

**Environmental Impact Assessment**

**For**

**Jiangxi Integrated Rural and Urban Water  
Supply and Wastewater Management Project**

**Jiangxi PMO**

**Nov. 2017**

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## Abstract

As explicitly stated in 13th Five-year Plan in Jiangxi Province, by the end of 2020 water supply rural coverage will have recorded 90%, with county wastewater treatment rate reaching 85% as targeted, and rural sewage treatment below the county level with substantial improvement. In order to materialize the goal, Water Conservation Bureau in Jiangxi Province has applied for the utilization of the bank's loan of \$200 million to implement the *Provincial Project Of Integrated Urban And Rural Water Supply And Rural Sewage Treatment*. The project load is accountable by Water Conservation Bureau in Jiangxi Province, implemented and reimbursed by Water Investment Group in Jiangxi Province, and finally co-operated by Water Investment Sub-group in Jiangxi Province and Water Investment Ecological Resources Development Group Co., Ltd in Jiangxi Province. According to the local actual demand, the project will engage the participation of 7 counties: Yongxin County, Linchuang District, Fuzhou City, Dongxiang Village, Jinxi County, Nanfeng County, Jiujiang City, Xiushui County and Leping City, Jingde Town respectively.

The project mainly includes improved urban water supply facilities, the consolidated rural drinking water security, and building up new rural sewage treatment facilities. Respectively, improved urban water supply facilities includes the renovation of urban water plants and construction of urban supply pipeline; consolidated rural drinking water safety includes the extension of rural pipe network and water supply pipeline as well as renovation and expansion of the rural water plants; building up rural sewage treatment facilities expects, due to the rural sewage treatment campaign yet in full motion in Jiangxi province, with present big risk and unknown factors, Jinzha Town to be a demonstration base. The implementation of this project means 5 urban water plants; water supply pipeline newly built in 6 counties; extended pipeline in 6 counties; water supply pipeline extension in 3 villages; 1 rural water plant construction and expansion. The new water supply will record 245600m<sup>3</sup>/d, with urban proportion of 240000m<sup>3</sup>/d and rural proportion of 5600m<sup>3</sup>/d, in favor of the population of 294,6577(According to the 2015 population statistics

yearbook, there are discrepancies with the latest data), reducing leakage of pipeline by 38929.5m<sup>3</sup>/d.

#### (1) Environmental Impact and Mitigation and Control Measures

The environmental impact during the construction period includes the impact analysis of atmospheric environment, acoustic environment, water environment, solid waste and water and soil erosion. Respectively, the atmospheric environmental impact mainly comes from the large-scale pipeline construction, water and sewage treatment plant construction in the process of earthwork backfilling and digging as well as loaded and unloaded building materials, transportation and storage process of dust pollution; the influence of acoustic environment mainly derives from the influence of the noise on the peripheral sensitive targets caused by the construction noise and transport vehicles during the construction of large-scale pipeline; the water environmental impact mainly comes from the construction sewage water and living sewage; the influence of solid waste mainly derives from waste residue caused by construction and on-site living. Construction excavation, backfilling and temporary stacking will lead to soil and water erosion, to the detriment of vegetation, while water supply and drainage pipe laying construction will bring undermine the road traffic.

The adverse impact during the operation period mainly comes from the sewage treatment plant in Jinzha Town, including the influence of waste water discharge, of sludge disposal, and of the machine pump noise on the surrounding environment.

The project implementation may involve some environmental protection objects, such as underground infrastructure (cables, gas pipeline), transport facilities, the material and cultural resources, ancestral hall and ancient trees), residential areas, schools, nursing homes, etc. In feasibility study, we should resort to the reasonable location to avoid the environmental protection objects; in the environmental evaluation, we should make alternative comparison optimizing design scheme, mitigation and control measures, the implementation of environmental and social management plan, public participation in negotiations and other ways to reduce impact on the environmental protection objects, with its influence range allowable in

the national laws, regulations and standards.

## (2) Plan of Implementation of Environmental Management

World bank loan for integration of urban and rural water supply and rural sewage treatment engineering PMO of Jiangxi Provincial Water Conservancy Investment Group Co., Ltd is commissioned and led by Water Conservancy Bureau in Jiangxi with the comprehensive management on the whole project. PMO from various counties and cities is accountable for the coordination and supervision of sub-project environmental management, with each owner unit responsible for the implementation of the project within the environmental management plan, assisted by at least 1 environmental supervision engineer.

Environmental management organization has the following specific duties: provincial PMO environmental protection; feasibility study organization; environmental protection planning; coordination between various departments and the construction units; guiding the construction unit to perform various management measures; coordinating and preparing sub-regional projects. The environmental manager of the project is responsible for planning environmental protection and designing phased environment management; the project owner is responsible for the implementation and management of environmental protection measures during the construction and operation period; Environmental Protection Bureau is accountable for supervising the implementation of environmental management plan; the specific implementation agencies of environmental management plan are generally owners and contractors.

# 1. Overview

## 1.1 Project Context

### 1.1.1 Project brief

Jiangxi is located in the southeastern China, between 24°29'14"N and 30°04'41"N, 113°34'36"E and 118°28'58"E, faces Zhejiang and Fujian provinces on the east, Guangdong Province on the south, Hunan Province on the west, Hubei and Anhui provinces on the north connecting the Changjiang River, belongs to the Eastern China. The total province area is 166,900 km<sup>2</sup>, with 45,422,000 people as the permanent resident population. The gross provincial productivity in 2015 was RMB 1,672.38 billion.

“The 13th Five-Year Plan” of Jiangxi proposes to build a modern powerful agricultural province. To ensure farmers’ drinking water safety and healthy water environment is a prerequisite for agricultural development. Therefore, when developing “the 13th Five-Year Plan”, Jiangxi puts forward the rural water supply and wastewater treatment as the prior task, and as one of the anti-poverty measures. The provincial government made clear in “the 13th Five-Year Plan” that, by the end of 2020, the provincial tap water supply will cover about 90% of the rural population, and the county-level wastewater treatment ratio will reach 85% and the wastewater treatment in rural area below the county-level will be substantially improved. Since 2009, Jiangxi Province Water Resources Investment Group has established the integrated mode of urban and rural water supply in Leping and other counties with the government as the responsibility subject and enterprises as investment subjects. The goal is to improve the level of guarantee of rural drinking water safety and the utilization of water resource by the overall planning of urban and rural public service resources in economically less-developed areas, and to make room for the further improvement of the future urbanization rate and the development of industrial parks through the rational distribution of water source, waterworks and pipe network.

“Project of The World Bank Loan for the Engineering of Jiangxi Urban and

Rural Water Supply Integration and Rural Wastewater Treatment” applied by Jiangxi Province Water Resources Investment Group, USD 200 million loan from The World Bank is applied, about RMB 2,429,054,000 of the estimated total investment. The main construction sites are located in seven counties under Fuzhou, Ji’an, Jiujiang, Jingdezhen and other cities in Jiangxi, including Yongxin County in Ji’an, Jinxi, Linchuan, Nanfeng counties and Dongxiang District in Fuzhou, Xiushui County in Jiujiang and Leping City in Jingdezhen. The main construction content includes urban water supply, rural water supply and rural wastewater treatment engineering.

Entrusted by Jiangxi Province Water Resources Investment Group, CNNC Beijing Research Institute of Uranium Geology bears the evaluation of environmental impact of “Project of The World Bank Loan for the Engineering of Jiangxi Urban and Rural Water Supply Integration and Rural Wastewater Treatment”. The evaluation unit carried out field investigation on the project in November 2016 and May 2017, understood the natural environment, distribution of environmental protection targets and environmental functional district planning in the engineering area, collected data about the area’s social environment status and planning related to this engineering and other files and completed the investigation on the quality of the area’s surface water, ambient air and sound environment. *Environmental Impact Statement on Project of the World Bank Loan for the Engineering of Jiangxi Urban and Rural Water Supply Integration and Rural Wastewater Treatment (Version IV)* was developed and completed in September 2017 by the unit.

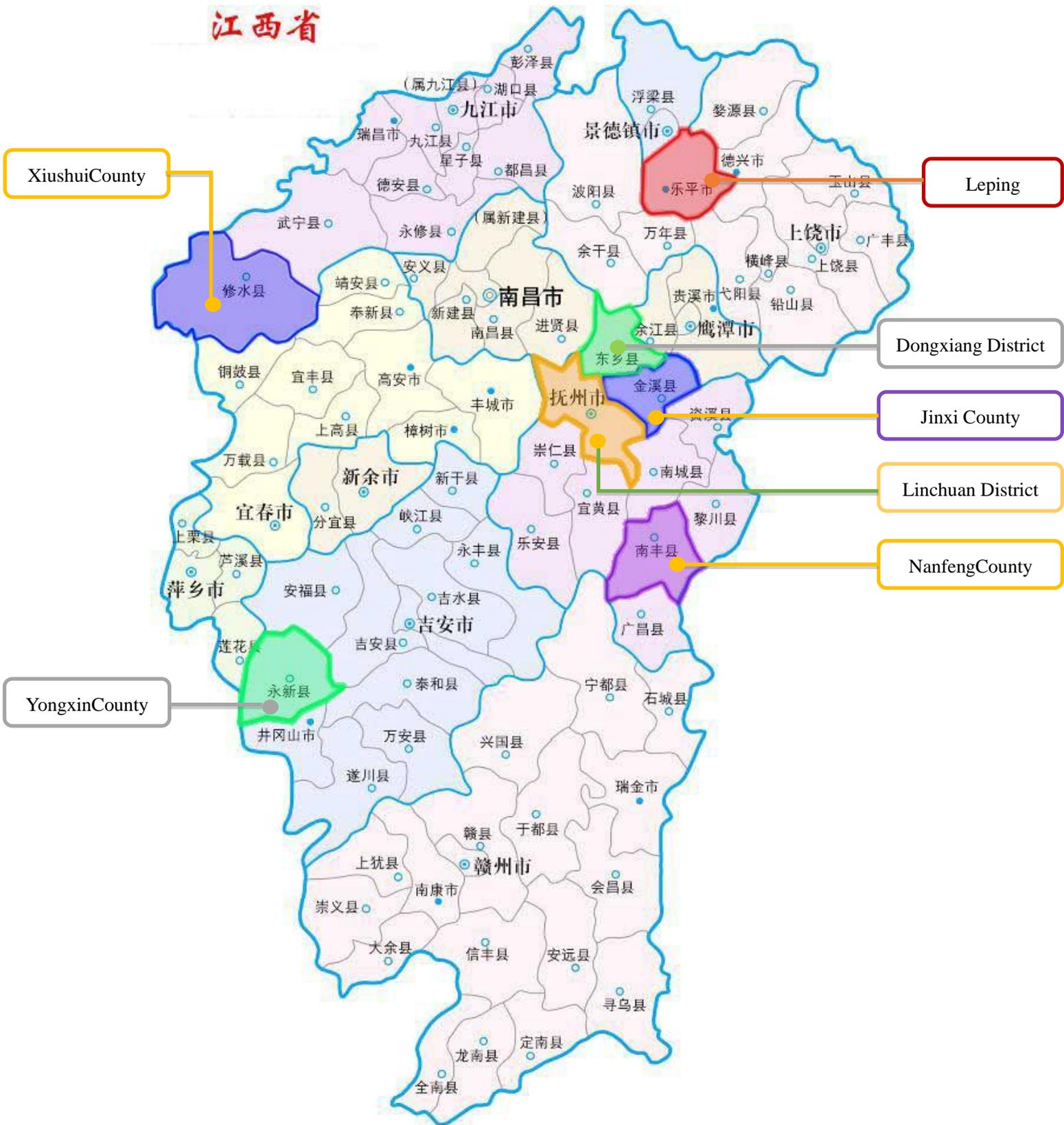


Figure 1.1-1 Distribution of Engineering of Jiangxi Urban and Rural Water Supply Integration and Rural Wastewater Treatment

### **1.1.2 Source of fund**

The estimated total fund demand of this project is RMB 2,429,054,000, RMB 1,698,715,000 for water supply engineering, RMB 47,860,000 for wastewater engineering, RMB 183,062,000 for the other expenses, RMB 37,260,000 for public participation and project management, RMB 57,445,000 of the reserve cost, RMB 2,253,113,000 of the total cost, RMB 175,942,000 of the financial cost; intending to apply for The World Bank loan of USD 200 million (equivalent to RMB 1,394,000,000 according to USD 1=RMB 6.97). Other funds will be self-raised.

## **1.2 Basis of Development**

### **1.2.1 Laws and regulations**

(1) *Law of the People's Republic of China on Environmental Protection* (executed on December 26, 1989 and revised on April 24, 2014);

It is developed to protect and improve the environment, prevent pollution and other environmental disruptions, guarantee public health, promote the construction of ecological civilization and promote the sustainable development of the economic society. About the evaluation of environmental impact, it said that: *The Environmental Impact Statement on a construction project must assess the pollution the project is likely to produce and its impact on the environment and stipulate the preventive and curative measures; the statement shall, after initial examination by the authorities in charge of the construction project, be submitted by specified procedure to the competent department of environmental protection administration for approval.*

(2) *Law of the People's Republic of China on Evaluation of Environmental Impact* (executed from September 1, 2003 and revised on July 2, 2016);

It is about the solutions and measures for the analysis, prediction, evaluation and prevention from possible environmental impact arising from the implementation of planning and construction projects, or for the alleviation of adverse environmental impact, and is about the methods and systems for tracking monitoring.

(3) *Law of the People's Republic of China on Soil and Water Conservation* (executed from June 29, 1991 and revised on December 25, 2010);

It is designed for the prevention and control of water and soil loss, protection and rational utilization of land and water resources, reduction of water, drought, wind-sand disasters, improvement of ecological environment and guarantee of sustainable development of the economic society.

(4) *Law of the People's Republic of China on Land Management* (executed from January 1, 1987 and revised on August 28, 2004);

This national law is developed for the enhancement of land management, maintenance of the land's socialist public ownership, protection and development of land resources, rational utilization of land, effective protection of cultivated land, and promotion of sustainable development of the society's economy.

(5) *Law of the People's Republic of China on Air Pollution Prevention and Control* (executed from June 1, 1988 and revised on August 29, 2015);

It is developed to protect and improve the environment, prevent and control air pollution, guarantee public health, promote the construction of ecological civilization and stimulate the sustainable development of the economic society.

(6) *Law of the People's Republic of China on Environmental Noise Pollution Prevention and Control* (executed from March 1, 1997);

It is developed to prevent and control environmental noise pollution, protect and improve the environment, safeguard human health and promote the development of economy and society.

(7) *Law of the People's Republic of China on Water Pollution Prevention and Control* (executed from May 11, 1984 and revised on February 28, 2008);

It is developed to prevent and control water pollution, protect and improve the environment, ensure drinking water safety and promote the comprehensive harmonious and sustainable development of the economic society.

(8) *Law of the People's Republic of China on Solid Waste Environmental Pollution Prevention and Control* (executed from April 1, 1996 and revised on November 7, 2016);

It is developed to prevent and control solid waste environmental pollution, guarantee human health, maintain ecological safety, and promote the sustainable

development of the economic society.

(9) *Regulations on Environmental Protection Management of Construction Projects*, No.253 Decree by the State Council (executed from November 29, 1998);

It is issued by the State Council to prevent the new pollution and destruction of ecological environment caused by construction projects.

### **1.2.2 Departmental rules**

(1) *Measures for Public Participation in Environmental Protection* (executed from September 1, 2015);

It is developed to ensure the right of citizens, legal persons and other organizations to acquire environmental information, participate in and supervise the environmental protection, and to open participation channel and promote the legal and orderly development of public participation in environmental protection.

(2) *Catalogue for the Classified Management of Evaluation of Environmental Impact of Construction Projects* (executed from July 1, 2017);

According to the impact degree of construction projects on the environment, the country carries out classified management on the evaluation of environmental impact of construction projects. The sensitivity nature and degree of the environment where a construction project is located are important basis for determining the classification of evaluation of environmental impact of the construction project. Construction units shall, in accordance with this catalogue, respectively, prepare Environmental Impact Statement and Environmental Impact List, or complete Environmental Impact Registration Form.

### **1.2.3 Local laws**

(1) *Regulations of Jiangxi Province on Environmental Pollution Prevention and Control* (executed from January 1, 2009);

It is promulgated by Jiangxi for the prevention and control of environmental pollution and the protection and improvement of living and ecological environment, is used for the prevention and control of water, air, environmental noise, solid waste

pollution and other pollution in the administrative region of Jiangxi.

(2) *Regulations of Jiangxi on Environmental Protection of Construction Projects* (executed from April 29, 1995 and revised on September 17, 2010);

It is promulgated for the enhancement of environmental protection of construction projects, effective prevention and control of environmental pollution and ecological destruction, protection and rational utilization of natural resources and the guarantee of human health. It is applicable to all new construction, expansion, reconstruction, relocation, technological transformation projects and regional development projects in the administrative region of Jiangxi that have impact on the environment.

(3) *Measures for Jiangxi Province's Implementation of Law of the People's Republic of China on Land Management* (adopted on December 27, 1986 and revised on November 26, 2010);

It is developed in accordance with *Law of the People's Republic of China on Land Management* and *Regulations on the Implementation of Law of the People's Republic of China on Land Management* and other related laws and administrative regulations and the actual conditions in Jiangxi Province.

(4) *Guidelines of Jiangxi on the Control Technology of Rural Surface Source and Domestic Pollution (Trial)*, 2011.

It is used to promote the scientific, normative and effective treatment of centralized town domestic wastewater in the province. It puts forward some technologies and selection principles suitable for the centralized town domestic wastewater treatment in Jiangxi, and related requirements for process design and management and maintenance.

(5) *Measures of Jiangxi on the Prevention and Control of Water Source Pollution of Domestic Drinking Water* (executed from August 1, 2006);

It is developed on the basis of *Law of the People's Republic of China on Water Pollution Prevention and Control*, *Water Law of the People's Republic of China*, *Regulations on the Implementation of Law of the People's Republic of China on Water Pollution Prevention and Control* and other laws and regulations and the actual

conditions in Jiangxi.

