Management Center	186		

Component	S/N	Name	Type	Direction	Distance (m)	Population	Environmental Functional Area
Industry Incubation Platform							
	4	Longjiang Middle School	School	South	60	800	
	5	Jiangxia village	Residential area	South	100	200	
	6	Tonghua kindergarten	Kindergarten	northwest	140	480	

Note: HH= households

Figure 5-1: Map of the Locations of Environmentally Sensitive Points in the Computing Power Center

Figure 5-2: Map of the Locations of Environmentally Sensitive Points in the Operations Control Center and incubation center

2. Environmental Impact and Mitigation Measures

a) Equipment Procurement

All equipment procured for this project must comply with the requirements of the "Government Procurement Requirements for Green Data Centers." The project's energy consumption is primarily concentrated in the operation of the computing center. The computing center will be constructed according to the A data center standards outlined in the "Data Center Design Code" (GB50174-2017).

Table 5-2 GB50174-2017 Data Center Design Technical Requirements

Item	Technical Requirements		
	A Level	**B Level**	**C Level**
Air Conditioning			
Air conditioning systems are installed in the main engine room and auxiliary areas	Mandatory		Recommended
Air conditioning cooling systems are installed in the backup battery room of the uninterruptible power supply system	Recommended		Optional
Maintain positive pressure in the main engine room	Mandatory		Optional
Chiller units, cooling, and cooling water pumps	N+X redundancy (X=1 to N)	N+1 redundancy	N
Dedicated air conditioning for the engine room	N+X redundancy (X=1 to N), X redundant units in each area of the engine room	N+1 redundancy, 1 redundant unit in each area of the engine room	N

Item	Technical Requirements		
Radiators are installed in the engine room	Not allowed	Not recommended	Allowed but not recommended
Electrical Technology			
Power supply	Two power sources supply power, and both power sources should not be damaged simultaneously	Recommend to have dual power supply	
Transformers	2N	N+1	
Backup diesel generator system	N+X redundancy (X=1 to N),	N+1 when there is only one power supply source	Diesel generators are not required when the uninterruptible power supply system can meet the requirements of information storage
Basic capacity of backup diesel generators	Should include basic capacity for UPS system, air conditioning, and refrigeration equipment	/	/
Fuel storage capacity of diesel generators	Should meet 12 hours of fuel use	24 hours	/
Configuration of uninterruptible power supply system	N+1 or M(N+1) redundancy (M=2, 3, 4, ...)	N+X redundancy (X=1 to N)	N
Minimum backup time for UPS battery system	15 minutes when diesel generators are used as backup power	7 minutes when diesel generators are used as backup power	Determined based on actual needs
Distribution of air conditioning system	Dual power supply (at least one of them is an emergency power supply), end switching. Adopt a radiative distribution system	Dual power supply, end switching. Adopt a radiative distribution system	Adopt a radiative distribution system

Source: Technical Specification of Data Center (GB50174-2017).

b) Environmental Impacts and Mitigation Measures During the Construction Phase

(1) Analysis and Mitigation Measures for Environmental Air Impact

The project's space-time twin intelligent platform and safeguard system sub-project does not involve construction activities. The impact on air quality during the construction period mainly comes from the dust generated by the installation of smart light poles and fiber optic cable laying, as well as the dust and organic waste gas generated by the indoor decoration of the Arithmetic Center, the Transportation and Management Center, and the Intelligent Industry Incubation Platform. This project does not involve large-scale earth excavation, and the dust mainly comes from the installation of smart light poles, the demolition of the original light poles and other poles, as well as the earth excavation and road transportation of materials and equipment during the laying of fiber optic cables. This project includes laying 54.3 kilometers of fiber optic cable, mainly in the form of leasing subway bridges and communication pipelines, fiber optic cable laying only 2.4 kilometers of pipeline excavation, the impact is small. Intelligent light pole foundation construction stage, excavation operations will be in the light pole pit and a certain area around the dust impact, usually centered on the pit, within a radius of 3-5 meters dust is more concentrated, lasts about 1 week.

The interior decoration of the Computing Center, Operational Management Center, and Incubation Platform will produce dust when cutting wood and ceramics. Commonly used decoration materials like cement and other powdery building materials are transported in sealed bags, preventing spillage and minimizing environmental impact.

Common decoration materials, such as paints, coatings, linoleum, wallpaper, plywood, plastics, PVC (polyvinyl chloride) boards, insulation materials, and indoor man-made board materials like sandwich boards, curved willow, various veneered panels, density boards for furniture, etc., all release volatile organic compounds. The main compounds are ammonia, formaldehyde, and benzene. The pollution period varies for different decorative materials, with volatilization mainly concentrated within 1 to 3 months of the decoration stage.

During interior and exterior decoration, it's crucial to use green, environmentally friendly building materials, strictly ensuring that the building materials are harmless (no pollution, no radiation, etc.). Environmentally friendly products with a green label should be preferred as decoration materials and equipment. During the decoration period, indoor ventilation should be strengthened. After decoration completion, daily ventilation should be maintained for 1 to 3 months and must meet the "Indoor Air Quality Standard" (GB/T18883-2002) requirements before use.

(2) Noise Impact Analysis and Mitigation Measures

During construction, the noise mainly comes from the decoration noise of the Computing Center, Operational Management Center, and the Incubation Platform, as well as the short-term traffic noise generated by construction machinery, equipment, and material transportation.

Decoration noise mainly refers to construction noise generated by various mechanical equipment used at the construction site. This construction machinery includes electric drills, saws, multifunctional woodworking planes, etc. Different equipment or machinery have different noise source characteristics. Some of them produce vibrational, sudden, and pulsating noises, which have a significant impact on people. Some equipment operates at low frequencies, which are not easily attenuated and can be irritating. Such machinery is the main source of construction noise, with some equipment's operational noise reaching over 90dB.

The various equipment and materials for the project are primarily transported to the site by trucks, especially heavy trucks, which generate high-intensity noise. The frequent movement of various transport vehicles on construction sites and municipal roads will impact the surrounding environment with traffic noise. The noise source strength of commonly used transport vehicles is shown in Table 5-3.

Table 5-3: Noise Source Intensity During the Construction Phase of the Project

Construction Phase	Construction Sound Source Category	Source Intensity (dB(A))
Decoration Phase	Electric Drill	100-110
	Electric Saw	100-115
	Multi-Function Wood Planer	95-100
Traffic Noise	Transport Vehicles	90-95

The impact of construction noise depends on the condition of the sound source on the one hand, and on the other hand, it is related to the distance between the surrounding sensitive points and the sound source. The nearest acoustic environment sensitive points of the project's Transportation Management Center and Incubation Center are Longjiang Middle School at 60m in the south, Jiangxia Village at 100m in the south, Fairytale World Kindergarten at 140m in the northwest, and Rheinland Garden Community at 150m in the north, and the nearest acoustic environment sensitive points of the Calculation Center are Shabian Village at 135m in the northwest, and the residential building of Yungtay Group at 135m in the west, which are all within the range of 200m. within the area. During the construction period, the contractor shall refer to IFC's EHS General Guidelines on the construction of project decoration and the relevant requirements of domestic projects, and take necessary mitigation measures to reduce the negative impacts of the construction on the surrounding environment and

construction workers.

During the construction process, the construction unit should strictly adhere to the relevant provisions of the "Environmental Noise Emission Standards for Construction Sites" (GB 12523-2011) to prevent construction-related disturbances. Noise levels should be closely monitored at the construction boundaries.

The construction unit should schedule construction operations reasonably, minimizing the construction period, and scheduling activities that may generate high-intensity noise during the times of the day when they have the least impact, with a prohibition on nighttime construction (22:00-6:00).

Noise generated by construction machinery is often characterized by suddenness, irregularity, discontinuity, and high intensity. The construction unit should schedule the operating times of construction machinery reasonably, reduce the operating time of noisy machinery, minimize the number of high-noise construction machinery operating simultaneously, and try to minimize the cumulative impact of noise sources.

Considering the impact of transportation noise on the environmental sound, construction routes should avoid concentrated noise-sensitive points. When transporting materials, the project should schedule transportation during reasonable hours and avoid nighttime transportation. Furthermore, strict management of transportation vehicles should be implemented, including reducing speed and prohibiting horn usage when passing through residential areas.

Monitor noise during the construction period. The project owner should prominently display a complaint hotline at the construction site. Upon receiving complaints, the project owner should promptly contact the local environmental protection department for timely resolution of environmental disputes.

Workers operating near high-noise equipment should be provided with personal protective equipment such as earplugs, earmuffs, and noise-canceling helmets.

When selecting construction equipment, advanced equipment with low noise, minimal vibration, and low energy consumption should be chosen whenever possible. Avoid prolonged use of high-noise equipment and ensure proper maintenance to prevent an increase in machinery noise due to poor equipment performance.

By implementing the above noise control measures, the construction noise generated by this project will have a minimal impact on the surrounding environmental sound.

(3) Water Environment Impact Analysis and Mitigation Measures

The construction workers for this project are all local laborers, and no construction camps are set up during the construction period. The main source of wastewater during construction is domestic sewage generated during the construction process, with no construction wastewater generated during the renovation period.

In this project, the main pollutants in domestic sewage generated by construction workers in the Computing Center and Operations Management Center are COD, SS, NH3-N, with estimated concentrations of 300 mg/L, 200 mg/L, and 35 mg/L, respectively. The water consumption of construction workers is estimated at 50 L/person·d, and the pollution coefficient is taken as 0.8. Each construction site has an estimated workforce of 40 people, totaling 80 people. Therefore, the daily discharge of domestic sewage during the construction period for each site is 1.6 m^3, totaling 3.2 m^3. Domestic sewage is collected and discharged into the municipal sewage network, and after treatment in the urban sewage treatment plant to meet the standards, it is discharged.

The following mitigation measures are recommended to reduce the negative impact of construction on the water environment:

Strengthen environmental awareness among construction workers and ensure that domestic sewage is discharged into the municipal sewage network without improper disposal.

During the project's construction period, ensure smooth management of the sewage network and guarantee that domestic sewage meets the "Water Pollutant Discharge Limits" (DB44/26-2001) for the second period, Class III standards (for other pollutant discharge units), before entering the municipal sewage treatment system.

(4) Solid Waste Impact Analysis and Mitigation Measures

During the construction phase, solid waste mainly consists of construction waste and the household waste generated by construction personnel. If not properly managed, these wastes can lead to soil, air, and water pollution in the local area.

Construction Waste. The construction activities for this project mainly involve interior decoration and renovation. Based on past experience, the estimated production of construction waste is 0.30 m3/m2. The computing center has a leased area of approximately 15,000 m2, while the operations management center and the smart industry incubation platform have leased areas of approximately 3,300 m2. Therefore, the estimated total production of construction waste for the project is 5,490 m3. After collection, the renovation waste will be discharged to the designated construction waste landfill site managed by the local sanitation department.

In addition, 5,000 original poles need to be dismantled for the transformation of multi-pole integration. Communication poles, light poles, monitoring poles and other poles are mostly made of aluminum alloy or steel, and the weight of each pole is about 50-100kg, and the ancillary equipment on each pole, such as lamps and lanterns, monitoring equipment, wiring and so on, is about 20-30kg.

Construction Personnel's Household Waste Garbage bins will be placed at appropriate locations on the construction site to collect the household waste generated by construction personnel. The collected waste will be promptly transported to the municipal garbage landfill site.

Hazardous Waste Hazardous waste mainly comes from equipment maintenance and may include waste engine oil, waste mineral oil, and cleaning fluids from machinery.

The following measures are recommended to prevent and reduce the negative impact of solid waste during construction:

Construction materials should be sorted and stored centrally. Recyclable materials should be sold to recyclers, while non-recyclable materials should be sent to designated locations for storage and disposal. Mixing construction waste with household waste or indiscriminate disposal should be prohibited. For smart light poles recyclable poles and ancillary equipment are first categorized and collected. The metal parts in the ancillary equipment, such as lamps and lanterns shells, monitoring equipment brackets and other recyclable metals are also categorized and collected. For parts that cannot be directly recycled, they are handed over to professional metal waste treatment organizations.

Qualified units should be commissioned to transport the construction waste generated during the project's construction process. The waste should be transported to relevant construction waste disposal sites and managed in accordance with the "Regulations on the Management of Urban Construction Waste."

Household waste should be collected at the construction site and promptly transported to municipal garbage landfill sites.

Contractors should label and record hazardous waste from construction activities and use appropriate impermeable and sealed storage methods. The storage period should not exceed the specified limit. Contractors should retain records of the sale, transfer, and storage of such waste and provide these records for inspection. With the consent of the project management company, authorized recyclers should be allowed to transport and dispose of hazardous waste. After implementing these preventive measures, the environmental impact of solid waste during the construction phase will be minimal.

(5) Health and Safety Mitigation Measures

Construction should be conducted in accordance with all applicable laws, statutory requirements in China, guidelines, and Occupational Health and Safety (OHS) requirements in the IFC/WB EHS General Guidelines. To prevent community health and safety issues during construction, contractors need to execute a Labor Safety Management Plan concerning construction, access to buildings, awareness, and information sharing.

In terms of labor safety, the following measures are proposed:

- Employ at least one full-time security officer.
- Provide occupational safety education to all construction employees, mandate the use of safety equipment such as helmets, work boots, and gloves during construction.
- Strictly adhere to operating procedures for tasks involving working at heights, radiation, and electrical work. Use safety harnesses, protective glasses, and other protective equipment as required.
- Maintain and service all types of machinery and equipment to prevent personal safety accidents caused by equipment failures.
- Ensure that all electrical equipment's metal casing or base is well-connected to grounding.
- Installation and use of equipment with special safety requirements, such as flammable, explosive, high-temperature, and high-pressure equipment, should be approved and subject to review and verification systems. Equipment should be managed and operated by qualified personnel with appropriate training and certification. Operators should strictly follow operating procedures and not leave their posts during operations.

Regarding health and epidemic prevention:

- Designate a responsible person for maintaining cleanliness within the project area. Prioritize the working environment of all personnel during construction and operation, equip them with devices and equipment for heatstroke prevention, noise reduction, and protection against ionizing radiation, control various occupational hazards generated during work processes, and ensure the physical health of employees.
- Comply with relevant regulations by providing toilets and handwashing facilities within the project area. Maintain a small stock of necessary medications within the project area to address emergency situations.
- Distribute personal protective equipment to relevant personnel in accordance with relevant regulations. Organize regular physical examinations for employees to ensure their physical health.
- Implement "Four Preventions" measures against rodents, flies, moisture, and food poisoning.

- Pre-treated wastewater should be discharged into the municipal drainage network, while household waste and construction waste should be handed over to relevant authorities.
- Implement health and epidemic prevention measures and promptly report any mass health incidents according to regulations, taking effective measures to prevent their spread.

(6) Traffic impact analysis and mitigation measures

The impact of the project on traffic during construction mainly comes from two aspects, one is the construction of large-scale machinery and transportation equipment during construction may cause road damage or traffic congestion; the second is the smart light pole construction during the transportation and installation of pole parts on the nearby residents traffic impact.

Smart light poles are generally arranged on both sides of the road or within the lane partition, such as green belts, sidewalks; supporting integrated chassis set in the green belt. Each light pole covers an area of less than 1 m^2, and the integrated chassis is about 8 m^2, and the construction time is less than one week. During the construction period, due to the pole transportation and installation needs to temporarily occupy part of the lane, in order to avoid inconvenience to nearby residents and traffic, intelligent pole installation construction should be constructed at night, sectioned for enclosure, and can not interrupt the traffic. Therefore, before the construction of the project should consult the traffic police department, do a good job during the construction of traffic mitigation measures, roadway excavation and restoration should be well organized construction, to ensure that the construction of the project on the road vehicles and pedestrians to minimize the impact of traffic. Mitigation measures include the following.

(1) Principles of traffic organization design during the construction period

Strictly according to the national standard of the People's Republic of China “Road Traffic Signs and Markings” (GB5768-2009) and refer to the requirements of relevant documents related to civilized construction of relevant municipal projects for design. Reasonable and scientific traffic organization through reasonable construction organization and arrangement, not only to ensure the smooth progress of construction, but also to protect the construction area and the surrounding road network traffic, as far as possible to reduce the construction of the project on the city traffic to bring negative impact.

Construction impact minimization. Ensure traffic priority, scientific and reasonable organization of construction and traffic, strict implementation of construction

procedures and progress plans, strive to complete the construction as soon as possible, return the road to the people, and reduce the negative impact of the construction project on urban traffic.

Minimize environmental impact. Enclosing the construction area, strictly controlling the noise, dust, soil disposal and sewage, minimizing the negative impact on the society, paying attention to the coordination with the surrounding landscape, and taking strong measures to protect the environment.

(2) Traffic organization design during construction

Traffic relief during construction mainly focuses on the traffic relief during the construction of intelligent poles, and adopts traffic diversion in the construction area as well as the construction area of enclosure construction. The scope of the construction enclosure area should consider the possibility that the pole may fall over or break during dismantling or installation, which may affect the personal safety of the surrounding people, and the vertical enclosure length is recommended to be more than 2 times of the length of the pole. After a construction section is constructed, it will move forward to carry out the construction of the next section, and so on, until the construction of the whole section is completed. Use the construction shelter guardrail for sheltering, set up construction warning signs and traffic warning signs on the face of the shelter guardrail and at the inlet road of the intersection, and set up warning red lights at night.

(3) Implementation requirements

For each phase of construction involving the temporary occupation of roads, the location of the road users caused by the obstruction, are required to be in accordance with the requirements of traffic organization, traffic control and relevant norms, by the construction unit to configure the necessary and sufficient number of temporary traffic signs. Traffic facilities shall be set up in accordance with the requirements of Road Traffic Signs and Markings Part 4: Operation Area (GB 5768.4-2017).

Traffic signs, cones, guardrails, and construction barriers shall be set up in accordance with relevant requirements before construction. The arrangement of the installation shall face the approaching vehicles and place the “construction sign” first, and the other signs shall be arranged in sequence. For any construction site, high-brightness night warning lights should be installed at the beginning, middle and end of the site, with a height of more than 1.2 meters.

The setting of traffic facilities in addition to warning, prohibition and indication signs, other facilities can be adjusted according to the actual situation of the site, such as the use of cones, which can be replaced by the form of demarcation or guardrail, and so on.

(7) Impact on existing municipal pipelines

The construction of the smart light pole sub-project will remove the old municipal poles for lighting, traffic, city management, etc., and install the new poles on both sides of the existing road or within the lane partition, such as next to the green belt and sidewalk. In the process of removal and installation, it is possible to cause temporary interruption of municipal services such as lighting, power supply, traffic signals, communication cables, water supply and drainage, gas, etc., which may have an impact on residents' lives. Meanwhile, the line construction may cross or neighbor all kinds of underground municipal pipelines, in order to protect the normal operation of municipal pipelines and public safety, the following measures need to be taken:

(1) At the preliminary design stage, the design unit will investigate the types, uses, quantities, directions, burial depths and so on of the underground pipelines in the project area, and ask the responsible unit of the pipelines to provide relevant drawing information as a basis for the development of protective measures for the underground pipelines. The design unit of this project designs the safety distance between the pipeline network of this project and the existing pipelines in accordance with the relevant norms, and reserves the location of other pipelines for urban planning.

(2) Before the construction unit starts work, Wisdom Investment Company will hold a pre-coordination meeting for underground pipelines and briefing to ensure that all construction-related personnel master the pipeline information.

(3) Before the start of construction need to develop for the existing pipeline construction protection program, the program needs to be recognized by the existing pipeline right unit or by the pipeline right unit.

(4) If crossing or neighboring gas pipelines, the gas pipeline protection measures during construction are as follows:

① construction unit before the start of construction to the gas company to understand the construction has crossed the pipeline direction and pipeline burial depth, in the cross construction with the gas pipeline section of the gas unit instructor is not present can not be excavated, piling, extrusion, non-excavation crossing and other construction.

② In the location of the gas pipeline construction, 24 hours in advance to notify the gas company.

③Set construction signboards in the construction section, always reminding the construction workers that there are gas pipelines under the construction, to prevent construction workers from paralysis.

④ pipe position clear pipe network: pipe wall within 2 meters on both sides of the outer edge of the area using manual excavation until the gas pipeline and do a good job of protection measures, the construction process, the construction workers are required to strictly prohibit fire, by the gas company's professional staff to carry the valve key in the control of the section of the pipeline valve wells squatting to do at any time to shut down the valve is ready to test the valve closure and open before construction, squatting personnel in the other construction The squatting personnel will leave the site only after the other party has finished the construction and found the pipeline to make sure that the pipeline has not been dug up.

⑤ pipe position is not clear pipe network: the use of manual excavation to find out the pipeline out of the earth and into the earth point, each end of the two ends of the excavation 1 meter to 2 meters along the pipeline 2 end of the direction to confirm the location of the outer edge of the wall of the pipe on both sides of the 2-meter range of the area using manual excavation until to find out the gas pipeline and do a good job to protect the measures, during the construction process, the construction workers are required to prohibit fires, there are gas company professionals carrying the valve key to control the section of the pipeline valve wells in can be closed at any time, the valve key. Control of the section of the pipeline valve wells squatting ready to close the valve at any time before the construction test under the valve closed and open, squatting personnel in the other side of the construction to find out the pipeline to determine that the pipeline has not been dug up before leaving the scene.

(6) In the gas pipeline road construction to avoid gas time, so as not to bring inconvenience to the residents of the gas.

5） Protection measures for cables and communication lines during construction:

① technical briefing before the operation to avoid barbaric construction.

② construction unit before the start of work to the pipeline rights unit to understand the construction of the pipeline crosses the direction and depth of the pipeline, in the section with the cable drainage, communication pipeline

cross construction, the unit instructor is not present can not be excavated, piling, extrusion, trenchless crossing and other construction.

② In the location of cable ducts, communication pipelines, construction, 24 hours in advance to notify the company whose rights.

③Set construction signboards on construction sections to remind construction workers that there are cables or communication pipelines underneath, so as to prevent construction workers from being paralyzed.

④ After excavation of the pit, exposed or nearly exposed pipelines should be prepared in advance and protected in time. Protection methods include isolation method, suspension method, support method and reinforcement method.

⑤ After the cable discharge pipe or communication pipeline is exposed, when excavating the earth on both sides, it is strictly prohibited to use mechanical excavation within the range of 1m from each side of the cable or communication pipeline, and the earth within the range of 1m from both sides of the pipeline and directly underneath the pipeline must be excavated manually, so as to ensure that the high-voltage cables and communication pipelines are absolutely safe.

6）Protection measures for water pipeline during construction:

① Technical briefing before operation to avoid barbaric construction.

② construction unit before the start of work to the drainage pipe right unit to understand the construction of the pipeline direction of the cross and the depth of the pipeline, in the section of the cross construction with the water supply and drainage pipeline, the unit instructor is not present can not be excavated, piling, extrusion, non-excavation crossing and other construction.

② In the case of construction in the location where there is a water supply and drainage pipeline network, notify the company that owns the rights to it 24 hours in advance.

③Set construction signboards on construction sections to always remind construction workers that there are water supply and drainage pipelines underneath, so as to prevent construction workers from being paralyzed.

④ After excavation of the pit, the exposed or nearly exposed pipelines should be prepared in advance and protected in time. Protection methods include isolation method, suspension method, support method and reinforcement method.

⑤ After the water supply and drainage pipe network is exposed, when excavating the earth on both sides, it is strictly prohibited to use mechanical excavation within the range of 1m from each side of the water supply and drainage pipe line, and the earth within the range of 1m from each side of the water supply and drainage pipe line and directly underneath the water supply and drainage pipe line must be excavated manually, so as to ensure absolute safety for the water supply and drainage pipe line.

c) Impact and Mitigation Measures during the Operational Phase

(1) Noise Impact and Mitigation Measures

During the operational phase of this project, noise primarily originates from large cooling equipment and the operation of computer equipment. As all the project's equipment is located indoors or within equipment rooms, and all fans and equipment are installed with vibration-reducing foundations and flexible connections, with noise reducers at the fan outlets, and double-door sound insulation or noise-reducing doors, and further sound insulation through building walls and floors, the external impact is minimal. The noise levels are compliant with Class 2 standards as specified in the "Emission Standards for Noise at Industrial Enterprises" (GB 12348-2008).

A maintenance plan for equipment should be developed during the operational phase to prevent equipment malfunctions that could lead to excessive noise.

(2) Water Environment Impact and Mitigation Measures

(1) Characteristics of Wastewater: The main impact on the water environment comes from domestic sewage generated by the computing center, operations management center, and smart industry incubation platform.

According to the local standard of Guangdong Province, "Water Consumption Quotas Part 3" (DB44/T1461.3-2021), the water consumption for employee daily life is calculated based on the advanced value of 10 m3/(person·a) in Table A.1, "National Administrative Institutions - Office Buildings (without canteens and bathrooms)." Major pollutants in domestic sewage include COD, BOD5, animal and vegetable oils, and ammonia nitrogen.

(2) Wastewater Treatment and Discharge: The domestic sewage generated by this project can be centrally collected through the municipal drainage network and treated at the city's sewage treatment plant.

(3) Solid Waste Environmental Impact Analysis and Mitigation Measures

(1) Solid Waste Environmental Impact Analysis During the operational phase of this

project, solid waste mainly consists of office and domestic waste, as well as solid waste generated from equipment replacement or maintenance.

Solid Waste from Equipment Replacement or Maintenance Equipment replacement or maintenance primarily generates waste engine oil, discarded servers and electronic components, old cables, and other waste materials.

The annual production of waste engine oil is approximately 0.5 tons/a, classified as hazardous waste under the "National Catalog of Hazardous Wastes" (2025), with the code HW08. The waste code is 900-249-08. After collection, it should be disposed of by qualified units with appropriate hazardous waste qualifications.

The lifespan of communication equipment is generally 8-15 years. During the operational phase of this project, equipment replacement or maintenance will generate a certain amount of electronic waste, such as discarded batteries, old servers, and electronic components. According to the "Solid Waste Pollution Prevention and Control Law of the People's Republic of China" and the "Regulations on the Management of Recycling and Treatment of Waste Electrical and Electronic Products" (promulgated by the State Council of the People's Republic of China with Decree No. 551 on February 25, 2009, and amended based on the "Decision of the State Council on Amending Certain Administrative Regulations" on March 2, 2019), as of October 30, 2023, Guangdong Province has a total of nine enterprises with qualifications for the dismantling and disposal of waste electrical and electronic products. The electronic waste generated by this project will be collected by units with qualifications for the disposal of waste electrical and electronic products for recycling and proper disposal, thereby preventing heavy metals or toxic substances from scrapped equipment from entering the natural environment.

Household Waste: During the operational phase, household waste is estimated to be approximately 0.5 kg/person/day. All household waste will be centrally collected and regularly transported to a municipal garbage landfill site by the local sanitation department.

(2) Mitigation Measures

The following measures are recommended to avoid environmental harm caused by solid waste:

- Waste batteries and discarded servers, electronic components, and other items should be returned to the manufacturers or handed over to qualified units for disposal.
- Waste engine oil should be collected in barrels and temporarily stored in a dedicated room, then promptly transported and disposed of by relevant qualified units.

- Household waste generated by the project should be collected centrally and entrusted to the environmental sanitation department for regular removal.
- Through the implementation of these measures, all types of solid waste generated by the project will be properly disposed of, ensuring a 100% disposal rate.