(6) *Regulations of Jiangxi on Water Resource* (executed from March 30, 2006);

It is developed on the basis of *Water Law of the People's Republic of China* and related laws and administrative regulations and the actual conditions in Jiangxi.

#### **1.2.4 Technical specifications**

(1) *Technical Guideline for Evaluation of Environmental Impact-General Programme* (HJ2.1-2011), executed from January 1, 2017; the general principles, content, working procedures, methods and requirements for evaluation of environmental impact of construction projects are stipulated.

(2) *Standards for Prevention and Control of Water and Soil Loss on Development and Construction Projects* (GB50434-2008), executed from July 1, 2018;

It is developed to carry out the national standards stipulated in *Law of the People's Republic of China on Soil and Water Conservation* and the regulations on its implementation. It is applicable to the prevention and control of water and soil loss on development and construction projects that may cause water and soil loss.

(3) *Notifications on Strengthening Risk Prevention and Strict Management on Evaluation of Environmental Impact* (No.98 [2012], issued by Ministry of Environmental Protection); executed from July 3, 2012;

It is developed to clarify the enterprise's main body responsibility for environmental risk prevention, strengthen the environmental supervision by environmental protection departments at all levels and effectively prevent environmental risks.

#### **1.2.5 Project files**

(1) Feasibility Study Report on The World Bank Loan for the Engineering of Jiangxi Urban and Rural Water Supply Integration and Rural Wastewater Treatment (Yongxin County, Jinxi County, Nanfeng County, Leping City, Xiushui County, Dongxiang District, Linchuan District), 2017.11.

(2) Water Source Demonstration Statement on the Standby Water Supply

Engineering at Longyuankou in Yongxin County, 2015.6;

(3) Report on Water Source Demonstration on the Water Supply Engineering at Huangtong Town in Jinxi County, 2017.8;

(4) Water Source Demonstration on the New Construction of No.2 Waterworks of Linchuan District in Fuzhou City, 2017.8;

(5) Water Source Demonstration on the New Construction of Water Supply Engineering of 40,000 Tons Per Day at Urban East Waterworks in Dongxiang District, 2017.8;

(6) Water Source Demonstration Statement on the Construction of 100,000 Tons Per Day at No.3 Waterworks in Xiushui County, 2012.10;

(7) Water Source Demonstration Statement on the Extension of Runquan Waterworks in Leping in Jingdezhen City, 2017.5;

(8) Statement on Soil and Water Conservation Plan for The World Bank Loan for the Engineering of Jiangxi Urban and Rural Water Supply Integration and Rural Wastewater Treatment (Subprojects in Dongxiang District, Subprojects in Leping City, Subprojects in Linchuan District, Subprojects in Xiushui County, Subprojects in Yongxin County), 2017.7;

(9) Evaluation Report on the Dam Safety of the World Bank Loan for the Engineering of Jiangxi Urban and Rural Water Supply Integration and Rural Wastewater Treatment, 2017.11;

(10) Social Evaluation Report on The World Bank Loan for the Engineering of Jiangxi Urban and Rural Water Supply Integration and Rural Wastewater Treatment, 2017.11;

(11) Action Plan for Resettlement on Construction Project of Jiangxi Urban and Rural Water Supply Integration and Rural Wastewater Treatment, 2017.9.

## **1.2.6 Policies of the World Bank**

### **1.2.6.1 The World Bank's business policies**

The environmental evaluation and management plan of this project involve water supply and rural wastewater treatment engineering. The project is located in the area

disturbed by human activities. The World Bank’s policies relating to this project are detailed in Table 1.2-1:

**Table 1.2-1 The World Bank’s Business Policies**

The World Bank’s Business Policies		Involved or Not	Related Instructions on the Evaluation Influenced by The World Bank’s Business Policies Relating to this Project
OP4.01	Environmental evaluation	Yes	This project will have a certain impact on the surrounding environment during its construction and operation period. The evaluation of environmental impact is needed.
OP4.04	Natural habitat	No	According to the field investigation, the proposed project area has no natural habitat.
OP4.36	Forest policy	No	According to the current information, the proposed project does not involve forest area.
OP4.09	Disease and pest management	No	The construction content does not involve pesticide or increase the amount of pesticide application.
OP4.11	Physical cultural resources	Yes	The investigation shows that the expected influence scope of part of the subprojects includes old trees. PCR plan shall be developed as part of the Environmental Management Plan.
OP4.10	Aboriginal	No	Not involved
OP4.12	Involuntary resettlement	Yes	This project’s construction of water supply and wastewater treatment engineering will result in land occupation and resettlement.
OP4.37	Dam safety	Yes	A total of six subprojects of this project need to rely on the existing reservoirs as their sources, so this policy is involved; a total of ten dams concerned. The project office has hired experts in dam safety to prepare Report on the Evaluation of Dam Safety.
OP7.50	Project in international waters	No	The proposed construction sites are in China, not involving international waters.
OP7.60	Project in disputed area	No	The construction sites are all in Jiangxi Province, without disputed area.
BP17.50	Evaluation information disclosure	Yes	This environmental evaluation shall carry out information disclosure and public consultation for at least two times.

### 1.2.6.2 Guidelines for environment, health and safety

According to the project’s characteristics and nature, in the evaluation of environmental impact, the state’s standards for environmental quality and pollutant emission applicable to this project and the standards and requirements for pollutant

control in *General Guidelines for Environment, Health and Safety* promulgated by The World Bank will be in contrastive analysis, and more rigid standards will be as the basis for implementation of monitoring and evaluation (see Section 1.5.3).

(1) *General Guidelines for Environment, Health and Safety* by The World Bank;

(2) *Guidelines for Water and Sanitary Environment and Health and Safety* by The World Bank;

(3) *Guidelines for Waste Management Facility Environment and Health and Safety* by The World Bank.

## **1.3 Evaluation Factor and Scope**

### **1.3.1 Identification of environmental and social impact**

According to the construction scale, process plan, type and distribution of pollution source and pollution control measures, the evaluation summarizes the content of each project and identifies the potential environmental and social impact and determines the security guarantee tools (hereinafter referred to as “security tools”) based on The World Bank’s policies. See Table 1.3-1 for details.

Table 1.3-1 Identification of the Project's Environmental and Social Influence Factors

No.	Types	Name of Subprojects	Nature of Project	Content and Scale of Construction	Permanent Floor Space (acre)	Land Types (State-owned and Collective)	Acquisition Ways (Expropriated, Leased, Self-owned)	Cultivated Land Involved or Not	Physical Cultural Resources	Underground Infrastructure	Water Sources	Dam Involved or Not	Receiving Water	Potential Environment and Social Impact	Security Tools
I. Construction and Renovation of Water Supply Infrastructure															
1	New construction and reconstruction of urban water supply facilities														
1.1	Renovation and new construction of urban waterworks	New Construction of Urban Waterworks in Yongxin County	New construction	New construction of one auto-flowing pontoon of 100,000 m <sup>3</sup> /d and 21.5km DN1200 muddy water pipe; new construction of south of the city waterworks, 50,000 m <sup>3</sup> /d in the short term and 100,000 m <sup>3</sup> /d in the long term; new construction of 11.2km DN900 main delivery pipe of clear water	108.8	Collective	Expropriation	No	/	/	Longyuankou Reservoir	Yes	/	<b>Construction period:</b> construction dust; waterworks, pipe, pumping station construction noise; wastewater, solid waste emissions; the impact of construction activities on animals and plants, landscape and water and soil loss, traffic impact; the impact on underground infrastructure, highway, physical cultural resources and the specific sensitive point of atmospheric noise; The construction of the project involves the land expropriation and demolition, so that the normal production and life of the local people are adversely affected  <b>Operation period:</b> the impact of wastewater discharge on water environment; the impact of equipment noise on acoustic environment; solid waste emissions; the impact of water intake engineering on the water capacity and quality of water source and downstream water demand; dam safety impact.	EIA, ESMP, ECOP, SA, RAP
		New Construction of Urban Waterworks in Linchuan District	New construction	New construction of water intake engineering, 55,000 m <sup>3</sup> /d pumping house in the short term; new construction of two DN800 raw water pipes of 2.4km; new construction of waterworks, 50,000 m <sup>3</sup> /d in the short term	82.1	Collective	Expropriated	No	/	/	Chongren River	No	/		
		New Construction of Urban Waterworks in Dongxiang District	New construction	New construction of water intake engineering, 42,000 m <sup>3</sup> /d pumping house; new construction of DN800 raw water pipe of 17.4km; new construction of waterworks, 40,000 m <sup>3</sup> /d in the short term; with the county area as its service scope	91	Collective	Partly expropriated	Yes	/	Crossing west-east gas transmission pipe	Hefang Reservoir Hengshan Reservoir	Yes Yes	/		
		Extension of Urban Waterworks in Xiushui County	Extension/new construction	New construction of water intake engineering, extending the pumping house to 105,000 m <sup>3</sup> /d from 85,000 m <sup>3</sup> /d; new construction of 22.6km DN1200 raw water pipe, extending the waterworks to 100,000 m <sup>3</sup> /d from 50,000 m <sup>3</sup> /d	50	State-owned	Self-owned	No	/	/	Dongjin Reservoir	Yes	/		
		Extension of Urban Waterworks in Leping City	Extension/new construction	New construction of water intake engineering, pumping house of 120,000 m <sup>3</sup> /d; new construction of 36.9km DN1000 raw water pipe, extending the waterworks to 100,000 m <sup>3</sup> /d from 50,000 m <sup>3</sup> /d	108.8	State-owned	Expropriated	No	/	Parallel with the optical cable, 10 m of the distance	Communist Reservoir	Yes	/		
1.2	Renovation and new construction of urban water supply pipe network	Renovation of Urban Pipe Network of Tap Water in Yongxin County	Renovation	Renovation of 6.97km DN200~DN500 water supply pipe network, new construction of 41.3km DN300~DN800 water supply pipe network	/				/	/	/	No	/	<b>Construction period:</b> construction dust; pipe construction noise; wastewater, solid waste emissions; the impact of construction activities on animals and plants, landscape and water and soil loss, traffic impact; the impact on the specific sensitive point of atmospheric noise;	EIA, ESMP, ECOP, SA, RAP
		Renovation and New Construction of Urban Pipe Network of Tap Water in Linchuan District	Renovation/new construction	Renovation of 13.4km DN200~DN600 nodular cast iron pipe and 150m DN300 steel pipe, new construction of 22.9km DN200~DN1000 nodular cast iron pipe and 250m DN400 steel pipe	/				/	/	/	No	/		
		Renovation of Urban Pipe Network of Tap Water in Dongxiang District	Renovation/new construction	Renovation of 16.3km DN200~DN1000 pipe network, new construction of 6.74km DN600~DN800 pipe network	/				/	/	/	No	/		
		Renovation and New Construction of Urban Pipe	Renovation/new	Renovation of 10.5km DN500~DN600 pipe network and 105m DN500 steel pipe, new	/				/	/	/	No	/		

No.	Types	Name of Subprojects	Nature of Project	Content and Scale of Construction	Permanent Floor Space (acre)	Land Types (State-owned and Collective)	Acquisition Ways (Expropriated, Leased, Self-owned)	Cultivated Land Involved or Not	Physical Cultural Resources	Underground Infrastructure	Water Sources	Dam Involved or Not	Receiving Water	Potential Environment and Social Impact	Security Tools		
		Network of Tap Water in Jinxi County	construction	construction of 24.1km DN300~DN500 nodular cast iron pipe and 250m DN300 steel pipe													
		New Construction and Renovation of Urban Pipe Network in Xiushui County	Renovation/new construction	Renovation and new construction of 149km DN200~DN1000 pipe	/					/	/	No	/				
		New Construction and Renovation of Urban Pipe Network in Leping City	Renovation/new construction	Renovation of 15.1km DN200~DN1000 nodular cast iron pipe; new construction of 40.9km DN200~DN700 nodular cast iron pipe	/				/	/	/	No	/				
2	Consolidation and upgrading of rural water supply facilities																
2.1	Extension of counties' pipe network	Extension of Pipe Network in Towns of Yongxin County	New construction	Extending to 40 villages in Shiqiao Town, Caifeng Town, Lianzhou Town, Huaizhong Town and Gaoqiaolou Town from the pipe network of the county's waterworks, new construction of 24.7km DN200-DN500 pipe network	/				One old tree, camphor tree, unknown age, 15 m of the distance, with indirect influence	/	/	No	/	<p><b>Construction period:</b> construction dust; pipe construction noise; wastewater, solid waste emissions; the impact of construction activities on animals and plants, landscape and water and soil loss, traffic impact; the impact on underground infrastructure, highway, physical cultural resources and the specific sensitive point of atmospheric noise;</p> <p><b>Operation period:</b> unemployment after closing the original small waterworks</p>	EIA, ESMP, PCR Management Plan, ECOP, SA, RAP		
		Extension of Pipe Network in Towns of Jinxi County	New construction	Extending to 22 villages in Zuofang Town, Shuangtang Town and Heshi Town from the pipe network of the county's waterworks, new construction of 34.4km DN200-DN300 pipe network	/				/	/	No	/					
		Extension of Pipe Network in Towns of Linchuan District	New construction	Extending to Wenquan Town, Liancheng Town and Chonggang Town from the pipe network of the county's waterworks, new construction of 14km DN200~DN300 pipe network, 280m DN200~DN300 steel pipe	/				/	/	/	No	/				
		Extension of Pipe Network in Towns of Dongxiang District	New construction	Extending to 54 villages in Dengjia Town, Gangshangji Town, Huxu Town, Pogan Town, Xushangqiao, Xiaohuang Town, Xiaogang Town from the pipe network of the county's waterworks, new construction of 40.9km DN200~DN300 pipe network	/				/	/	/	No	/				
		Extension of Pipe Network in Towns of Nanfeng County	New construction	Extending to 27 villages in Shishan Town, Qiawan Town and Laixi Town from the pipe network of the county's waterworks, new construction of 19.5km DN200~DN400 pipe network and one booster pump station	/				Three old trees, camphor trees, 1,000-year, 280-year and unknown age, 15 m of the distance, indirect influence	Parallel with the optical cable, 15 m of the distance; parallel with the burning line, 15 m of the distance	/	No	/				
		Extension of Pipe Network in Towns of Leping City	New construction	Extending to 28 villages in Jiedu Town, Legang Town and Hougang Town from the pipe network of the county's waterworks, new construction of 21.3km DN200~DN300 pipe network and two integrated booster pump	/				One old tree, camphor tree, unknown age, 10 m of the distance, with	Crossing burning line	/	No	/				

No.	Types	Name of Subprojects	Nature of Project	Content and Scale of Construction	Permanent Floor Space (acre)	Land Types (State-owned and Collective)	Acquisition Ways (Expropriated, Leased, Self-owned)	Cultivated Land Involved or Not	Physical Cultural Resources	Underground Infrastructure	Water Sources	Dam Involved or Not	Receiving Water	Potential Environment and Social Impact	Security Tools
				stations					indirect influence						
2.2	Renovation and extension of rural water supply pipe network	Consolidation and Upgrading of Rural Drinking Water Safety in Yongxin County	New construction	Laying 49.5 km DN50~DN100 branch pipe in Longyuankou Town, Yange Town and Zaizhong Town; new construction of one booster pump station, covering a total of 22 villages	/				/		/	No	/	<b>Construction period:</b> construction dust; pipe construction noise; wastewater, solid waste emissions; the impact of construction activities on animals and plants, landscape and water and soil loss, traffic impact; the impact on highway, physical cultural resources and the specific sensitive point of atmospheric noise; <b>Operation period:</b> unemployment after closing the original small waterworks	EIA, ESMP, PCR Management Plan, ECOP, SA, RAP
		New Construction and Renovation of Pipe Network in Towns of Xiushui County	New construction	New construction and renovation of pipe network of the original waterworks in Zhajin Town, Ma'ao Town, Xigang Town, Shankou Town and Gangkou Town, new construction of water intake engineering in Shankou Town, covering a total of 46 villages and 23,990 households, new construction of 65.5km DN200~DN600 pipe network	/				/	/	/	No	/		
		Extension of Pipe Network in Towns of Leping City	New construction	Extension of pipe network of the original Wukou, Lingang, Yongshan, Xingfu, Dongfanghong, Nangang, Lilin, Zhongbu and Zhenqiao waterworks in nine towns, covering a total of 77 villages, new construction of 44.3km DN200~DN300 pipe network and 17 integrated booster pump stations	/				One old tree, camphor tree, unknown age, 8 m of the distance, with indirect influence	/	/	No	/		
2.3	New construction, renovation and expansion of rural water works	New Construction of Waterworks in Huangtong Town of Jinxi County	New construction	New construction of one box-type water intake head, with 1,200 m <sup>3</sup> /d of its intake scale; new construction of two DN200 raw water pipes of 90m; new construction of waterworks of 1,200 m <sup>3</sup> /d in Huangtong Town; new construction of 8km DN200~DN250 modular cast iron pipe and 150m DN200 steel pipe, four villages in Huangtong Town as its service scope	4.4	Collective	Expropriated	Yes	/	/	The upstream mountain stream of Gaofang River	Yes	/	<b>Construction period:</b> construction dust; waterworks and pipe construction noise; wastewater, solid waste emissions; the impact of construction activities on animals and plants, landscape and water and soil loss, traffic impact; the impact on the specific sensitive point of atmospheric noise; The construction of the project involves the land expropriation and demolition, so that the normal production and life of the local people are adversely affected <b>Operation period:</b> the impact of wastewater discharge on water environment; the impact of equipment noise on acoustic environment; solid waste emissions; the impact of water intake engineering on the water capacity and quality of water source and downstream water demand; dam safety impact.	EIA, ESMP, ECOP, SA, RAP
		Renovation and Expansion of Waterworks in the Town of Leping City	Renovation and expansion	Extending Lilin Waterworks to 10,000m <sup>3</sup> /d from 5,000 m <sup>3</sup> /d, 26 villages in Lilin Town as its service scope	5	State-owned	Self-owned	No	/	/	/	No	/		

II. Construction and Renovation of Wastewater Treatment Infrastructure

No.	Types	Name of Subprojects	Nature of Project	Content and Scale of Construction	Permanent Floor Space (acre)	Land Types (State-owned and Collective)	Acquisition Ways (Expropriated, Leased, Self-owned)	Cultivated Land Involved or Not	Physical Cultural Resources	Underground Infrastructure	Water Sources	Dam Involved or Not	Receiving Water	Potential Environment and Social Impact	Security Tools
1	New construction of wastewater pipe network and treatment plant in Zhajin Town of Xiushui County	New construction	New construction of wastewater treatment plant of 2,000 m <sup>3</sup> /d and 14.5km DN300~DN400 HDPE wastewater main pipe, 35.79km DN200~DN500UPVC and HDPE pipes for wastewater collection covering households	2	Collective	Expropriated	Yes	Ancestral temple of Sub-village 6, Putian Village, 30 m of the distance	/	/	No	Zhajin River, Class III water	<p><b>Construction period:</b> construction dust; wastewater treatment plant and pipe network construction noise; wastewater, solid waste emissions; the direct impact of wastewater pipe network and treatment plant and other buildings and structures and temporary facilities and other land occupations on vegetation; the impact on physical cultural resources and the specific sensitive point of atmospheric noise; The construction of the project involves the land expropriation and demolition, so that the normal production and life of the local people are adversely affected</p> <p><b>Operation period:</b> the impact of wastewater discharge on receiving water; foul gas produced in wastewater treatment; noise from operation of wastewater treatment facilities; sludge and other solid wastes emissions.</p>	EIA, ESMP, PCR Management Plan, ECOP, SA, RAP	

III. Improvement and Enhancement of Service Quality: Water Supply Pipe Storage Engineering, Layout of Pipe Network Monitoring, Information Management System of Water Supply Pipe Network, etc.

### 1.3.2 Selection of evaluation factors

Through the identification of this project’s environmental impact, combined with the environmental sensitivity along the line, and the analysis of the interaction relationship, the evaluation factors of environmental impact of the environmental elements are determined, see Table 1.3-4 below.

**Table 1.3-4 Evaluation Factors of Environmental Impact**

Environmental Elements		Current Evaluation Factors	Predicted Evaluation Factors	
			Construction period	Operation period
Acoustic environment		LeqdB(A)	LeqdB(A)	LeqdB(A)
Surface water	Water supply engineering	pH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum	COD, BOD <sub>5</sub> , SS	COD, BOD <sub>5</sub>
	Wastewater treatment engineering	pH, DO, COD, BOD <sub>5</sub> , NH <sub>3</sub> -N, TP	COD, BOD <sub>5</sub> , SS	pH, COD, BOD <sub>5</sub> , ammonia nitrogen, TP
Atmosphere	Water supply engineering	TSP	TSP	Cl <sub>2</sub>
	Wastewater treatment engineering	TSP	TSP	H <sub>2</sub> S, NH <sub>3</sub>
Solid wastes		\	Earthwork	Sludge, household garbage
Ecology		Vegetation and land utilization status	Construction land occupation, water and soil loss, landscape ecology	/
Social environmental impact		Physical cultural resources	Impact of traffic and resettlement	/

### 1.3.3 Evaluation grade and scope

The evaluation grade of each subject in this evaluation report is detailed in Table 1.3-5.

**Table 1.3-5 Evaluation Grade of Each Subject**

Evaluation Subjects	Evaluation Grade	Basis of Classification
Environmental noise	Grade II	According to <i>Technical Guideline for Evaluation of Environmental Impact-Acoustic Environment</i> (HJ2.4-2009), the acoustic environmental functional zone along the line of this project belongs to Class I area, and the noise level of sensitive targets within the evaluation scope increases below 3dB(A) (not including 3dB(A)) before and after the construction of the project, with little change in the number of affected people.
Surface water	Grade III	This project's wastewater discharge sources are mainly the rural wastewater treatment engineering. In accordance with <i>Technical Guideline for Evaluation of Environmental Impact-Water Environment</i> (HJ/T2.3-93), the wastewater discharge < 1,000m <sup>3</sup> /d, the pollutants are non-persistent pollutants, and the number of water quality parameters of which the concentration needs to be predicted < 7. The complexity degree of wastewater quality is "simple". The evaluation grade is Grade III.
Ambient air	Grade III	On the basis of HJ2.2-2008, P <sub>max</sub> < 10% or D <sub>10%</sub> < the closest distance of pollution source from the plant boundary. The grade of atmospheric environment impact of this project is Grade III.
Ecological environment	Grade II	On the basis of <i>Technical Guideline for Evaluation of Environmental Impact-Ecological Impact</i> (HJ19-2011), the length of range of impact of pipe of this project's water supply engineering is more than 100 km, and the project is located in general area, so the evaluation grade is Grade II. The area of range of impact of wastewater treatment engineering is less than 2 km <sup>2</sup> , the length of which is less than 100 km, and the project is located in general area, so the evaluation grade is Grade III.

The evaluation scope of this project's environmental impact includes water source, newly-built pumping station, raw water pipe, waterworks and water delivery pipe network; newly-built wastewater treatment plant, wastewater pipe network and discharge outlet; and digging and discarding places in the construction process, all related projects of this project, such as the existing waterworks relating to the pipe network extension, wastewater treatment plant for discharge of water from new construction and renovation and expansion of waterworks, refuse landfill for sludge disposal of waterworks and wastewater treatment plant, etc., and the existing waterworks that will be closed after the implementation of this project.

The evaluation grade and scope of this project's environmental impact are shown in Table 1.3-6.

**Table 1.3-6 Evaluation Grade and Scope**

Types	Environmental Elements	Evaluation Grade	Evaluation Period	Evaluation Scope
Water supply engineering	Ecological environment	Grade II	Construction period	Range of ecological impact of water source, new pumping station, raw water pipe, waterworks and water delivery pipe network construction, specifically, range of 200 m from the both sides of pipe, range of impact of waterworks construction, and digging and discarding places therein
	Acoustic environment	Grade II	Construction period	Range of noise impact of pumping station, raw water pipe, waterworks, water delivery pipe construction on surrounding residential area and villages, specifically, range of 60 m from the both sides of pipe and range of 70 m from waterworks boundary
			Operation period	Range of 70 m from pumping station and waterworks boundaries
	Surface Water	Grade III	Construction period	Range of impact of construction wastewater discharge on surface water
			Operation period	Analysis of up-to-standard discharge of wastewater from waterworks
	Ambient air	Grade III	Construction period	Range of atmospheric environmental impact of water source, new pumping station, raw water pipe, waterworks and water delivery pipe network construction dust on surrounding residential area and villages
			Operation period	Waterworks as the center, range of rectangle of 5 km-side length
	Waste water treatment engineering	Ecological environment	Grade III	Construction period
Acoustic environment		Grade II	Construction period	Range of 200 m from wastewater pipe network construction area; range of 200 m from the newly-built wastewater treatment plant
			Operation period	Range of 200 m from wastewater treatment plant boundary
Surface Water		Grade III	Construction period	Range of impact of wastewater discharge on receiving water
			Operation period	Range of impact of wastewater discharge on receiving water
Ambient air		Grade III	Construction period	Range of atmospheric environmental impact of construction dust on surrounding residential area and villages
			Operation period	Wastewater treatment plant as the center, range of rectangle of 5 km-side length

## 1.4 Evaluation Emphasis

This project's evaluation emphases:

(1) Analysis of environmental impact: By the identification of environmental and social impact factors and environmental protection targets in this project's construction and operation periods, the key environmental impact is the short-term impact during its construction period. According to the characteristics of each subproject, the commonness, characteristic environment and social impact are analyzed, and corresponding mitigation measures are proposed;

(2) Analysis of alternative proposal: From the point of technology, economy and environment, the proposals will be overall compared on water source, line, plant site, process and other aspects, then the recommended proposal is determined based on the comparison result.

(3) Environmental and social management plans: To grasp the weak link of easy occurrence in environmental management and make effective environmental management plan. Environmental management plan runs through the whole process of project construction. Its main content includes environmental management system, environmental management organization, environmental management training, environmental management regulations, environmental monitoring plan, estimation of investment in environmental protection, etc..

## 1.5 Evaluation Standards

### 1.5.1 Environmental quality standards

(1) Ambient air: Ambient air quality area is classified into two types. The secondary standard in *Ambient Air Quality Standard* (GB3095-2012) shall be executed. *Ambient Air Quality Standard* (GB3095-2012) is shown in Table 1.5-1.

**Table 1.5-1 Ambient Air Quality Standard (GB3095-2012)**

Name of Pollutant	Sampling Time	Secondary Standard Value (mg/Nm <sup>3</sup> )
TSP	Daily mean	0.30

(2) Noise: The project is located in rural area. Class I and Class II standards in *Acoustic Environment Quality Standard* (GB3096-2008) shall be performed for

acoustic environment, Class I standard for the rural area and Class II standard for the urban area. The standard value is shown in Table 1.5-2.

**Table 1.5-2 Standard for the Evaluation of Quality Actuality of Acoustic Environment** Unit: dB (A)

Time Interval Standards	Daytime	Nighttime
Class I	55	45
Class II	60	55

(3) Surface water: The Class II and Class III standards in *Surface Water Environment Quality Standard* (GB3838—2002) are performed for the evaluation of surface water. The standard value is shown in Table 1.5-3.

**Table 1.5-3 Surface Water Environment Quality Standard (Excerpt)**

Unit: mg/L (except for pH)

Items	pH	COD	BOD <sub>5</sub>	DO	Petroleum	NH <sub>3</sub> -N	Total phosphorus
Class II Standard	6-9	≤15	≤3	≥6	≤0.05	≤0.5	0.1
Class III Standard	6-9	≤20	≤4	≥5	≤0.05	≤1.0	0.2

### 1.5.2 Pollutant discharge standards

(1) Exhaust gas: The secondary standard in *Comprehensive Discharge Standard of Air Pollutants* (GB16297-1996) is executed for the project's exhaust gas discharge. The secondary standard under Table 4 in *Discharge Standard of Pollutants for Urban Wastewater Treatment Plant* (GB18918-2002) is performed for discharge of air pollutants of wastewater treatment plant. The specific standard value is shown in Table 1.5-5~Table 1.5-6.

**Table 1.5-5 Discharge Standard of the Project's Air Pollutants** Unit: mg/m<sup>3</sup>

Pollutant	Limit of Monitoring Concentration of Unorganized Discharge		Standard
	Monitoring point	Concentration (mg/m <sup>3</sup> )	
TSP	Periphery maximum concentration	1.0	Secondary standard, CGB16297-1996

**Table 1.5-6 Maximum Allowable Concentration of Exhaust Gas Discharge for Urban Wastewater Treatment Plant Boundary**

Pollutants	Unit	Guidance Value
Ammonia	mg/m <sup>3</sup>	1.5
Hydrogen sulfide	mg/m <sup>3</sup>	0.06

(2) Wastewater:

① Urban domestic wastewater

In 2002, the original State Environmental Protection Administration issued *Discharge Standard of Pollutants for Urban Wastewater Treatment Plant* (GB18918-2002). It said that, where the effluent of urban wastewater treatment plant is discharged into the major river basin, lakes, reservoirs and other enclosed and semi-enclosed waters determined by the state and provinces, Standard A under the primary standard will be executed; where it is discharged into the functional waters under GB3838 Class III surface water (except for the designated protected area of drinking water source and swimming area) and the functional waters under GB3097 Class II seawater, Standard B under the primary standard will be performed.

② Rural domestic wastewater

There is no discharge standard for rural domestic wastewater treatment in China, which leads to different standards adopted in the current new rural construction. On June 29, 2015, The People's Government of Zhejiang Province issued *Discharge Standard of Water Pollutant for Rural Domestic Wastewater Treatment Facilities* (DB33/973-2015) as the provincial standard, which was formally implemented on July 1. In order to strengthen rural domestic wastewater treatment and environmental supervision, and further promote the comprehensive improvement of rural environment, Hebei developed and implemented *Discharge Standard for Rural Domestic Wastewater* (DB13/2171-2015) in 2015. Ningxia Hui Autonomous Region issued *Discharge Standard for Rural Domestic Wastewater* (DB64/T700-2011) in 2011.

Rural domestic wastewater discharge requirements shall take into account the local rural financial capacity, technology maturity, operational reliability and other factors. Therefore, the rural domestic wastewater discharge requirements suitable for Jiangxi rural social and economic development shall be determined combined with

the rural actual conditions and technical level and based on the idea of divisional control and classified guidance. This project's receiving water is Zhajin Water. In accordance with Jiangxi's water environment function zoning, Zhajin Water is the source of Xiu River, the water quality goal of which is Class III water. This reach's water function area is Xiushui County reserved area of Zhajin Water. According to *Discharge Standard of Pollutants for Urban Wastewater Treatment Plant*, this project adopts Standard B under the primary standard as the discharge standard for rural domestic wastewater. See Table 1.5-7 for details.

**Table 1.5-7 Discharge Standard of Pollutants for Urban Wastewater**

<b>Treatment Plant</b>		<b>Unit: mg/L (except for pH)</b>			
Pollution Factors	pH	COD	BOD <sub>5</sub>	NH <sub>3</sub> -N	TP
Primary Standard (Standard B)	6-9	60	20	8 (15)	1

(3) Noise: During the construction period, the standard limit in *Discharge Standard of Environmental Noise for Construction Site at Boundary* (GB12523-2011) is executed for the noise, see Table 1.3-8. During the operation period, the Class I and Class II standards in *Discharge Standard of Environmental Noise for Industrial Enterprise at Boundary* (GB 12348-2008) are performed for the ambient noise, see Table 1.5-8~1.5-9.

**Table 1.5-8 Discharge Standard Limit of Environmental Noise for Construction Site at Boundary** Unit: dB (A)

<b>Daytime</b>	<b>Nighttime</b>
70	55

The noise discharge during the construction period of all subprojects of this project is applicable to *Discharge Standard of Environmental Noise for Construction Site at Boundary* (GB12523-2011).

**Table 1.5-9 Discharge Standard Limit of Environmental Noise for Industrial Enterprise at Boundary** Unit: dB (A)

<b>Standards</b>	<b>Daytime</b>	<b>Nighttime</b>
Class I	55	45
Class II	60	50

The noise discharge from the pumping station, waterworks and wastewater treatment plant during the operation period is applicable to *Discharge Standard of Environmental Noise for Industrial Enterprise at Boundary* (GB 12348-2008).

### 1.5.3 Comparison with General EHS, Water and Sanitary EHS

The World Bank’s Guidelines for environment, health and safety relating to this project include *General Guidelines for Environment, Health and Safety* (hereinafter referred to as “*General EHS Guidelines*”) and *Guidelines for Water and Sanitary Environment and Health and Safety*. When The World Bank and China apply environmental protection regulations and standards, the principle of execution of more rigid applicable standards is adopted. This project needs to meet both the domestic and foreign standards, so it is necessary to compare and analyze the above standards.

The comparison between the project’s evaluation standards and The World Bank’s environmental protection regulations and standards is shown in Table 1.5-1.

**Table 1.5-1 The Comparison between the Project’s Evaluation Standards and The World Bank’s Environmental Protection Regulations and Standards**

<b>Envi ron ment al Elem ents</b>	<b><i>Guidelines for Water and Sanitary Environment and Health and Safety</i></b>	<b><i>General Guidelines for Environment, Health and Safety</i></b>	<b>Domestic Standards</b>	<b>The Project’s Final Selected Standards</b>	<b>Descripti on of Adoption of the Standard s</b>
Atmo spher ic envir onme nt qualit y stand ards	No	To implement the standard prescribed by national legislation, where there is no standard prescribed by national legislation, the latest <i>World Health Organization Air Quality Guidelines</i> or other internationally recognized	<i>Ambient Air Quality Standard</i> (GB3095-2012)	<i>Ambient Air Quality Standard</i> (GB3095-2012)	/

Environment al Elem ents	<i>Guidelines for Water and Sanitary Environment and Health and Safety</i>	<i>General Guidelines for Environment, Health and Safety</i>	Domestic Standards	The Project's Final Selected Standards	Descripti on of Adoption of the Standard s
		reference standards shall be implemented.			
Air pollutant discharge standards	No discharge standard limit of unorganized discharge and stink is proposed.	No discharge standard limit of unorganized discharge and stink is proposed.	<i>Comprehensive Discharge Standard of Air Pollutants (GB16297-1996)</i> <i>Discharge Standard of Odor Pollutants (GB14554-93)</i>	<i>Comprehensive Discharge Standard of Air Pollutants (GB16297-1996)</i> <i>Discharge Standard of Odor Pollutants (GB14554-93)</i>	/
Water environment quality standards	Where there is no national standard, Guidelines for <i>Drinking Water Quality of Health Organizations</i> in current version shall be met.	Where there is no national standard, Guidelines for <i>Drinking Water Quality of Health Organizations</i> in current version shall be met.	<i>Surface Water Environment Quality Standard (GB3838 - 2002)</i>	<i>Surface Water Environment Quality Standard (GB3838 - 2002)</i>	The national standard divides different quality standards for different water, and quantify various water quality indicators, convenient for monitoring and evaluation.
Wastewater discharge	The wastewater shall meet the relevant national	To comply with national or local standards of domestic	<i>Discharge Standard of Pollutants for Urban</i>	<i>Discharge Standard of Pollutants for Urban Wastewater Treatment Plant</i>	The domestic standard is more

Environmental Elements	<i>Guidelines for Water and Sanitary Environment and Health and Safety</i>	<i>General Guidelines for Environment, Health and Safety</i>	Domestic Standards	The Project's Final Selected Standards	Description of Adoption of the Standards
Large standards	requirements or international acceptance standards, and achieve the relevant wastewater discharge quality goals on the basis of assimilative capacity and the most sensitive end use of the receiving water, referring to part of “Surface Water Discharge” in <i>General EHS Guidelines</i> .	wastewater discharge, where there are no such standards, the applicable reference guidance value for domestic wastewater discharge in Table 1.3.1 shall be met; the specific indicators are: pH 6~9; COD 125; BOD <sub>5</sub> 30; TP 2	<i>Wastewater Treatment Plant</i> (GB18918-2002), the specific indicators are: pH 6~9; COD 60; BOD <sub>5</sub> 20; TP 1	(GB18918-2002)	rigid than the standard of The World Bank.
Acoustic environment quality standards	Referring to <i>General EHS Guidelines</i>	Residence; office; culture and education: daytime 55dB(A), nighttime 45 dB(A); industrial and commercial facilities: daytime 70 dB(A), nighttime 70 dB(A)	<i>Acoustic Environment Quality Standard</i> (GB3096-2008), details: Class I acoustic function area: daytime 45dB(A), nighttime 55 dB(A); Class II acoustic function area: daytime 50dB(A), nighttime 60 dB(A)	<i>Acoustic Environment Quality Standard</i> (GB3096-2008)	The domestic standard is more stringent than the standard of The World Bank.
Noise	Referring to <i>General EHS</i>	No noise standard for construction site	<i>Discharge Standard of Environmental</i>	<i>Discharge Standard of Environmental</i>	/

Environmental Elements	<i>Guidelines for Water and Sanitary Environment and Health and Safety</i>	<i>General Guidelines for Environment, Health and Safety</i>	Domestic Standards	The Project's Final Selected Standards	Description of Adoption of the Standards
discharge standards	<i>Guidelines</i>	and discharge standard of environmental noise for industrial enterprise at boundary are proposed.	<i>Noise for Construction Site at Boundary</i> (GB12523-2011)	<i>Noise for Construction Site at Boundary</i> (GB12523-2011)	

## 1.6 Analysis of Conformity of the Proposed Project with Related Regional Policies and Planning

### 1.6.1 Analysis of conformity with Action Plan for Water Pollution Prevention and Control

Action Plan for Water Pollution Prevention and Control proposed that efforts shall be made to save and protect water resource, improve water use efficiency and strengthen urban water conservation. Also, the water supply pipe network that has been used for more than 50 years and is of poor quality shall be renovated. By 2017, the national public water supply pipe network leakage rate is less than 12%; by 2020, the rate will be less than 10%. To promote agricultural and rural pollution prevention and control and sludge treatment and disposal, and the stabilized, harmless and reclamation treatment and disposal of sludge generated from wastewater treatment facilities, and to prohibit the sludge of substandard treatment and disposal flowing into the cultivated land. Illegal sludge dumps shall be banned.