(4) Project Water Consumption Estimation

The fresh water in this project will primarily be used for domestic water, air conditioning humidification, and the replenishment of the air conditioning circulation cooling water system. The cooling tower will adopt an indirect evaporative cooling tower, with a replenishment volume of 0.8% of the cooling tower's circulation water volume. The humidifier will operate when the air humidity is below 5.6 g/kg, and the humidification duration is approximately 1058 hours per year, with a rated humidification capacity of 15 kg/h. Based on Guangdong Province's local standard "Water Quota Part 3: Domestic Use" (DB44/T146 1.3-2021), employee water consumption is set at 50 m³/(person·a).

Table 5-4: Project Water Consumption Estimation

Name	Water Quota	Unit	Scale	Hourly Variation Factor	Usage Time (h)	Maximum Hourly Water Consumption (m³/h)	Daily Water Consumption (m³/d)	Annual Water Consumption Days (d)	Annual Total Water Consumption (10^4m³)	Remarks
Office Water	50 L/(person·shift)	person·shift	100	1.2	24	6	144	365	5.26	Includes three sites
Air Conditioning Replenishment	--	--	825	1	24	12.38	306	365	11.17	Replenishment volume is 1.5% of the cooling water circulation volume
Domestic Water	300 L	--	/	1.5	8	9	72	366	2.64	
Landscaping	2 L/(m²·d)	m²·d	10000	1	10	10	100	120	1.2	

Name	Water Quota	Unit	Scale	Hourly Variation Factor	Usage Time (h)	Maximum Hourly Water Consumption (m^3/h)	Daily Water Consumption (m^3/d)	Annual Water Consumption Days (d)	Annual Total Water Consumption (10^4m^3)	Remarks
Unforeseen Water Usage	-	--	--	1	24	3.78	90.72	365	3.31	Assumed as 10% of the total water consumption
Total Water Consumption	/	/	/	/	/	41.53	712.72	/	23.58	

Source: Feasibility Study Report, December 2024

(5) Project Energy Consumption and Carbon Emissions

According to the Feasibility Study Report, the project will consume a total of 10,600.54 tce (tons of standard coal equivalent) of energy annually. The primary energy consumption is concentrated in the operation of the computation center. The estimated annual electricity consumption is approximately 8,614.45 KWh. The PUE (Power Usage Effectiveness) of the computation center is estimated to be 1.247, and the operational center's server room PUE is 1.30. These values comply with the "Notice on Issuing the Guangdong Province 5G Base Stations and Data Center Overall Layout Plan (2021-2025)" (Yue Gong Xin Xin Ruan [2020] No. 73), which requires new projects to achieve a PUE of ≤ 1.3.

The project's carbon emissions primarily come from indirect emissions due to electricity purchase and direct emissions from the purchase of diesel. The average carbon emission factor for Guangdong's electricity is referenced from the "Notice on Adjusting the Average Carbon Emission Factor for Guangdong Electricity (Annually)" issued by the provincial carbon peak and carbon neutrality task force. The estimated annual greenhouse gas emissions for the project are 30,179.82 tCO_2.

Table 5-5: Project Greenhouse Gas Emission Estimation

Emission Activity	Activity Data	Emission Factor	CO_2 Emissions (tCO_2)
Purchased Electricity	86,144.5 MWh	/ MWh	30,150.58

Emission Activity	Activity Data	Emission Factor	CO_2 Emissions (tCO_2)
Purchased Diesel	20.4 tons	--	29.25
Total	-	-	30,179.82

Source: Feasibility Study Report, December 2024

(6) Occupational Health and Safety Risks

In the operational environment of data centers and communication infrastructure, occupational health and safety risks may include musculoskeletal problems due to prolonged sitting or improper workstation design, electrical fire risks due to electrical system failures or improper operation, and hearing damage due to prolonged exposure to high noise levels. To mitigate and manage occupational health and safety risks in data center and communication infrastructure operation centers, a series of measures should be taken, including providing ergonomically designed workstations to reduce musculoskeletal problems, regularly inspecting electrical systems to prevent electrical fires, proper management of chemicals and hazardous substances to avoid chemical hazards, using hearing protection equipment in high-noise areas to protect employees' hearing, and installing efficient air filtration systems to control dust and particulate matter.

B. Social Impact Assessment

The ESIA unit conducted a questionnaire survey within the project implementation area from August 17th to 26th, 2023, encompassing two neighborhoods. A total of 320 questionnaires were distributed, and after statistical analysis and screening, 300 of them were deemed valid, resulting in a questionnaire validity rate of 93.8%. The survey respondents represented diverse demographics, including individuals of different age groups, educational backgrounds, and occupations. The survey included 159 male and 141 female respondents. Additionally, the Social Impact Assessment team organized 11 sessions of resident-focused meetings with a total participation of 101 individuals. Among the participants, 49 were female, constituting 48.5% of the total attendees.

Table 5-6: Identification of Social Impact Assessment

4. Table 5-6: Social Impact Assessment Identification

No.	Construction Content	Affected Population (10,000 people) / Female (10,000 people) - Percentage	Social Benefits	Social Risks
1	Communication Network Infrastructure	Covered areas: Haizhu, Liwan, Yuexiu, Nansha, etc. Affected population: 4.8799 million / Female: 2.4789 million (50.8%)	1.1 Improve Urban Governance: The realization of the IoT perception private network enables the city to more accurately monitor and respond to various environmental and infrastructure issues, improving residents' living environment and public service quality. 1.2 Promote Innovation and Development: The construction of the metropolitan private network and computation center provides enterprises with high-speed, stable network environments and powerful computing capabilities, helping to drive technological innovation and the development of emerging industries.	Not applicable
2	Computation Infrastructure	Affected population: 2.8228 million / Female: 0.6136 million (50.91%)	2.1 Provide Employment Opportunities: Creates local jobs across various fields such as technology, construction, electricity, etc. It is estimated that 150 jobs will be provided during the construction phase, and 30 jobs during the operation phase. 2.2 Smart Services: The application of city cloud	Social risks mainly during the construction period: 2.1 Large machinery transportation during construction may cause road damage or traffic congestion. 2.2 Uncertainty of project location due to pending lease agreements.

No.	Construction Content	Affected Population (10,000 people) / Female (10,000 people) - Percentage	Social Benefits	Social Risks
			platforms and intelligent devices can provide residents with smarter public services, such as traffic management and environmental monitoring, improving convenience in life.	
3	Integration Infrastructure	Affected population: 3.6668 million / Female: 0.6307 million (51.32%)	3.1 Provide Employment Opportunities: Creates local jobs in construction, technology, operations, and management. It is estimated that 150 jobs will be provided during the construction phase, and 20 jobs during the operation phase. 3.2 Provide an Entrepreneurial Platform: The smart industry incubation platform provides resources and support, helping entrepreneurs innovate and grow, creating employment opportunities and boosting the job market.	Social risks during both the construction and operation phases: 3.1 Large machinery transportation during construction may cause road damage or traffic congestion. 3.2 Drone flights during operation may cause noise and visual disturbance to the environment and residents. 3.3 Data Misuse: Collected data may be misused for commercial purposes or inappropriate use, infringing on personal rights.
4	Spatio-Temporal Twin Intelligent Platform	Affected population: 18.827 million / Female: 5.3583 million (50.71%)	4.1 The spatio-temporal twin intelligent platform provides accurate city information, allowing residents to better understand the city's operation and access real-	Not applicable

No.	Construction Content	Affected Population (10,000 people) / Female (10,000 people) - Percentage	Social Benefits	Social Risks
			time traffic, weather, and other information, thus enhancing life quality.	
5	Smart Industry Applications	Affected population: 18.827 million / Female: 5.3583 million (50.71%)	5.1 Improve Precision Governance in Cities: Smart city management and urban construction projects connect communities, workplaces, public places, etc., offering more efficient urban management services that make residents' living environment cleaner and more convenient. 5.2 Raise Residents' Environmental Awareness: The waste sorting management system can improve waste sorting efficiency, reduce environmental pollution, and promote sustainable development. 5.3 Encourage Low-Carbon Commuting: The construction of electric vehicle charging stations will facilitate residents’ use of electric vehicles, promoting green commuting. 5.4 Save Energy: Smart energy projects such as carbon asset management and carbon data support will help achieve carbon reduction targets,	5.1 During construction, the installation of smart elevators may temporarily affect residents' mobility. 5.2 The installation of cameras in smart elevators and smart trash bins may raise privacy concerns, and public participation needs to inform residents about the collection of such information. 5.3 Smart city projects may face challenges in overcoming residents' misunderstanding of new technologies and smart systems. 5.4 Smart city projects may lead to labor substitution in traditional industries. For example, the monitoring of waste sorting in smart trash bins may replace waste station sorting personnel.

No.	Construction Content	Affected Population (10,000 people) / Female (10,000 people) - Percentage	Social Benefits	Social Risks
			contributing positively to climate change mitigation.	
6	Security System	Affected population: 18.827 million / Female: 5.3583 million (50.71%)	6.1 Enhanced Cybersecurity: The implementation of the security system project can improve the city's infrastructure network security, reducing the risk of cyberattacks and data leaks, and protecting residents' and businesses' information security. 6.2 Data Privacy Protection: Technologies such as privacy computing and national commercial encryption can strengthen the protection of sensitive personal and business information, enhancing awareness of data privacy and rights protection.	Not applicable

1. Social Benefits and Risks

a) Telecommunication Network Infrastructure

The telecommunication network infrastructure covers the key areas of Haizhu, Liwan, Yuexiu, and Nansha with an IoT (Internet of Things) dedicated network. It includes an urban network with eight nodes. The IoT sensing network covers important urban areas in Haizhu, Yuexiu, Liwan, Nansha, etc., including significant buildings, roads (including road facilities), water supply and drainage systems, pipelines, environmental monitoring points, bridges, tunnels, critical resources, and old renovation electrical safety. It achieves a ground signal reception strength RSSI greater than -90dBm in 95% of the area. Combined with the terminal perception system in the aforementioned areas, it

provides a "neural network" transmission channel for emergency management, "Internet + monitoring and supervision," comprehensive governance, and enhances the city's real-time risk perception capabilities, strengthens market-oriented construction and operation capabilities, and improves the city's governance perception system.

(1) The implementation of the entire project can improve urban governance effectiveness. The realization of the IoT sensing network allows the city to more accurately monitor and respond to various environmental and infrastructure issues, thereby enhancing the living environment and the quality of public services for residents.

(2) It also promotes innovation and development. The construction of the urban network and data centers provides businesses with a high-speed, stable network environment and powerful computing capabilities, which helps drive technological innovation and the development of emerging industries.

According to the questionnaire survey, when asked, "Do you think the implementation of telecommunication network infrastructure (IoT dedicated network applied to roads, water supply and drainage, pipeline networks, bridges and tunnels to provide a 'neural network' transmission channel for emergency management) has a significant effect on improving urban governance?" 85% of residents believe that the effect is significant, 10% believe it is moderate, and only 5% believe it is not significant.

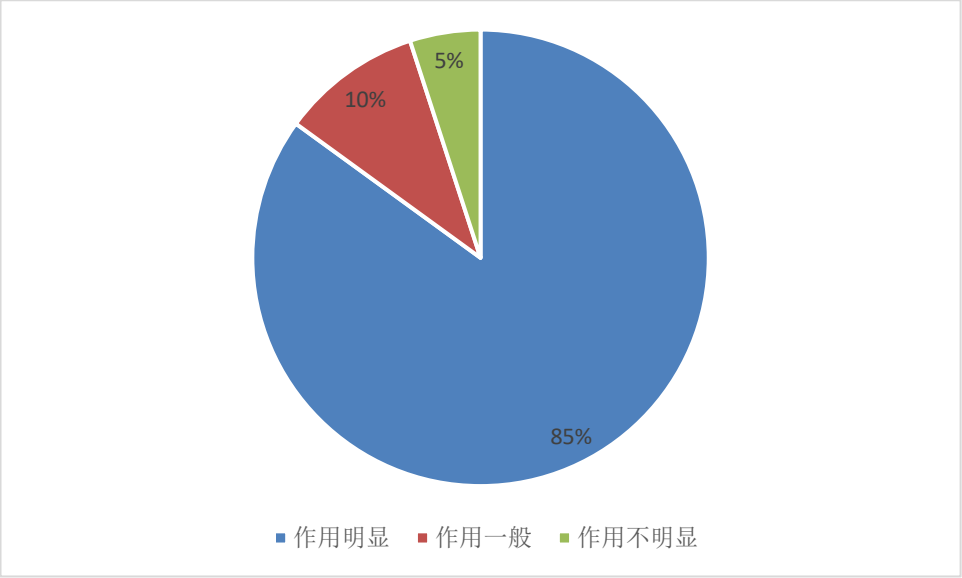


Figure 5-3: Resident Evaluation of Communication Network Infrastructure

b) Computing Infrastructure

The computing infrastructure includes the City Computing Center, which consists of the Computing Center Data Center and the Urban Cloud. The Urban Cloud relies on the Computing Center Data Center to create a unified, secure, and efficient urban cloud

platform. The Computing Center Data Center serves as the foundational physical infrastructure for the operation of the Urban Cloud and encompasses aspects such as data center construction, power supply and distribution, and cooling and heat dissipation systems, providing a secure and reliable physical environment. The Urban Cloud includes general computing resources, AI computing resources, storage resources, network resources, and security resources. It is categorized into basic service resource pools and data service resource pools based on different service capabilities.

(1) Leasing existing building facilities avoids the impact of land acquisition and relocation. The land initially belonged to the collective ownership of Shitou Village, Nancun Town, covering an area of 135.89 mu. In 2003, the collective land acquisition and compensation work was completed, and the land was converted into state-owned land. It was subsequently allocated to Guangzhou University City Energy Development Co., Ltd. in 2007 and obtained real estate certificates in 2019. Currently, Guangzhou Zhi Investment Co., Ltd. plans to use a leasing approach for the construction of the computing center project, thereby avoiding the large-scale land development that would affect the surrounding residents.

(2) Employment opportunities will be provided during construction and operation. During the construction and operation phases, tasks such as installing data center equipment, setting up server racks, and laying electrical and network cables will be carried out, necessitating the hiring of construction workers and technical personnel. During the operation phase, maintenance personnel will be required to handle routine maintenance, upkeep, and repairs to ensure the long-term stability of the equipment. Consequently, the project will create employment opportunities across multiple fields, including technology, construction, and electrical work. It is estimated that 55 job positions will be available during the construction phase, and 20 job positions will be available during the operation phase.

(3) The project's construction and operation will provide intelligent services. For residents in the project's beneficiary areas, the application of the Urban Cloud platform and intelligent devices will offer more intelligent public services, such as traffic management and environmental monitoring, thereby enhancing the convenience of daily life. According to survey questionnaire results, when asked whether they believed that the implementation of computing infrastructure (Computing Center Data Center and Urban Cloud) would significantly enhance public services' intelligence for residents, 96% of respondents considered the effect to be significant, 3% viewed it as moderate, and only 1% considered it insignificant.

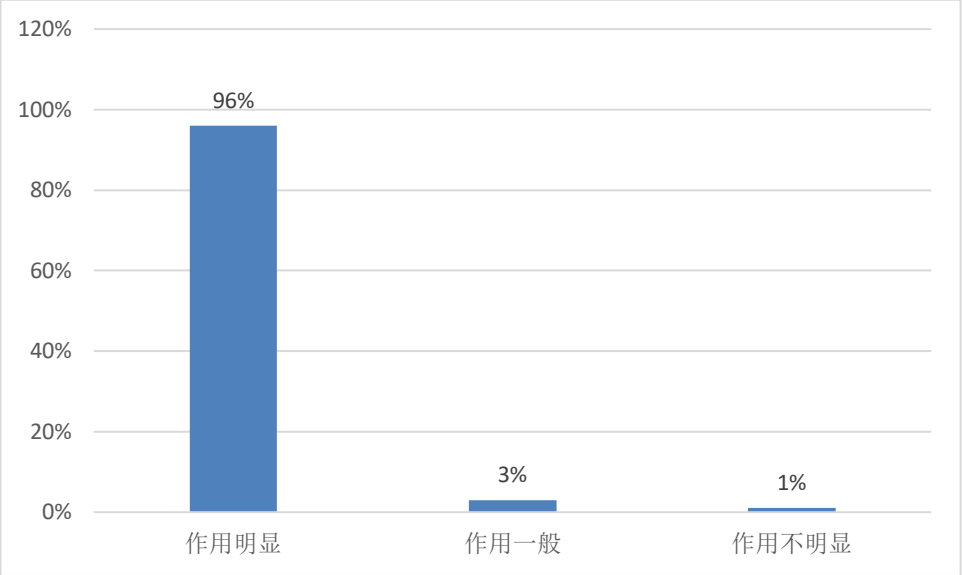


Figure 5-4: Resident Evaluation of Computing Infrastructure

(4) Potential risks during construction and operation. Even without significant civil engineering projects, attention should be paid to the impact on residents during construction, such as potential damage to roads or traffic congestion caused by the entry of large machinery and transportation equipment.

(5) The leased building facilities have not met acceptance conditions yet. The construction and preparation of the computing center require time, and if acceptance conditions are not met, the project may face delays in delivery. This could potentially impact the overall implementation progress of the entire smart city project. In addition, the lease agreement has not been signed, which may create uncertainty for the project's execution. If the lease agreement is eventually signed but delays occur due to acceptance and delivery issues, it may lead to increased leasing costs, negatively affecting the overall project cost and feasibility.

c) Integrated Infrastructure

The integrated infrastructure includes the Operations Management Center and the Smart Industry Incubation Platform, which attract industries and enterprises to settle in Guangzhou, promoting the convergence of the smart city industry and innovation chains. The Industry Incubation Platform's solutions are aimed at the operation and management of incubation platforms, achieving full connectivity and data integration of managed objects to create a visual, manageable, and controllable incubation platform operating environment. Through the Industry Incubation Platform, previously isolated subsystems such as property, energy, 5G innovation applications, security, fire protection, and building management are unified, aggregated, and modeled, enabling comprehensive analysis, integration, and unified services. In a city's extensive operating system, drones can provide intuitive insights into the smooth operation of various city components,

identify problems in urban operations, and enable more targeted fine-tuned management. This includes monitoring "two violations," conducting inspections of unauthorized construction, monitoring wastewater discharge, detecting urban air pollution, recognizing traffic violations, forest fire monitoring, and responding to emergencies, among other functions.

(1) Leasing existing building facilities avoids the impact of land acquisition and relocation. The proposed location for the Operations Management Center covers an area of 34.41 mu and was originally state-owned riverbank land. In 2017, it was converted into state-owned land and transferred for development to Guangzhou Convention and Exhibition Tower Investment and Development Co., Ltd. In 2021, the company obtained real estate certificates. Currently, Guangzhou Zhi Investment Co., Ltd. and Guangzhou Convention and Exhibition Tower Investment and Development Co., Ltd. have reached a preliminary lease agreement, planning to use partial sections of the 3rd and 13th floors of the Pazhou Logistics Waiting Building for project construction. Therefore, this approach avoids significant civil engineering projects and reduces the impact on surrounding residents.

(2) Employment opportunities will be provided during construction and operation. During the construction phase, the project will require a significant number of construction workers and technical personnel, including construction workers, engineers, and designers for tasks such as data center construction and equipment installation. During the operation phase, a management and operation team will be needed to coordinate various tasks and ensure the smooth operation of the project. Therefore, the project can provide employment opportunities across various fields, including construction, technology, operation, and management. It is estimated that 55 job positions will be available during the construction phase, and 20 job positions will be available during the operation phase. Additionally, after the project is completed, it will provide a platform for entrepreneurship. The Smart Industry Incubation Platform offers resources and support to promote innovation and development among entrepreneurs, create job opportunities, and contribute to the growth of the job market.

(3) Potential risks during construction and operation. Even without significant civil engineering projects, attention should be paid to the impact on residents during construction, such as potential damage to roads or traffic congestion caused by the entry of large machinery and transportation equipment. During the project's operation, drone flights may generate some noise and visual disturbances in the city's environment for residents. Additionally, there is a risk of data misuse; data collected by the project may be misused for commercial purposes or inappropriate uses, potentially harming individual rights.

d) Spatiotemporal Twin Intelligent Platform

The Spatiotemporal Twin Intelligent Platform includes core software capabilities such as spatiotemporal computing, digital twinning, artificial intelligence, IoT sensing, big data,

and service support. It provides precise and detailed descriptions and understanding of spatiotemporal activities and patterns generated during the operation of urban systems. It includes AI algorithm supermarkets, large model application development and reasoning services, algorithm model iteration support, video intelligent analysis, and more. The platform constructs a comprehensive, multi-modal, multi-scale, and multi-level digital twinning city data resource system that covers core areas such as Yuexiu, Tianhe, Haizhu, and Baiyun. It offers online maps and scenario services to the public and other platforms. The data lake warehouse is built to manage data throughout its entire lifecycle, including IoT sensing management, video management, drone management, etc., providing unified operational and maintenance portals, microservices, and unified basic support. This platform deeply integrates massive computing resources, digital technology capabilities, and smart decision-making capabilities with Guangzhou's digital economy, digital government, and digital society for a comprehensive fusion.

The construction of the project can provide precise urban information, allowing residents to better understand the city's operating conditions and obtain real-time information on transportation, weather, and more, thereby improving their quality of life. According to the survey questionnaire, when asked whether they believed that the implementation of the Spatiotemporal Twin Intelligent Platform (including AI algorithm supermarkets, large model application development and reasoning services, algorithm model iteration support, video intelligent analysis, and the provision of online maps and scenario services) had a significant effect on improving residents' quality of life and understanding the city's operations, 66% of residents considered the effect to be significant, 23% viewed it as moderate, and 11% considered it insignificant.

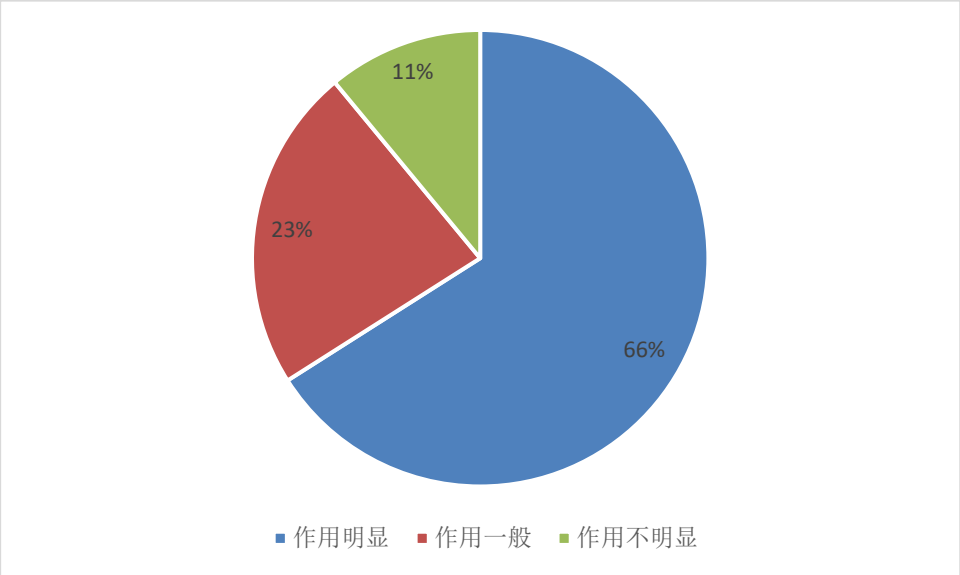


Figure 5-5: Resident Evaluation of the Spatiotemporal Twin Intelligent Platform

e) Smart Industry Applications

The construction of intelligent industrial applications includes the "Guangzhou Urban Management Bureau Sui Fashion+" mini-program, which has created a four-level management system at the city, district, street (township), and community (village) levels. It connects residential communities, collective units, public places, and operating areas, forming a "4+4" two-party principal and four-level application system. This system provides functions such as comprehensive information display, reporting, management, inspection, and reporting. It offers data support to improve the efficiency of waste classification management, strengthen the exchange of waste classification management experiences, and display real-time waste classification status. Additionally, it provides decision-making support for subsequent waste classification work. The project also includes intelligent energy infrastructure, a smart energy service platform and application systems, and comprehensive operational services. This encompasses functions such as safe electricity management, intelligent lighting management, air conditioning intelligent management, energy consumption monitoring, flexible load control, secure operation monitoring of distribution rooms, electric vehicle charging station management, carbon asset management, dual-carbon data support, carbon peak intelligent decision analysis, and mobile applications for smart energy. The project involves the installation of energy-class perception and control terminals (such as air conditioning monitoring devices and lighting monitoring devices) covering one building/area and pilot street electric bicycle charging stations.

(1) The implementation of the project can enhance precise urban governance. Smart urban management and urban construction projects provide more efficient urban management services by connecting residential communities, units, public places, and other entities. This leads to a cleaner, more convenient, and environmentally friendly living environment for residents.

(2) It raises residents' environmental awareness. The waste classification management system can improve waste classification efficiency, reduce environmental pollution, promote sustainable development, and encourage residents to use low-carbon transportation methods. The construction of electric vehicle charging stations facilitates residents' use of electric vehicles, promoting the popularization of green travel methods and the cultivation of low-carbon behavior habits.

(3) The project advocates energy conservation. The functions of the smart energy project, such as carbon asset management and carbon data support, contribute to achieving carbon reduction goals, positively impacting climate change mitigation.

Among these projects, the smart waste bin project is closely related to residents' daily lives. According to the survey questionnaire, when asked whether they believed that the implementation of smart industrial applications (such as smart waste bins) had a significant effect on improving waste classification with precision and efficiency, 79% of

residents considered the effect to be significant, indicating that residents have high expectations for the implementation of smart waste bins.

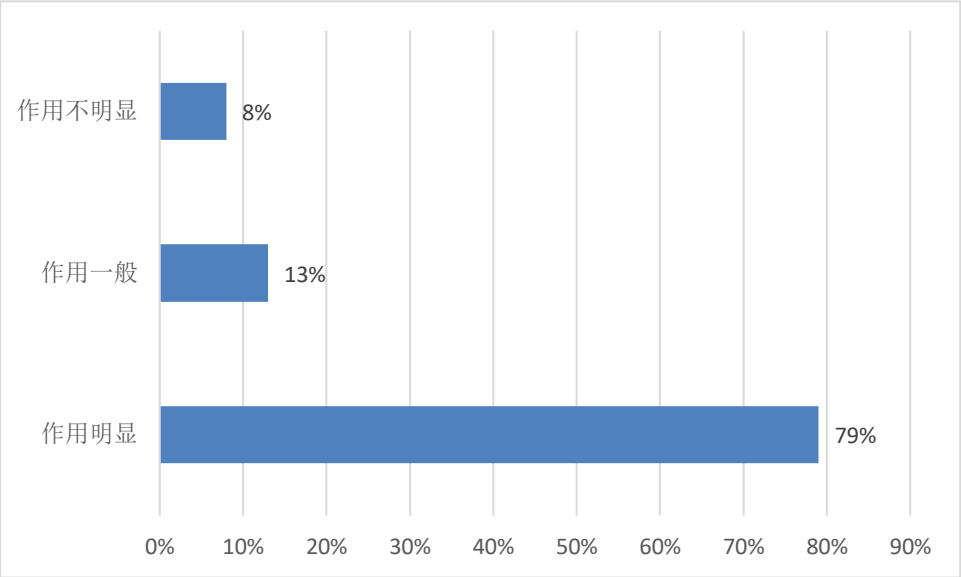


Figure 5-6: Resident Evaluation of the Implementation of Smart Industrial Applications

(4) During the construction period, the installation of intelligent elevator equipment may temporarily affect the travel of nearby residents. Regarding personal privacy issues, the installation of cameras on intelligent elevators and smart waste bins may raise concerns about personal privacy. In public participation, residents need to be informed in advance about the project's data collection related to such information.