This project intends to renovate the counties' pipe network, can reduce the leakage rate, improve the operation benefit of the counties' waterworks; to carry out smart pipe network engineering to reduce leakage rate, improve production capacity, guarantee the safety of water supply and use. At the same time, the project aims at providing a reference for the rural wastewater treatment of the whole province by

building a pilot project of rural wastewater treatment for the town and the surrounding rural area and other densely-populated areas. The implementation of the project is in line with the requirement of Action Plan for Water Pollution Prevention and Control.

### **1.6.2 Analysis of conformity with “the 13th Five-Year” Plan of Jiangxi Rural Drinking Water Safety Consolidation and Upgrading Engineering**

The main construction content of “The 13th Five-Year” Plan of Jiangxi Rural Drinking Water Safety Consolidation and Upgrading Engineering includes renovation and construction of water supply engineering, renovation and matching of water treatment facilities, water source protection, waterworks water quality laboratory of scale and information construction, etc.. According to the planning objectives and the overall layout, combined with the actual conditions in each place, a total of 12,956 projects are planned, benefiting 24,717,300 people (solving the rural drinking water consolidation and upgrading demand of poor people of 1,350,300). Among which: 533 pipe network extension projects, benefiting 11,425,600 people (solving the rural drinking water consolidation and upgrading demand of poor people of 455,700); 5,767 renovations and matching projects, benefiting 12,641,800 people (solving the rural drinking water consolidation and upgrading demand of poor people of 713,900); 6,656 of new construction, benefiting 649,900 people (lifting rural poor people of 180,700 out of poverty). In addition, 1,439 water source protected areas are designated, and 659 waterworks laboratories of scale, 566 above-scale waterworks automation monitoring systems, 618 pilot water quality real-time monitoring will be built.

This project’s Yongxin County, Linchuan District, Dongxiang District, Jinxi County, Nanfeng County, Xiushui County and Leping City are in the scope of Report on “The 13th Five-Year” Plan of Jiangxi Rural Drinking Water Safety Consolidation and Upgrading Engineering. The implementation of the related content helps to achieve the goals in Report on “The 13th Five-Year” Plan of Jiangxi Rural Drinking Water Safety Consolidation and Upgrading Engineering.

### **1.6.3 Analysis of conformity with Yongxin County's planning**

“The 13th Five-Year Plan” of Yongxin Rural Drinking Water Safety Consolidation and Upgrading Engineering aims at the upgrading and renovation of the existing total 12 rural drinking water engineering in Yongxin County and the extension and renovation of pipe network of ten waterworks to improve the low coverage and small water supply capacity of the early pipe network, and the serious aging and high leakage rate of part of the pipe network.

This project's construction of Yongxin urban water supply facilities and renovation of the county's pipe network of tap water belong to the scope of construction of standby water source and urban infrastructure in the general planning. The project of consolidation and upgrading of rural drinking water safety in Longyuankou Town belongs to the extension engineering of pipe network in “the 13th Five-Year Plan” of rural drinking water. Therefore, this project is consistent with the planning.

### **1.6.4 Analysis of conformity with Jinxi County's planning**

The planning puts forward that, by 2020, through the implementation of consolidation and upgrading of rural drinking water safety, by new construction and renovation and other measures, the rural centralized water supply rate of drinking water safety will reach more than 85% in the whole province, with more than 80% of coverage rate of tap water; water quality pass rate will be greatly improved; the guarantee rate of water supply for small projects will be not less than 90%, and not less than 95% for that for other projects; the proportion of urban tap water pipe network covering administrative villages will reach more than 33%. According to *Jinxi Special Planning on Water Supply*, the county's No.1 and No.2 waterworks will be connected to meet the water demand of county residents living, industrial production and residents in the surrounding areas.

This project's towns to be included in the improvement engineering of rural water supply facilities are Shuangtang Town, Heshi Town (Tiannan, Chonglu and

Xiaogong under its jurisdiction), Zuofang Town and Huangtong Town. Shuangtang Town and Zuofang Town will be covered by the county's waterworks pipe network extension, and waterworks and pipe network will be built in Huangtong County. Through the water supply pipe network extension, renovation, matching, networking and other measures, non-compliance and easy repetition and other problems in rural drinking water safety that still exist in some areas caused by low standard, small scale and aging and out of repair of engineering and water pollution and water source change and other reasons will be overall solved, and drinking water for poor people will be given priority to. Through the renovation of waterworks' purification process, disinfection equipment matching and other measures, the prominent problem of water supply quality influenced by imperfect water treatment facilities of waterworks will be solved. This project is in accordance with Jinxi's planning of various water supply engineering.

#### **1.6.5 Analysis of conformity with Nanfeng County's planning**

According to the planning, during "The 13th Five-Year" period, 21 new centralized water supply engineering are planned in Nanfeng County. Rural water supply capacity will be increased by 3,600 m<sup>3</sup>/d. Rural water supply population will be increased by 24,300 (18,500 of the rural poor people). The renovation of 20 centralized water supply engineering in Nanfeng County is planned, so as to greatly improve the drinking water guarantee extent of rural population of 127,300 (7,500 of the rural poor people). As a result, by 2020, the rural centralized water supply rate of drinking water safety will reach more than 85% in the whole province, with more than 80% of coverage rate of tap water; water quality pass rate will be greatly improved; the guarantee rate of water supply for small projects will be not less than 90%, and not less than 95% for that for other projects; the proportion of urban tap water pipe network covering administrative villages will reach more than 33%. The benign operational mechanism of the project shall be established and perfected, and the operational management level and supervision ability shall be improved to provide a good drinking water safety guarantee for the overall construction of well-off society

in Nanfeng County.

This project's renovation of the county's tap water pipe network belongs to the scope of construction of urban infrastructure in the general planning. Tap water pipe network extension in the county of Qiawan, Shishan and Laixi towns belongs to the pipe network extension in "The 13th Five-Year" Plan of rural drinking water. The implementation of the project will improve the water supply pipe network in the central urban area of Nanfeng County, and extend to the surrounding towns, forming a regional water supply integration project to achieve the healthy and sustainable development of urbanization. The implementation can make the regional centralized water supply coverage rate reach more than 95%, 100% of the pipe network coverage rate, more than 95% of guarantee rate of water supply safety, more than 70% of emergency water supply guarantee rate, and the water supply quality fully meet the *Sanitary Standard for Drinking Water* (GB 5749-2006). Therefore, this project is consistent with the planning.

#### **1.6.6 Analysis of conformity with Leping City's planning**

Leping City's planning of water supply engineering is developed to renovate and improve the technical transformation engineering of current waterworks and old urban pipe network, complete the construction of diversion engineering from Communist Reservoir to the central urban area of Leping City, comprehensively improve the quality of drinking water, designate water source protected areas and reduce water resource pollution. Meanwhile, waterworks shall be set up in other towns for their water use, and self-prepared water shall be used in administrative villages.

Leping 2016-2020 Rural Drinking Water Safety Planning intends to build 17 rural drinking water engineering, involving a total of 19 towns and 325 administrative villages, benefiting 764,246 people. Through the water supply pipe network extension, renovation, matching, networking and other measures, non-compliance and easy repetition and other problems in rural drinking water safety that still exist in some areas caused by low standard, small scale and aging and out of repair of engineering and water pollution and water source change and other reasons will be overall solved,

and drinking water for poor people will be given priority to. Through the renovation of waterworks' purification process, disinfection equipment matching and other measures, the prominent problem of water supply quality influenced by imperfect water treatment facilities of waterworks will be solved.

This project involves Runquan, Yongshan, Wukou, Lingang, Dongfanghong, Xingfu, Zhenqiao, Lilin, Zhongbu and Nangang waterworks. All of them belong to the water supply projects urgently to be implemented in *“The 13th Five-Year” Plan of Leping Rural Drinking Water Safety Consolidation and Upgrading Engineering* and *Revision of Overall Urban Planning for Leping City in Jiangxi (2009-2030)*. In consequence, this project is in line with the local planning.

### **1.6.7 Analysis of conformity with Xiushui County's planning**

(1) Analysis of conformity with “The 13th Five-Year” Plan of Xiushui Rural Drinking Water Safety Consolidation and Upgrading Engineering

“The 13th Five-Year” Plan of Xiushui Rural Drinking Water Safety Consolidation and Upgrading Engineering points out that, by 2020, the construction and renovation of rural drinking water safety consolidation and upgrading engineering in the whole county shall be basically completed, with 86.45% of the rural centralized water supply rate and 80.62% of the rural tap water coverage rate. The water supply guarantee rate, water capacity, water quality, water pressure and other indicators and parameters of tap water engineering reach the relevant regulations, specifications and standards. By new construction, expansion, matching, renovation, networking and other measures, by 2020, the rural centralized water supply rate in Xiushui County will reach 86.45%, with 80.62% of the rural tap water coverage rate and 84.09% of the water quality pass rate. By 2020, the rural tap water supply quality will fully meet the requirements of the new national standard *Sanitary Standard for Drinking Water (GB5749-2006)*.

After the implementation of this project, 4,943 water supply households will be increased in the county, and 50,064 water supply households will be increased in the rural area, more than 85% of the regional centralized water supply converge rate and

90% of the pipe network converge rate. The proportion of urban tap water pipe network covering administrative villages will reach more than 33%, not less than 95% of the guarantee rate of water supply safety, and not less than 70% of the emergency water supply guarantee rate. The water supply quality will fully meet the *Sanitary Standard for Drinking Water (GB5749-2006)*. By 2030, non-revenue water rate will be less than 25%. Therefore, the project is in line with the planning.

#### (2) Analysis of conformity with Implementation Plan of Wastewater Treatment Facilities Construction and Engineering Operating for Top 120 Central Towns in Jiangxi Province

In 2013, Jiangxi Province selected 120 central towns with obvious regional advantages, better resource endowment, prominent industrial characteristics, stronger clustering ability and more perfect infrastructure, and by the provincial, municipal and county's Grade-III key cultivation, makes effort to make them new highlights in the harmonious and beautiful rural construction, demonstration areas of town-village linkage, new platforms for urban-rural integration development. According to the implementation plan, the construction of wastewater treatment facilities and matching pipe network is comprehensively started in 2015, and the wastewater treatment facilities are effectively operated in 2016, about 80% of the town's wastewater collection rate in 2017, with the town's domestic wastewater effectively disposed. Zhajin Town in Xiushui County is included in the list of top 120 central towns of which the wastewater treatment facilities construction is supported by the province's financial fund.

This project's content includes the construction of wastewater pipe network and treatment plant, which will help to improve the absence of domestic wastewater treatment facilities in Zhajin Town and the living quality of the local residents. Therefore, this project is consistent with Implementation Plan of Wastewater Treatment Facilities Construction and Engineering Operating for Top 120 Central Towns.

#### **1.6.8 Analysis of conformity with Linchuan District's planning**

According to the *Overall Urban Planning of Fuzhou City*, Special Planning for Water Supply in Shangdundu Town and Shangdundu water supply facilities construction in recent years, No.2 Waterworks in Linchuan will be built, with 100,000 m<sup>3</sup>/d of its water supply scale. Pipe laying along related roads is planned to form the main pipe and looped network of water supply.

According to this project, No.2 Waterworks will be built, 50,000 m<sup>3</sup>/d and 100,000 m<sup>3</sup>/d of its short-term and long-term scale. The urban pipe network will be renovated and constructed. The water delivery and distribution pipe network along the whole section of Fuba Road in Shangdundu's planned urban area will be laid in the short term to realize the good connection between No.2 Waterworks water and Hedong water supply pipe network in the urban area of Shangdundu. At the same time, one DN400 pipe along Linchong Road from Fuba Road will be laid connecting the DN300 pipe that has been laid along Linchong Road. Therefore, this project is in line with Linchuan District's planning.

#### **1.6.9 Analysis of conformity with Dongxiang District's planning**

According to the planning, by pipe network extension, renovation, matching, networking and new construction and other measures, the rural centralized water supply rate, tap water coverage rate, water quality pass rate, water supply guarantee rate and engineering operational management level shall be further improved, and the rural drinking water safety engineering construction and operational management systems "from source to tap" shall be established to further improve the living conditions in rural areas and promote the comprehensive, coordinated and sustainable development of rural economy and society. By 2020, through the implementation of rural drinking water safety consolidation and upgrading engineering, new construction and renovation and other measures, the rural centralized water supply rate of drinking water safety will be more than 85%, with more than 80% of coverage rate of tap water; water quality pass rate will be greatly improved; the guarantee rate of water supply for small projects will be not less than 90%, and not less than 95% for that for other projects; the proportion of urban tap water pipe network covering administrative

villages will reach more than 33%.

This project's construction content includes: new construction of urban east waterworks of 40,000 m<sup>3</sup>/d and 100,000m<sup>3</sup>/d of the short-term and long-term scale; renovation of urban pipe network, mainly involving the pipe network that is located in the old town or laid ten years ago, and involving the pipe network in reinforced concrete and PVC as well. The extension of urban pipe network mainly involves the surrounding eight towns of Dongxiang District. As a result, this project is in line with Dongxiang District' planning.

## **1.7 Environmental Protection Targets**

### **1.7.1 Xiushui County's environmental protection targets**

The protection targets of Xiushui County's urban water supply, rural water supply and wastewater treatment engineering are shown in Table 1.7-1~1.7-3.