(5) Smart city projects may face challenges related to residents' lack of understanding of new technologies and intelligent systems. Lack of sufficient information and public engagement can lead to resistance or distrust among residents, hindering the smooth implementation of the project. It can also lead to a digital divide, where access to and use of digital information are unequal. If some residents, especially the elderly and women, cannot access or understand digital technology, they may be marginalized and unable to enjoy the smart services provided by the city, exacerbating social inequality.

(6) Problem of labor substitution due to smart city projects. The development of smart cities may lead to the problem of labor replacement, which means that some traditional jobs may be affected by automation, intelligence and digital technology, resulting in the loss of job opportunities for workers. For example, the monitoring of waste sorting by smart bins may reduce the number of waste sorting managers at refuse collection points.

a) 5.2.1.6 Safeguard System

The safeguard system aims to enhance the safety monitoring and decision-making capabilities of the Guangzhou Smart City infrastructure project. By establishing a smart urban infrastructure safety management platform, it creates a hub for urban infrastructure safety intelligence, enhances network security defense technology, promotes innovation in network security technology, and provides network security threat discovery, monitoring and warning, judgment analysis, comprehensive situation awareness, and emergency response capabilities for the safety risks of smart urban infrastructure projects.

(1) The implementation of the safeguard system project can enhance the network security protection capabilities of urban infrastructure, reduce the risks of network attacks and data leaks, and protect the information security of residents and businesses.

(2) Privacy computing and national commercial encryption technologies can strengthen the protection of sensitive information of individuals and businesses, enhance data privacy awareness, and protect their rights and interests.

2. Mitigation of Social Impact Risks

a) Mitigation of Construction Period Risks

(1) Computational Infrastructure

According to on-site investigations, the selected site for the computational center is located within the Guangzhou University City Huaneng New Energy Co., Ltd. compound in Shabian Street, Panyu District, Guangzhou. Construction activities are separate from the community's main traffic arteries, with no direct intersection between the two. The project's traffic impact will not extend to the surrounding community's main roads, helping to reduce interference with residents. To address issues such as road damage or traffic congestion caused by the entry and exit of large mechanical equipment, as well as the issue of leased buildings not meeting acceptance criteria, the following risk mitigation measures have been formulated: a. Develop a detailed traffic management plan and promptly inform residents in the surrounding communities; b. Conduct road inspections in advance and carry out necessary road maintenance and repair work before construction. This will help reduce damage to the roads caused by mechanical equipment and improve traffic flow; c. Expedite the readiness of the leased buildings to meet acceptance criteria: Take measures to ensure that the computational center meets acceptance criteria as soon as possible. This may include optimizing infrastructure, security measures, and equipment installation to meet project requirements; d. Reach an agreement and sign a lease contract with the lessor as soon as possible. Ensure that the agreement covers key aspects such as lease duration, rent, maintenance responsibilities, and safety requirements.

(2) Fusion Infrastructure

Based on the site survey, it was found that the proposed location for the Operations Management Center and Smart Industry Incubation Platform, the "Guangzhou Design Capital Phase II," is situated in the central part of Baiyun District, Guangzhou, surrounded by schools, kindergartens, and residential buildings. Even without large-scale civil engineering works, the impact on residents during construction still needs to be monitored and mitigated. To address issues such as road damage or traffic congestion caused by the entry and exit of large machinery, the following risk mitigation measures have been developed: a. Develop a detailed traffic management plan and publicly inform the surrounding community residents in a timely manner; b. Conduct a road surface inspection in advance and carry out necessary road maintenance and repairs before construction. These measures will help reduce the damage to roads caused by machinery and improve traffic flow.

(3) Smart Industrial Applications

Regarding the installation of smart elevator equipment that may temporarily affect residents' travel and the installation of cameras on smart elevators and smart waste bins that may raise privacy concerns, the following risk mitigation measures have been proposed: a. Notify residents in advance of the timing and location of elevator equipment installation, and try to install during non-peak hours. Establish communication channels to address residents' concerns and questions; b. Provide clear privacy policies that explain the purpose and data processing methods of cameras to ensure residents' informed consent.

b) Mitigation of Operational Period Risks

(1) Fusion Infrastructure

Regarding the risk of noise and visual disturbances caused by drone flights during the project's operational period, as well as the risk of data misuse, the following mitigation measures have been proposed: a. Establish flight time and area regulations: Restrict the time and locations of drone flights to minimize interference with residents. Flights should be avoided during daytime and non-working hours, and low-altitude flights in residential areas should be minimized; b. Notify residents in advance of the time and location of drone flights and explain the purpose and necessity of the flights. Establish communication channels for residents to report any discomfort; c. Provide transparent information to residents, informing them about data collection and its purposes. Obtain their informed consent; d. Ensure that data collection and processing comply with privacy regulations and data protection laws. Clearly define the purposes of data collection and collect only necessary information.

(2) Smart Industrial Applications

Based on on-site investigations, waste station managers are often local community

administrators and volunteers. If there are indeed issues related to labor displacement, training and job transition measures will be implemented to ensure that no workers lose employment opportunities due to the implementation of smart projects. To mitigate the challenges related to residents' lack of understanding of new technologies and intelligent systems and the issue of labor displacement that may arise, the following mitigation measures have been proposed: a. Use visual tools, demonstrations, and simulations to show residents how smart city technology works and its application scenarios. Practical demonstrations will help residents better understand; b. Encourage residents to participate in project planning and decision-making processes, especially by facilitating the participation of the elderly and women through time and methods suitable for them, enabling them to play a role in the project and raise concerns and suggestions; c. Provide vocational retraining and skills conversion programs for affected workers to help them transition to new employment opportunities.

C. Impact on Vulnerable Groups

(1) Helps Low-Income Individuals Increase Employment and Income

The project provides direct and indirect employment opportunities, enabling more low-income individuals, both local and migrant, as well as women, to gain employment. This, in turn, helps low-income individuals and vulnerable groups increase their economic income. During the construction period, the project will directly provide temporary job positions. Non-technical positions such as construction laborers, transportation workers, and site cleaners will be offered during the construction period. These employment opportunities will be prioritized for local low-income populations and women, among other vulnerable groups, to increase their economic income. In summary, the project's implementation will promote local economic development, increase employment opportunities for low-income individuals, and reduce poverty.

(2) Helps Improve the Socioeconomic Status of Women

The project's implementation will increase employment opportunities for women. Women's employment contributes to enhancing their abilities and qualities, thereby improving their socioeconomic status.

(3) Provides a Safer and More Convenient Travel and Living Environment for Women

(4) Promotes Social Equity, Allowing Vulnerable Groups to Share in Development Achievements

The project's construction will benefit a large number of local residents, allowing them to share in the benefits of digital social development.

5.3.4 Prohibited Activities

(1) Child labor under the age of 18 is not allowed to be employed in this project.

(2) Forced labor or any form of harmful or exploitative labor is not allowed.

(3) The construction, production, or activities that violate Chinese laws or regulations and international conventions and agreements are not allowed.

D. Gender Analysis

1. Current Status of Women's Development in the Project Area

To promote gender equality and the advancement of women's socioeconomic status, China has established a comprehensive legal framework and policy system. Based on relevant laws and regulations in China, such as the Constitution of the People's Republic of China, the Law on the Protection of Women's Rights and Interests, the Labor Law, the Marriage Law, the Election Law, the Criminal Law, and the Special Provisions on the Labor Protection of Female Workers, the project will be implemented within the framework of Chinese laws and policies. It will coordinate with women's federations at all levels in the project area to implement specific requirements for the protection of women's rights and gender development in accordance with the overall goals and requirements of "China's Women's Development Outline (2021-2030)," "Guangdong Province Women's Development Plan (2021-2030)," "Guangzhou Women's Development Plan (2021-2030)," "Panyu District Women's Development Plan (2021-2030)," and "Haizhu District Women's Development Plan (2021-2030)."

Table 5-7 Women's Federation Organizational Structure at Various Levels

Level	**Stakeholders**
National Organization	All-China Women's Federation
Local Organizations	Guangdong Provincial Women's Federation
	Guangzhou Municipal Women's Federation
	Panyu District Women's Federation
	Haizhu District Women's Federation
Grassroots Organizations	Nancun Town Women's Federation
	Women's Federations of Pazhou Street and Guanzhou Street
	Women's Federations in the affected communities within the project area
Group Members	City Investment Group Union Female Workers' Committee

	Female Workers' Committees of grassroots unions in affected enterprises within the project area, and others

According to the Guangzhou National Economic and Social Development Statistical Report, as of the end of 2023, Guangzhou had a total permanent resident population of 18.827 million, with a registered population of 10.5661 million. Among the permanent resident population, 5.2078 million were male (49.29%) and 5.3583 million were female (50.71%). For detailed information, refer to Table 5-8.

Table 5-8: Basic Population Statistics for Women in the Project Area

Population Statistic	Permanent Population at Year-End (10,000)	Registered Population at Year-End (10,000)	Male Population (10,000)	Female Population (10,000)
Guangzhou	1882.70	1056.61	520.78	535.83
Panyu District	282.28	120.52	59.16	61.36
Baiyun District	366.68	122.89	59.82	63.07
Nancun Town	34.00	11.62	5.67	5.59
Huangshi Street	17.00	3.96	1.80	2.16

Source: Population data from the 2023 National Economic and Social Development Statistical Report for the project area.

2. Project Area Gender Disparity Analysis

c) Characteristics of Survey Sample Population

To understand the development status of women in the project area, the ESIA team conducted surveys and interviews with women during on-site investigations. A total of 300 valid questionnaires were collected, with 141 female respondents, accounting for 47% of the survey sample.

(1) Age Distribution

From the statistical results of the survey sample, it can be seen that males and females account for 53% and 47%, respectively. In terms of the age distribution within the female sample, the largest group falls within the age range of 35-44, comprising 34.04%. The second-largest group is in the age range of 45-54, making up 20.57%. The age group of 25-34 is the smallest, representing 9.93%. The details are shown in Figure 5-7 below.

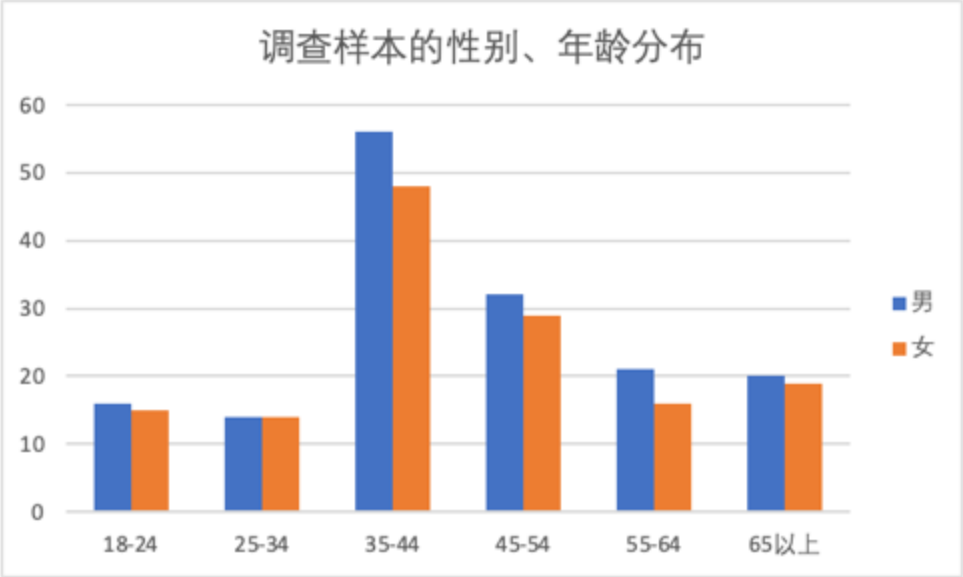


Figure 5-7 Gender and Age Distribution of Survey Samples

(2) Educational Attainment

Regarding the distribution of educational attainment in the survey sample, the educational levels of the respondents are primarily concentrated at the junior high school and high school/technical school levels. Women with a junior high school education account for 34.75% of their respective group, slightly higher than the 28.30% among men. For those with a high school or technical school education, women make up 31.21% of their group, lower than the 42.14% among men. Overall, the educational attainment of women in the project area is also concentrated at the junior high school and high school/technical school levels, but it is slightly lower than that of men.

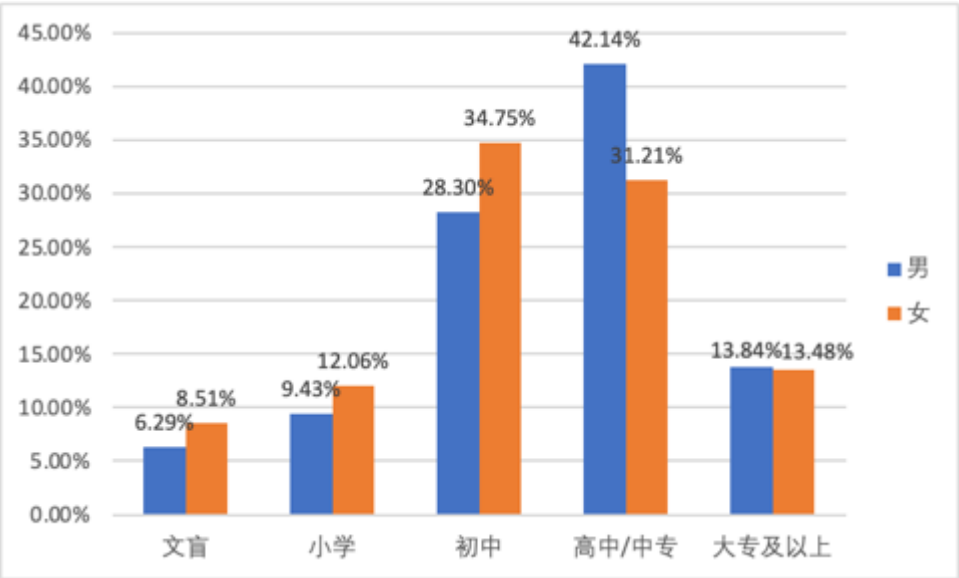


Figure 5-8 Educational Attainment of Survey Samples

(3) Occupational Composition

Based on the overall distribution of the survey sample in the project area, both men and women have over one-third of individuals working in government agencies, enterprises and institutions, and private enterprises. Men have a higher employment rate than women. In other categories and among self-employed individuals, the occupational composition is higher for women than men. This indicates a relatively balanced employment of both genders in the labor market. Considering the interview findings, young and middle-aged men and women in urban areas mainly work nearby or engage in labor work. On the other hand, older women mostly stay at home and rarely work outside. There is still a noticeable division of roles between genders, with men mainly playing roles outside the home, while women's roles in managing household affairs are more pronounced. Most survey respondents stated that women are primarily responsible for household chores and taking care of the elderly and children.

Table 5-9 Gender and Occupational Distribution of Survey Samples

Occupation	Male	Male Percentage	Female	Female Percentage	Total
Civil Servants	13	8.18%	6	4.26%	19
Public Sector Employees	32	20.13%	17	12.06%	49
Corporate Employees	31	19.50%	15	10.64%	46
Self-Employed	35	22.01%	25	17.73%	60
Freelancers	27	16.98%	43	30.50%	70
Students	4	2.52%	12	8.51%	16
Retired	6	3.77%	12	8.51%	18
Farmers	3	1.89%	4	2.84%	7
Others	8	5.03%	7	4.96%	15
Total	159	100%	141	100%	300

d) Gender Differences in the Project Area (Baseline)

The AIIB project has always focused on gender equality and women's development. ESS1 clearly states the need to identify any adverse gender risks and impacts and develop mitigation measures to reduce these risks and impacts based on gender factors. This includes optimizing project design, promoting equal opportunities, and empowering women in socio-economic aspects. By referencing the dimensions of gender differences analyzed by international financial institutions such as the World Bank and the Asian Development Bank (ADB), and considering the specific circumstances of this project, an analysis of gender differences was conducted in the areas of participation in decision-making, economic participation, and development capabilities.

(1) Women have a lower level of understanding of the project compared to men. When asked about their level of understanding of the project, the cumulative proportion of women who chose "very familiar" or "familiar" (64.8%) was lower than that of men (88.9%). Interviews revealed that women have shown positive trends in terms of their recognition and participation in the project. When asked, "Who in the family is more familiar with policies such as land compensation and noise pollution control implementation standards?" the proportion of women (39.3%) was lower than that of men (45.8%).

Interview Record 5-1: Ms. Zhang (35 years old) from Pazhou Street "I've heard of smart cities before, and now many transactions need to be done on smartphones, which I think should also be related to your smart city project, right? My education level is not very high, so if there are any issues with using these smart platforms, I hope there can be simple training to help more people participate."

(2) In households within the project area, the economic status of women is lower than that of men. Family income in the project area is primarily supported by men. Survey results indicate that men account for 50.8% of the household income, while women's income constitutes 43.3%. Interviews revealed that despite a narrowing of the gender economic gap, certain gender inequalities persist. These disparities may manifest in terms of opportunities for career advancement and differences in compensation. Household decision-making authority is predominantly held by men. Women are constrained by factors such as lower educational attainment, physiological differences, heavy domestic responsibilities, and obligations related to the care of elderly family members and children. These constraints limit women's opportunities for external employment, resulting in their lower contribution to household economic activities and a lower economic status compared to men.

Interview Record 5-2: Southwest Yue Community, Ms. Sun (42 years old), and others. "Life in Guangzhou is quite stressful. Both my husband and I work outside, and sending our child to school costs a lot of money. My job is relatively flexible—I cook for others and take care of children, which allows me to earn some money. However, my husband still earns more than me."

(3) Women have lower access to employment information and skills training opportunities compared to men. Women in the project area face higher employment difficulties in the job market, as their opportunities to access employment information (39.8%) are significantly lower than those of men (54.2%). This reduces their chances of participating in income-generating activities, such as starting micro-enterprises or joining

cooperative organizations. In addition, the burden of household chores and the responsibility of taking care of the elderly and children also limit women's time to participate in various employment skills training activities.

Table 5-10: Gender Difference Analysis Table

S/N	Specific Option	Male (A)	Female (B)	Gender Discrepancy (A-B)	Analysis	Remarks	Dimension
1	Do you know about the Smart City Project?	88.9%	64.8%	24.1%	Women have lower awareness than men	Women respondents have a strong desire to participate	Participation
2	Who has more access to employment opportunities (business and skills), males or females?	54.2%	39.8%	14.4%	Men have a significantly higher chance of accessing employment information	Increase promotion and skills training for women	Employment
3	Who earns more in the family, males or females?	50.8%	43.3%	7.5%	Men earn more in the family	Increase female income	Economic Participation
4	Do you think it's difficult for women to find employment in the family?	57.3%	42.7%	14.6%	Women find it more difficult to find employment	Prioritize employment opportunities for women	Employment

3. Impact on Women

e) Positive Impact

(1) Providing Employment Opportunities for Women and Increasing Economic Income During the project construction process, it is expected to provide 30 temporary positions for women, such as laborers with low technical requirements, cleaners, traffic maintenance workers, and cooks for the construction team. These local temporary positions can be offered to young and middle-aged women and low-income groups, allowing local women and low-income groups to increase their non-agricultural income. After the project construction is completed, it will provide certain non-technical positions (5 positions), such as cleaners, patrol officers, and security personnel, which will be prioritized for low-income households and women in the affected residents of the project area, ensuring that low-income groups increase their economic income.

(2) Encouraging Women's Participation and Promoting Women's Development The AIIB project encourages women's participation in the project and focuses on protecting women's rights and interests. During the project construction and implementation process, existing community and village committees can promote women's participation in relevant public affairs, encourage women to participate in project discussions and advisory consultations. This allows more women to understand and participate in the project, giving them a voice and the opportunity to express their own needs, and seeking more development opportunities for women. Additionally, providing safety awareness training and employment training for women will contribute to improving their overall skills and promoting their long-term development. Field surveys have shown that women have a high willingness to participate in public activities, so community public participation initiatives should prioritize the involvement of women.

(3) Providing Women with a Safer and More Convenient Living Environment The implementation of this project will improve urban safety facilities and strengthen urban fine management, such as smart elevators, which will enhance the sense of security for women in the city. Moreover, the project's implementation is expected to provide more intelligent services and improve the supporting public infrastructure, making women's lives more convenient and efficient.

f) Negative Impact

Field investigations have found that women will benefit from the project implementation. However, if the project lacks sensitivity to social gender issues and neglects women's needs and suggestions in the project's design, implementation, and management processes, it may reduce the project's effectiveness and pose social risks to women. Specifically:

(1) Women's Relevant Needs May Be Neglected In the project area, influenced by factors such as social traditional culture and economic dominance, women's social status is still

lower than that of men. Most decisions in major family matters are made by men, and most participants in public affairs are also men. In the Smart City project, women have limited opportunities and rights to participate in the project, and they may not be able to fully realize their potential. Therefore, in the design, implementation, and operation management of the project, it is easy to neglect women's specific needs and related suggestions, which can lead to inadequate attention to women's needs. Some groups of women may lack appropriate awareness and training in digital technology, making it difficult for them to fully participate in the digital services of the Smart City.

(2) Potential Gender-Based Violence Risk Article 40 of the Law on the Protection of Women's Rights and Interests of the People's Republic of China states that "sexual harassment of women is prohibited. Injured women have the right to complain to the unit and relevant authorities." Article 11 of the Special Provisions on the Protection of Female Workers' Labor Rights stipulates, "In the workplace, employers shall prevent and stop sexual harassment of female workers." Gender-based violence is any harmful behavior between individuals based on gender differences that violates personal will and includes behavior that causes physical, sexual, or mental harm or suffering, or involves threats, coercion, and other forms of deprivation of freedom. These behaviors can occur openly or privately. During the implementation and operation of this project, the proportion of male workers is significantly higher than that of female workers, and male workers are more inclined to work in technical and managerial positions. If not managed properly, it may lead to harmful behaviors such as gender-based violence, sexual exploitation, sexual abuse, and sexual harassment, which may have a negative impact on the physical and mental health of female workers. During the implementation or operation of the project, implementing agencies, project construction units (contractors), etc., should sign labor (employment) contracts with female workers in accordance with laws and regulations such as the Law on the Protection of Women's Rights and Interests of the People's Republic of China, the Special Provisions on the Protection of Female Workers' Labor Rights, the Regulations on Women Workers' Health Protection, and the Special Labor Protection System for Women Workers (reference text). They should implement equal pay for equal work for men and women and, based on the characteristics of their own work and production units, take effective measures such as setting up special commissioners responsible for the protection of women's rights and interests to prevent and stop sexual harassment of female workers in the workplace. Currently, for the protection of women workers' labor rights and interests, especially the gender differences, gender discrimination, and gender violence faced in the workplace, the Smart Investment Company has signed a Special Collective Contract for the Protection of Women Workers' Rights and Interests with female workers. At the same time, the company's Women Workers' Committee is an organization responsible for promoting gender equality and women's rights and interests, safeguarding the legitimate rights and interests of women workers, and fighting against phenomena of discrimination, abuse, and persecution of women. Specific protection measures have been put in place for the special circumstances of female workers.

g) Gender Action Plan

In summary, the ESIA unit has summarized some concentrated needs of women in the project area based on questionnaire surveys of sampled samples, women's seminars, in-depth interviews, and on-site surveys. In response to these needs, the following action suggestions are proposed.

Table 5-11: Gender Action Plan

Specific Measures or Actions		Monitoring Indicators	Implemented by	Target population
A. Increase Women's Employment Opportunities	a. During the project construction and operation, prioritize offering non-technical positions to women in the project area's villages and communities. b. For physically undemanding jobs, consider relaxing the age range for recruitment and give priority to women aged 40 to 50 who have difficulty finding non-agricultural employment, such as cleaning, cooking, and caretaking roles.	Prioritize providing employment opportunities for women (baseline female worker ratio during construction approximately 10%, target 15%).	Contractors	Communities surrounding the project area
B. Enhance Women's Development Capacities	a. Improve women's employment and entrepreneurship skills and opportunities through employment knowledge lectures, skills training courses, and employment and entrepreneurship seminars. b. In smart city and sustainable information disclosure capacity building training, provide appropriate skills training content and suitable training times considering women's physical and psychological characteristics, education	a. Proportion of female participation in various training programs, including digital skills training, health and lifestyle guidance, women's rights awareness education, and employment skills training (baseline 20%, target 30%). b. Increase female participation in project information disclosure and management training (baseline 25%, target 30%).	Smart Investment Company, Township and Street Women's Federations, Project Community Resident Committees, Contractors, etc.	Female in the project area; female staff of contractor, Zhitou company and PMO

Specific Measures or Actions		Monitoring Indicators	Implemented by	Target population
	levels, personal needs, etc., to further ensure that women have equal opportunities to enhance their skills alongside men.			
C. Reduce Gender-Based Violence Risks	a. Strengthen the protection of women labor rights, providing regular mental health counseling and women labor rights protection training for female laborers. b. Enhance site supervision to prevent harmful behaviors such as gender-based violence, exploitation, sexual abuse, and harassment. c. Each female worker signs a "Special Collective Contract for the Protection of Female Workers' Rights." d. Establish clear complaint and grievance channels, forming a site complaint and grievance team including at least two female members, and ensuring the safety of team members to prevent biases and fear of retaliation.	a. 100% of female workers receive labor rights protection training. b. Ensure equal pay for equal work between 100% of female and male workers, with zero cases of gender-based violence incidents. c. Number of contracts signed d. Establishment of complaint and grievance channels, number of female team members.	Smart Investment Company, Township and Street Women's Federations, Project Community Resident Committees, Contractors	Female in the project area

E. Labor Management Status

1. Management of Non-Local Workers during Construction

h) Analysis of Potential Labor Management Risks (Local and Non-Local Labor During Project Construction)

The Guangzhou Smart City project involves two sub-projects that employ a building leasing model and does not involve land acquisition or resettlement of communities. Currently, all the floors leased by the two sub-projects have been completed, with only equipment relocation and decoration work remaining. The equipment relocation and decoration work have a small scope and quantity and do not require the organization of specialized construction teams; hiring local decoration companies should suffice. It is expected to involve some temporary job positions, approximately 110 people, mainly from the local labor force in Guangdong Province. Among them, male laborers mainly perform skilled and technical work, while female laborers are primarily engaged in unskilled work. During the construction process and in daily affairs at the construction site, special attention should be paid to gender-based violence issues, and discrimination against women should be avoided during labor recruitment. Efforts should be made to prevent physical and sexual harm to women, including threats, coercion, or arbitrary deprivation of freedom based on gender. During the construction process, particular attention should be paid to the gender ratio of male and female laborers, and the proportion of female laborers should be increased.

Laborers will move and consume in the residential communities near the construction site and relevant street shops, which may lead to certain social and health risks. For example, concerning public health, conditions may facilitate the spread of some infectious diseases (including HIV/AIDS, COVID-19, seasonal flu, etc.).

Table 5-12 Overview of Expected Labor Force for the Project

Source of Labor	Statistical Indicators	During Project Construction (Individuals)	During Project Operation (Individuals)	Total (Individuals)
Local Labor	Total Number (People)	110	40	150
Number of Women (People)	11	12	23	
Percentage of Women (%)	10%	30%	15%	

Remarks: although there is such risk, the risk level is low.

i) Existing Management Measures

Through a comparative analysis of China's legal framework for labor protection and the key requirements of Asian Infrastructure Investment Bank's (AIIB) Environmental and Social Framework (ESS1) Labor and Working Conditions standards, it was found that China's legal framework for labor protection is consistent with the key requirements of AIIB ESS1, and in some cases, even stricter, such as the statutory age for employing child labor. Therefore, the existing Chinese legal framework aligns with the essential requirements of AIIB ESS1.