Table 1.7-1 Protection Targets of Xiushui County's Urban Water Supply  
Engineering

Water Source	Name of water source	Dongjin Reservoir				
	Current water quality	Class II water				
Raw Water Pipe	Distribution of environmental sensitive sites within the range of impact of raw water pipe	Name of the Sites	Orientat ion	Distance (m)	Numb er of House holds	Impact Factors
		Longbei Village	Crossin g	10	11	Air, noise
		Bailuoqiu	Crossin g	10	9	
		Zoujiawan	W/E	10	7	
		Youjiacha Village	N	20	4	
		Zhishanyuan	N	20	54	
		Duanshang Primary School	S	20	60	
		Baitu Village	N	30	13	
		Chenjiazui	Crossin g	10	85	
		Songshanxia	Crossin g	10	15	
		Shangwuping	S	10	81	
		Xiawuping	S	10	90	
		Kengkou Pushang	S	10	15	
		Duanshang Village	S	10	60	
		Lingxia Village	S	20	25	
		Guoping Village	S	40	13	
		Hangkou Town	N/S	30	32	
Pingxia Village	S	20	10			
Expansio n of Waterwo rks	Distribution of peripheral sensitive sites	No				

Table 1.7-2 Protection Targets of Xiushui County's Rural Water Supply  
Engineering

			Engineering														
			Name of the Sites	Orientatio n	Distan ce (m)	Name of Househol ds	Impact Factors										
Zh ajin To wn	Exten sion of water suppl y pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe	Tangxia Village	N	10	25	Air, noise										
			Zhengjiaduan	Crossing	10	34											
			Longping Village	N	10	25											
			Tingziqian	Crossing	10	32											
			Chen Old House	W	10	28											
			Zhangjiaduan	N	5	10											
			Tianxi Village	W	10	15											
			Shangduan Village	E	10	44											
			Aoshang Village	N	10	18											
			Meizhou Village	S	10	8											
			Yuanli	W	15	7											
			Shangshuiche	S	20	18											
			Zhajin Village	Crossing	10	250											
			Putian Village	N/S	20	18											
			Guojiaduan Village	N	30	15											
			Huangxianwan	SE	15	18											
			Huangnilong	Crossing	10	14											
			Hujiaowan	Crossing	10	36											
	River	Dongjin River															
Ma 'ao To wn	Exten sion of water suppl y pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe	<table border="1"> <thead> <tr> <th>Name of the Site</th> <th>Orienta tion</th> <th>Distance (m)</th> <th>Numb er of House holds</th> <th>Impact Factors</th> </tr> </thead> <tbody> <tr> <td>Youpuli</td> <td>S</td> <td>20</td> <td>42</td> <td>Air, noise</td> </tr> </tbody> </table>					Name of the Site	Orienta tion	Distance (m)	Numb er of House holds	Impact Factors	Youpuli	S	20	42	Air, noise
			Name of the Site	Orienta tion	Distance (m)	Numb er of House holds	Impact Factors										
			Youpuli	S	20	42	Air, noise										
River	Dongjin River																

Shankou Town	Extension of water supply pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe	Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors
			Bashang	N	10	7	Air, noise
			Shankou Old Street	W	10	20	
			Xiushui Village	Crossing	10	140	
			Xinling Village	Crossing	Crossing	120	
Gangkou Town	Extension of water supply pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe	Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors
			Shaheli	Crossing	10	38	Air, noise
			Henglingxiang	W	20	15	
			Dishang	N	10	8	
			Gangbei	S	10	20	
			Shankou	Crossing	10	8	
			Kanshang	N	10	15	
			Hejiawo	Crossing	10	6	
			Zengjiawo	N	15	8	
Xigang Town	Extension of water supply pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe	Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors
			Qingbanqiao	W	10	20	Air, noise
			Zhangjiawo	Crossing	10	35	
			Xizhuang Village	E	10	40	
			Hujialong	SE	20	13	

Table 1.7-3 Protection Targets of Xiushui County’s Rural Wastewater Treatment Engineering

Zhajin Town	Sensitive targets around wastewater treatment plant site	Name of the Sites	Orientation	Distance (m)	Number of House holds	Impact Factors
		Sub-village 6, Putian Village	SW	70	3	Air, noise
		Sub-village 13, Putian Village	SE	80	10	
	Residents along wastewater pipe network	Name of the Sites	Orientation	Distance (m)	Number of House holds	Impact Factors
		Sub-village 6, Putian Village	W/E	20	40	Air, noise
		Sub-village 13, Putian Village	W/E	15	35	
		Sub-village 5, Putian Village	W/E	20	38	
		Sub-village 10, Putian Village	W/E	15	26	
	Receiving water	Zhajin River, Class III water				
	Physical cultural resources	The ancestral temple of Sub-village 6, Putian Village, 30 m of the distance				

**1.7.2 Yongxin County’s environmental protection targets**

The protection targets of Yongxin County’s urban water supply, rural water supply and wastewater treatment engineering are shown in Table 1.7-4~1.7-5.

Table 1.7-4 Protection Targets of Yongxin County's Urban Water Supply Engineering

Water Source	Name of water source	Longyuankou Reservoir				
	Current water quality	Class II water				
Raw Water Pipe	Distribution of environmental sensitive sites within the range of impact of raw water pipe					
		Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors
		Jiangdongbian	E	5	8	Air, noise
		Longyuankou	W	5	30	
		Mapi	Crossing	20	40	
		Wangshe Village	S	50	23	
		E Village	NW	50	20	
		Xiaquanshan	S	20	24	
		Shangyao	SE	40	37	
		Shangqiaotou	N	10	21	
Shishan Village	W	30	20			
New Construction of Waterworks	Distribution of peripheral sensitive sites	No				
Water Supply Pipe	Distribution of environmental sensitive sites within the range of impact of water delivery pipe					
		Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors
		Xianshang	Crossing	0	37	Air, noise
		Long'an Village	S	30	21	
		Lianhe Village	W	60	22	
	Yumin Village	W	60	25		
Surface water	He River (Class III)					

Table 1.7-5 Protection Targets of Yongxin County's Rural Water Supply  
Engineering

Town	Extension of the county's water supply pipe	Distribution of environmental sensitive sites within the range of impact of the extended pipe	Name of the Sites	Orientati on	Distance (m)	Numbe r of Househ olds	Impact Factors
			Lianzhou			Yangqiao Village	Crossing
	Tutian Village	Crossing	10			45	
	Huangmen Village	Crossing	10			40	
	Rongxi Village	Crossing	10			37	
	Guangming Village	Crossing	10			58	
	Shuanghu Village	Crossing	10			47	
	Surface water	Rongjiang River (Class III)					
Town	Extension of the county's water supply pipe	Distribution of environmental sensitive sites within the range of impact of the extended pipe	Name of the Sites	Orientati on	Distance (m)	Numbe r of Househ olds	Impact Factors
			Cai fen g			Long'an Village	Crossing
	Lianhe Village	W	30			30	
	Qingtang Village	S	10			64	

Hu aiz hon g To wn	Exten sion of the count y's water suppl y pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe	Name of the Sites	Orientatio n	Distan ce (m)	Number of Household s	Impact Factors
			Renshan Village	E	10	31	Air, noise
			Chayuan Village	NE	10	30	
			Chizhu Village	W	20	8	
			Taihu Village	E	10	18	
			Guanshan Village	Crossing	10	28	
			Huaizhong Town	Crossing	10	200	
			Quantang Village	Crossing	10	78	
			Guojiang Village	Crossing	10	15	
			Ningjia	S	10	10	
			Zuofang Village	Crossing	10	35	
			Linjiali	Crossing	10	40	
			Lianfang Village	Crossing	10	38	
			Nantian Village	Crossing	10	20	
		Xinju Village	Crossing	10	50		
Surface water	Rongjiang River (Class III)						
Shi qia o To wn	Exten sion of the count y's water suppl y pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe	Name of the Sites	Orientati on	Distance (m)	Number of Househol ds	Impact Factors
			Dongli Village	Crossing	20	80	Air, noise
			Yaobei Village	N	20	15	
			Jingquan Village	N	10	22	
			Donghailou	N	10	38	
			Zhangjiashan	S	10	25	
			Zhangshi Village	Crossing	10	50	
			Shiqiao Village	Crossing	10	41	
			Yanqu Village	S	10	40	
			Rongjiang Village	N/S	10	30	
	Qishan Village	Crossing	10	80			
Physical cultural resources	One old tree (camphor tree), 15 m of the distance						

Gaoqiaolou Town	Extension of water supply pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe	Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors
			Taishan	Crossing	10	33	Air, noise
			Longjia	S	10	18	
			Gaoqiaolou Town	Crossing	10	35	

### 1.7.3 Nanfeng County's environmental protection targets

The protection targets of Nanfeng County's urban water supply, rural water supply and wastewater treatment engineering are shown in Table 1.7-6.

Table 1.7-6 Protection Targets of Nanfeng County's Rural Water Supply Engineering

Shishan Town	Extension of the sensitive sites within the range of impact of water supply pipe network	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors
			Shishan Town	Crossing	5	200	Air, noise
			Xi Village	Crossing	5	15	
			Dong Village	Crossing	5	10	
			Shangkaokeng Village	W	5	27	
			Xinjiabao Village	W	5	30	
			Pengjiabao Village	N	5	40	
			Zihe Village	S	5	30	
	Guanjiabao	Crossing	10	10			
	Underground infrastructure	The pipe from Shishan Town to Luoxi Village passes by Fugan Optical Cable; gas pipeline owned by Nanfeng Kuangyuan Energy Co., Ltd. is laid beside the cable.					

Qiaowan Town	Extension of the county's water supply pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<table border="1"> <thead> <tr> <th>Name of the Sites</th> <th>Orientation</th> <th>Distance (m)</th> <th>Number of Households</th> <th>Impact Factors</th> </tr> </thead> <tbody> <tr> <td>Qiawan Village</td> <td>E</td> <td>5</td> <td>20</td> <td rowspan="5">Air, noise</td> </tr> <tr> <td>Shiergang</td> <td>E</td> <td>30</td> <td>50</td> </tr> <tr> <td>Pengjia Village</td> <td>Crossing</td> <td>5</td> <td>45</td> </tr> <tr> <td>Shijing</td> <td>Crossing</td> <td>5</td> <td>58</td> </tr> <tr> <td>Changling Village</td> <td>Crossing</td> <td>5</td> <td>69</td> </tr> </tbody> </table>	Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors	Qiawan Village	E	5	20	Air, noise	Shiergang	E	30	50	Pengjia Village	Crossing	5	45	Shijing	Crossing	5	58	Changling Village	Crossing	5	69																																
			Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors																																																						
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Pengjia Village	Crossing	5	45																																																										
Shijing	Crossing	5	58																																																										
Changling Village	Crossing	5	69																																																										
Physical cultural resources		Three old trees in Taoyuan Village, camphor trees, 1,000-year, 280-year and unknown age, the national Grade I and Grade III protected old trees, 15 m of the distance																																																											
Laixi Town	Extension of the county's water supply pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<table border="1"> <thead> <tr> <th>Name of the Sites</th> <th>Orientation</th> <th>Distance (m)</th> <th>Number of Households</th> <th>Impact Factors</th> </tr> </thead> <tbody> <tr> <td>Zhaojiashan</td> <td>N</td> <td>5</td> <td>27</td> <td rowspan="14">Air, noise</td> </tr> <tr> <td>Badu Village</td> <td>Crossing</td> <td>5</td> <td>35</td> </tr> <tr> <td>Laixi Primary School</td> <td>N</td> <td>5</td> <td>80</td> </tr> <tr> <td>Laixi Village</td> <td>Crossing</td> <td>5</td> <td>20</td> </tr> <tr> <td>Guanjia Village</td> <td>E</td> <td>10</td> <td>10</td> </tr> <tr> <td>Zhangjia Village</td> <td>S</td> <td>5</td> <td>35</td> </tr> <tr> <td>Zhujia Village</td> <td>E</td> <td>5</td> <td>15</td> </tr> <tr> <td>Gengxi</td> <td>W</td> <td>5</td> <td>15</td> </tr> <tr> <td>Zhulin Village</td> <td>W</td> <td>5</td> <td>15</td> </tr> <tr> <td>Qiujiayuan</td> <td>S</td> <td>5</td> <td>8</td> </tr> <tr> <td>Lujiaku Village</td> <td>Crossing</td> <td>5</td> <td>12</td> </tr> <tr> <td>Kushan Village</td> <td>Crossing</td> <td>5</td> <td>15</td> </tr> <tr> <td>Jiulian Village</td> <td>Crossing</td> <td>5</td> <td>15</td> </tr> </tbody> </table>	Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors	Zhaojiashan	N	5	27	Air, noise	Badu Village	Crossing	5	35	Laixi Primary School	N	5	80	Laixi Village	Crossing	5	20	Guanjia Village	E	10	10	Zhangjia Village	S	5	35	Zhujia Village	E	5	15	Gengxi	W	5	15	Zhulin Village	W	5	15	Qiujiayuan	S	5	8	Lujiaku Village	Crossing	5	12	Kushan Village	Crossing	5	15	Jiulian Village	Crossing	5	15
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			Laixi Village	Crossing	5	20																																																							
			Guanjia Village	E	10	10																																																							
			Zhangjia Village	S	5	35																																																							
			Zhujia Village	E	5	15																																																							
			Gengxi	W	5	15																																																							
			Zhulin Village	W	5	15																																																							
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### 1.7.4 Linchuan District’s environmental protection targets

The protection targets of Linchuan District’s urban water supply, rural water supply and wastewater treatment engineering are shown in Table 1.7-7.

Table 1.7-7 Protection Targets of Linchuan County’s Urban Water Supply Engineering

Water Source	Name of water source	Chongren River				
	Current water quality	Class III water				
New Construction of Raw Water Pipe	Distribution of environmental sensitive sites along the pipe	No				
New Construction of Waterworks	Distribution of peripheral sensitive sites	<b>Name of the Sites</b>	<b>Orie ntati on</b>	<b>Distan ce (m)</b>	<b>Nu mb er of Ho use hol ds</b>	<b>Impact Factors</b>
		Huangshi Village	NE	70	5	Air, noise

			Name of the Sites	Orie ntati on	Distan ce (m)	Num ber of Hous ehold s	Impact Factors
Wenquan Town	Extension of the county's pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	Wuhuyan	S	10	30	Air, noise
			Wenquan Town	Crossing	10	100	
			Zhoujia	Crossing	20	30	
			Yangjia	W	10	50	
			Zhuji Village	N	10	30	
			Liangxian Primary School	S	10	100	
			Dongliangji Village	Crossing	10	30	
			Fujia Village	S	10	30	
			Menloushi Village	N	50	5	
			Gejia	N	10	35	
Lijia	W	5	100				
Liancheng Town	Extension of the county's pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	Name of the Sites	Orie ntati on	Distan ce (m)	Num ber of Hous ehold s	Impact Factors
			Zoujia	Crossing	20	20	Air, noise
			Dengjia	E	10	20	
			Jiaoshang raojia	Crossing	10	15	
			Nanzhuang	E	20	10	
			Liancheng Town	Crossing	10	50	

Chonggan g Town	Exten sion of the count y's pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<b>Name of the Sites</b>	<b>Orie ntati on</b>	<b>Distan ce (m)</b>	<b>Num ber of Hous ehold s</b>	<b>Impact Factors</b>
			Hujia Village	Cross ing	5	30	Air, noise

### 1.7.5 Jinxi County's environmental protection targets

The protection targets of Jinxi County's urban and rural water supply engineering are shown in Table 1.7-8~1.7-9.

Table 1.7-8 Protection Targets of Jinxi County's Urban Water Supply Engineering

							Impact Factors
			Name of the Sites	Orientati on	Distan ce (m)	Number of Househol ds	
Shua ng ta ng To wn	Ext ens ion of the cou nty 's pip e	Distribution of environment al sensitive sites within the range of impact of water supply pipe network	Yufang Village	W	80	20	Air, noise
			Shancheng Town	Crossing	30	100	
			Xiajiamiao	Crossing	20	30	
			Tianxiantou	Crossing	15	35	
			Wangjiadun	W	10	40	
			Lijiabian	N	10	10	
			Zhuqiao Village	Crossing	15	20	
			Maotaofeng	Crossing	15	40	
			Zuoshan Village	Crossing	15	20	
			Xiayaofang	W	10	10	
			Shangyaofang	Crossing	15	20	
			Shuangtang Town	Crossing	20	150	
			Bolin	Crossing	5	100	
			H es hi To wn	Ext ens ion of the cou nty 's pip e	Distribution of environment al sensitive sites within the range of impact of water supply pipe network	Name of the Sites	
Shantou sujia	N	40				5	Air, noise
Kongyuan	N	20				25	
Youlutou	N	20				5	
Xiaogong New Village	Crossi ng	10				70	
Xiaogong Village	Crossi ng	10				70	
Lijia	S	15				20	
Xiazhengjia	Crossi ng	15				40	
Chonglu Town	Crossi ng	10				110	

Zuofang Town	Extension of the county's pipeline	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<b>Name of the Sites</b>	<b>Orientation</b>	<b>Distance (m)</b>	<b>Number of Households</b>	<b>Impact Factors</b>
			Xufang	E	25	35	Air, noise
			Liwu Village	Crossing	25	30	
			Yujia	Crossing	25	40	
			Panting	Crossing	25	20	
			Zuofang Town	Crossing	25	80	
			Zhanjia	E	50	10	
			Xujia	Crossing	10	30	
			Mijia	W	15	25	
			Gengyuan	Crossing	15	40	

Table 1.7-9 Protection Targets of Jinxi County's Rural Water Supply Engineering

Huangton Town	Water source	Name of water source	The upstream mountain stream of Gaofang River				
		Current water quality	Class II				
	New construction of raw water pipe	Distribution of environmental sensitive sites	No sensitive sites on the both sides of raw water pipe				
	New construction of waterworks	Distribution of peripheral sensitive sites	No sensitive sites				
	New construction of water supply pipe	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<b>Name of the Sites</b>	<b>Orientation</b>	<b>Distance (m)</b>	<b>Number of Households</b>	<b>Impact Factors</b>
Xiaguan Village			N	5	10	Air, noise	
Hewan Village			Crossing	5	25		
Dunhou Village			S	5	30		
Liujia Village			Crossing	10	15		
Huangtong Town			Crossing	5	100		

### 1.7.6 Dongxiang District’s environmental protection targets

The protection targets of Dongxiang District’s urban and rural water supply engineering are shown in Table 1.7-10~1.7-11.

Table 1.7-10 Protection Targets of Dongxiang District’s Urban Water Supply Engineering

Water Source	Name of water source	Hengshan Reservoir, Hefang Reservoir																		
	Current water quality	Class III water																		
Raw Water Pipe of Hefang Reservoir	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<table border="1"> <thead> <tr> <th>Name of the Sites</th> <th>Orientation</th> <th>Distance (m)</th> <th>Number of Households</th> <th>Impact Factors</th> </tr> </thead> <tbody> <tr> <td>Daping Village</td> <td>N</td> <td>50</td> <td>20</td> <td rowspan="2">Air, noise</td> </tr> <tr> <td>Lijiadun</td> <td>S</td> <td>30</td> <td>15</td> </tr> </tbody> </table>	Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors	Daping Village	N	50	20	Air, noise	Lijiadun	S	30	15				
		Name of the Sites	Orientation	Distance (m)	Number of Households	Impact Factors														
		Daping Village	N	50	20	Air, noise														
Lijiadun	S	30	15																	

						Impact Factors
		Name of the Sites	Orientation	Distance (m)	Number of Households	
Raw Water Pipe of Hengshan Reservoir	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	Shujiayuan	Crossing	5	25	Air, noise
		Paishang New Village	Crossing	5	10	
		Fenglin Village	Crossing	5	50	
		Technician training school in Dongxing District	S	10	120	
		Xigangshang	N	10	25	
		Zhangjia	N	5	15	
		Xiaohuang Nursing Home	N	15	60	
		Aijia Village	S	10	15	
		Caojia Village	Crossing	10	15	
		Xiaohuang Town	N	10	50	
		Hongjia Village	S	50	10	
		Yaoqian	S	10	30	
		Fanli Village	N	15	10	
			Underground infrastructure	Crossing west-east gas transmission pipe		
New Construction of Waterworks	Distribution of peripheral sensitive sites	No				

Table 1.7-11 Protection Targets of Dongxiang County's Rural Water Supply Engineering

			Name of the Sites	Orientat ion	Distance (m)	Numbe r of Househ olds	Impact Factors
			Xi ao hu an g P og an	Ext ensi on of the cou nty's wat er sup ply pip e	Distributio n of environme ntal sensitive sites within the range of impact of water supply pipe network	Fenglin Village	N
			Zhangjia	N	15	30	
			Zengjia	N	15	20	
			Xiaohuang Nursing Home	N	15	60	
			Guangchang Primary School	N	50	70	
			Fanli Village	N	10	20	
			Xiaohuang Town	Crossing	15	80	
			Gulougang	S	30	10	
			Xiangyuanli	S	20	30	
			Zhajia	Crossing	15	35	
			Zongyifang	Crossing	15	60	
			Yanghu Village	Crossing	15	65	
			Lingdi	N	10	45	
			Xiangjia	N	10	5	
			Jiangjia	S	15	30	
			Pogan Middle School	N	15	80	
			Pogan Town	Crossing	15	100	
H ux u To w n	Ext ensi on of the cou nty's wat er sup ply pip e	Distributio n of environme ntal sensitive sites within the range of impact of water supply pipe network					
			Yanjia Village	Crossing	10	10	Air, noise
			Huxu Town	Crossing	10	25	
			Xinju Village	E	15	30	
			Jinling Chenjia	W	15	25	
			Yangguang Village	Crossing	10	15	
			Chenqiao Village	Crossing	10	30	
			Yangguang Village	Crossing	25	10	
			Houxie Xujia	Crossing	20	25	

G a n g s h a n g j i T o w n	Ext e n s i o n o f t h e c o u n t y' s w a t e r s u p p l y p i p e	Distributio n o f e n v i r o n m e n t a l s e n s i t i v e s i t e s w i t h i n t h e r a n g e o f i m p a c t o f w a t e r s u p p l y p i p e n e t w o r k	<b>Name of the Sites</b>	<b>Orientat ion</b>	<b>Distance (m)</b>	<b>Numbe r of Househ olds</b>	<b>Impact Factors</b>
			Xiongjia	Crossing	20	5	Air, noise
			Wentian	Crossing	15	15	
			Jiaoxi	W	15	35	
			Hongliang Reclamation Farm	N	20	15	
			Gangshangji	N	15	60	
			Juqiao Village	Crossing	15	15	
			Xiaojiazhuang	Crossing	15	30	
			Pingtangbu	Crossing	15	30	
			Pingtang Village	Crossing	15	30	
Shuinan	Crossing	15	35				
D e n g j i a T o w n	Ext e n s i o n o f t h e c o u n t y' s w a t e r s u p p l y p i p e	Distributio n o f e n v i r o n m e n t a l s e n s i t i v e s i t e s w i t h i n t h e r a n g e o f i m p a c t o f w a t e r s u p p l y p i p e n e t w o r k	<b>Name of the Sites</b>	<b>Orientat ion</b>	<b>Distance (m)</b>	<b>Numbe r of Househ olds</b>	<b>Impact Factors</b>
			Xiayang	Crossing	10	30	Air, noise
			Dengjia Town	Crossing	10	40	
			Xichen	Crossing	10	25	
			Rongjiadun	Crossing	10	10	
			Pushang	Crossing	10	15	
X u s h a n g q i a o	Ext e n s i o n o f t h e c o u n t y' s w a t e r s u p p l y	Distributio n o f e n v i r o n m e n t a l s e n s i t i v e s i t e s w i t h i n t h e r a n g e o f i m p a c t o f w a t e r s u p p l y p i p e	<b>Name of the Sites</b>	<b>Orientat ion</b>	<b>Distance (m)</b>	<b>Numbe r of Househ olds</b>	<b>Impact Factors</b>
			Xushangqiao Town	Crossing	10	100	Air, noise
			Wuguidun	S	10	20	
			Dianqian	Crossing	10	45	
			Donggang	Crossing	10	20	

	pipe	network					
Xi ao ga ng To w n	Ext ensi on of the cou nty' s wat er sup ply pip e	Distributio n of environme ntal sensitive sites within the range of impact of water supply pipe network					
			<b>Name of the Sites</b>	<b>Orientat ion</b>	<b>Distance (m)</b>	<b>Numbe r of Househ olds</b>	<b>Impact Factors</b>
			Hudunbu	Crossing	10	10	Air, noise
			Nanbian Village	Crossing	10	10	
			Shujiayuan	Crossing	10	5	
Zhangfang Village	Crossing	10	30				

### 1.7.7 Leping City's environmental protection targets

The protection targets of Leping County's urban and rural water supply engineering are shown in Table 1.7-12~1.7-13.

Table 1.7-12 Protection Targets of Leping County's Urban Water Supply Engineering

Water Source	Name of water source	Communist Reservoir
	Current water quality	Class III water

						Impact Factors
		Name of the Sites	Orientat ion	Distance (m)	Number of Househol ds	
New Construction of Water Delivery Pipe Network from Communist Reservoir to Runquan Waterworks	Distribution of environmental sensitive sites within the range of impact of water delivery pipe network	Bayu Village	Crossing	5	10	Air, noise
		Guankou Village	N	10	35	
		Guankou New Village	Crossing	10	40	
		Chexi Village	W	15	30	
		Kuqian Village	S	10	35	
		Gujinshan	Crossing	5	25	
		Liucha Village	N	15	30	
		Duqiao Village	Crossing	5	40	
		Dunshang	Crossing	10	15	
		Xiawan	Crossing	5	20	
		Houtian Village	E	10	40	
		Hongyuan Village	W	30	10	
		Lingang Town	Crossing	50	40	
		Lijiabian	W	8	20	
		Wutandu	N	10	20	
		Zhaixia Village	N	10	15	
		Wangjia	S	50	15	
		Jiang Village	Crossing	5	50	
		Wukou Village	S	50	15	
		Maoshan Village	N	15	10	
		Bi Village	N	15	10	
		Hejia	S	10	8	
		Yangshuhu Village	N	50	15	
Zhangjia	E	20	30			
	Underground facility	The pipe is in parallel with the existing optical cable in Wukou Village.				

Renovation of Urban Water Supply Pipe Network	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<b>Name of the Sites</b>	<b>Orientalion</b>	<b>Distance (m)</b>	<b>Number of Households</b>	<b>Impact Factors</b>
		Jin'eshan Town	S	10	40	Air, noise
		Jin'eshan Village	Crossing	10	40	
		Bi Village	Crossing	20	30	
		Fangjiagang Village	Crossing	5	40	
		Nan'an Village	Crossing	5	120	
		Xinwanli	Crossing	5	40	
		Fanchangli	Crossing	5	30	

						Impact Factors
		Name of the Sites	Orientalion	Distance (m)	Number of Households	
Extensi on of Water Supply Pipe Networ k in the Urban Area of Hougan g Town	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	Jiantou Village	E	10	30	Air, noise
		Xujiafan Village	W	5	50	
		Xinmajia	N	45	25	
		Fengjia Village	W	10	25	
		Xialiaojia	N	40	10	
		Meihuayuan	S	35	20	
		Caojia	S	50	20	
		Yifang Village	Crossing	5	60	
		Luping Village	Crossing	5	10	
		Gukou Village	Crossing	5	45	
		Guanpuqian	Crossing	5	40	
		Hejiafan	Crossing	5	45	
		Baichang	Crossing	5	20	
		Qimingxing Experimental <a href="#">../././././././æ œ%é•“/Dict /7.5.0.0/result ui/dict/?keyw ord=Kinderga rten</a>	S	10	140	
		Xingaoqiao Village	Crossing	5	4	
		Choubeizhua ng	Crossing	5	40	
		Yexing Village	Crossing	5	60	
		Jiangluo Village	E	15	3	
Yuanqiao	Crossing	5	30			
Hengyuan Village	Crossing	5	60			

	Underground facility	This pipe passes through natural gas pipeline, the section from Yujiang to Jingdezhen, managed by Jiangxi Natural Gas Co., Ltd..				
	Physical cultural resources	One old tree in Panxi Village, 10 m of the distance				
Extension of Water Supply Pipe Network in the Urban Area of Legang Town	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<b>Name of the Sites</b>	<b>Orientat ion</b>	<b>Distance (m)</b>	<b>Number of Househol ds</b>	<b>Impact Factors</b>
		Zhangjiaqiao	E	10	50	Air, noise
		Yuanjia Village	W	10	40	
		Lishou Village	E	10	50	
		Lujia Village	N	10	50	
		Handu Village	E	10	60	
Extension of Water Supply Pipe Network in the Urban Area of Jiedu Town	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<b>Name of the Sites</b>	<b>Orientat ion</b>	<b>Distance (m)</b>	<b>Number of Househol ds</b>	<b>Impact Factors</b>
		Yangjiadian	N	10	20	Air, noise
		Pengban Street	N	10	10	
		Linli Village	S	10	30	
		Yuanjiating	Crossing	10	35	
		Dongjinfan	E	10	40	
		Jiangjia Village	E	10	30	
		Shantoule	S	50	30	
		Maowu Village	W	10	40	
		Yangjia	Crossing	10	50	
		Pan Village	Crossing	10	80	
		Xuli Village	N	10	50	
		Jiangjia	N	10	30	
		Xinwuchang	Crossing	10	40	
		Yuanjia Village	Crossing	10	50	
Yeja	Crossing	5	50			

Table 1.7-13 Protection Targets of Leping County's Rural Water Supply  
Engineering

			Name of the Sites	Orientati on	Distan ce (m)	Number of Households	
Yongs han Water works -Yongs han Town	Extension of water supply pipe network	Distribut ion of environ mental sensitive sites within the range of impact of water supply pipe network	Changyuan Village	W	10	45	Air, noise
			Li Village	Crossing	10	35	
			Fangjia Village	Crossing	10	45	
			Bajia Village	E	55	5	
			Hengtang Village	Crossing	10	55	
			Pengjiaqiao	Crossing	5	40	
			Minkou Village	Crossing	5	60	
			Liuja	Crossing	50	5	
			Changsongg ang Village	Crossing	5	80	
			Yongshan Town	Crossing	5	60	
			Maowu Village	W	5	25	
			Yangou Village	Crossing	5	60	
			Zhangjiadian Village	S	5	65	
			Zhangjiajin g	W	15	20	
			Liucha Village	E	5	50	
			Xiayongshan	S	5	50	
			Donggang Village	Crossing	5	30	
			Lintou Village	N	10	20	
			Guilin Village	N	5	40	
			Caochong	Crossing	5	40	
Lvjia Village	Crossing	5	30				

		Physical cultural resources	One old tree in Fangjia Town, 10 m of the distance																																																																		
Xingfu Water works-Hongyan Town	Extension of water supply pipe network	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<table border="1"> <thead> <tr> <th>Name of the Sites</th> <th>Orientalion</th> <th>Distance (m)</th> <th>Number of Households</th> <th>Impact Factors</th> </tr> </thead> <tbody> <tr> <td>Dongjiawan</td> <td>Crossing</td> <td>5</td> <td>5</td> <td rowspan="15">Air, noise</td> </tr> <tr> <td>Caijia</td> <td>Crossing</td> <td>5</td> <td>15</td> </tr> <tr> <td>Laohubei</td> <td>N</td> <td>5</td> <td>25</td> </tr> <tr> <td>Hongluo Village</td> <td>Crossing</td> <td>5</td> <td>35</td> </tr> <tr> <td>Hongyan Town</td> <td>E</td> <td>10</td> <td>50</td> </tr> <tr> <td>Gancun Village</td> <td>Crossing</td> <td>10</td> <td>30</td> </tr> <tr> <td>Shantou Village</td> <td>Crossing</td> <td>10</td> <td>25</td> </tr> <tr> <td>Sanmenting</td> <td>Crossing</td> <td>5</td> <td>10</td> </tr> <tr> <td>Qishuwu</td> <td>S</td> <td>5</td> <td>5</td> </tr> <tr> <td>Wangchongwu</td> <td>Crossing</td> <td>5</td> <td>25</td> </tr> <tr> <td>Xiabuduan Village</td> <td>S</td> <td>5</td> <td>25</td> </tr> <tr> <td>Wanfuting</td> <td>Crossing</td> <td>5</td> <td>20</td> </tr> <tr> <td>Leyuanfan</td> <td>Crossing</td> <td>5</td> <td>15</td> </tr> <tr> <td>Xiajia</td> <td>Crossing</td> <td>10</td> <td>25</td> </tr> <tr> <td>Luojia</td> <td>Crossing</td> <td>20</td> <td>30</td> </tr> </tbody> </table>	Name of the Sites	Orientalion	Distance (m)	Number of Households	Impact Factors	Dongjiawan	Crossing	5	5	Air, noise	Caijia	Crossing	5	15	Laohubei	N	5	25	Hongluo Village	Crossing	5	35	Hongyan Town	E	10	50	Gancun Village	Crossing	10	30	Shantou Village	Crossing	10	25	Sanmenting	Crossing	5	10	Qishuwu	S	5	5	Wangchongwu	Crossing	5	25	Xiabuduan Village	S	5	25	Wanfuting	Crossing	5	20	Leyuanfan	Crossing	5	15	Xiajia	Crossing	10	25	Luojia	Crossing	20	30
			Name of the Sites	Orientalion	Distance (m)	Number of Households	Impact Factors																																																														
			Dongjiawan	Crossing	5	5	Air, noise																																																														
			Caijia	Crossing	5	15																																																															
			Laohubei	N	5	25																																																															
			Hongluo Village	Crossing	5	35																																																															
			Hongyan Town	E	10	50																																																															
			Gancun Village	Crossing	10	30																																																															
			Shantou Village	Crossing	10	25																																																															
			Sanmenting	Crossing	5	10																																																															
			Qishuwu	S	5	5																																																															
			Wangchongwu	Crossing	5	25																																																															
			Xiabuduan Village	S	5	25																																																															
			Wanfuting	Crossing	5	20																																																															
			Leyuanfan	Crossing	5	15																																																															
Xiajia	Crossing	10	25																																																																		
Luojia	Crossing	20	30																																																																		

			Name of the Sites	Orientalion	Distance (m)	Number of Households	
Xingfu Water works-Gaojia Town	Extension of water supply pipe network	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	Beijiaxia Village	W	5	35	Air, noise
			Yueshan Village	E	5	35	
			Guanzhuaning Village	Crossing	5	30	
			Luojiashuang	Crossing	5	5	
			Cangtian Village	N	10	30	
			Yingqian Village	W	15	20	
			Shangyang Village	Crossing	10	30	
			Gaojia Town	Crossing	10	20	
			Xiajiawu	Crossing	10	10	
			Xinlingyang	N	30	5	
			Tonglin Street	Crossing	10	25	
			Meiyan Village	N	10	15	
			Wanxi	Crossing	10	25	
			Longkou	Crossing	5	60	
			Agricultural Research Institute	E	10	10	
			Datangxia	Crossing	10	15	
			Zhuangquan Village	N	10	30	

			Name of the Sites	Orie ntati on	Distance (m)	Number of Househol ds	Impact Factors
Xin gfu Wa ter wo rks -Mi ngk ou To wn	Exten sion of wa ter suppl y pipe netw ork	Distribut ion of environ mental sensitive sites within the range of impact of wa ter supply pipe network	Jinjiating	Cross ing	10	5	Air, noise
			Dongmen Village	Cross ing	10	15	
			Wangjiazhai	E	15	15	
			Zhuwu Village	Cross ing	10	40	
			Jiashanli	Cross ing	10	15	
			Mingkou Town	Cross ing	10	100	
			Lankeng Village	N	10	20	
			Liufang Village	Cross ing	10	35	
			Shangsi Village	Cross ing	10	25	
			Shangnan'an Village	Cross ing	20	35	
			Dai Village	S	10	35	
Na nga ng Wa ter wo rks -Sh ilig ang To wn	Exten sion of wa ter suppl y pipe netw ork	Distribut ion of environ mental sensitive sites within the range of impact of wa ter supply pipe network	Name of the Sites	Orientat ion	Distan ce (m)	Number of Househol ds	Impact Factors
			Cangxia Village	Crossing	5	60	Air, noise
			Xinwuqian	W	5	60	
			Shilingshang	Crossing	10	15	
			Hejia	Crossing	30	5	
			Lvjiayuan	Crossing	20	10	
			Chating	Crossing	10	10	
			Shiligang Town	Crossing	30	5	
			Dianshang Village	Crossing	30	10	
			Sanwangyuan	Crossing	10	5	
Fujiawu	Crossing	10	25				

Zhongbu Waterworks-Zhongbu Town	Extension of water supply pipe network	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<b>Name of the Sites</b>	<b>Orientat ion</b>	<b>Distan ce (m)</b>	<b>Number of Households</b>	<b>Impact Factors</b>  Air, noise
			Gaoqiao Village	W	10	35	
			Luowan Village	Crossing	20	15	
			Zhangkeng Village	Crossing	5	25	
			Raoxi Village	Crossing	10	10	
			Yeshuiqiao	Crossing	10	35	
			Hejia	Crossing	5	25	
			Houwang Village	N	20	15	
			Shuangxifan Village	Crossing	10	10	
			Henan Village	Crossing	10	15	
			Huangtielu	Crossing	10	15	
			Peixia Village	Crossing	10	10	
			Zhonglutung	Crossing	5	20	
			Zhongnao Village	Crossing	15	50	
Wukou Waterworks-Wukou Town	Extension of water supply pipe network	Distribution of environmental sensitive sites within the range of impact of water supply pipe network	<b>Name of the Sites</b>	<b>Orientat ion</b>	<b>Distance (m)</b>	<b>Number of Households</b>	<b>Impact Factors</b>  Air, noise
			Hanjatang	Crossing	5	30	
			Guanmuling	Crossing	10	20	
			Zhoujia	Crossing	5	40	
			Wukou Town	Crossing	10	60	
			Chengjiadun	E	40	20	
			Taoyuan Village	Crossing	5	30	
			Xiagang	Crossing	10	35	
			Zhongjiashan	Crossing	10	20	
Xiqiao Village	Crossing	10	35				

							Impact Factors
			Name of the Sites	Orientat ion	Distan ce (m)	Number of Households	
Zh enq iao Wa ter wo rks -Zh enq iao To wn -Le gan g To wn	Exten sion of water suppl y pipe netw ork	Distribut ion of environ mental sensitive sites within the range of impact of water supply pipe network	Longtang Village	Crossing	5	40	Air, noise
			Gutian Village	W	30	10	
			Gangbengsha n Village	Crossing	10	25	
			Shanbei Xujia	W	10	10	
			Shanbei Gaojia	Crossing	20	5	
			Xi'an	S	50	5	
			Yaoshan	Crossing	5	15	
			Handu Village	E	10	10	
			Dutou Village	Crossing	5	20	
			Zhangshuxia	Crossing	5	20	
			Qianxi Village	Crossing	10	10	
			Sibei Shaojia	Crossing	5	20	
			Huangwan	W	30	20	
			Gutang Village	W	20	10	
			Zhukeli	S	10	10	
			Fengshuxia	E	10	5	
			Jinshan Village	Crossing	10	15	
			Miaochang	Crossing	5	45	
			Xinzong Village	Crossing	5	50	
			Kuichen Village	Crossing	5	40	
			Kuibao Village	Crossing	10	20	
			Lushanxia	N	5	10	
			Jiangwan Village	W	5	60	
			Zhoushang Village	S	10	30	
			Wuchang Village	E	15	10	
			Loufang Village	W	10	10	
			Qianjiang Village	<sup>67</sup> Crossing	10	30	
			Yangjia New Village	Crossing	20	10	

## **2. Project Description**

This project involves Yongxin County, Jinxi County, Nanfeng County, Leping City, Xiushui County, Linchuan District and Dongxiang District in Jiangxi Province. It mainly includes the new construction and reconstruction of urban water supply facilities, the consolidation and upgrading of rural water supply facilities and the construction and renovation of wastewater treatment infrastructure. The general project description is shown in Table 2.1-1.