Norms for labor management by construction units include:

Based on the principles of equal opportunity and fair treatment, employ project staff without discriminating against specific groups such as women, disabled persons, migrant workers, and legally aged youths.

Provide appropriate protection and assistance measures, including establishing working time restrictions, specifying leave systems to protect the safety and health of laborers from a time perspective, and providing sufficient and complete labor protection supplies according to the needs of construction, the presence of hazards in the construction site, and labor safety and health requirements. Care for specific groups of workers such as women, disabled persons, migrant workers, and legally aged youths.

Adhere to national laws and regulations. Workers have the right to establish and join worker organizations of their choice and ensure that their collective bargaining is not interfered with.

To prevent the occurrence of sexual harassment incidents, contractors shall provide sufficient male and female shared facilities according to the number of female staff at the construction site, formulate relevant rules and regulations to prevent sexual harassment, and assign dedicated personnel to ensure compliance and inform all staff of relevant requirements during routine management training.

Establish and clarify a mechanism for labor complaint handling and grievances. Protect individuals' privacy when handling complaints of sexual harassment in accordance with the law.

j) Mitigation Measures

Based on the identified potential labor management risks for non-local workers during the construction period, the social evaluation unit, in consultation with Guangzhou Smart Investment Co., Ltd., implementing agencies, and design units, has formulated relevant design optimization and mitigation measures as detailed in the Social Management Plan.

2. Management of Guangzhou Smart Investment Staff

k) Analysis of Potential Labor Management Risks

Guangzhou Smart Investment Co., Ltd. has a total of 112 employees, including 97 regular employees and 15 temporary workers. The number of female employees is 47, accounting for 41.9%. The ESIA unit's on-site investigation identified potential labor management risks, including the impact of extended commuting time on employee work, the potential for sudden situations and quality and safety accidents, the risk of sexual harassment or assault, health and infectious disease risks, and risks related to the lack of wage and benefits protection.

l) Existing Management Measures

Guangzhou Smart Investment Co., Ltd. must ensure that construction units and contractors strictly comply with relevant labor safety laws and regulations of the People's Republic of China and provide a fair and safe working environment in accordance with the labor management methods and regulations of Guangzhou. To achieve labor protection goals, Guangzhou Smart City Investment & Operation Co., Ltd. has established and improved mechanisms for labor rights protection and supervision to safeguard the legitimate rights and interests of workers.

Strict access control: Any unit or organization that recruits workers must hold a valid license, establish recruitment regulations, and conduct legal recruitment through information release, commissioning human resources service agencies, or participating in recruitment negotiations, among other legal means.

Clear labor records: Employers that have established labor relations with workers should establish a register of workers for inspection. Changes or terminations of labor contracts should be recorded promptly.

Adherence to daily inspection and special law enforcement inspections: Strict written materials review and inspection should be carried out for issues such as whether employers comply with the prohibition of employing child labor, whether they comply with special labor protection for female workers and underage workers, whether they comply with working hours and rest leave regulations, and whether they pay workers' wages and implement minimum wage standards.

Implementation of rights protection publicity system: In labor recruitment places, labor rights protection publicity signs should be established or posted to inform workers of their statutory rights and channels for safeguarding rights.

Clear responsibilities of government departments: Establish a coordination and inspection system. Establish a social public announcement system for major violations of labor protection, comprehensively promote labor protection laws and regulations,

strengthen social supervision, and enhance the deterrent effect of labor protection inspection.

Regarding gender-based violence (GBV) management, Guangzhou Smart Investment Co., Ltd. has taken multiple measures. Starting from the physical reality of female employees, it has established regulations to protect the legitimate rights and interests of female employees, such as pregnancy protection, maternity leave, miscarriage leave, and menstrual period protection. This effectively reduces gender-based labor discrimination. According to the "Special Regulations on Labor Protection for Female Workers in Guangdong Province," regarding the protection of the right to childbirth of female workers, employers are not allowed to include content in labor (employment) contracts that restrict their legal rights such as marriage and childbirth. Employers shall not reduce the wages and benefits of female workers, restrict their promotions and job advancements, or unilaterally terminate labor (employment) contracts due to reasons such as marriage, pregnancy, maternity leave, and breastfeeding. To protect female workers from workplace sexual harassment, employers are required to take effective measures to prevent and stop sexual harassment of female workers in the workplace according to the characteristics of their work and production, preventing sexual harassment. If there are cases of sexual harassment or other actions that harm the personal safety of female workers in the workplace and are reported or complained about to the employer, the employer should handle them promptly and protect the personal privacy of female workers. Furthermore, female workers are encouraged to vigorously defend their personal rights, with support from the Guangzhou Women's Federation through services such as consultation, exhibition boards, legal knowledge quizzes, door-to-door promotion, and distribution of prevention and legal propaganda materials. These initiatives aim to promote knowledge of gender-based violence prevention and elimination and contribute to building a healthy, civilized, and harmonious society.

Figure 5-7 Labor Contracts

m) Mitigation Measures

Based on the identified potential labor management risks for Guangzhou Smart Investment employees, the social evaluation unit, in consultation with the AIIB PMO, implementing agencies, and design units, has developed relevant design optimization and mitigation measures. For details, refer to Chapter 7, Social Management Plan.

F. Material Cultural Resources

This project is located in the urban area and involves leasing existing buildings. After on-site investigations and reviewing documents, it was found that there are no material cultural resources in the vicinity of the project that need protection. The construction activities for this project mainly include interior decoration, equipment installation, cable laying, etc. It does not involve pile driving, excavation, or other construction activities that would impact material cultural resources. Therefore, this project does not require the protection of material cultural resources.

VI. Climate Change Risk Assessment

The purpose of the climate change risk assessment is to ensure that project facilities can operate continuously and stably in the face of challenges posed by climate change. Climate change risk analysis begins by identifying potential risks based on historical observation data and future climate change predictions, such as increased energy demand due to rising temperatures and the impact of extreme weather events on communication systems. Based on the identified risks, corresponding adaptation strategies are developed to enhance facility resilience and reduce greenhouse gas emissions.

A. Climate Characteristics of the Project Location

Guangzhou belongs to the South Asian tropical maritime monsoon climate zone. Its terrain is higher in the northeast and lower in the southwest, with mountains in the north and northeast, hills and plateaus in the central part, and a delta plain in the south. Due to its low latitude and proximity to the South China Sea, Guangzhou experiences abundant solar energy, warm temperatures with minimal cold spells, and ample rainfall throughout most of the year. Typically, the year is divided into seasons as follows: spring (March to May), summer (June to September), autumn (October and November), and winter (December to February of the following year).

Guangzhou experiences relatively high temperatures year-round, with an annual average temperature of approximately 22°C. Temperature variation throughout the year follows a unimodal pattern, with the highest temperatures occurring in July and August and the lowest in January. Rainfall is abundant for most of the year, with a pronounced rainy season. From April to September, it is the wet season, with more than 80% of the annual precipitation falling during this period. The peak rainy months are May and June, with an average monthly rainfall of 280-300 millimeters, often accompanied by heavy to torrential rains. The dry season occurs from November to January of the following year. From October to November, influenced by the sinking airflow of subtropical high-pressure systems, the weather is generally clear. From December to March of the following year, the region is mainly affected by cold, dry air masses from the continent, resulting in relatively cool and dry weather.

B. Observed Climate Change Trends

Temperature. From 1908 to 2020, the annual average surface temperature recorded by the Guangzhou Meteorological Observatory has exhibited a significant warming trend, with a warming rate of 0.14°C per decade. Moreover, the rate of warming has accelerated significantly since the early 1980s. In 2020, the annual average surface temperature in Guangzhou was 23.6°C, which was 1.2°C higher than the long-term average. This tied with 2019 as the highest value since 1908.

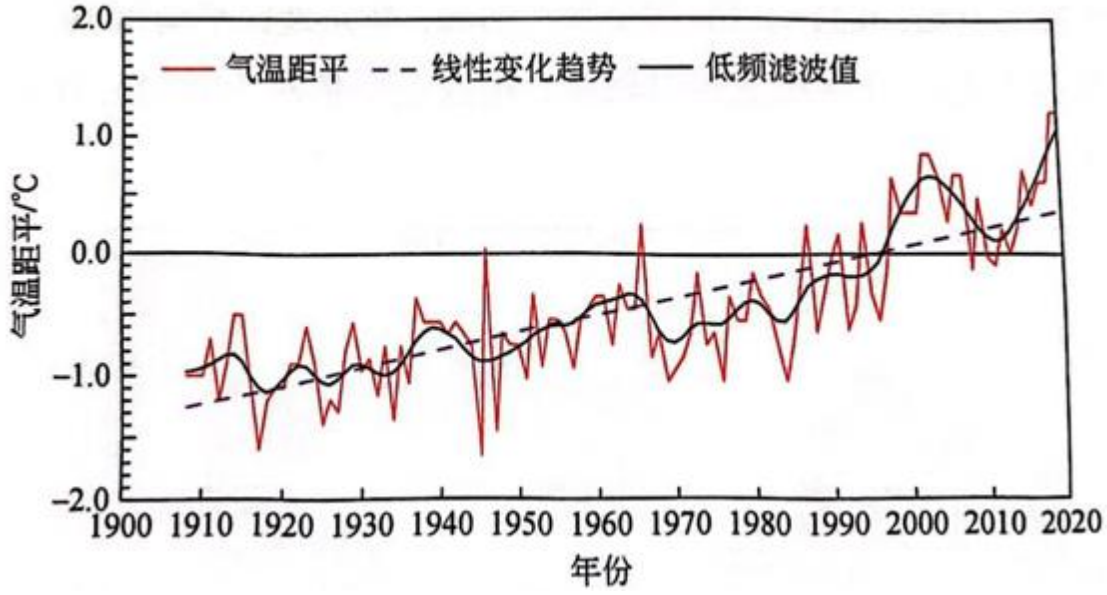


Figure 6-1 Guangzhou Meteorological Observatory Annual Average Surface Temperature Anomaly and Precipitation

Precipitation. From 1908 to 2020, the annual average precipitation at the Guangzhou Meteorological Observatory has shown an increasing trend, accompanied by significant decadal fluctuations. In the 1930s and mid-1950s to late 1960s, there was a period of reduced precipitation. However, precipitation started to increase with fluctuations since the early 1970s, and it has been in a period of above-average precipitation since the early 1990s. Since 2012, precipitation has continued to be above average. In 2020, the annual precipitation at the Guangzhou Meteorological Observatory was 1916.2mm.

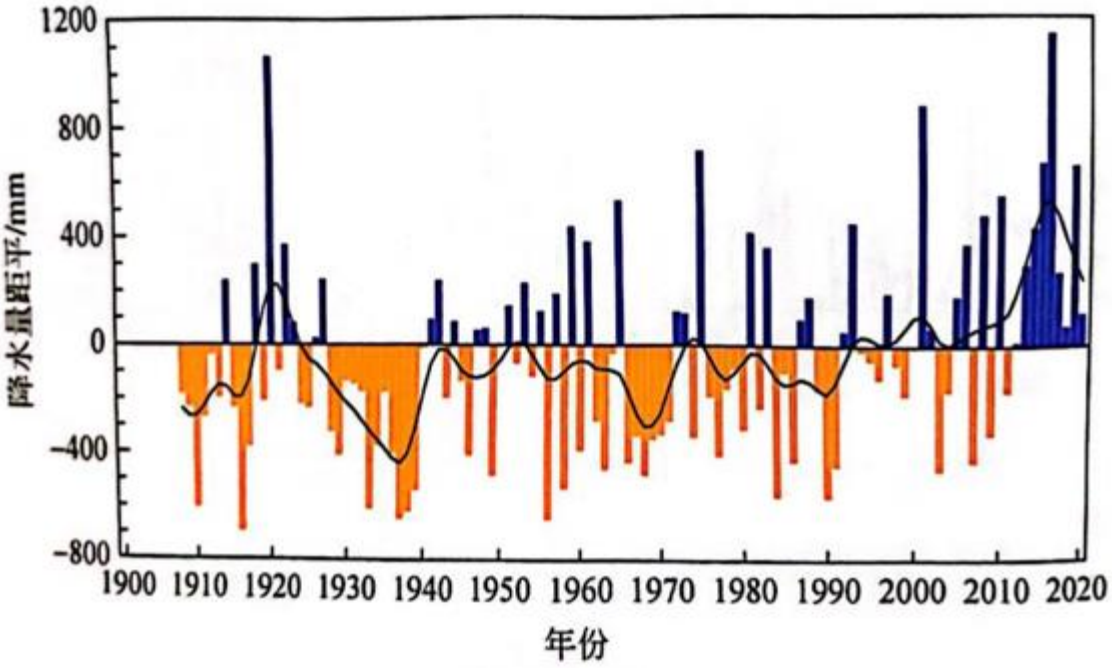


Figure 6-2 - Deviation of Precipitation from Average at Guangzhou Meteorological

Station Sea Level: The sea level along the South China Sea coast has risen by 68 millimeters compared to the average from 1993 to 2011, from 1980 to 2020.

Typhoons: Guangdong is one of the popular regions for typhoon landfalls in China, especially after the westward track of typhoons. Over the past 72 years since 1949, a total of 264 typhoons have made landfall in the Guangdong region, with a total of 277 landfalls, accounting for over 30% of the total number of typhoons landing in China during the statistical period. On average, 3.6 typhoons visit Guangdong each year, making it one of the provinces with the highest number of typhoon landfalls in China. In the past decade, nearly 7 typhoons on average have landed in China each year, and nearly half of them have made landfall in Guangdong. Particularly, since 2013, over 50% of strong or super typhoons that have made landfall in China did so in Guangdong.

C. Future Climate Change Predictions

SSP126, SSP245, SSP370, and SSP585 are a set of new climate change emission scenarios used by the Intergovernmental Panel on Climate Change (IPCC) for its Sixth Assessment Report. These scenarios are known as Shared Socioeconomic Pathways (SSP), and each SSP represents a different future path of social, economic, and technological development that leads to varying levels of greenhouse gas emissions. They are used to simulate and predict potential trends in climate change and their impacts.

Here is a brief description of these four SSP scenarios:

SSP126: This is a low-emission scenario where the world takes proactive measures, global communities cooperate, and sustainable development goals are achieved, resulting in reduced greenhouse gas emissions. By 2100, the radiative forcing (an indicator of the impact of greenhouse gas concentrations) is expected to be 2.6 W/m2.

SSP245: This is a medium-emission scenario where some emission reduction measures are taken, but global efforts are not entirely consistent. The world in this scenario is diverse, with some regions emphasizing sustainable development while others prioritize national interests.

SSP370: This is a medium-to-high-emission scenario where economic development and growth are the top priorities, leading to high energy demand and greenhouse gas emissions. While some emission reduction efforts are made at the regional level, they are not well integrated globally.

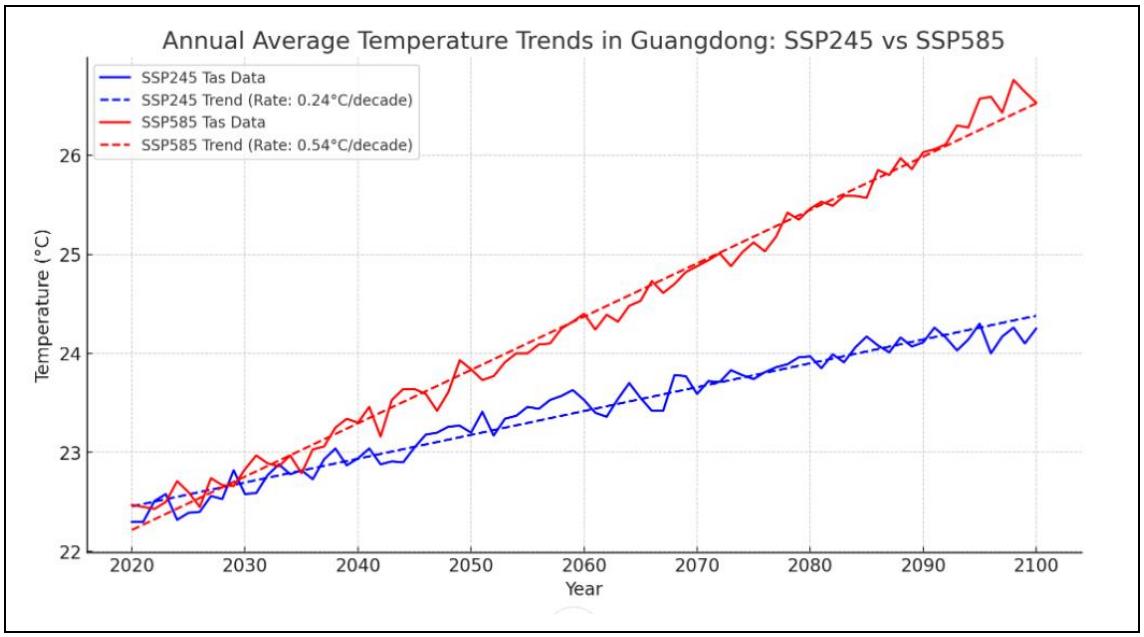
SSP585: This is a high-emission scenario that depicts a world focused on economic

growth and technological development, with less emphasis on sustainable development and environmental protection. This results in a significant increase in greenhouse gas emissions, and by 2100, radiative forcing is projected to exceed 8.5 W/m2.

Project designs typically consider climate change under different scenarios. Therefore, this assessment uses both SSP245 and SSP585 emission scenarios.

The future climate change scenario data for Guangdong Province is sourced from the World Bank's Climate Change Knowledge Portal to obtain a broader regional perspective on climate change. This platform integrates outputs from multiple climate models and provides forecasts for future climate scenarios, including temperature and precipitation changes. Considering that the World Bank platform data cannot provide sufficient geographical resolution to capture the local climate characteristics of Guangzhou City, this assessment uses an ensemble average method of five different climate models (ACCESS-CM2, MIROC6, TaiESM1, BCC-CSM2, IPSL-CM6A). Ensemble averaging helps reduce biases and uncertainties from individual models, resulting in more robust climate prediction results. This approach allows for a more detailed analysis of local climate change.

According to the data from Guangdong Province, both average temperature (tas), minimum temperature (tasmin), and maximum temperature (tasmax) are showing an upward trend under SSP245 and SSP585 scenarios. As shown in Figure 6-3, under the SSP245 scenario, the warming rates for tas, tasmax, and tasmin are 0.24°C/10 years, 0.25°C/10 years, and 0.23°C/10 years, respectively. Under the SSP585 scenario, these warming rates are 0.54°C/10 years, 0.55°C/10 years, and 0.53°C/10 years, respectively. It can be observed that under the SSP585 scenario, Guangdong Province experiences a faster rate of temperature increase.



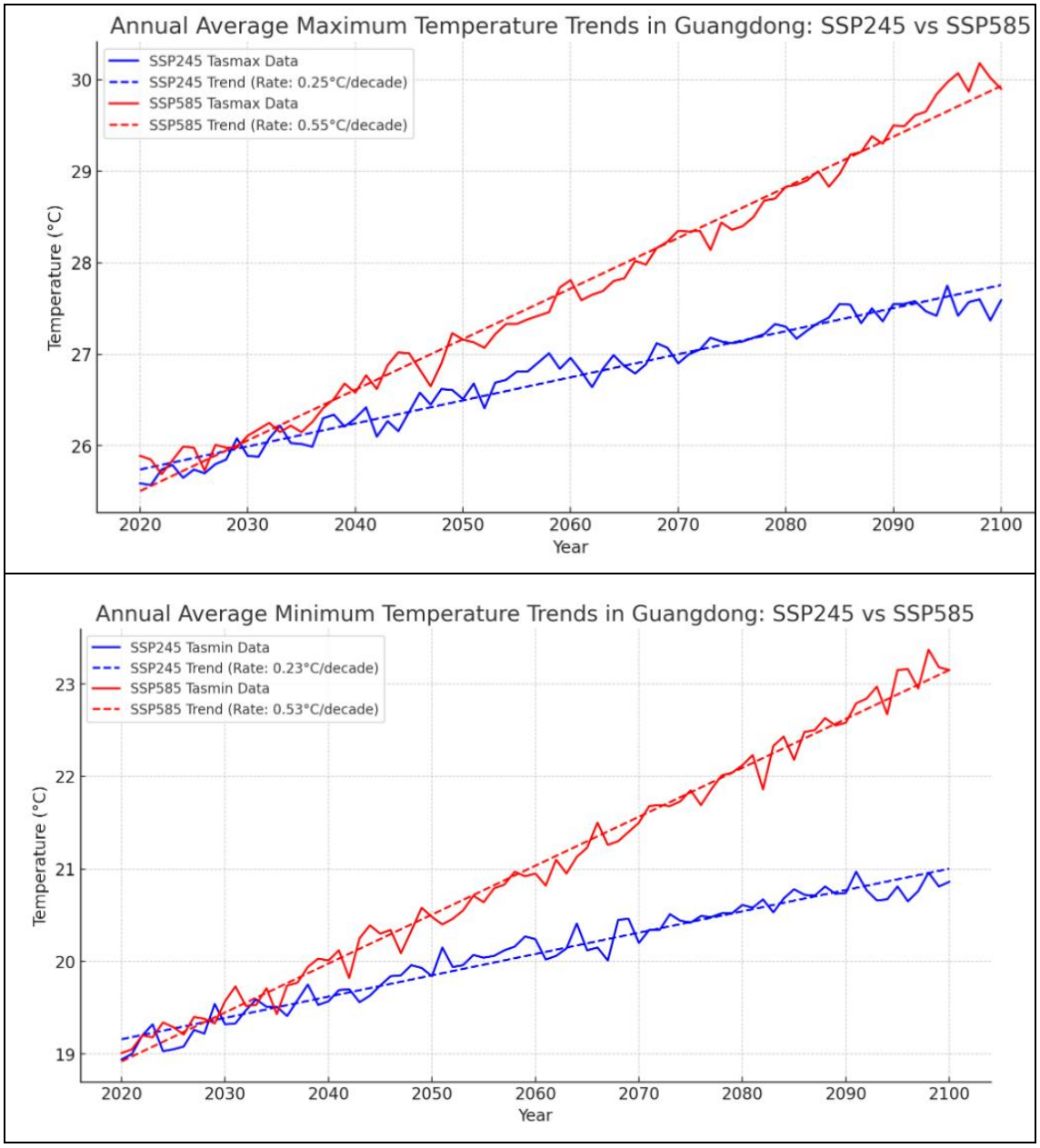
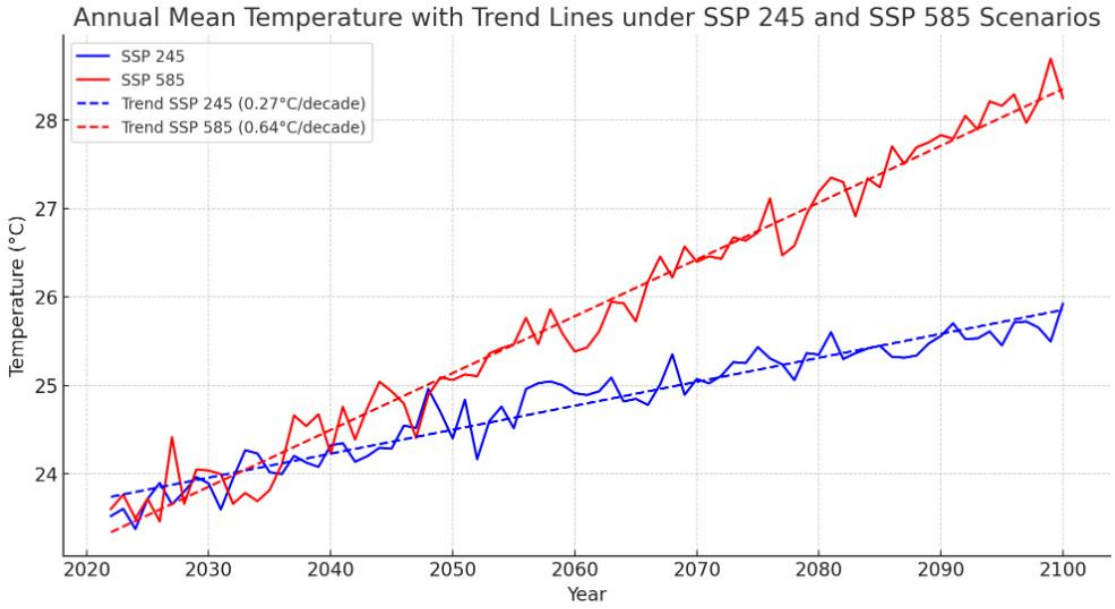


Figure 6-3: Temperature Change Forecast in Guangdong Province from 2020 to 2100

In Guangzhou City, average temperature (tas), minimum temperature (tasmin), and maximum temperature (tasmax) also show an upward trend under both SSP245 and SSP585 scenarios. Under the SSP245 scenario, the warming rates for tas, tasmax, and tasmin are 0.27°C/10 years, 0.29°C/10 years, and 0.27°C/10 years, respectively. Under the SSP585 scenario, these warming rates are 0.64°C/10 years, 0.66°C/10 years, and 0.63°C/10 years, respectively. It can be observed that under the SSP585 scenario, Guangzhou City experiences a faster rate of temperature increase.

An analysis of extreme high-temperature heatwave events (defined as days with maximum temperatures reaching or exceeding 35°C) during the period from 2020 to

2050 under the SSP245 and SSP585 climate change scenarios reveals an increasing trend in extreme high-temperature days over time. Specifically, during the period from 2020 to 2030, there are an average of approximately 13.9 days of extreme high-temperature days per year under the SSP245 scenario, while it increases to 15.7 days under the SSP585 scenario. Moving into the period from 2030 to 2040, these numbers further rise to an average of 25.9 days and 36.1 days per year, respectively. By the period from 2040 to 2050, the frequency of extreme high-temperature days significantly increases, with an average of approximately 43.0 days per year under the SSP245 scenario and a high of 61.3 days per year under the SSP585 scenario. This indicates that, under higher emission scenarios, the frequency and intensity of extreme high-temperature heatwave events are expected to significantly increase in the future.



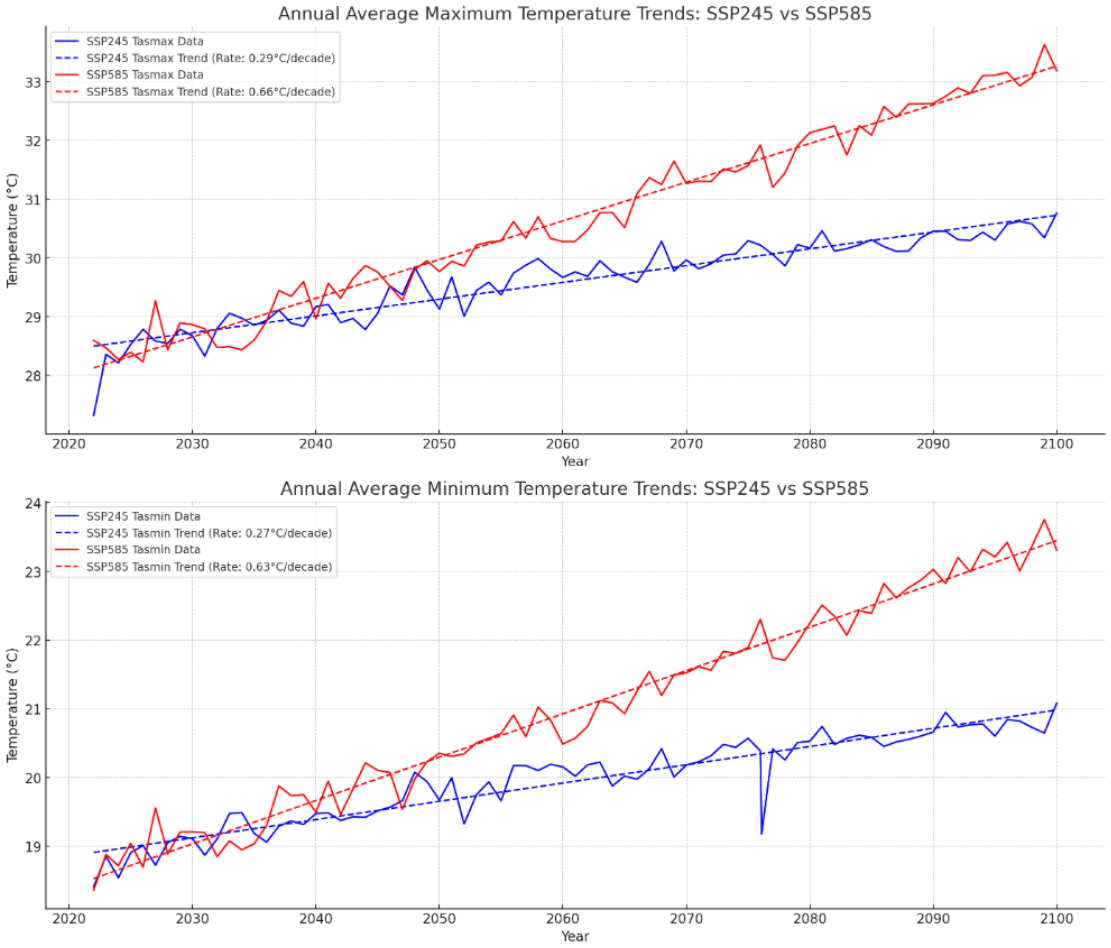


图 6-4 广州市温度变化预测（2020-2100）

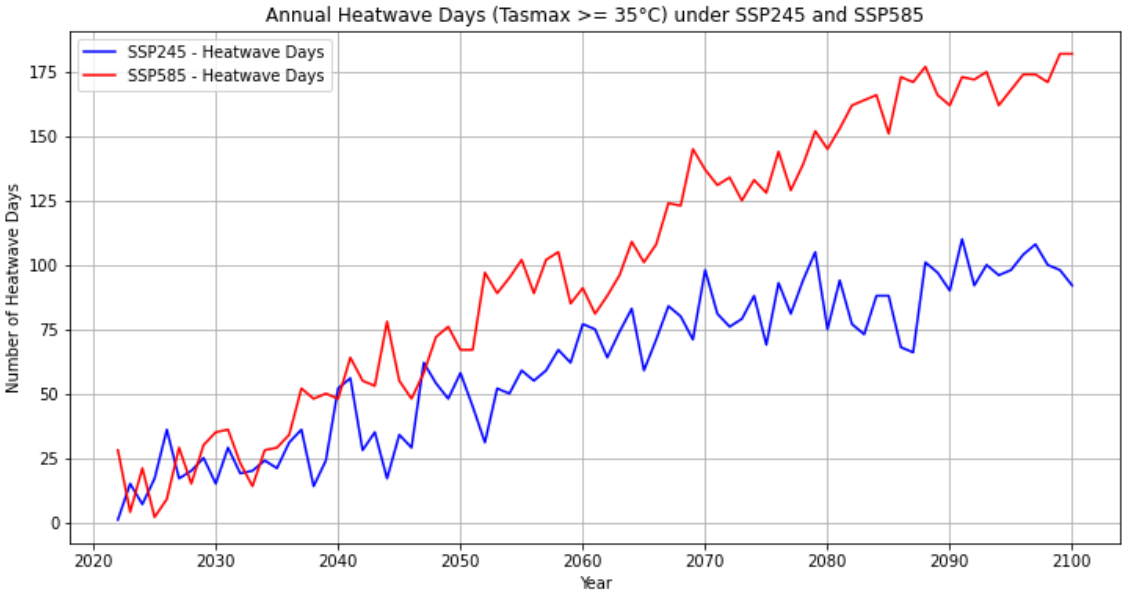


Figure 6-5 Extreme High-Temperature Event Forecast for Guangzhou City

Floods. Referring to the "Analysis of the Impact of Coastal Flooding in the Pearl River Estuary Area, Spatial Optimization, and Response Strategies Research," the analysis of future scenarios for coastal flooding in Guangzhou City shows the following risks regarding the exposure of assets to flood impacts:

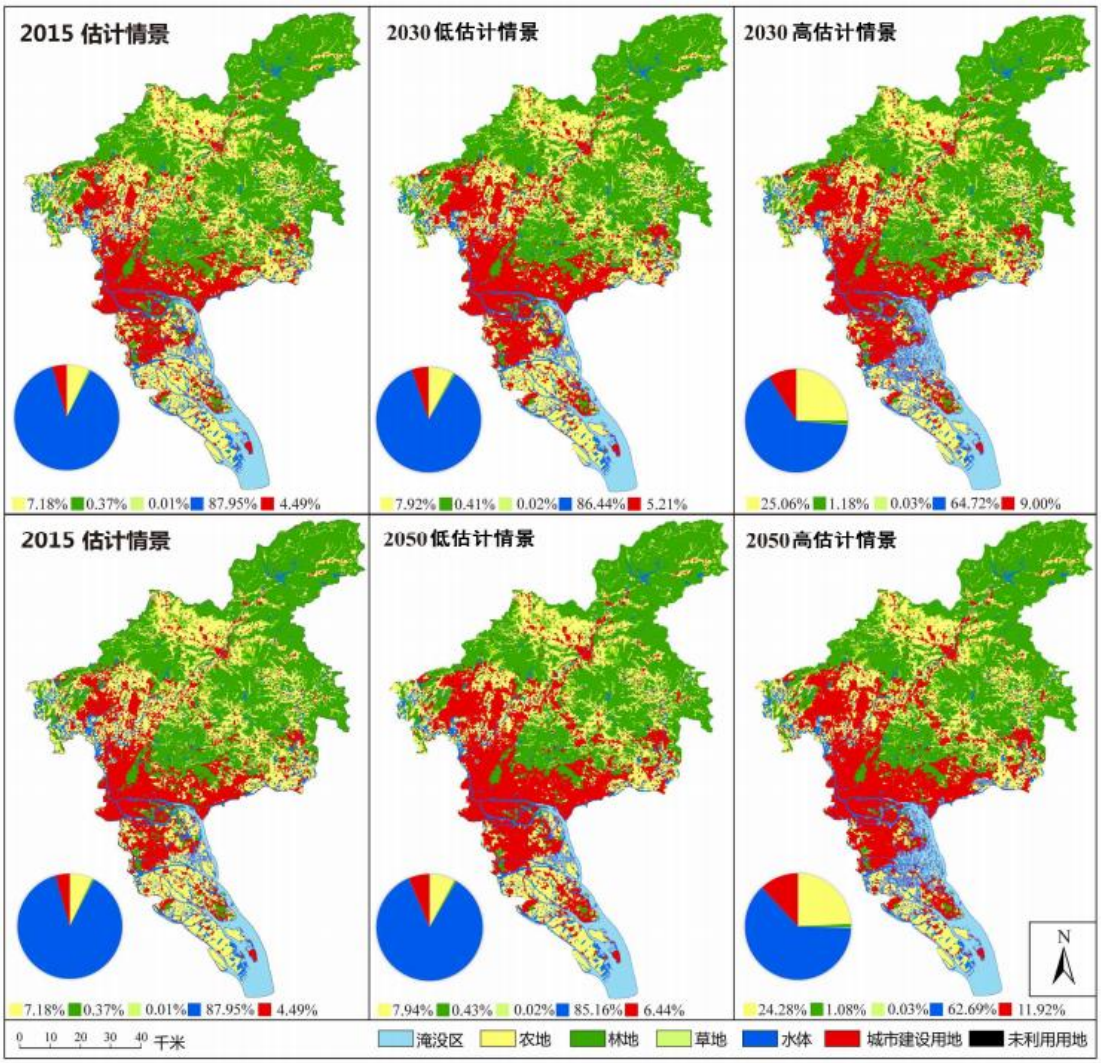


Figure 6-4 Simulation Results of Different Coastal Flooding Scenarios for 2030 and 2050[2]

Based on the analysis above, by the year 2050, the selected location area for the project's computing center and urban network has a relatively low risk of exposure to flood disasters. However, a significant number of IoT sensing devices have been

[2] Reference: "Analysis of Coastal Flood Impacts, Spatial Optimization, and Response Strategies in the Pearl River Estuary Area, Guangzhou" (Lin Weibin, Ph.D. Dissertation, November 2021).

deployed in the coastal areas of Nansha. According to the simulation analysis results mentioned above, the IoT sensing devices (including drone nests) located in the Nansha region in the year 2050 are at a higher risk of exposure to flood disasters.

D. Impact of Climate Change and Adaptation Assessment

(1) High-Temperature Risks

Table 6-1 High-Temperature Risks and Adaptation Measures

		Adaptation Measures		
Project Content	**Key Risks**	**Site Selection**	**Design and Construction**	**Emergency Response**
General Network Infrastructure	High temperatures affect the efficiency of communication base stations and gateways, reducing their lifespan.	Site selection generally has no specific requirements.	- Avoid installation methods directly affected by high temperatures; - When in operation, choose gateway equipment that is resistant to high temperatures to prevent temperature fluctuations from affecting sensors.	- Monitor the operation of communication network equipment and facilities. In case of failure, troubleshoot the line issue as per the situation. - Follow the principle of prioritizing business recovery. - Recover different-level businesses and business networks in different priority orders.
Computing Center	In addition to the risk of damaged electronic components, high temperatures increase resistance and limit electronic movement in complex systems. Chips run slower, age faster, and overall reliability decreases,	Site selection generally has no specific requirements.	- Follow the temperature and humidity requirements for data centers in "Data Center Design Specifications" GB50174-2017: the temperature in the cold aisle or cabinet inlet area	- Data backup and remote storage: Establish a regular backup system to back up data in real-time to remote storage devices to prevent data loss. - Conduct emergency drills and establish comprehensive emergency plans to

		Adaptation Measures		
Project Content	**Key Risks**	**Site Selection**	**Design and Construction**	**Emergency Response**
	which may cause application unresponsiveness.		should be between 18 to 27°C. - Consider various cooling systems; this project utilizes liquid cooling and air-cooling heat dissipation technology. - Choose energy-efficient server hardware. - Design for the use of alternative energy sources.	enhance the data center's response capabilities and flexibility.
Fusion Infrastructure (Sensor Equipment)	Risks include decreased sensitivity of sensors in high-temperature environments leading to reduced measurement accuracy, affecting sensor precision, and shorter sensor lifespans when used for extended periods in high-temperature environments, which may impact their reliability in practical applications.	Site selection generally has no specific requirements.	- Temperature range: Ensure that sensor temperature resistance meets application requirements. - Detection distance: Determine the required detection distance for high-temperature-resistant proximity sensors. - Sensor types: High-temperature-resistant proximity sensors, including capacitive, magnetic, and photoelectric types. - Materials and sealing	- Emergency resource preparation: Appoint dedicated personnel responsible for emergency fault handling, prepare backup equipment and spare parts, back up critical data and system configuration files, and establish emergency cooperation with relevant partners. - Establish an emergency response process, including regular monitoring and user feedback channels. - Conduct regular Internet of

		Adaptation Measures		
Project Content	**Key Risks**	**Site Selection**	**Design and Construction**	**Emergency Response**
			performance: Consider the materials and sealing performance used for sensors. - Select suitable installation methods based on application requirements, such as threaded, flange, or welding methods.	Things (IoT) system emergency drills to improve emergency response capabilities and response speed.
Software Systems (Including Various Systems)	The main risk is hardware device failure leading to the inability of software systems to operate, resulting in data loss.	Generally, there are no specific measures.	Software is generally not directly related to temperature. It is recommended to strictly implement the above measures to ensure the operation of software carriers and data security.	Software is generally not directly related to temperature. It is recommended to strictly implement the above measures to ensure the operation of software carriers and data security.

(2) Flood Risks

Table 6-2 Flood Risks and Adaptation Measures

		Adaptation Measures		
Project Content	Key Risks	Site Selection	Design and Construction	Emergency Response
General Network Infrastructure	1. Flooding may submerge communication	1. Site selection should avoid low-lying areas.	1. Waterproof Design: Implement	1. Develop emergency plans.

		Adaptation Measures		
Project Content	Key Risks	Site Selection	Design and Construction	Emergency Response
	equipment, especially in low-lying areas. 2. Heavy rain can lead to wireless signal attenuation, affecting communication quality.		waterproof measures and materials in the design and construction of IoT and base stations to ensure equipment and facilities can withstand heavy rain and floods. 2. Enhance Flood Resistance of Base Stations: Reinforce the flood resistance of base station equipment using measures such as waterproof enclosures and elevating equipment to reduce the impact of heavy rain and floods.	
Computing Power Center	1. Flooding may affect electricity supply, leading to power outages. 2. Equipment damage and downtime: Heavy rain and flooding may damage critical equipment such as servers and network devices	1. Strong drainage capacity around the data center building to meet predicted drainage intensity requirements and reduce the risk of flooding disasters.	1. Waterproof Design: Use waterproof materials and construct waterproof facilities to ensure that data center equipment and rooms can withstand heavy rain and floods. 2.	1. Data Backup and Remote Storage: Establish a regular backup system to back up data in real-time to remote storage devices to prevent data loss. 2. Emergency Drills and Plans: Conduct regular emergency drills and establish

		Adaptation Measures		
Project Content	Key Risks	Site Selection	Design and Construction	Emergency Response
	inside the data center, causing downtime and data loss. 3. Data loss and security risks: Flooding may damage storage devices in the data center, making data unrecoverable and increasing the risk of data leaks and security vulnerabilities.		Backup Power Supply: Set up backup power generation equipment to ensure continuous operation of the data center during power outages, ensuring data processing and storage.	comprehensive emergency plans to improve the data center's responsiveness and flexibility.
Integrated Infrastructure	1. Flooding may affect electricity supply, leading to power outages.	1. Ensure strong drainage capacity around the operation and management center building, meeting predicted drainage intensity requirements, and reducing the risk of flooding disasters.	1. Waterproof Design. 2. Backup Power Supply.	1. Emergency Drills and Plans.
Software Systems (Including Spatio-Temporal Twin Smart Platform, Network, and	1. Equipment damage and malfunctions: Heavy rain and flooding can damage drones, causing short circuits and preventing normal	1. High Ground Selection: Choose relatively high locations for drone base stations to minimize the impact of	1. Waterproof Design: Use waterproof materials and measures to ensure that drone equipment and base stations can withstand heavy	1. Backup Equipment and Links: Establish backup drone equipment and communication links to address equipment damage and communication

		Adaptation Measures		
Project Content	Key Risks	Site Selection	Design and Construction	Emergency Response
Data Security, etc.)	flight. 2. Communication interruptions: Rainwater can impact communication between drones and base stations, leading to the inability to transmit commands and upload data. 3. Data loss and security risks: Flooding may damage drone base stations, causing data loss and increasing security vulnerabilities.	flooding. 2. Avoid Low-Lying Areas: Avoid locating in low-lying or prone-to-water accumulation areas to reduce the impact of heavy rain on drone equipment.	rain and flooding. 2. Strengthening Structural Integrity: During design and construction, strengthen the structural integrity of equipment and base stations to enhance their ability to withstand heavy rain and flooding.	interruptions caused by heavy rain and flooding. 2. Rapid Maintenance and Replacement: Establish a rapid response mechanism to ensure timely repair or replacement of equipment after damage, minimizing downtime and impact.

(3) Typhoon risk

Table 6-3: Typhoon Risks and Adaptation Measures

Project Content	**Key Risks**	**Site Selection**	**Design and Construction**	**Emergency Response**
General Network Infrastructure	1. Communication Interruption: Typhoons may damage or cause power outages in communication base stations, fiber optics, and other communication equipment, leading	1. When selecting locations, consider the characteristics of typhoon-prone areas and choose geographically safer positions to minimize the impact of	1. Enhance resistance to typhoons in the design of communication and IoT equipment by using measures like wind resistance, waterproofing,	1. Establish typhoon emergency plans for communication and IoT equipment, specifying responsibilities and action steps, and prepare in advance for typhoon

Project Content	Key Risks	Site Selection	Design and Construction	Emergency Response
	to communication disruptions. 2. IoT Equipment Failures: Urban IoT devices may be affected by typhoons, leading to equipment failures and potential security risks.	typhoons on communication equipment and urban networks.	dustproofing, etc., to improve equipment stability and resilience. 2. Strengthen equipment fixation and protection during construction to ensure equipment can withstand strong winds and rainfall, reducing the possibility of damage.	response to strengthen emergency response capabilities. 2. Enhance backup and recovery capabilities.
Computing Power Center	1. Power Supply Interruption: Typhoons may lead to power supply interruptions, resulting in power outages in data centers. 2. Equipment Damage and Failures: Damage to hardware equipment such as servers and network devices can impact the normal operation of data centers. 3. Network Connection Disruption: Damage or power outages may affect communication	1. Ensure strong wind resistance of the data center building, meeting requirements.	1. Implement disaster-resilient design techniques, including earthquake resistance, wind resistance, and waterproofing, to enhance the building's stability and resilience against natural disasters. 2. Strengthen equipment fixation and protection measures, reduce the likelihood of equipment damage, and choose durable and waterproof equipment to enhance disaster resilience.	1. Develop typhoon emergency plans, specifying responsibilities and action steps, including preparations for backup power supply, emergency equipment repair and recovery, data backup, and recovery to ensure continuous operation of the data center. 2. Enhance backup and redundancy capabilities: Establish equipment and data backup mechanisms to ensure quick service recovery in

Project Content	Key Risks	Site Selection	Design and Construction	Emergency Response
	equipment such as communication base stations and fiber optics, disrupting the connection between data centers and external networks.			case of equipment damage or data loss.
Integrated Infrastructure	1. Power Supply Interruption	1. Ensure strong wind resistance of the operation and management center building, meeting requirements.	1. Implement disaster-resilient design techniques, including earthquake resistance, wind resistance, and waterproofing, to enhance the building's stability and resilience against natural disasters.	1. Establish emergency plans.
Software Systems (Including Spatio-Temporal Twin Smart Platform, Network, and Data Security, etc.)	1. Communication Interruption: Typhoons may disrupt communication between drones and base stations, resulting in the inability to receive commands and upload data. 2. Equipment Damage: Strong winds and heavy rains can damage drone equipment, affecting flight and	1. Site Selection: Set up base stations in secure locations away from typhoon impact and ensure stable communication.	1. Use anti-wind design and materials to ensure safe drone operation in adverse weather conditions. 2. Strengthen data encryption and security mechanisms to ensure data security during transmission and storage.	1. Emergency response: Establish alternative communication links, such as satellite communication, to address primary communication interruptions.

Project Content	Key Risks	Site Selection	Design and Construction	Emergency Response
	mission execution. 3. Data Loss and Security Issues: Typhoons may lead to the loss of drones, damage to base station equipment, and an increase in the risk of data loss and security vulnerabilities.			

E. Climate Adaptation Cost

The project site has been selected to avoid landslides, and the risk of flooding is relatively low. Future climate change risks mainly revolve around increased electricity demand due to rising temperatures and extreme heat events, as well as power interruptions caused by heavy rainfall.

Table 6-4 Climate Adaptation Investment

Climate Change Factor	Climate Change Risk	Climate Adaptation Measures	Climate Adaptation Investment (10,000)
Temperature Increase, More Hot Days	Exacerbate Cooling Issues in the Computing Power Center, Increase Cooling Costs, and May Result in Hardware Damage Due to Overheating.	Air Cooling	2,656.788
		Liquid Cooling	1,150.854
		Data Center Power Environment Monitoring System	63.816
Increased Frequency and Intensity of Heavy Rainfall	Power Interruptions	Uninterruptible Power Supply (UPS)	2,682.948
Total			6,554.406

Note: According to the "Joint Report on Multilateral Development Banks' Climate Finance," climate change adaptation investment is calculated as 30% of facility investment.

F. Climate Change Mitigation

The greenhouse gas emissions for this project are primarily concentrated in the computing center. The project's design will comply with the requirements of the jointly issued "Government Procurement Demand Standards for Green Data Centers (Trial)" by the Ministry of Finance, the Ministry of Ecology and Environment, and the Ministry of Industry and Information Technology. The "Government Procurement Demand Standards for Green Data Centers (Trial)" state that data center-related equipment and services should meet the requirements of relevant laws, regulations, and mandatory standards. Priority should be given to the use of advanced technologies, processes, products, and equipment encouraged by the state, as well as high-efficiency solutions such as new energy, liquid cooling, distributed power supply, and modular data centers for data center-related equipment and services. The operational service requirements include eight items with specific requirements for data center PUE (Power Usage Effectiveness), the utilization of renewable energy, water resource consumption, etc. Starting in 2025, the PUE for data centers should not exceed 1.3, and the ratio of annual water resource consumption to annual electricity consumption for information equipment should not exceed 2.5 L/kWh. According to the notice from the Ministry of Ecology and Environment of the People's Republic of China dated February 7, 2023, regarding the management of greenhouse gas emissions reports by the power generation industry enterprises for the years 2023-2025, the national average emission factor for the power grid in 2022 is 0.5703 tCO2/MWh. With a design PUE of 1.3 and considering a single cabinet power of 6KW and a total number of cabinets of 2000, the average PUE value for data centers in operation in Guangdong Province is 1.77. When the PUE value is 1.3, the electricity saved compared to a PUE value of 1.77 is 4,718.5 MWh. Calculating the saved carbon emissions as 1 kgCO2 per kWh saved, the saved carbon emissions amount to 26,910 tCO2.

VII.Environmental and Social Management Plan

In the design phase, efforts should be made to minimize environmental pollution and traffic safety issues caused by construction. Through public participation and soliciting public opinions, the project's negative impacts should be reduced. This will provide management and monitoring tools for the implementation of mitigation measures and the daily management of environmental impacts. Therefore, it is necessary to formulate an Environmental and Social Management Plan for the project. To ensure the implementation of the Environmental and Social Management Plan, it should be included in the contract text. This ESMP, as an appendix to the project contractor's contract documents, forms part of the Asian Infrastructure Investment Bank (AIIB) loan agreement documents. In case of any discrepancies between Chinese environmental regulations and this environmental management plan, the construction activities of the Guangzhou Smart City Infrastructure Construction Project (Phase I) will be carried out in accordance with the strictest requirements.

A. Institutional Arrangements

Guangzhou Smart Investment Company is the implementing agency for this project. Guangzhou Smart Investment Company has established a leadership team and a project management office for this project. The leadership team is chaired by the Chairman of Smart Investment. Smart Investment will designate a person within the project management office as the Environmental and Social Coordinator, responsible for (1) coordinating the implementation of the Environmental and Social Management Plan, (2) ensuring that the Environmental and Social Management Plan, monitoring plan, and mitigation measures are included in the tender documents and construction contracts, (3) managing the appeals mechanism, (4) addressing unforeseen adverse impacts and promptly reporting to the AIIB, and (5) hiring qualified external environmental and social monitoring units. Contractors: (1) Ensure that there is sufficient funding and manpower to implement the mitigation measures and monitoring plan in the Environmental and Social Management Plan throughout the construction phase. (2) Be responsible for the operation of the appeals mechanism during the construction phase.

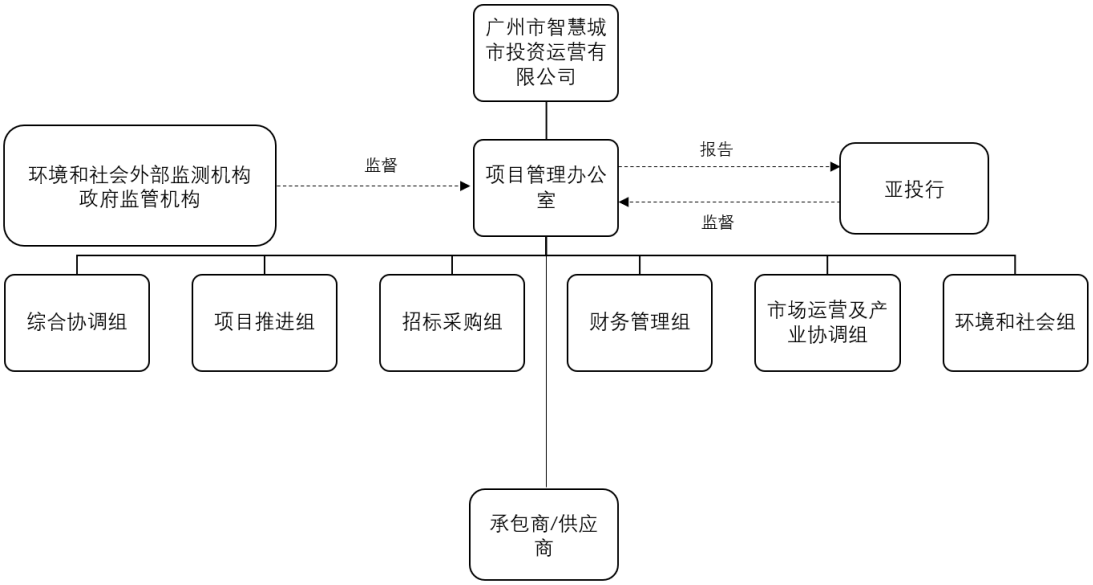


Figure 7-1 Environmental and Social Organization Chart

B. Anticipated Environmental and Social Impacts and Mitigation Measures

Based on the main findings of the environmental and social impact assessment in Chapter 5, corresponding mitigation measures have been formulated (see Table 7-1). Considering the specific impacts of the installation of smart light poles, the dedicated measures are provided in Table 7-2. The design unit and contractors, under the supervision of the project implementation unit, will incorporate these mitigation measures into the design, tender documents, construction contracts, and operational management. The effectiveness of these measures will be assessed based on the monitoring results from external monitoring units to determine whether adjustments and improvements to these measures are necessary.

Table 7-1 Environmental and Social Mitigation Measures

Risk Category	Measures or Actions	Implementing Unit/Department	Funding Source	Monitoring Indicators
Construction Phase				
Noise Pollution Risk	1. Strictly adhere to the "Environmental Noise Emission Standards for Construction Sites" (GB 12523-2011) to prevent disturbances during construction. Monitor noise levels at construction boundaries. 2. Schedule construction activities to minimize noise impact. No nighttime construction (22:00-6:00). 3. Optimize construction machinery operation schedules to reduce high-noise machinery usage and minimize noise overlap. 4. Plan transportation routes to avoid noise-sensitive areas. Avoid nighttime transportation. Strengthen vehicle management. 5. Monitor construction noise. Display a complaint hotline at the construction site for prompt resolution of environmental disputes. 6. Provide personal protective equipment (earplugs, earmuffs, noise-canceling helmets, etc.) for workers near high-noise equipment. 7. Select advanced equipment with low noise, minimal vibration, and energy efficiency. Avoid	Contractor	Contractor Contract	Noise monitoring meets "Environmental Noise Emission Standards for Construction Sites" (GB 12523-2011).