### **2.1 General Introduction of the Subproject in Yongxin County**

#### **2.1.1 The baseline of water supply system in Yongxin County**

##### 2.1.1.1 The baseline of water supply system in the county

(1) Yongxin County now has No.2 Waterworks and No.3 Waterworks (Xiaowuling Waterworks). No.2 Waterworks was completed and put into operation in 2001, with He River as its water source, 20,000 m<sup>3</sup>/d of its supply capacity. No.3 Waterworks (Xiaowuling Waterworks) was completed and put into operation in September 2003, with He River as its water source, 15,000 m<sup>3</sup>/d of its capacity. Both waterworks are located at the middle and lower reaches in the city/town. The quality of their water source is under great influence of the urban production and living; furthermore, the capacity of their source is not sufficient for the needs in the dry season.

(2) At present, the pipe network in the old town, though well established, many of which were built in the 80s, mostly are made of grey cast iron, steel concrete and PVC, seriously aging. The leakage rate of pipe network in Yongxin County is about 30%. Hedong New District and other newly developed areas have not laid any pipe network.

##### 2.1.1.2 The baseline of water supply systems in towns

This project involves Shiqiao Town, Gaoqiaolou Town, Huaizhong Town,

Lianzhou Town, Caifeng Town, Wenzhu Town, Longyuankou Town, Yange Town and Zaizhong Town, totally 9 towns. Seven waterworks have been completed, four of which are in use now and three are not in use yet. Gaoqiaolou and Lianzhou waterworks are not used due to their poor water quality, and Shiqiao waterworks is not in use because its pipe network is not ready. It is found out that Caifeng, Longyuankou, Yange and Zaizhong waterworks, though in operation now, miss out a large number of households as the pipes are not in place yet.

Table 2.1-1 Summary of Project Description of Jiangxi Urban and Rural Water Supply Integration and Rural Wastewater Treatment

No	Type	Subproject Name	Project Nature	Content and Construction Scale	Investment (10,000RMB)
I. Construction and Renovation of Water Supply Infrastructure					
1	Improvement of urban water supply facilities				
1.1	Renovation and new construction of urban waterworks	New Construction of Urban Waterworks in Yongxin County	New construction	New construction of one auto-flowing pontoon of 100,000 m <sup>3</sup> /d and 21.5 km DN1200 muddy water pipe; new waterworks construction in southern city, 50,000 m <sup>3</sup> /d in the short term and 100,000 m <sup>3</sup> /d in the long term; new construction of 11.2 km DN900 main delivery pipe of clean water, with the county area as its service scope	20,299.84
		New Construction of Urban Waterworks in Linchuan District	New construction	New construction of water intake engineering, 55,000 m <sup>3</sup> /d pumping house in the short term; new construction of two DN800 raw water pipes of 2.4 km; new construction of waterworks, 50,000 m <sup>3</sup> /d in the short term, with the urban area as its service scope	9,198
		New Construction of Urban Waterworks in Dongxiang District	New construction	New construction of water intake engineering, 42,000 m <sup>3</sup> /d pumping house; new construction of DN800 raw water pipe of 17.4 km; new construction of waterworks, 40,000 m <sup>3</sup> /d in the short term; with the county area as its service scope	8,685.25
		Extension of Urban Waterworks in Xiushui County	Extension/new construction	New construction of water intake engineering, extending the pumping house to 105,000 m <sup>3</sup> /d from 85,000 m <sup>3</sup> /d; new construction of 22.6 km DN1200 raw water pipe, extending the waterworks to 100,000 m <sup>3</sup> /d from 50,000 m <sup>3</sup> /d, covering 29403 households, with the county area as its service scope	10,953.29
		Extension of Urban Waterworks in Leping City	Extension/new construction	New construction of water intake engineering, pumping house of 120,000 m <sup>3</sup> /d of the total scale of water intake; new construction of 36.9 km DN1000 raw water pipe, extending the waterworks to 100,000 m <sup>3</sup> /d from 50,000 m <sup>3</sup> /d, with the county area as its service scope	13,341.77

No	Type	Subproject Name	Project Nature	Content and Construction Scale	Investment (10,000RMB)
1.2	Renovation and new construction of urban water supply pipe network	Renovation of Urban Pipe Network of Tap Water in Yongxin County	Renovation	Renovation of 6.97 km DN100~DN500 water supply pipe network, new construction of 41.3 km DN300~DN800 water supply pipe network, with the county area as its service scope	5,873.35
		Renovation and New Construction of Urban Pipe Network of Tap Water in Linchuan District	Renovation/new construction	Renovation of 13.4 km DN200~DN600 pipe network, new construction of 22.9 km DN200~DN1000 pipe network, with the urban area as its service scope	7,306.56
		Renovation of Urban Pipe Network of Tap Water in Dongxiang District	Renovation/new construction	Renovation of 16.3 km DN200~DN1000 pipe network, new construction of 6.74 km DN600~DN800 pipe network, with the county area as its service scope	8,748.75
		Renovation and New Construction of Urban Pipe Network of Tap Water in Jinxi County	Renovation/new construction	Renovation of 10.5 km DN500~DN600 pipe network, new construction of 24.1 km DN300~DN500 pipe network, with the county area as its service scope	6,680.73
		New Construction and Renovation of Urban Pipe Network in Xiushui County	Renovation/new construction	Renovation and new construction of 149 km DN200~DN1000 pipe; with the county area as its service scope	21,027.7

No	Type	Subproject Name	Project Nature	Content and Construction Scale	Investment (10,000RMB)
		New Construction and Renovation of Urban Pipe Network in Leping City	Renovation/new construction	Renovation of 15.1 km DN200~DN1000 nodular cast iron pipe and 112 m steel pipe across river; new construction of 40.9 km DN200~DN700 nodular cast iron pipe, with the county area as its service scope	9,654.28
2	Consolidation and upgrading of rural drinking water safety				
2.1	Extension of counties' pipe network	Extension of Pipe Network in Towns of Yongxin County	New construction	Extending to 40 villages in Shiqiao Town, Caifeng Town, Lianzhou Town, Huaizhong Town and Gaoqiaolou Town from the pipe network of the county's waterworks, new construction of 24.7 km DN200-DN500 pipe network, covering 16035 households	5,260.45
		Extension of Pipe Network in Towns of Jinxi County	New construction	Extending to 22 villages in Zuofang Town, Shuangtang Town and Heshi Town from the pipe network of the county's waterworks, new construction of 34.4 km DN200-DN300 pipe network	2,852.68
		Extension of Pipe Network in Towns of Linchuan District	New construction	Extending to 36 villages in Wenquan Town, Liancheng Town and Chonggang Town from the pipe network of the county's waterworks, new construction of 14 km DN200~DN300 pipe network, covering 5643 households	1,357.5
		Extension of Pipe Network in Towns of Dongxiang District	New construction	Extending to 54 villages in Dengjia Town, Gangshangji Town, Huxu Town, Pogan Town, Xushangqiao, Xiaohuang Town, Xiaogang Town from the pipe network of the county's waterworks, new construction of 40.9 km DN200~DN300 pipe network, covering 52252 households	8,520.19
		Extension of Pipe Network in Towns of Nanfeng County	New construction	Extending to 27 villages in Shishan Town, Qiawan Town and Laixi Town from the pipe network of the county's waterworks, new construction of 19.5 km DN200~DN350 pipe network, covering 6807 households	2,378.58

No	Type	Subproject Name	Project Nature	Content and Construction Scale	Investment (10,000RMB)
		Extension of Pipe Network in Towns of Leping City	New construction	Extending to 28 villages in Jiedu Town, Legang Town and Hougang Town from the pipe network of the county's waterworks, new construction of 21.3 km DN200~DN300 pipe network and two integrated booster pump stations, covering 17893 households	12,440.68
2.2	Renovation and extension of rural water supply pipe network	Consolidation and Upgrading of Rural Drinking Water Safety in Yongxin County	New construction	Laying 49.47 km pipe network in Longyuankou Town, Yange Town and Zaizhong Town; new construction of one booster pump station, covering a total of 22 villages, covering 3547 households	661.3
		New Construction and Renovation of Pipe Network in Towns of Xiushui County	New construction	New construction and renovation of pipe network of the original waterworks in Zhajin Town, Ma'ao Town, Xigang Town, Shankou Town and Gangkou Town, covering a total of 46villages, covering 23990 households, new construction of 65.5 km DN200~DN600 pipe network	8,264.85
		Extension of Pipe Network in Towns of Leping City	New construction	Extension of pipe network of the original Wukou, Lingang, Yongshan, Xingfu, Dongfanghong, Nangang, Lilin, Zhongbu and Zhenqiao waterworks in nine towns, covering a total of 77 villages, new construction of 44.3 km DN200~DN300 pipe network and 17 integrated booster pump stations, covering 55945 households	5,642.22
2.3	New construction, renovation and expansion of rural waterworks	New Construction of Waterworks in Huangtong Town of Jinxi County	New construction	New construction of one box-type water intake head, with 1,200 m <sup>3</sup> /d of its intake scale; new construction of two DN200 raw water pipes of 90m; new construction of waterworks of 1,200 m <sup>3</sup> /d in Huangtong Town; new construction of 8 km DN200~DN250 pipe network of waterworks and 150m DN200 steel pipe network, 4 villages in Huangtong Town as its service scope, covering 12154 households	1,983.61
		Renovation and Expansion of Waterworks in the Town of Leping City	Renovation and extension	Extending Lilin Waterworks to 10,000m <sup>3</sup> /d from 5,000 m <sup>3</sup> /d, 26 villages in Lilin Town as its service scope	3,964.49

II. New Construction of Rural Wastewater Treatment Facilities

No	Type	Subproject Name	Project Nature	Content and Construction Scale	Investment (10,000RMB)
1		New construction of wastewater pipe network and treatment plant in Zhajin Town of Xiushui County	New construction	New construction of wastewater treatment plant of 2,000 m <sup>3</sup> /d and 14.5km DN300~DN400 HDPE wastewater pipe network, covering 2,800 households	4,496.03

III. Improvement and Enhancement of Service Quality: Water Supply Pipe Storage Engineering, Layout of Pipe Network Monitoring, Information Management System of Water Supply Pipe Network, etc.

### 2.1.2 Content and construction scale

The main construction in Yongxin County: new construction of water intake engineering of 100,000 m<sup>3</sup>/d at Longyuankou Waterworks, new construction of waterworks in southern city, renovation of the county’s pipe network, new construction of delivery pipe of clean water, extension of the county’s pipe network, extension of the pipe network in Longyuankou Town, Yangge Town and Zaizhong Town. The distribution of subprojects in Yongxin County is shown in Figure 2.1-1.

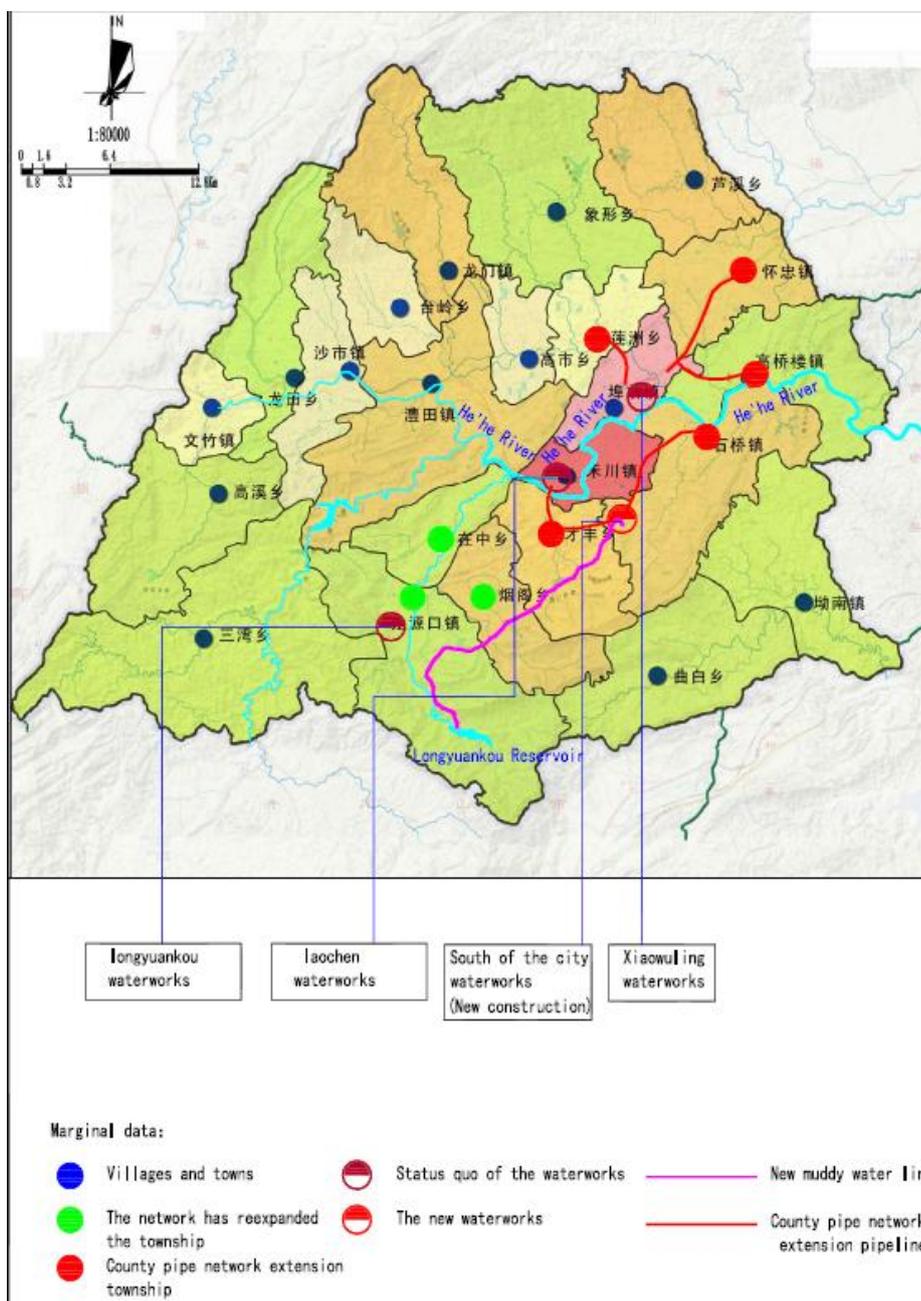


Figure 2.1-1 Distribution of Subprojects in Yongxin County

### 2.1.2.1 New construction of urban water supply facilities

#### (1) Water source demonstration

If calculate the typical year, the water intake can meet the needs under normal circumstances, while He River is needed for supplement in dry years. Calculating by multi-year regulation, the water guarantee rate of the waterworks is 99.8 %, meeting the requirement for the waterworks' guarantee rate (95 %) of water intake (99,000 m<sup>3</sup>/d).

According to the Testing Report, all indicators of Longyuankou reservoir's water and the power station's tail water reach the Class III water standards in *Environmental Quality Standard for Surface Water* (GB3838-2002), and the quality of the power station's tail water does not appear to be much different from that of the dam mouth water, so it is possible to be the source of the newly built waterworks.

#### (2) The main construction

1) New construction of 100,000 m<sup>3</sup>/d water intake engineering of auto-flowing pontoon at Longyuankou Reservoir and 21.5 km DN1200 raw water pipe from the reservoir to the waterworks in the south of the city.

2) New construction of waterworks in southern city, 50,000 m<sup>3</sup>/d in the short term and 100,000 m<sup>3</sup>/d in the long term; new construction of 11.2 km DN900 main delivery pipe of clean water that connects the county's pipe network.