Risk Category	Measures or Actions	Implementing Unit/Department	Funding Source	Monitoring Indicators
Construction Phase				
	prolonged use of high-noise equipment. Maintain machinery to prevent increased noise due to poor performance.			
Sewage	During construction, provide temporary toilets for workers. Ensure workers' environmental awareness and proper discharge of domestic sewage into the municipal sewage system.	Contractor	Contractor Contract	Monitoring of environmental management plan implementation.
Air Pollution	Use sealed packaging for powdery construction	Contractor	Contractor	Compliance with sealed

Risk Category	Measures or Actions	Implementing Unit/Department	Funding Source	Monitoring Indicators
Construction Phase				
	materials like cement to minimize environmental impact during transportation.		Contract	packaging for materials.
	Choose green and eco-friendly building materials during indoor and outdoor decoration. Ensure materials are harmless and meet indoor air quality standards. Promote ventilation.		Contractor Contract	Usage of green building materials and indoor air quality compliance.
	Strengthen indoor ventilation during and after decoration. Meet indoor air quality standards (GB/T18883-2002) before use.			Compliance with ventilation requirements and indoor air quality standards.
Solid Waste	Categorize and centrally store waste construction materials. Recycle where possible. Dispose of non-recyclables at designated locations. Prohibit mixing with household waste.	Contractor	Contractor Contract	Compliance with waste disposal regulations.
	Entrust qualified units with the removal of construction-generated waste to relevant construction waste disposal sites.	Contractor	Contractor Contract	Compliance with waste transportation and management.
	Collect and promptly transport household waste to municipal landfill sites.	Contractor	Contractor Contract	Compliance with household waste disposal.
Risks to Residents by Workers	Promote health, HIV/AIDS, COVID-19 prevention,	Contractor	Contractor	Quantity of educational

Risk Category	Measures or Actions	Implementing Unit/Department	Funding Source	Monitoring Indicators
Construction Phase				
	and other infectious disease education among workers. Include these in the contractor's contract documents.		Contract	materials and training courses.
Traffic Safety Risk	a. Plan construction vehicle routes strategically to minimize the impact on residents and road damage. b. Increase traffic safety awareness.	Contractor	Contractor Contract	Quantity of promotional materials, training sessions, road signs, and implementation of safety measures.
Location Change Risk	After meeting acceptance criteria for the data center, optimize infrastructure, safety measures, and equipment installation for project requirements. Promptly secure lease agreements.	PMO, City Investment Group, Contractor	Project Budget, Government Department Budget	Project acceptance opinions and comprehensive lease agreements.
Labor Management Risk	Worker Management During Construction: a. Ensure equal opportunity hiring without discrimination based on unrelated personal characteristics. b. Establish worker appeal mechanisms. c. Develop worker training programs. d. Implement specific occupational health measures.	Contractor	Contractor Contract	Worker demographics, appeal mechanisms, training programs, and occupational health measures.
	Smart Investment Employee Management: a. Ensure equal opportunity hiring without discrimination based on unrelated personal characteristics. b. Refer to the	Contractor	Contractor Contract	Worker demographics, implementation of the Gender Action Plan, and

Risk Category	Measures or Actions	Implementing Unit/Department	Funding Source	Monitoring Indicators
Construction Phase				
	Gender Action Plan for addressing gender-based violence.			environmental management plan monitoring.
Occupational Health and Safety	Employ at least one full-time health and safety specialist. Provide occupational safety education for all construction employees. Enforce the use of personal protective equipment (helmets, safety shoes, gloves, etc.).	Contractor	Contractor Contract	a. Worker satisfaction. b. Log of construction vehicle activities. c. Quantity of signs. d. Parking locations for construction vehicles. e. High-altitude work permits.
Public Engagement	a. Provide advance notice to residents about equipment installation time and its impact, allowing them to make appropriate arrangements. b. Transparently announce equipment location, function, and data collection purposes before installation, ensuring residents' informed consent.	Neighborhood Committees, PMO, Contractor	Project Funds, Government Funding	a. Records of resident complaints. b. Number of public announcements.
Operation Phase				
Noise	- Use high-quality, low-noise equipment. - Implement soundproofing and vibration reduction for noisy equipment. - Enhance equipment maintenance.	PMO, Industrial and Information Technology Bureau, Environmental	Included in the project budget	Procurement and usage of low-noise equipment.

Risk Category	Measures or Actions	Implementing Unit/Department	Funding Source	Monitoring Indicators
Construction Phase				
		Protection Bureau		
Wastewater	- Collect wastewater through municipal drainage network. - Treat at urban sewage treatment plant.	PMO, Housing and Construction Bureau, etc.	Included in the project budget	Status of centralized wastewater collection and treatment.
Solid waste	- Reclaim waste materials by manufacturers or qualified e-waste disposal companies.	PMO, Urban Management Bureau, Environmental Protection Bureau	Included in the project budget	- Hazardous waste material classification, collection, and disposal status. - Recycling and utilization of recycled resources.
Labor management	- Equal opportunity and fair treatment principles. - Protection and assistance for special worker groups. - Gender Action Plan implementation.	PMO, Labor Union, Women's Federation, etc.	Included in labor management plan budget	- Proportion of special population groups among hired workers and their age distribution. - Protective measures for special worker groups. - Implementation of the Gender Action Plan.
OHS	- Safety training for equipment maintenance personnel. - Ensure a healthy workplace environment. - Regular inspections and maintenance.	Project Management Office	Included in daily operational management	- Number of safety training sessions. - Workplace environment inspection reports.

Risk Category	Measures or Actions	Implementing Unit/Department	Funding Source	Monitoring Indicators
Construction Phase				
	- Ergonomic office facilities. - Efficient air filtration systems.		costs	
Public engagement	- Inform residents of data collection purpose. - Strengthen information management. - Utilize visualization tools. - Encourage resident participation in project planning and decision-making.	Project Management Office, Community Street Offices	Included in project funds, government funds	- Disclosure channels and methods. - Monitoring disclosure channels. - Training methods and frequency. - Resident participation in the project in terms of frequency and forms.

Table 7-1.2: Environmental and Social Management Plan for the Smart Lamp Post Project

Phase	Specific Measures or Actions	Implementing Entity/Department	Funding Source	Monitoring Indicators
Construction Phase	Noise and Dust	Enclose the lamp post pit area with barriers.	Contractor	Contractor's contract
	Solid Waste	Classify and collect recyclable components of the smart lamp posts and associated equipment. Recyclable metal parts, such as lamp shells and monitoring device brackets, should also be sorted. Parts that cannot be directly recycled should be	Contractor	Contractor's contract

Phase	Specific Measures or Actions	Implementing Entity/Department	Funding Source	Monitoring Indicators
		handled by specialized metal waste disposal companies.		
	Traffic Safety Risk	① Plan the route for large construction vehicles to minimize impact and road damage by staggering the transport times. ② Increase traffic safety awareness with road signs and detour plans for residential areas. ③ Smart lamp post construction traffic mitigation measures: a. Consult traffic police before construction and develop a reasonable traffic management design to avoid traffic disruptions. b. Use enclosed construction areas, with suggested barrier length at least twice the length of the lamp posts. c. Set up construction warning signs and traffic warnings, including red warning lights at night.	Contractor	Contractor's contract
	Impact on Existing Municipal Pipelines	During the initial design phase, the design unit will investigate the types, uses, quantity, alignment, and burial depth of underground pipelines in the project area, and obtain relevant drawings from the responsible pipeline units. These will be used as the basis for developing pipeline protection measures. The project design will ensure safe distances from existing pipelines and reserve space for other pipelines based on urban planning.	Design Unit	Design contract
		Prior to construction, Zhìtóu Company will organize a preliminary coordination meeting regarding underground pipelines and provide relevant information to all construction personnel.	Zhìtóu Company	-
		A protection plan for existing pipelines must be developed before construction begins, and this plan must be approved by the relevant pipeline ownership units or	Contractor	Contractor's contract

Phase	Specific Measures or Actions	Implementing Entity/Department	Funding Source	Monitoring Indicators
		developed by those units.		
	Gas Pipeline Protection Measures	① Prior to construction, the contractor should consult the gas company about the direction and burial depth of pipelines intersected by the construction. Excavation, piling, squeezing, or non-excavation crossing should not occur in sections where the gas pipeline crosses without guidance from the gas company. ② Notify the gas company 24 hours in advance when construction occurs near a gas pipeline. ③ Set up construction warning signs to remind workers of the gas pipeline below. ④ For identified gas pipelines: hand-dig within 2 meters of both sides of the pipe until it is located and protected. ⑤ For unknown gas pipeline locations: hand-dig to find the pipeline, confirming its exact location. During construction, prohibit open flame operations, and have gas company personnel on-site with valve keys ready for emergency valve closure.	Contractor	Contractor's contract
	Cable and Communication Pipeline Protection Measures	① Provide technical briefings before construction to avoid improper handling of the pipelines. ② Consult the pipeline ownership unit regarding the intersection and burial depth of the cables and communication pipelines. ③ Notify the responsible company 24 hours in advance when working near these pipelines. ④ Set up construction signs to warn workers of the cables and communication pipelines below. ⑤ If the pipeline is exposed during excavation, ensure protective measures are in place immediately, such as isolation, suspension, or reinforcement methods.	Contractor	Contractor's contract

Phase	Specific Measures or Actions	Implementing Entity/Department	Funding Source	Monitoring Indicators
	Water Supply Pipeline Protection Measures	① Provide technical briefings before construction to prevent improper construction. ② Consult the water supply company regarding the pipeline direction and burial depth. ③ Notify the responsible company 24 hours in advance when working near water supply pipelines. ④ Set up construction warning signs for water supply pipelines. ⑤ If the pipeline is exposed during excavation, immediately implement protective measures (isolation, suspension, support, and reinforcement).	Contractor	Contractor's contract

Note: This table represents the Environmental and Social Management Plan for the Smart Lamp Post project, following the general guidelines outlined in Table 7-1.1.

C. Monitoring Program

Monitoring and evaluation are crucial processes to ensure that the project is implemented according to its objectives, that project information is made publicly available, and that the social management actions proposed in the social impact assessment report are given due attention and implementation. They also serve as important corrective and engagement mechanisms for the proposed project. Therefore, the proposed project has established a monitoring and evaluation mechanism, which includes internal supervision and external monitoring and assessment.

Internal supervision involves Guangzhou Smart Investment Company monitoring and assessing the project's implementation progress, the implementation of the environmental and social management plan, the progress of information disclosure and public participation plans, the use of project funds, compliance with regulations, and more.

External independent monitoring and assessment will be carried out by an independent monitoring organization with the approval of the PMO, which has experience with loan projects from international financial organizations such as the AIIB, World Bank, and ADB. This organization will conduct external monitoring of the implementation of the environmental and social management plan. The independent monitoring and assessment unit will regularly track and assess the implementation activities of the environmental and social management plan, provide advisory opinions, and submit monitoring and assessment reports to the AIIB. Environmental data testing will be entrusted to qualified units. According to the characteristics of the project, separate environmental impact monitoring plans will be developed for the construction period and the operation period, as shown in Table 7-2.

For the environmental and social external monitoring work, content related to specialized testing will be conducted by qualified environmental monitoring companies, with support from information provided by local environmental protection bureaus' monitoring stations. The results of monitoring the implementation of the environmental and social management plan will be recorded in the Environmental and Social Monitoring Report, which will be submitted to the AIIB every six months.

Table 7-2 Environmental Monitoring Plan

Phase	Elements	Indicators	Inspection Points	Inspection Frequency	Implementing Agency	Supervisory Agency	Applicable Standard
Pre-Construction	Environmental Air	TSP, PM2.5	1 point each at the boundary of the Power Calculation Center and Operations Management Center	Once, collected as the baseline before construction	Qualified monitoring units	Guangzhou Smart Investment Company	"Ambient Air Quality Standards" (GB3095-1996) and "Comprehensive Emission Standards for Air Pollutants" (GB16297-1996)
	Environmental Noise	LAeq(dB)	4 points around the boundary of the Power Calculation Center and Operations Management Center, daytime and nighttime	Once, collected as the baseline before construction	Qualified monitoring units	Guangzhou Smart Investment Company	"Environmental Quality Standards for Noise" (GB3096-2008) and "Noise Emission Limits for Construction Sites" (GB12523-2011)
Construction Phase	Environmental Air	TSP, PM2.5	1 point each at the boundary of the Power Calculation Center and	Semi-annually, twice a year, one day each time	Qualified monitoring units	Guangzhou Smart Investment Company	"Ambient Air Quality Standards" (GB3095-1996) and "Comprehensive Emission Standards

Phase	Elements	Indicators	Inspection Points	Inspection Frequency	Implementing Agency	Supervisory Agency	Applicable Standard
			Operations Management Center				for Air Pollutants" (GB16297-1996)
	Environmental Noise	LAeq(dB)	4 points around the boundary of the Power Calculation Center and Operations Management Center, daytime and nighttime	Semi-annually, twice a year, one day each time	Qualified monitoring units	Guangzhou Smart Investment Company	"Environmental Quality Standards for Noise" (GB3096-2008) and "Noise Emission Limits for Construction Sites" (GB12523-2011)
	Indoor Air	PM10, PM2.5, formaldehyde, benzene, VOCs	Inside the Power Calculation Center and Operations Management Center	Semi-annually	Qualified monitoring units	Guangzhou Smart Investment Company	"Indoor Air Quality Standards" (GB/T18883-2002)
	Indoor Noise	Equivalent continuous A-weighted sound level (LAeq, 8hr)	Inside the Power Calculation Center and Operations Management	Semi-annually	Qualified monitoring units	Guangzhou Smart Investment Company	"Occupational Noise Exposure Limits" (GBZ/T189.8-2007)

Phase	Elements	Indicators	Inspection Points	Inspection Frequency	Implementing Agency	Supervisory Agency	Applicable Standard
			Center				
Operation Phase	Environmental Air	Ozone (O3), Nitrogen Dioxide (NO2), Sulfur Dioxide (SO2), Carbon Dioxide (CO2), Carbon Monoxide (CO), Ammonia (NH3), Formaldehyde (HCHO), Benzene (C6H6), Toluene (C7H8), Xylene (C8H10), Total Volatile Organic Compounds (TVOC), Trichloroethylene (C2HCl3), Tetrachloroethylene (C2Cl4), Benzo[a]pyrene (BaP), Inhalable Particulate Matter (PM10), Fine Particulate Matter (PM2.5), Total Bacterial Count, Radon (222Rn)	Inside the offices of the Power Calculation Center and Operations Management Center after decoration	Once after decoration	Qualified monitoring units	Guangzhou Smart Investment Company	"Ambient Air Quality Standards" (GB3095-1996) and "Indoor Air Quality Standards" (GB/T18883-2002)
	Environmental Noise	LAeq(dB)	4 points around the boundary of the Power Calculation Center and Operations Management Center, daytime and nighttime	Semi-annually, twice a year, one day each time	Qualified monitoring units	Guangzhou Smart Investment Company	"Environmental Quality Standards for Noise" (GB3096-2008) and "Emission Standards for Noise from Industrial Enterprises" (GB 12348-2008)

Phase	Elements	Indicators	Inspection Points	Inspection Frequency	Implementing Agency	Supervisory Agency	Applicable Standard
	Water Resource Consumption	Cooling water usage	Power Calculation Center	Monthly cumulative statistics	-	Guangzhou Smart Investment Company	-
	Energy Consumption	Electricity consumption and the proportion of green electricity	Power Calculation Center	Monthly cumulative statistics	-	Guangzhou Smart Investment Company	PUE less than 1.3

Table 7-3 Monitoring Plan

Schedule	Monitoring Content	Responsible Party	Supervisory Body
First year of project implementation	1. Evaluate the implementation of the environmental and social management plan; 2. Verify the effectiveness of mitigation measures; 3. Collect public opinions to determine the need for adjustments to mitigation measures; 4. Further understand the needs and opinions of stakeholders and provide suggestions for mid-term project adjustments.	Guangzhou Smart Investment Company	Municipal Leadership Group, Relevant Government Functional Departments, AIIB
Middle term of project implementation	1. Evaluate the implementation of the environmental and social management plan; 2. Summarize the experiences and lessons learned during project implementation to provide decision-making basis for later project management; 3. Stakeholder satisfaction and opinions on project implementation.	Guangzhou Smart Investment Company	Municipal Leadership Group, Relevant Government Functional Departments, AIIB
Project completion	1. Project goal achievement; 2. Residents' evaluation of the project.	Guangzhou Smart Investment Company	Municipal Leadership Group, Relevant Government Functional Departments, AIIB

Note: Specific monitoring times may be adjusted based on the actual progress of the project.

D. Capacity Building

1. Environmental and Social Management Capacity

Based on the investigation, the project has relatively well-established organizational capacity, office conditions, and equipment configuration. The professional qualifications of the personnel are relatively high, and they have domestic experience in the preparation, construction, and operation of similar projects. However, since this project falls under the AIIB loan program, it is necessary for relevant personnel to become familiar with the operational procedures of AIIB projects, especially in terms of environmental, social, and safety requirements, and be able to adequately compare them with domestic practices. Therefore, further learning and training on relevant business

and strategy requirements are needed.

The Environmental and Social Management Capacity Building and Training Plan can be found in Table 7-4.

Table 7-4 Environmental and Social Training Program

Training Time	Training Topic	Training Participants	Training Content	Frequency	Days	Number of Participants	Cost (CNY/Person/Day)	Total Cost (10,000 CNY)
Construction Phase								
During Construction	Social Policies and Regulations	Pazhou Center West Tower Project	1. Content related to public participation in China's environmental protection laws and regulations	1	1	20	500	1
			2. Law on the Protection of Women's Rights and Interests of the People's Republic of China					
			3. Special Provisions on Labor Protection for Female Workers					
			4. Content of the Asian Infrastructure Investment Bank (AIIB) Social Management Framework					

Training Time	Training Topic	Training Participants	Training Content	Frequency	Days	Number of Participants	Cost (CNY/Person/Day)	Total Cost (10,000 CNY)
	Environmental Policies and Regulations	Pazhou Center West Tower Project	1. Environmental protection laws and regulations	1	1	20	500	1
			2. Environmental policies and plans					
			3. Content of the AIIB Environmental Management Framework					
	Implementation and Adjustment of Environmental and Social Management Plans	Pazhou Center West Tower Project	1. Environmental management responsibilities during the project construction period	1	1	20	500	1
			2. Major tasks and contents of environmental management during the project construction period					
			3. Public participation during construction					

Training Time	Training Topic	Training Participants	Training Content	Frequency	Days	Number of Participants	Cost (CNY/Person/Day)	Total Cost (10,000 CNY)
			4. Internal monitoring of environmental and social management					
	Emergency Response	Pazhou Center West Tower Project	Emergency plans and measures	1	1	20	500	1
	Complaints and Dispute Resolution	Pazhou Center West Tower Project	Collection, handling, feedback of residents' opinions	1	1	20	500	1
	Environmental and Social Consultation	Pazhou Center West Tower Project	Methods, content, stakeholder consultation					
Operation Phase								
During Operation	Environmental Monitoring Inspections and Reports	Pazhou Center West Tower Project	1. Inspection of environmental protection facilities, environmental quality monitoring, report preparation	1	1	5	500	0.25
			2. Rules and regulations for environmental safety					

Training Time	Training Topic	Training Participants	Training Content	Frequency	Days	Number of Participants	Cost (CNY/Person/Day)	Total Cost (10,000 CNY)
	Environmental and Social Management Measures	Pazhou Center West Tower Project	Environmental and social management plan during the operation phase, fire safety, occupational health and safety	1	1	5	500	0.25
	Public Participation During Operation	Pazhou Center West Tower Project	1. Methods of public participation during operation	1	1	5	500	0.25
			2. Collection, handling, and feedback of public opinions					
Total				9	9	135	—	6.75

2. Vocational Skills Training

Employees of the Smart City Operations Enterprise need to possess a wide range of knowledge and skills, including but not limited to the following areas:

(1) Basic Knowledge of Smart City Operations Employees of the Smart City Operations Enterprise need to understand the basic concepts, operational processes, and technical methods of smart cities, including the composition of smart cities, data collection and processing, urban management, and operation-related content.

(2) IoT and Big Data Technology Employees of the Smart City Operations Enterprise need to grasp the basic principles, application scenarios, and solutions of IoT and big data technology, including sensors, wireless networks, data mining, and data analysis, among other aspects.

(3) Smart City Operation Management Employees of the Smart City Operations Enterprise need to comprehend the concepts, goals, and processes of smart city operation management, including the design, development, and operation of smart city operation platforms.

(4) Information Security and Privacy Protection Employees of the Smart City Operations Enterprise need to be familiar with the basic concepts, technologies, and solutions of information security and privacy protection, including network security, data privacy protection, and identity authentication, among other aspects.

(5) Team Collaboration and Project Management Employees of the Smart City Operations Enterprise need to possess basic knowledge and skills in team collaboration and project management, including communication skills, time management, project planning, and resource management, among other aspects. To address the knowledge and skills requirements mentioned above, a yearly training plan should be developed. The training objectives should cover both technical skills and operational management skills. Regarding technical skills training, courses related to IoT sensor technology, data collection and storage, machine learning, deep learning, 4G/5G communication technology, and more should be developed. For operational management skills training, a plan should be created for courses related to project management, team collaboration, risk management, and communication skills. The evaluation of training effectiveness should include surveys, behavioral assessments, and performance evaluations to understand employee satisfaction with the training content, training effectiveness, the fulfillment of training needs, and the improvement in technical skills and management capabilities after training.

E. Monitoring and Evaluation Reports

Guangzhou Smart City Investment Group Co., Ltd. (Smart Investment) needs to regularly report on the implementation of the "Environmental and Social Management Plan" for

the sub-projects under its jurisdiction. During the project implementation period, every six months, a monitoring and evaluation report on the implementation of the environmental and social management plan should be submitted as an independent document and as part of the project implementation report.

F. Implementation Budget for the Environmental and Social Management Plan

Environmental protection activities are all engineering measures; therefore, they should be provided by the project construction unit and the operating unit and included in their project costs. The costs in the environmental management plan mainly cover environmental and social management during the construction and operation phases, including environmental monitoring costs, personnel training costs, and environmental and social consulting fees. The estimated costs for this part are shown in Table 7-5.

Table 7-5 Estimated Implementation Costs of Environmental and Social Management Plan

Category	**Cost (10,000 Chinese Yuan)**
Training Costs	6.75
Environmental and Social Consultation, External Monitoring Fees	100
Total	**156.75**

VIII. Stakeholder Engagement and Information Disclosure

A. Stakeholder Identification

Stakeholders are individuals or groups who can influence the achievement of project objectives or who are affected by the achievement of project objectives, and they can be categorized into primary stakeholders and secondary stakeholders.

1. Primary Stakeholders

The primary stakeholders of this project include direct beneficiaries of the project and groups negatively affected by the construction and operation of the project.

a) Project Beneficiaries

In this project, the direct beneficiaries of the computing infrastructure and integrated infrastructure are the residents of the Nancun Town and Huangshi Street areas under Panyu District and Baiyun District (mainly including local residents, women, vulnerable groups, students and teachers, employees of enterprises and institutions, and mobile population). The implementation of the project will benefit 155,800 people in the region directly, with 81,100 women, accounting for approximately 52.05% of the total population, and 130 vulnerable individuals, accounting for approximately 0.083% of the total population. The detailed direct beneficiaries of this project are shown in the table below.

Table 8-1: Direct Beneficiary Population Overview of the Project Area

Project Area	Baiyun District	Panyu District	Total
Subdistrict	Huangshi Street	Nancun Town	
Total Population (10,000 people)	3.96	11.62	15.58
Female Beneficiaries (10,000 people)	2.16	5.95	8.11
Percentage of Female Beneficiaries (%)	54.54%	51.20%	52.05%
Vulnerable Population (10,000 people)	0.0023	0.0107	0.013
Percentage of Vulnerable Population (%)	0.077%	0.092%	0.083%

Data Sources:

1. Population data from the 2023 Statistical Yearbook and National Economic and Social Development Statistical Report of the Project Area.
2. Population data from the Statistical Office of Rural Revitalization Bureau of the Project Area.

b) Groups Affected by Negative Impacts of Project Construction and Operation

The construction activities of the project, including construction machinery, materials transportation vehicles generating noise and dust, as well as environmental issues such as sewage discharge and solid waste disposal during the construction period, may have certain negative impacts on the lives and livelihoods of the residents in the project area (computing infrastructure and integrated infrastructure).

2. Secondary Stakeholders

Secondary stakeholders of this project include project owners, businesses, government entities, and related functional departments.

The smart light pole project focuses on the integrated, intelligent construction and "multi-pole integration" of various poles along municipal roads within the project area. It will involve the demolition of old poles from other government departments or units. The integration of poles involves a large quantity of poles and multiple responsible departments. The ownership or management units of the old poles are stakeholders in this project. To ensure the implementation of this subproject, with the approval of the municipal government, on April 25, 2024, the Guangzhou Municipal Housing and Urban-Rural Development Bureau released the "Pilot Work Plan for Pole Integration on Municipal Roads in Guangzhou" (see Attachment 4). The responsible departments for each pole and management unit will collaborate according to their respective roles to complete the optimization, integration, and relocation of poles, jointly advancing the project. The involved units and their relationships are shown in Table 8-2. According to the meeting held on August 22, 2024, by Guangzhou Urban Investment Group and relevant government departments and companies to further accelerate the multi-pole integration construction, it was clarified that the Intelligent Investment Company would be the project owner and organize the implementation of the multi-pole integration work. The meeting minutes are included in Attachment 5.

Table 8-2: Government Departments and Companies Related to the Smart Light Pole Project

No.	Relationship	Department Name
1	Coordinating Departments	Municipal Housing and Urban-Rural Development Bureau
		Municipal Industry and Information Technology Bureau
2	Investment and Implementation	Guangzhou Digital Technology Group
		Guangzhou Urban Investment Group, Intelligent Investment Company

No.	Relationship	Department Name
3	Ownership or Management Units of Old Poles	Municipal Public Security Bureau
		Municipal Transportation Bureau
		Municipal Urban Management Comprehensive Enforcement Bureau
		Municipal Culture, Radio, Television, and Tourism Bureau
		Guangdong Telecom Guangzhou Branch
		Guangdong Mobile Guangzhou Branch
		Guangdong Unicom Guangzhou Branch
		China Broadcasting Guangzhou Company
4	Relevant Administrative Approval and Management	Municipal Development and Reform Commission
		Municipal Finance Bureau
		Municipal Planning and Natural Resources Bureau
		Municipal Transportation Bureau
		Municipal Water Affairs Bureau
		Municipal Lighting Construction Management Center
		Municipal Communication Construction Management Office

3. Analysis of the Needs of Project Area Stakeholders

a) Residents' Needs to Reduce Negative Construction Impacts

During on-site investigations conducted by the ESIA unit, it was found that residents in the project vicinity hope to reduce the negative impacts during construction. These impacts include road blockages, dust emissions, heavy vehicle traffic, increased noise levels caused by construction, and more.

Interview Record 8-1: Mrs. Li and Others from the Northeast Yue Community (51 years old) "First and foremost, we certainly hope that the construction of the project will not bring environmental pollution. For example, we don't want to see significant road congestion

during the morning and evening rush hours, because our roads here are not wide to begin with, and we definitely don't want to see them blocked."

"I do support the concept of a smart city. After all, it symbolizes the level of a city's development. However, I hope that during the construction process, there will be fewer large vehicles. When there are too many large trucks around, we are afraid of them tipping over. Besides, there are a lot of electric scooters in our area, and every time we see a big truck, it makes us quite nervous."

b) Residents' Demand for Noise Pollution Reduction

Through preliminary investigations conducted by Guangzhou Smart Investment Company and various relevant units in the project areas, as well as on-site surveys by the social evaluation survey team, it has been found that whether it is the existing noise or the potential noise generated by the expansion and construction, the residents in the vicinity have an urgent demand for the reduction of noise pollution from the project.

Interview Record 8-2: Mr. Luo and others from Nancun Town (71 years old)

"Noise is a very important issue because there are many elderly people in our area. Although our hearing is not very sharp, the old power plant used to be very close to us. I'm afraid it will affect my rest and sleep."

"The old power plant did indeed have noise, but it didn't affect me much. I am a retired employee of the power plant, and I have gotten used to the noise. It's like living next to a railway track. Once you get used to these sounds, you become less sensitive to them."

c) Residents' Demand for Increased Income and Employment Opportunities

The ESIA unit found through on-site surveys that the stakeholders have a clear demand for increased income and employment opportunities. On one hand, the residents in the vicinity hope that the project can create more job opportunities and improve the existing salary levels. On the other hand, they also wish for the project to facilitate the transfer of their existing assets, such as renting out houses, to increase their income.

Interview Record 8-3: Mr. Chen, Southeast Community (52 years old)

"In general, the Smart City project might bring a lot of benefits to people in our neighborhood. For example, those data centers or units always need security personnel, and we are not too old for that kind of work. The income from this job should be relatively stable."

Interview Record 8-4: Mr. Cai, Northwest Community (56 years old)

"This Smart City data center or incubation center will definitely have a significant impact on attracting young people for employment, which is great for me. I can renovate my house and see if I can rent it to them. Renting to white-collar workers should be more profitable and hassle-free."

"I think the product incubation center is excellent, and my whole family supports it. Look at our village; there are many small shops and street vendors here, and the business is quite good. The food delivery business is also booming. My relatives have opened a small shop too. With more people, the business naturally improves. Even if I don't run it myself, renting the house to someone for food delivery is very easy to rent out."

d) Residents' Demand for Enhanced Urban Governance

Based on the project team's on-site investigations, residents have a positive attitude and demand for the Smart City project to improve urban governance. On one hand, they hope that the Smart City project can optimize the efficiency of existing infrastructure such as smart city management and waste sorting. On the other hand, they also expect the Smart City project to have diverse applications and paths in the future, systematically improving the operational efficiency of different levels of government.

Interview Record 8-5: Mr. Li, Northwest Community (31 years old)

"At present, the basic applications of the Smart City still have many shortcomings. For example, smart waste sorting is not as smart as it should be, and it cannot directly promote residents' awareness of waste sorting and environmental protection. Personally, I have high expectations for the Smart City project. I hope to see new interpersonal interaction technologies or other technologies that can help improve relevant awareness in practical scenarios."

"Smart City definitely needs to first improve the efficiency of government administration. This is the most important thing. Data barriers between different departments need to be removed; otherwise, every time you need to deal with something, you have to run to various departments, and if the data between departments is not connected, it's very troublesome."

e) Demand for Product Research and Development and Upgradation by Enterprises

According to interviews with various businesses and target enterprise groups related to Smart City, all types of enterprises have a strong demand for digital transformation. Whether it's expanding their business or conducting product research and development, digital technology is crucial for their development.

f) Demand for Enhanced Innovation and Decision-Making Capabilities by Enterprises

Similarly, interviews with relevant smart device manufacturing companies revealed that businesses are increasingly relying on big data effects for market analysis and decision-making. On one hand, the updating and sharing of smart information can help companies better understand the basic patterns and operating rules of the city. On the other hand, smart information contains information about the development and operation of specific industry supply chains, understanding this information is helpful for companies in positioning themselves and improving their decision-making capabilities.

Interview Record 8-7: Mr. Cao, Unmanned Aircraft Equipment Company (38 years old) "The Smart City project will collect a lot of information on the development of various industries and related indicators. This information is very useful for a company to determine its target market. You need to know what your upstream and downstream industries are doing to avoid falling behind in the times."

g) Stakeholders' Demand for Awareness of Project Information

During on-site surveys and discussions, the project-related government functional departments or grassroots government personnel showed an improved awareness of the project construction content. Most residents in the project area have learned about the project's construction through various means. However, the primary way for ordinary residents in the project area to learn about the project is through word of mouth, and their awareness and participation still need to be improved. This requires further efforts to increase project promotion and actively encourage public participation.

Interview Record 8-8: "I know about it; I've heard some things. Especially since I've also learned about Smart City projects in other cities, I paid attention when Guangzhou started it. We discuss these issues when we chat in our free time." "We usually learn about information through community propaganda or notifications from relatives and neighbors. Online, there may be push notifications on public accounts, but I haven't followed them, so I don't know much. Right now, one issue is that neighbors share a lot of information with each other, but everyone is somewhat uninformed about specialized things."

h) Stakeholders' Demand for Participation in Project Implementation

During on-site interviews, it was found that the stakeholders of this project have a high demand for participation in the project, including participating in the Residents' Congress, working in job positions provided during the project construction period, participating in various mass supervision activities, and more. In addition, residents in the project area

have a high level of support for the project, and if there are long-term job opportunities, they are willing to participate in the project, such as working as construction workers during the construction period, to increase their household income while balancing household chores.

Interview Record 8-9: "I really want to participate, especially in job positions. If there are construction teams coming to recruit workers, I will definitely apply. There's not much for me to do at home, so it's not easy to find work." "I really want to participate in related propaganda and supervision activities, even though I don't know much about it. But I want to understand because this is something at the forefront of the times."

B. Public Consultation and Information Disclosure

1. Purpose of Public Participation and Information Disclosure

Public participation in environmental and social impact assessments is aimed at improving the quality of these assessments by providing more information and suggestions. It makes the environmental and social impact assessment of construction projects more democratic and public, allowing the public, who have direct or indirect connections to the project, to participate in the assessment process. This ensures the transparency and credibility of the assessment decisions and allows individuals to provide their own opinions and views to improve and ensure the fairness of the assessment.

Public participation is an important part of environmental and social impact assessments and an effective means of improving scientific decision-making. Public participation in construction projects enhances communication and two-way interactions between the project construction unit, the environmental and social assessment unit, and the public. It allows the public, who will be directly or indirectly affected by the construction, to fully understand potential environmental and social impacts, mitigation measures, and the economic and social benefits brought about by the project construction. It also provides a platform for the public to express their opinions, suggestions, and concerns, actively contributing to the project and finding solutions to problems. This helps minimize the adverse impacts on public interests, avoids disputes related to environmental and social impacts during project construction and operation, and ensures that development and environmental protection are balanced. The main objectives include:

(1) Integrating public opinions into environmental protection and social regulatory measures and using them as guidelines for future project construction. (2) Facilitating two-way communication between the public and the construction unit. Detailed

information about the project overview, pollution status, control measures, and the predicted results of the environmental and social impact assessment are provided to the public. Public opinions and suggestions are also conveyed to the construction unit, which can then modify their plans accordingly, serving as a bridge for mutual understanding between the public and the construction unit. (3) Through public participation, various opinions and views of the public regarding the project can be obtained. This serves as a basis for safeguarding public interests and fully considering feasible suggestions in the environmental and social impact assessment, minimizing public concerns due to the lack of communication between the public and the project stakeholders, and minimizing adverse impacts on public interests, thus ensuring that they receive necessary compensation. (4) In the post-assessment evaluation phase, public supervision and active public participation serve as important components of the environmental and social management mechanism. They contribute to environmental protection, improve the environmental and economic benefits of the project, enhance environmental quality, and ensure the implementation of sustainable development strategies.

2. Relevant Laws, Regulations, Policies, and Stakeholder Identification

This evaluation is carried out in accordance with the public consultation and information disclosure requirements of the AIIB "Environmental and Social Framework," the stakeholder participation plan requirements, and the domestic requirements for public participation. Detailed domestic policy requirements can be found in Chapter 2 of this report: "Policy, Legal, and Administrative Framework."

3. Completed Information Disclosure and Public Consultation

The main methods for public consultation and information disclosure in this project include online public notices, newspaper notices, posting of announcements, on-site bulletin boards, questionnaires, seminars, in-depth interviews, and interviews with key informants.

In accordance with the requirements of the "Environmental Impact Assessment Law of the People's Republic of China," the "Interim Measures for Public Participation in Environmental Impact Assessment" issued by the Ministry of Ecology and Environment, and the AIIB "Environmental and Social Framework" (revised in 2021) and the 2021 AIIB "Environmental and Social Framework" (ESF) requirements, the ESIA unit conducted public consultation and information disclosure during the assessment process. Since the preparatory operation of the AIIB project by Guangzhou Smart Investment Group Co., Ltd. (Guangzhou Zhi Tou), various units and functional departments of the AIIB PMO and relevant departments have organized a series of information disclosure and public consultation activities. Furthermore, during the project's preliminary preparation phase, the AIIB PMO, the construction unit, the feasibility study unit, and the environmental and

social assessment report preparation consulting unit carried out project information disclosure, informed negotiations, and public participation activities related to project information.

With the close cooperation of the ESIA unit with the AIIB PMO, the Guangzhou Municipal Housing and Urban-Rural Construction Bureau, the Emergency Management Bureau, the Agriculture and Rural Bureau, the Civil Affairs Bureau, the Women's Federation, relevant street offices, communities/villages, and individuals, a public survey was conducted in the project implementation scope, including Nan Cun Town, Pazhou Street, and Guanzhou Street, and surrounding project points, from August 17 to 27, 2023. Supplementary surveys were conducted on December 23-25, 2024 at Huangshi Street Office and Jiangxia Community in Baiyun District.

Table 8-3 Overview of Public Participation in the Project

Type of Participation	Date	Location	Participation Contents	Participants
Notification and Public Disclosure of Project-Related Information	October 2022	Relevant websites	Information disclosure, project updates, and developments	Asian Infrastructure Investment Bank (AIIB) PMO, Environmental Impact Assessment (ESIA) Consultation Firms, Project Area Residents
	April 2023	Haixinsha Meeting Room	Special seminars	PMO, Municipal Development and Reform Commission, Urban Investment Group, Invited Experts
	May 2023	Smart City Company Exhibition Hall	Project launch meeting, feasibility study report	AIIB Inspection Team, PMO, Provincial Development and Reform Commission, Provincial Finance Department, Municipal Development and Reform Commission, Municipal Finance Bureau, Municipal Government Information Office, Urban Investment Group, Feasibility Study Unit

Type of Participation	Date	Location	Participation Contents	Participants
	July 2023	Various public media websites	Online project information disclosure	AIIB PMO, ESIA Consultation Firms, Project Area Residents
Site Investigation	May 2023	CITIC Pazhou Center West Tower, Guangzhou University City Huaneng New Energy Co., Ltd. Courtyard	Visit project site	AIIB Inspection Team, PMO, Provincial Development and Reform Commission, Provincial Finance Department, Municipal Development and Reform Commission, Municipal Finance Bureau, Municipal Government Information Office, Municipal Ecology and Environment Bureau, Municipal Ethnic and Religious Affairs Bureau, Urban Investment Group, Feasibility Study Unit
	August 17-27, 2023	Yongda Community, Shitou Village, Southeast Yao Community, Northwest Yao Community, etc.	Conduct socioeconomic sampling survey	Project-affected villages, AIIB PMO, Owner Units, ESIA Units
	August 17-27, 2023	Yongda Community, Shitou Village, Southeast Yao Community, Northwest Yao Community, etc.	Obtain opinions and suggestions from residents in the project area through field surveys, questionnaires, interviews, etc.	Project-affected villages and street offices, AIIB PMO, Owner Units, ESIA Units
	August 17-27, 2023	CITIC Pazhou Center West Tower, Guangzhou University City Huaneng New	Conducted field surveys of proposed project sites, visited and communicated with community	ESIA Units

Type of Participation	Date	Location	Participation Contents	Participants
		Energy Co., Ltd. Courtyard	residents, discussed and advised on the preparation of the project, and made suggestions for project optimization	
Questionnaire Survey	August 2023	Streets, communities, and residents' homes in the project area	Conduct a questionnaire survey with 300 valid questionnaires, with an effective recovery rate of 93.8%. Among them, 53% were male, and 47% were female.	Project-implementation streets, community residents, ESIA-related units
Focus Group Discussions	August 2023	Yongda Community, Shitou Village, Southeast Yao Community, Northwest Yao Community, etc.	Conducted 11 focus group discussions with a total of 101 participants. Among them, 49 were women, accounting for 48.5%; 10 were elderly, accounting for 18.8%.	Project-affected residents, neighborhood committees, and resident representatives, ESIA-related units
Key Informant Interviews	August 2023	Organizations related to project construction, implementation, and management, as well as communities/villages	In-depth interviews with 42 key informants, including responsible persons from the PMO, Nancun Town, Pazu Street, Guanzhou Street, neighborhood	Relevant government department heads, neighborhood/village committees, and village representatives, employees of enterprises and institutions, ESIA-related units

Type of Participation	Date	Location	Participation Contents	Participants
			committees, committee directors, secretaries, affected households, women, and villagers, to understand the project's progress, impact, residents' demands, and issues.	
Field Survey	December 2024	Huangshi Street office, Jiangxia village	In-depth interviews with 24 key informants, including responsible persons from the Huangshi Street, neighborhood committees, committee directors, secretaries, affected households, women, and villagers, to understand the project's progress, impact, residents' demands, and issues.	Relevant government department heads, neighborhood/village committees, and village representatives, employees of enterprises and institutions, ESIA-related units

4. Public Consultation in the Project Preparation Phase

(1) Starting from October 2022, the Asian Infrastructure Investment Bank (AIIB) PMO has initiated communication with residents in the project area regarding the construction details, necessity, and social benefits of the Smart City project. They have informed the residents of the project's information and gathered their attitudes and opinions on the

project construction.

(2) Since April 2023, under the guidance of technical assistance and consulting experts, the PMO, relevant departments, and project design units have conducted a series of socio-economic surveys and public opinion consultations (including approximately 30% participation by women). This includes holding meetings with village/resident representatives, party members, and homeowners in streets, communities, and schools affected by the project. Information about project construction, site selection, and public transportation safety knowledge was shared through methods such as project information disclosure, project notifications, distribution of brochures, hanging banners, outdoor wall slogans, and a WeChat public account. Resident needs and preferences were also surveyed.

(3) In August 2023, and December 2024 a social assessment survey team conducted on-site inspections for each sub-project and visited all streets, communities/villages that might be affected by the project construction. They conducted detailed understanding of the production and living conditions, socio-economic status, surrounding transportation facilities, project impact, and construction willingness of affected residents through methods such as questionnaires, meetings, institutional interviews, and in-depth individual interviews. A socio-economic sampling survey was conducted to understand the potential impacts of various projects on the affected population. Residents were informed about the project construction details and consulted on the possible impacts and benefits. Detailed consultations were conducted regarding the residents' needs, preferences, opinions, and suggestions on project implementation, with accurate recording and feedback. Currently, residents are concerned about potential traffic congestion, noise, and dust pollution during the construction period, and they hope the project can take effective measures to mitigate these negative impacts. In addition, residents strongly desire the project to provide more employment and income opportunities, especially long-term job opportunities. They also care about whether the project can improve urban governance efficiency and the transparency and widespread dissemination of project information to increase public awareness and participation.

5. Stakeholder Engagement Plan

Information disclosure and public participation will be integrated throughout the entire project cycle.

Based on stakeholder identification and the project's engineering content, public participation plans have been developed for various stages of the project, as detailed in Tables 8-4 and 8-5 below.

Table 8-4 Early Public Participation in the Project

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Stage Progress	Funding Source
Project Preparation Stage	Publicizing Basic Project Information	Television, radio, posting notices, distributing flyers, village meetings, (village) village committee notifications, online	PMO, Township, (Village) Village Committees	Residents (Project Area Residents, especially residents in project implementation areas), township/town cadres, PMO	Publicize the "Guangzhou Smart City Infrastructure Construction Project (Phase I) Environmental and Social Impact Assessment / Environmental and Social Management Plan" in both Chinese and English on the Guangzhou Development and Reform Commission website and the AIIB website		
	Participating in Design and Negotiation	Resident interviews, meetings, public notices	PMO, project design units, consulting units	Residents, PMO, project design units, consulting units, village committees, communities	Encourage residents to provide their opinions and suggestions on relevant design content during the design process by project design units and	In Progress	Project budget funds

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Stage Progress	Funding Source
					consulting units; After the preliminary design of the plan, the PMO should publicly display the plan in the project villages and collect residents' opinions and suggestions.		
	Publicizing Environmental and Social Impact Assessment Information and Public Consultation	Online, newspapers, posting notices, distributing flyers, village meetings, village committee notifications, meetings, questionnaire surveys	PMO, owner units	Street/townships, neighborhood committees/village committees, community residents/villagers, schools, businesses along the street	Owner units disclose construction plans, construction time and progress plans; Distribution of construction sites; Main environmental and social impacts of construction and proposed mitigation measures; Main conclusions of environmental and social assessments	Completed	Project budget funds

Table 8-4 Overview of Public Participation Plan during the Project Implementation and Operation Phases

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
Project Implementation Stage	Publicizing Construction Information	Residents' Representative Assembly, Village Committee Notice Boards Posting Notices, Hanging Banners, Broadcasting, etc.	PMO, Construction Units, Village Committees	Residents, PMO, Construction Units, Village Committees	Construction units publicly announce construction time and progress plans; Distribution of construction site locations; Major construction impacts; Safety issues for residents to be aware of; Construction units' liaison officers and contact information.	Construction unit's internal budget
	Publicizing Complaint and Appeal Channels	Media public notices, posting notices, distributing flyers, meetings, questionnaire surveys	PMO, Owner Units, Construction Units	Street/townships, neighborhood committees/village committees, community residents/villagers, schools	Owner units and construction units publicly display project supervision hotline numbers and contact names at appropriate locations for affected residents to contact relevant authorities if they observe any violations by construction units; Owner	Project budget funds

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
					units and construction units accept and inform residents of appeals raised through various means such as on-site appeals, letters, and telephone within 15 days if immediate notification is not possible; Construction units pay attention to the opinions of vulnerable groups such as women and low-income populations to ensure the transparency, fairness, and openness of project implementation.	
	Publicizing Pre-Construction Information	Online, on-site display	PMO	Street/townships, neighborhood committees/village committees, community residents/villagers, schools	Prior to construction, the PMO will publish the Environmental and Social Impact Assessment Report and Management Plan of this project in Chinese and English on	Project budget funds

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
					the PMO's website and the AIIB website. At the same time, the PMO will prepare hard copies of the Environmental and Social Impact Assessment Report and Management Plan for public access.	
	Publicizing Basic Project Information	On-site announcement	Construction Units	Street/townships, neighborhood committees/village committees, community residents/villagers, schools	Construction units set up billboards at the entrances to construction sites, indicating the project contractor, construction supervision unit, and construction schedule, aiming to gain understanding and support from affected populations regarding temporary disruptions caused by project construction; Construction units should participate in public	Project budget funds

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
					participation meetings organized by owner units in affected communities. At these meetings, construction units should explain construction activities and environmental protection measures that have been or will be implemented.	
	Mitigating Construction Impact	Improving relevant plans and effective mitigation measures	PMO, Construction Units, Village-level Supervisory Committees	PMO, Construction Units, Traffic Bureau, Traffic Police, Environmental Protection Bureau, Village-level Supervisory Committees, Village Residents	Construction units implement dust and noise reduction measures; Construction units avoid construction near residential and daily access areas as much as possible; Construction units collect suggestions from residents on improving construction measures.	Project budget funds
	Participation in Project	Village meetings, residents'	PMO, Construction	Village Residents, PMO, Construction	Construction units determine the positions	Construction unit's internal budget

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
	Construction	representative assemblies	Units, Village Committees, Community	Units, Village Committees, Community	they can provide for project construction; Construction units establish selection criteria for participants in project construction, giving priority to low-income groups and women; Construction units determine the compensation for participants in project construction, as well as technical training and safety system training; Village committees encourage residents to participate in public affairs through existing community residents' committees and village residents' committees, promote residents' participation in project	

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
					discussions and suggestion meetings, and establish corresponding incentive mechanisms; Village committees provide environmental awareness and waste sorting training to residents to increase their awareness of participation. Before collecting personal images and information, residents should be informed transparently about the location, function, and data collection purpose of the equipment to ensure residents' right to know.	
	Worker Input Management	Expanding safety and health education, standardizing	PMO, Construction Units, Health Bureau, Village-	PMO, Construction Units, Health Bureau, Township/Town and Community	Village-level Supervisory Committees, External Workers, Community Residents	Construction units should strengthen supervision of construction sites (to

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
		education and management of construction personnel	level Supervisory Committees			avoid the occurrence of harmful behaviors such as gender violence, sexual exploitation and abuse, sexual harassment, etc.), establish a clear appeal and complaint channel. Construction units should establish an appeal and complaint team on the construction site, including at least two female members, and ensure the safety of appeal and complaint team members (to avoid prejudice and fear of retaliation against team members).
	Publicizing	Television, radio,	PMO, Relevant	PMO, Relevant	The PMO publicly	/

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
	Complaint and Appeal Channels	posting notices, distributing flyers, village meetings, village committee notifications, online	Government Management Departments, and Village Committees	Government Management Departments, Street/Townships, Village Committees	announces project supervision hotline numbers and contact names at appropriate locations for residents to contact relevant authorities if they observe any violations by construction units; Relevant government management departments and village committees accept and inform residents of appeals raised through various means such as on-site appeals, letters, and telephone within 15 days if immediate notification is not possible; The PMO, relevant government management departments, and village committees pay attention	

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
					to the opinions of vulnerable groups such as women and low-income populations to ensure the transparency, fairness, and openness of project implementation.	
Project Operation Stage	Network Security Education	Knowledge lectures	PMO, Village Committees, Relevant Enterprises	Village Residents, Village Committees	The smart city project involves many aspects of network security and personal privacy protection. Village committees or neighborhood committees strengthen residents' network security education to increase public awareness of project network security and ensure the proper protection of information infrastructure of the smart city project. The following content can be	Administrative Department Special Funds, Village Collective Finance

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
					disseminated in the introduction: a. Awareness of network threats and risks: Introduce various network threats such as viruses, malware, phishing, etc., to help participants better understand potential network risks. b. Network privacy: Discuss the importance of personal privacy in the digital age, including privacy policies, data collection and sharing, and how to protect personal identity information. c. Enterprise network security: Introduce enterprise-level best practices for network security, including security	

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
					policies, employee training, vulnerability management, etc. Village committees, owners, etc., should pay special attention to the proportion of women, the elderly, and children participating in lectures.	
	Environmental Protection and Energy Conservation	Knowledge lectures	PMO, Village Committees	Village Residents, Village Committees, Guangzhou Ecological Environment Bureau	Village committees and relevant departments conduct environmental protection knowledge lectures to encourage residents to take actions in their daily lives: a. Introduction to waste sorting: Educate residents on how to correctly classify and handle garbage to reduce its impact on the environment. b. Bicycles and public	Administrative Department Special Funds, Village Collective Finance

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
					transportation: Encourage the use of bicycles and public transportation to reduce reliance on personal cars and lower carbon emissions. c. Understanding environmental policies: Introduce local environmental policies and initiatives to encourage residents to participate in community environmental projects. d. Green community initiatives: Encourage residents to participate in community green initiatives, such as clean-up campaigns and tree planting.	
	Publicizing Complaint and Appeal	Television, radio, posting notices, distributing flyers,	PMO, Relevant Government Management	PMO, Relevant Government Management	PMO publicly announces project supervision hotline numbers and contact	/

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
	Channels	village meetings, village committee notifications, online	Departments, and Village Committees	Departments, Street/Townships, Village Committees	names at appropriate locations for residents to contact relevant authorities if they observe any violations by construction units; Relevant government management departments and village committees accept and inform residents of appeals raised through various means such as on-site appeals, letters, and telephone within 15 days if immediate notification is not possible; PMO, relevant government management departments, and village committees pay attention to the opinions of vulnerable groups such as women and low-income	

Stage	Participation Content	Participation Method	Implementing Unit	Participants	Proposed Issues to Be Resolved	Funding Source
					populations to ensure the transparency, fairness, and openness of project implementation.	

Figure 8-1Draft Environmental and Social Assessment Report for the Project (Hard Copy) Posted at the project implementing unit

IX. Grievance Redress Mechanism

During the project preparation, construction, and operation phases, in order to promptly understand and resolve the impacts and issues brought about by the project for stakeholders, to ensure residents' demands for information disclosure, and to encourage extensive community participation, an appeal mechanism at the project level is established, taking into consideration the current situation of complaints from residents in the project area. All appeal records and resulting resolutions will be preserved through semi-annual environmental and social monitoring mechanisms and reported to the Asian Infrastructure Investment Bank (AIIB).

The project's grievance redress mechanism (GRM) mainly includes two types:

- The first type is a grievance redress mechanism at the project level, which provides a channel for affected residents, social groups, businesses, and other stakeholders during the implementation and operation of the project.
- The second type is a grievance redress mechanism for project workers, including direct workers, contract workers, and employees responsible for the project. It provides a channel for these workers to raise grievances and seek resolution.

A. GRM Arrangement

1. GRM for Project Stakeholders

This mechanism is aimed at addressing issues related to the project's implementation and operation, such as dust and noise generated by construction, improper disposal of construction waste, safety measures for the public and construction workers, as well as noise and waste generated during operation. Currently, residents in Guangzhou mainly report issues through the Mayor's Complaint Hotline 020-12345 and the Environmental Hotline 020-12369. The improved appeal mechanism of this project is in line with the regulatory standards of the People's Republic of China, which protect the rights of citizens from environmental and social impacts associated with construction. The "Regulations on Letters and Visits No. 431" issued by the State Council of the People's Republic of China in 2005 specify the complaint acceptance mechanism of governments at all levels and provide protection against retaliation. In accordance with these regulations, the former Ministry of Environmental Protection issued the latest "Measures for Environmental Letters and Visits" (Decree No. 15) in December 2010.

Guangzhou Intelligent Investment Corporation will appoint two environmental and social officers in the PMO responsible for coordinating and handling environmental and social-related appeals. When an appeal is received, the environmental and social officers should first verify whether the appeal is related to the project. If the appeal is related to the project, regardless of whether it is related to environmental and social aspects, the responsible party should initiate coordination to resolve the appeal. If the appeal is unrelated to this project, the responsible party should refer the complainant's appeal to

the relevant competent authority. All appeals should be documented, and the entire process of the appeal should be communicated to relevant personnel. The basic steps and timeframes of the appeal mechanism are as follows:

Phase 1 (5 days): If the complainant is dissatisfied with safety and environmental issues during the construction and operation phases, they can submit their complaint verbally or in writing to the residents' committee or contractor in their area. If it is a verbal complaint, the residents' committee or contractor should make a written record. The residents' committee or contractor will: (1) Immediately request the subject of the complaint to cease related activities (e.g., if on-site construction is causing noise disturbances to nearby residents); (2) The subject of the complaint shall not resume related activities until the complaint is resolved; (3) Immediately inform Guangzhou Intelligent Investment Corporation of the received complaint and the proposed solution; (4) Provide a clear response to the affected parties within two days; (5) Strive to resolve the issue within five days of receiving the complaint.

Phase 2 (15 days): If the complainant is not satisfied with the results from the residents' committee or contractor, they can verbally, by phone, or in writing appeal to the local street office or Guangzhou Intelligent Investment Corporation after receiving the results. During this phase, a meeting will be organized, and a solution will be determined in consultation with the main stakeholders (including the subject of the complaint and the complainant) within five days. The subject of the complaint should implement the resolution immediately and resolve the issue within 15 days. All measures and results should be documented.

Phase 3 (15 days): If the complainant is not satisfied with the results from the street office or Guangzhou Intelligent Investment Corporation, they can appeal verbally, by phone, or in writing to the Guangzhou Municipal Project Working Group or the Guangzhou Urban Investment Group, or directly file a lawsuit with the People's Court. The Guangzhou Municipal Project Working Group or Guangzhou Intelligent Investment Corporation will organize a stakeholder consultation meeting within two weeks, including the complainant, the subject of the complaint, and relevant functional departments such as the local ecological and environmental bureau and the social security bureau. An acceptable solution for all parties should be determined, including clear steps to resolve the issue. The subject of the complaint should immediately implement the agreed-upon solution and completely resolve the issue within 15 days. Actions and results at all stages should be documented. At the end of Phase 3, Guangzhou Intelligent Investment Corporation will inform AIIB of the results.

Phase 4: If the complainant is still dissatisfied with the above decisions, they can file a lawsuit with the civil court after receiving the decision, in accordance with the "Civil Procedure Law of the People's Republic of China."

2. Appeal/Suggestion Mechanism for Workers

Guangzhou Intelligent Investment Corporation will establish a dedicated complaint handling center to address complaints from workers working on the construction site, including issues related to wages, overtime pay, timely payment of wages, accommodation, and facilities related to drinking water, sanitation, and medical services.

In addition, in Gender-Based Violence (GBV) management, relying on the guidance and coordination of Guangzhou Intelligent Investment Corporation, district women's federations, townships/street offices, and village/community women's federations, institutions, and project construction units (contractors) will sign labor (employment) contracts with female workers in accordance with the "Law of the People's Republic of China on the Protection of Women's Rights and Interests," "Special Regulations on the Labor Protection of Female Workers," "Regulations on Women Workers' Health Protection," "Special Labor Protection System for Women Workers in the Workplace (Reference Text)," and "System for Eliminating Workplace Sexual Harassment (Reference Text)," among other laws and regulations, and ensure equal pay for equal work between male and female workers. Effective measures will be taken, including the appointment of a specialist responsible for protecting the rights of women, considering the characteristics of the unit's work and production, to prevent and stop sexual harassment of female workers in the workplace.

Furthermore, there will be an efficient response mechanism for female workers and women in the project area to appeal or complain about GBV-related issues. If there is an incident of harm to the personal safety of female workers in the workplace, such as sexual harassment, the victim can immediately report or complain to the employer, and the employer should handle it promptly while protecting the personal privacy of female workers.

Additionally, the Asian Infrastructure Investment Bank (AIIB) has established a Project Affected People Feedback Mechanism (PPM). When project-affected people believe that the AIIB project has not implemented its Environmental and Social Policy (ESP) and has caused or may cause adverse impacts on them, and their concerns cannot be satisfactorily resolved through the Project Complaints Redress Mechanism (GRM) or AIIB's management mechanism, the PPM provides an independent and impartial review opportunity. More information about PPM can be accessed through the following link: https://www.aiib.org/en/about-aiib/who-we-are/project-affected-peoples-mechanism/how-we-assist-you/index.html.

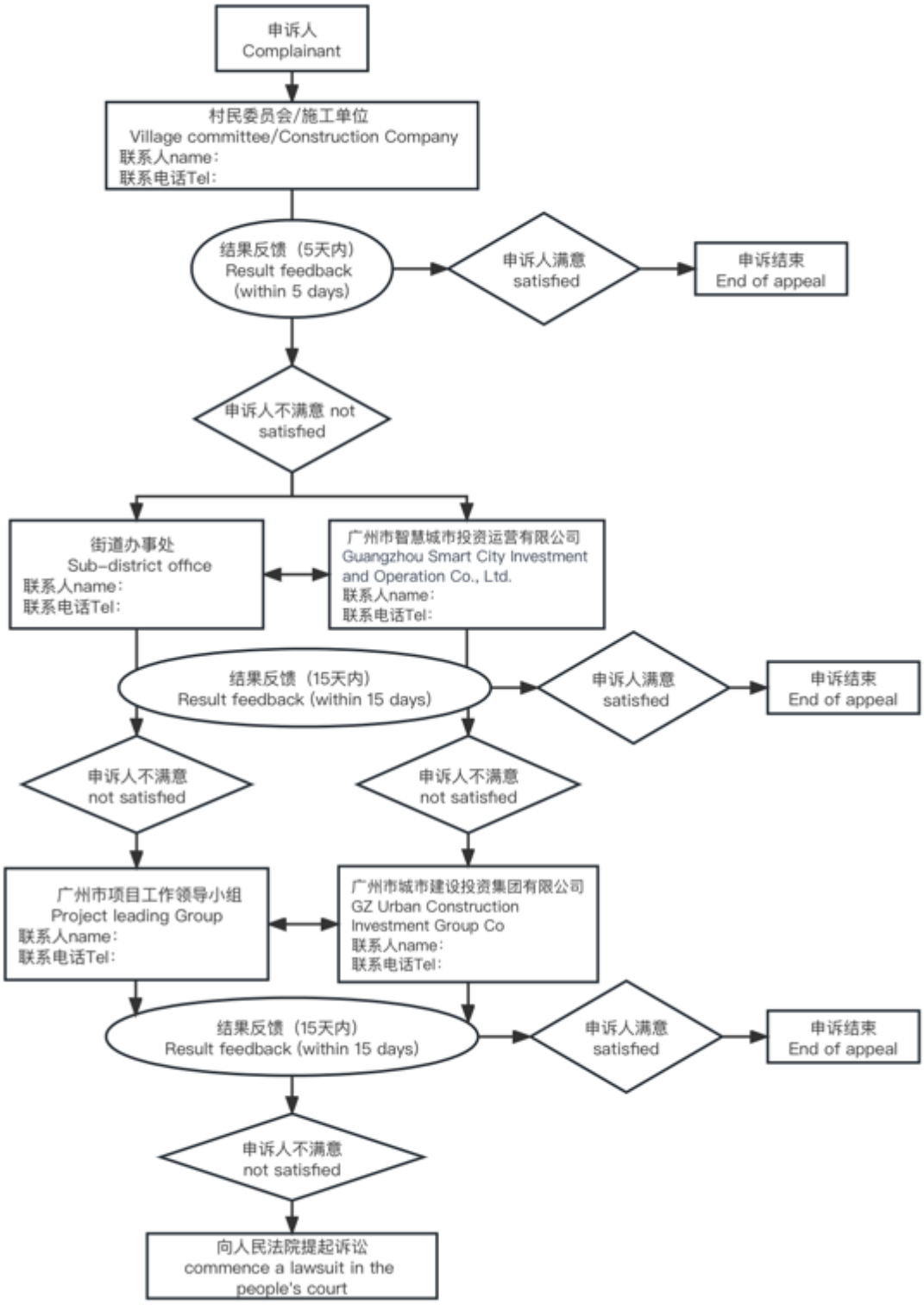


Figure 9-1 GRM procedures

B. Complaints and Appeals Recording and Tracking Feedback

During the execution of the Environmental and Social Management Plan, all entry points

of the appeal mechanism should maintain proper registration and management of complaint records and handling results. A written report should be submitted to the PMO on a monthly basis. The PMO will conduct regular reviews of the complaint handling registration.

In order to comprehensively document complaints from affected individuals and the status of their resolution, the PMO has developed a Complaints and Appeals Handling Record Form for Affected Individuals. The format of the form is as shown in Table 9-1.

Table 9-1: Complaints and Appeals Registration Form

Name of Complainant	Date	Location	Feedback from Receiving Unit	PMO	Suggestions from External Monitoring Unit	Progress in Resolving Complaint
Cause of Complaint						
Desired Resolution						
Proposed Solution						
Actual Handling						
Responsible Person (Signature)						

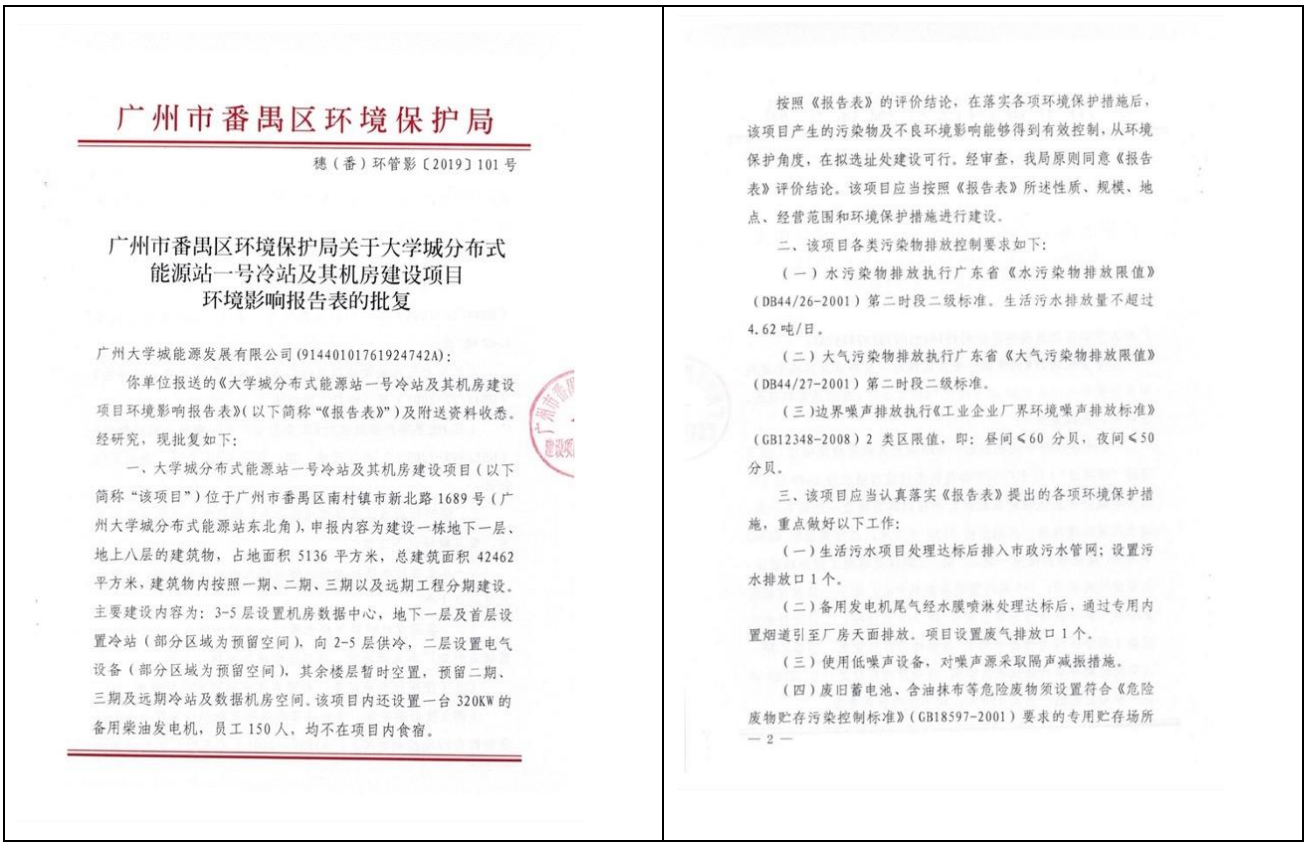
C. Contact Information for Complaints and Appeals

The implementing organization will appoint a designated senior official responsible for receiving and handling grievances and appeals from affected individuals. The names, office addresses, and contact phone numbers of the identified responsible individuals are currently as shown in Table 9-2. After the bidding process is finalized, the construction and supervisory units are required to confirm the Environmental and Social Responsibility Officer as their point of contact for the complaints and appeals mechanism.

Table 9-2: Contact Information for Receiving Complaints and Appeals from Affected Individuals

Organization/Unit	Contact Person	Address	Phone
Guangzhou Urban Construction Investment Group Co., Ltd.	Chen Zihao	Room 601, 228 Zhongshan Fourth Road, Yuexiu District, Guangzhou	+86 13533680931
Guangzhou Smart City Investment & Operation Co., Ltd.	Peng Wen	18th Floor, 326 Dongfeng Middle Road, Yuexiu District, Guangzhou	+86 15010141615
Project Leading Group Office of Guangzhou City	Jiang Xia	Building 9, Municipal Government Compound, Guangzhou	+86 020-83123730
Nancun Town Government	Duty Officer	1st Floor, North Side of Nancun Cultural Center, 885 Xingnan Avenue, Nancun Town	+86 020-34966116
Huangshi street office	Duty Office	No. 93, Huangshi North Road, Baiyun District, Guangzhou City	020-36505206
Guanzhou Sub-district Office	Duty Officer	19 Beishan Street, Guanzhou Sub-district, Haizhu District, Guangzhou	+86 020-34089337
Yongda Community	Duty Officer	Ground Floor, Building 2, Xiliyuan, Nancun Town, Panyu District, Guangzhou	+86 020-34693293
Shitou Village	Duty Officer	30 South Shitou Avenue, Panyu District, Guangzhou, Guangdong Province	+86 020-34769301
Xibei Yue Community	Duty Officer	51 Chisha Road, Haizhu District, Guangzhou	+86 020-84097491, +86 020-84097910
Dongnan Yue Community	Duty Officer	1 Lane 4, Fenyangliwai Street, Chisha, Haizhu District, Guangzhou	+86 020-89445402
Jiangxia village	Duty Officer	Jiangxia Village, No.281 Huangshi East Road, Baiyun District, Guangzhou, China	020-36305665

Appendix 1-Reply from the Environmental Protection Bureau of Panyu District, Guangzhou, Regarding the Environmental Impact Assessment Report for the Construction of University City Distributed Energy Station No. 1 Chilling Station and its Equipment Room



广州市番禺区环境保护局

穗（番）环管影〔2019〕101号

广州市番禺区环境保护局关于大学城分布式能源站一号冷站及其机房建设项目环境影响报告表的批复

广州大学城能源发展有限公司(91440101761924742A)：

你单位报送的《大学城分布式能源站一号冷站及其机房建设项目环境影响报告表》(以下简称"《报告表》")及附送资料收悉。经研究，现批复如下：

一、大学城分布式能源站一号冷站及其机房建设项目(以下简称"该项目")位于广州市番禺区南村镇市新北路1689号(广州大学城分布式能源站东北角)，申报内容为建设一栋地下一层、地上八层的建筑物，占地面积5136平方米，总建筑面积42462平方米，建筑物内按照一期、二期、三期以及远期工程分期建设。主要建设内容为：3-5层设置机房数据中心，地下一层及首层设置冷站(部分区域为预留空间)，向2-5层供冷，二层设置电气设备(部分区域为预留空间)，其余楼层暂时空置，预留二期、三期及远期冷站及数据机房空间。该项目内还设置一台320KW的备用柴油发电机，员工150人，均不在项目内食宿。

按照《报告表》的评价结论，在落实各项环境保护措施后，该项目产生的污染物及不良环境影响能够得到有效控制，从环境保护角度，在拟选址处建设可行。经审查，我局原则同意《报告表》评价结论。该项目应当按照《报告表》所述性质、规模、地点、经营范围和环境保护措施进行建设。

二、该项目各类污染物排放控制要求如下：

(一)水污染物排放执行广东省《水污染物排放限值》(DB44/26-2001)第二时段二级标准。生活污水排放量不超过4.62吨/日。

(二)大气污染物排放执行广东省《大气污染物排放限值》(DB44/27-2001)第二时段二级标准。

(三)边界噪声排放执行《工业企业厂界环境噪声排放标准》(GB12348-2008)2类区限值，即：昼间≤60分贝，夜间≤50分贝。

三、该项目应当认真落实《报告表》提出的各项环境保护措施，重点做好以下工作：

(一)生活污水项目处理达标后排入市政污水管网；设置污水排放口1个。

(二)备用发电机尾气经水膜喷淋处理达标后，通过专用内置烟道引至厂房天面排放。项目设置废气排放口1个。

(三)使用低噪声设备，对噪声源采取隔声减振措施。

(四)废旧蓄电池、含油抹布等危险废物须设置符合《危险废物贮存污染控制标准》(GB18597-2001)要求的专用贮存场所

— 2 —

存放并委托具备危险废物处理资质的机构处理。

（五）督促施工单位落实《报告表》提出的施工期污染防治措施，做好该项目施工现场的环保工作，防止施工粉尘、噪声和污水等对周围环境造成影响，并在施工过程及时缴纳施工期排污税。

四、该项目的性质、规模、地点、使用功能、经营范围或者防治污染的措施发生重大变动的，你单位应当重新报批环境影响评价文件。

五、自《报告表》批准之日起超过五年，方决定该项目开工建设的，《报告表》应当在开工建设前报我局重新审核，未经我局重新审核同意的，不得擅自开工建设。

六、该项目建设应严格执行配套建设的环境保护设施与主体工程同时设计、同时施工、同时投产使用的环境保护“三同时”制度，具体要求如下：

（一）项目竣工后，建设单位应当按照国务院生态环境行政主管部门规定的标准和程序，对配套建设的环境保护设施进行验收，编制验收报告，依法向社会公开。

（二）项目配套建设的环境保护设施经验收合格后，方可投入生产或者使用。

七、该项目建设和运行过程中如涉及规划、土地利用、建设、水务、消防、安全等问题，应遵照相关法律法规要求到相应的行政主管部门办理有关手续。

八、如不服本行政许可决定，你单位可以在接到本行政许可

决定之日起 60 日内向广州市番禺区人民政府（地址：广州市番禺区市桥街清河东路 319 号区行政办公中心主楼东 903 室，电话：84636756）或广州市生态环境局（地址：广州市环市中路 311 号，电话：83203039）申请复议；或在六个月内直接向有管辖权的人民法院提起诉讼。行政复议、行政诉讼期间内，不得停止本决定的履行。

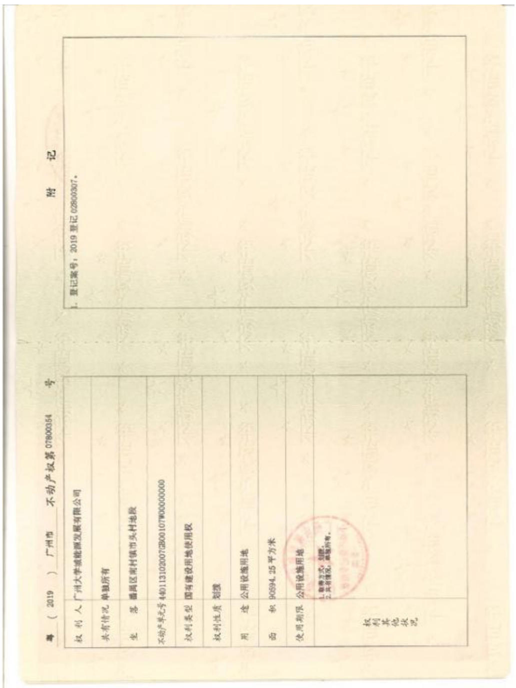
广州市番禺区环境保护局

2019 年 3 月 26 日

公开方式：主动公开

抄送：广州市番禺区环境保护局执法监察大队、第三环境保护所，广州市番禺环境工程有限公司。

Appendix 2 - Real Estate Ownership Certificate for the Building Housing the Computing Center

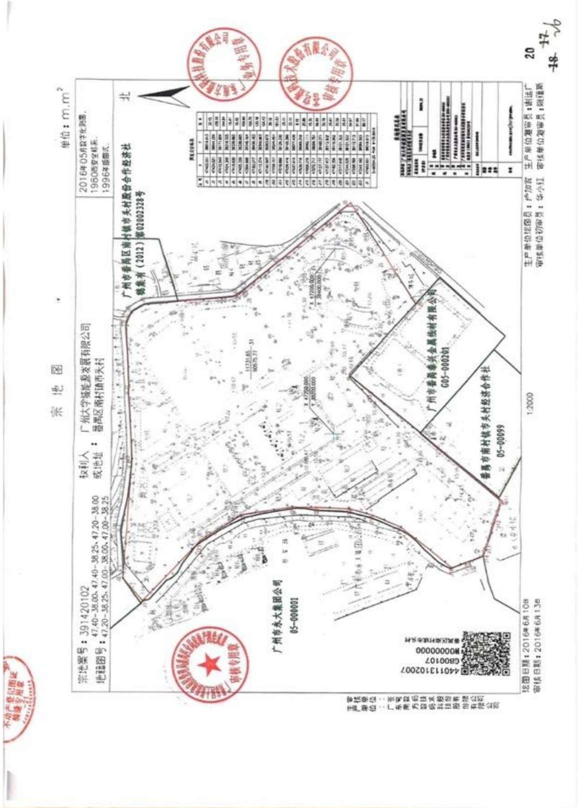


粤（2019）广州市不动产权第07800354号

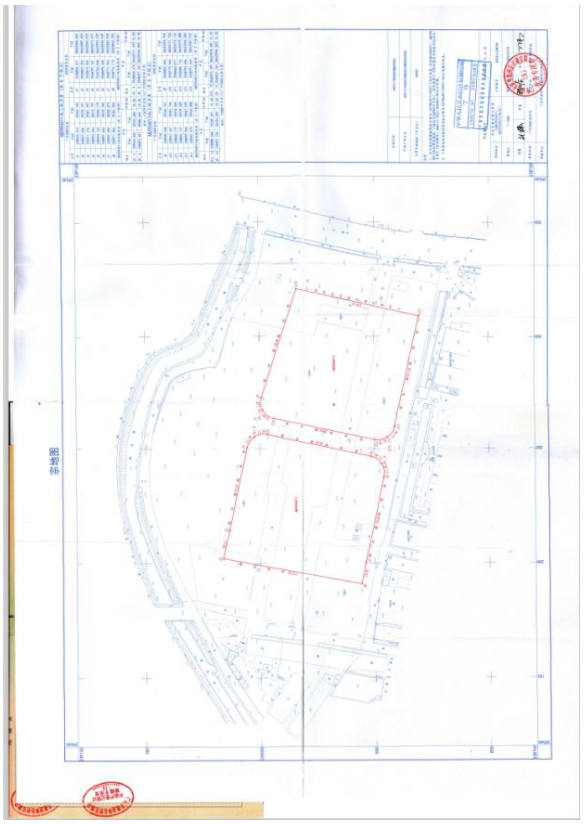
权利人	广州大学城能源发展有限公司
共有情况	单独所有
坐落	番禺区南村镇市头村地段
不动产单元号	440113102007GB00107W00000000
权利类型	国有建设用地使用权
权利性质	划拨
用途	公用设施用地
面积	90594.25平方米
使用期限	公用设施用地
权利其他状况	1.取得方式：划拨。 2.共有情况：单独所有。

附记

1. 登记案号：2019登记02800307。



Appendix 3 - Certificate of real estate rights for the building housing the Transportation and Management Center and the Incubation Center



粤（2023）广州市 不动产权第 04005855 号

权利人	广州新城建投资发展有限公司(统一社会信用代码:91440101MA9Y6WUC3J)
共有情况	单独所有
坐落	白云区黄石街江夏村（AB2904011、AB2904013地块）
不动产单元号	440111006002GB04053W00000000
权利类型	国有建设用地使用权
权利性质	出让
用途	零售商业用地/餐饮用地/商务金融用地
面积	26959.0000平方米
使用期限	详见附记
权利其他状况	☆四至：东：广州市白云区土地开发中心；西：绿地用地；南：城市道路用地；北：城市道路用地 ☆图号：236-38-6(1、2、5、6)

附 记

☆登记字号：2023登记10011530
☆本宗地已签订《国有建设用地使用权出让合同》（编号：440111-2021-000051号），土地使用权人应按照合同规定的条款使用土地。
☆宗地图（工程编号：2023土23B155）
☆合同项下的国有建设用地使用权出让年期为零售商业用地、餐饮用地出让年期自2022年3月3日起至2062年3月2日止；商务金融用地出让年期自2022年3月3日起至2072年3月2日止。
☆项目代码：2201-440111-04-01-21209

Appendix 4-Letter from the Housing and Urban-Rural Development Bureau of Guangzhou Municipality on the Issuance of a Pilot Work Program for the Improvement of Municipal Road Hopping Poles in Guangzhou Municipality

广州市住房和城乡建设局

H202403322

广州市住房和城乡建设局关于印发广州市市政道路合杆整治试点工作方案的函

市发展改革委、工业和信息化局、公安局、财政局、规划和自然资源局、交通运输局、水务局、城市管理综合执法局、文化广电旅游局，省通信局市通信建设管理办公室、市照明建设管理中心，广州数字科技集团、广州城投集团、广东移动广州分公司、广东电信广州分公司、广东联通广州分公司、中国广电广州公司：

《广州市市政道路合杆整治试点工作方案》（详见附件）已经市政府同意，现予以印发，请认真组织实施，并切实落实如下工作：

一、各单位应提高政治站位，充分认识合杆整治工作的重要性、紧迫性，提升责任意识、大局意识，积极配合全市合杆整治工作。

二、各单位应加强沟通协调，建立有效的协作机制和沟通机制，确保工作的高效推进。

三、广州数字科技集团、广州城投集团要强化责任担当，压实工作责任，优化项目建设时序，健全完善“全方位、全流程、全周期”项目管理模式，坚持一流的标准优化合杆整治设计，在严守安全和质量底线的前提下加力提速，确保合杆整治试点工作保质保量

如期完成。

附件：广州市市政道路合杆整治试点工作方案

广州市住房和城乡建设局

2024年4月25日

（联系人：麦健超，联系电话：83064102、13822116215）

Appendix 5 Minutes of the Special Meeting of Guangzhou Urban Investment Group on Matters Concerning the Further Acceleration of Multi-Pole Construction Work

广州市城市建设投资集团有限公司会议纪要

穗城投工程会纪〔2024〕162 号

广州市城市建设投资集团有限公司　　2024 年 8 月 30 日

广州城投集团关于进一步加快多杆合一建设工作事宜专题会会议纪要

2024 年 8 月 22 日下午，城投集团工程管理部在城投大厦 11 楼会议室组织召开关于研究加快推进多杆合一建设工作安排等相关事宜专题会，集团工程管理部、科技信息部、智投公司、广宽公司、照明公司、广州城建院、维修处公司等相关领导及负责人员参加了本次会议。经研究，纪要如下：

一、根据集团工作安排，为了进一步加快推进多杆合一建设工作，明确由智投公司作为业主牵头，组织实施多杆合一相关工

— 1 —

作。请智投公司高度重视，合理统筹，迅速调动人力物力，积极启动多杆合一建设相关建设工作。

二、请智投公司牵头，按既定的“先行启动不带电、不迁线或少迁线部分的合杆实施工作”的工作要求，并适时启动带电杆体部分的合杆实施工作，按程序紧密推进项目立项实施等相关工作，尽快依法开展工程设计、施工总承包公开招标等工作。

三、请智投公司牵头，广宽公司、照明公司配合，根据集团负责的约129.8公里实施范围、市住建局进度计划节点要求，详实梳理合杆方案及预算，制定专项实施方案，并开展多杆合一建设事宜投资运营模式探索工作。

参会人员：邓梓晖、陈宁、李勇其（广州城投集团），陈科峰（广宽公司），唐国强、黎珀（智投公司），陈文刚、杨蒙（照明公司），赖寿华、赖铭中（广州城建院），胡成生、马业晓（维修处公司）。

分送：各参会单位

广州市城市建设投资集团有限公司办公室　　2024年8月30日印发