#### 3) New construction of delivery pipe of clean water

Laying two DN900 delivery pipes that are connected to the county's water distribution network, a total of 11.2 km.

### 2.1.2.2 Renovation of the county's pipe network of tap water

This renovation of the pipe network is mainly to support the new districts and roads, with the renovation of a total of 6.969 km DN100~DN500 pipe and the new construction of a total of 41.29 km DN300~DN800 pipe, extending the pipes to 12350 households

### 2.1.2.3 Extension of the county's pipe network of tap water

The towns around this project location, Shiqiao Town, Gaoqiaolou Town, Huaizhong Town, Lianzhou Town and Caifeng Town, are in joint water supply system

composed of the No.2 Waterworks and Xiaowuling Waterworks and the southern city waterworks to be built, extending the pipes to 16035 households

The main content of extension of Yongxin County's pipe network of tap water is shown in Table 2.1-1.

Table 2.1-1 Content of Extension of Yongxin County's Pipe Network of Tap Water

No.	Name	Extended Length (km)	Pipe Diameter	Service Scope
1	Caifeng Town	28.67	De50~DN200	3 villages
2	Lianzhou Town	61.88	De50~DN300	8 villages
3	Huaizhong Town	69.15	De50~DN300	9 villages
4	Gaoqiaolou Town	25.67	De50~DN250	7 villages
5	Shiqiao Town	84.05	De50~DN350	13 villages

### 2.1.3.3 Renovation and extension of rural water supply pipe network

Extension of pipe network of the original waterworks in Longyuankou Town, Yange Town and Zaizhong Town, laying 49,473m De50~DN100 water distribution branch pipe, extending the pipes to 3,547 households, with 22 villages as the service scope.

## 2.2 General Introduction of the Subproject in Jinxi County

### 2.2.1 The baseline of water supply system in Jinxi County

#### 2.2.1.1 The baseline of water supply system in the county

(1) Jinxi County has two waterworks, one of which has 30,000 m<sup>3</sup>/d water supply capacity, with Majie Reservoir as its source; the other has 20,000 m<sup>3</sup>/d of its short-term water supply capacity, with Gaofang Reservoir as its source. The scope of water supply is the county area, with actual coverage of 140,000 people and water quality reaching standard.

(2) There are many old pipe networks in the old town, about 35 % of the leakage rate. mostly gray cast iron pipes in the early 1980s and PVC and concrete pipes in the 90s, with serious damage as built long time ago.

### 2.2.1.2 The baseline of water supply systems in towns

Currently, the main source of domestic water in Zuofang Town is mountain spring water. Kelu Village, Yanjia Village, Houtan Village, Pengjia Village, Jiangfang Village and Tangjia Village are located in the plain, no spring water available, which can only use the well water as the source of life. Lu River, the main river in Zuafang Town, is polluted by the upstream industrial and domestic wastewater; the groundwater is contaminated by the local landfill, with poor water quality; the reservoir in Zuofang Town is affected by fish culture, with eutrophication in the water, cannot be used as the water source of the town.

Shuangtang Town has no waterworks. Three reservoirs in the town are used for agricultural irrigation. Water capacity and quality are below standard. The only river in the town is Shuangchen River, serious pollution in its upstream, so the water quality is below drinking water standard. At present, the source of domestic water in Shuangtang Town is mainly the shallow groundwater.

The water source in Heshi Town is mainly the groundwater. Part of the population gain their access to drinking water through the pipe network extension of No.2 Waterworks in Xiugu Town. Pingshang, Hangqiao, Chemen, Gongjia, Heshi, Tangxia, Hutang, Fufang, Lianqiao villages use Pingshang Reservoir as their water source. Tiannan, Fenghuangshan, Xiaogong, Chonglu villages, in close proximity to the county, can use the water from the county's pipe network extension.

The water source in the mountainous area of Huangtong Town is mainly the spring water. The town's drinking water construction is not ideal, with frequent water supply cut-off.

### 2.2.2 Content and construction scale

The main construction in Jinxi County includes renovation and new construction of the county's pipe network, extension of the county's pipe network of tap water, new construction of the waterworks in Huangtong Town. The distribution of subprojects in Jinxi County is shown in Figure 2.2-1.

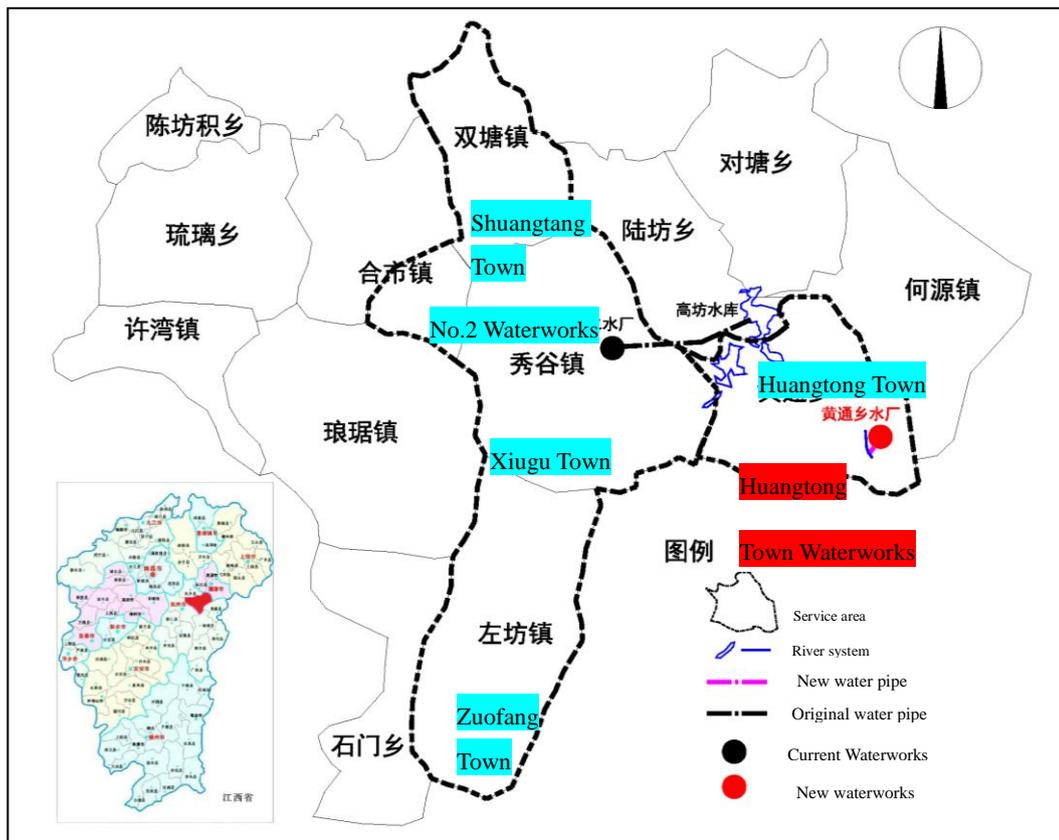


Figure 2.2-1 Distribution of Subprojects in Jinxi County

2.2.2.1 Renovation and new construction of the county’s pipe network of tap water

This renovation of the county’s pipe network is only for the road sections that have not been carried out pipe network renovation: Baima Road and North Shushan Road, and construction of new pipe network in the I Gaofang Reservoir

①Renovation of pipe network

Construction of a total of 10.5 km DN500~DN600 nodular cast iron pipe and 105m steel pipe.

②New construction of pipe network

Construction of a total of 24.1 km DN300~DN500 nodular cast iron pipe and 250m steel pipe, covering 10000 households

2.2.2.2 Extension of the county’s pipe network of tap water

It mainly includes the pipe laying from No.2 Waterworks to Shuangtang Town,

Heshi Town and Zuofang Town.

The extension of the county's pipe network to Shuangtang Town and Heshi Town includes the new construction of 49.07 km DN100~DN300 nodular cast iron pipe. The extension of the county's pipe network to Zuofang Town includes the new construction of 48.4 km DN100~DN400 nodular cast iron pipe and 650m DN200 steel pipe. The service scope of this project is 22 villages.

### 2.2.2.3 New construction of waterworks in Huangtong Town

#### (1) Water source demonstration

According to the Report on Water Source Demonstration, considering ecological water utilization based on average multi-year flow rate, where the, the proportion of project water draw rate in available water supply is 10.8%, 12.2%, 16.5%, 20.0%, 25.5% and 28.0%, respectively. Therefore, under the existing conditions of intake section, the water supply capacity can meet the intake demand of the waterworks. The water inflow quantity is sufficient, and the available water supply of project intake meets the requirement for 90% of the water supply guarantee rate.

The quality of water intake source is fine and meets the Class II water standards in *Environmental Quality Standard for Surface Water* (GB3838-2002).

#### (2) Project content

New construction of waterworks at Kaokeng Sub-village, Hewan Village, Huangtong Town, 600 m<sup>3</sup>/d of its scale in the short term and 1,200 m<sup>3</sup>/d in the long term; new construction of pumping house, 1,200 m<sup>3</sup>/d of its intake scale; new construction of two DN200 raw water pipes of 90 m from the water source at Kaokeng, Hewan Village to the water treatment plant.

The water treatment plant includes integrated equipment, dosing room, clean-water reservoir and other main production structures, and complex building, maintenance shop and other supporting production and living facilities.

New construction of water supply pipe includes laying about 13.6 km DN150~DN250 nodular cast iron pipe and 150m DN200 steel pipe network with four villages as the service scope, covering 12154 households.

## **2.3 General Introduction of the Subproject in Nanfeng County**

### **2.3.1 The baseline of water supply system in Jinxi County**

#### 2.3.1.1 The baseline of water supply system in the county

Water delivery and distribution pipes are not timely developed in parallel; thus the service scope is not enough. With the urban renewal, development and construction, the diameter of quite a few street and alley pipes appears to be small, with increasing water damage; high leakage rate of pipe network leads to a 39% difference between water production and sale.

#### 2.3.1.2 The baseline of rural water supply systems

(1) Shishan Town: The groundwater is used for water supply. The quality of finished water is below the national standard; insufficient scale of waterworks and low coverage rate of pipe network.

(2) Qiawan Town: Chuanshangkeng Reservoir is used as the water source, getting water by pumping house on bank, 40 m of water lift, with high lift cost. The service scope of pipe network is low, covering Qiawan Town only. The water source for other residents is mainly the well water.

(3) Laixi Town: This town has no large-scale centralized water supply system, with the well water as its main water supply, no guarantee for the water capacity and quality.

### **2.3.2 Content and scale of construction**

The main construction in Nanfeng County is the extension of the county's pipe network, including extension of Shishan Town's pipe network, extension of Qiawan Town's pipe network and extension of Laixi Town's pipe network. The distribution of subprojects in the County is shown in Figure 2.3-1.

#### 2.3.2.1 Extension of the county's pipe network

##### (1) Extension of Shishan Town's pipe network

Construction content: diverting water to Shishan Town by opening three-way DN350 pipe from the main pipe on National Highway G320, laying 32,455 m

De50~DN350 pipe, with 2,600 m<sup>3</sup>/d of the construction scale and ten villages as the service scope, covering 1245 households.

(2) Extension of Qiawan Town’s pipe network

Construction content: diverting water to Qiawan Town by opening three-way DN250 pipe from the main pipe on Huangjing Road, laying 39,510 m De50~DN400 pipe, with 1,650 m<sup>3</sup>/d of the construction scale and seven villages as the service scope, covering 3322 households.

(3) Extension of Laixi Town’s pipe network

Diverting water to Laixi Town by opening three-way DN150 pipe from the main pipe on North Huancheng Road, laying 16,481 m De50~DN150 pipe, with 800 m<sup>3</sup>/d of the construction scale and four villages as the service scope, covering 2240 households.

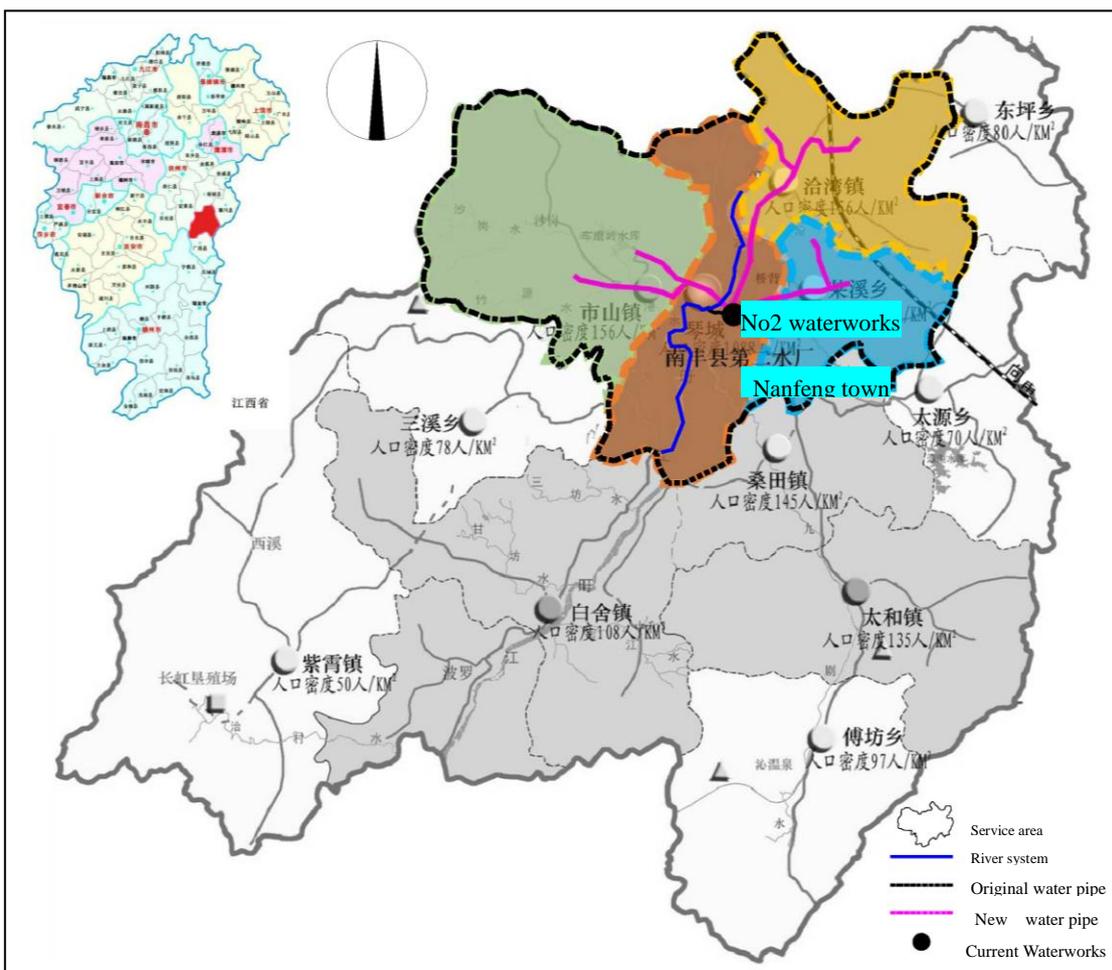


Figure 2.3-1 Distribution of Subprojects in Nanfeng County

## **2.4 General Introduction of the Subproject in Leping City**

### **2.4.1 The baseline of water supply system in Leping County**

#### 2.4.1.1 The baseline of water supply system in the county

(1) Communist Reservoir is used as the water source of urban Leping. The water in urban Leping area is centrally supplied by Leping Runquan Waterworks. Communist Reservoir is Class II water. The construction of pumping house is completed in one-time manner according to the long-term scale of 105,000 m<sup>3</sup>/d, with equipment installed by stages. The current water intake source is Communist Reservoir. The present capacity of water delivery pipe is 60,000 m<sup>3</sup>/d. The raw water pipe is a single DN1000 pre-stressed concrete cylinder pipe, a total length of 34 km.

(2) Leping City has one water treatment plant. The plant is situated close to Jinyuan Road in Dalian New District in the upstream of the city, completed in September, 2010 and its water system put into work in December the same year. Its long-term design scale is 100,000 m<sup>3</sup>/d, with 50,000 m<sup>3</sup>/d completed. The current daily water supply capacity is about 32,000 m<sup>3</sup>/d, and the maximum daily supply capacity is 45,000 m<sup>3</sup>/d. The water from Communist Reservoir is used as the raw water, benefiting 331,100 people.

(3) The urban water supply pipe network is mainly in dendritic distribution. The supply pipes in the old town are mainly in cement, while the pipes in the new town are mainly in PE, with serious pipe network aging and high leakage rate, low water supply pressure in the urban area.

#### 2.4.1.2 The baseline of rural water supply systems

By the end of 2015, the water-use population of rural drinking water engineering in Leping City was 402,600, with 50.43% of rural water supply coverage and 80.12% of centralized water supply rate. There are a total of ten waterworks with more than 1,000 m<sup>3</sup>/d of their supply scale in the whole city, among which, Runquan Waterworks mainly serves the urban area and surrounding towns, and Xingfu, Dongfanghong, Zhenqiao, Wukou, Yongshan, Lingang, Zhongbu, Nangang and Lilin

waterworks are located at the towns. The water quality of the above waterworks reaches the standard, with complete supporting facilities and normal operation status.

At present, the pipe network coverage in part of the neighboring towns of Leping City is not high enough, 20 villages in Jiedu Town are not included in the pipe network yet and only 70% of pipe network coverage in its other villages; with eight villages in Hougang Town not included in the pipe network and 50%~70% of coverage in its other villages, less than 50% of town coverage; 50%~70% of pipe network coverage in Legang Town.

#### **2.4.2 Content and scale of construction**

The main construction in Leping City includes new construction of water intake and raw water delivery, expansion of Runquan Waterworks, renovation of urban water supply pipe network, extension of pipe network of the waterworks in the county, renovation and extension of rural water supply pipe network, expansion of Lilin Waterworks. The distribution of subprojects in Leping is shown in Figure 2.4-1.

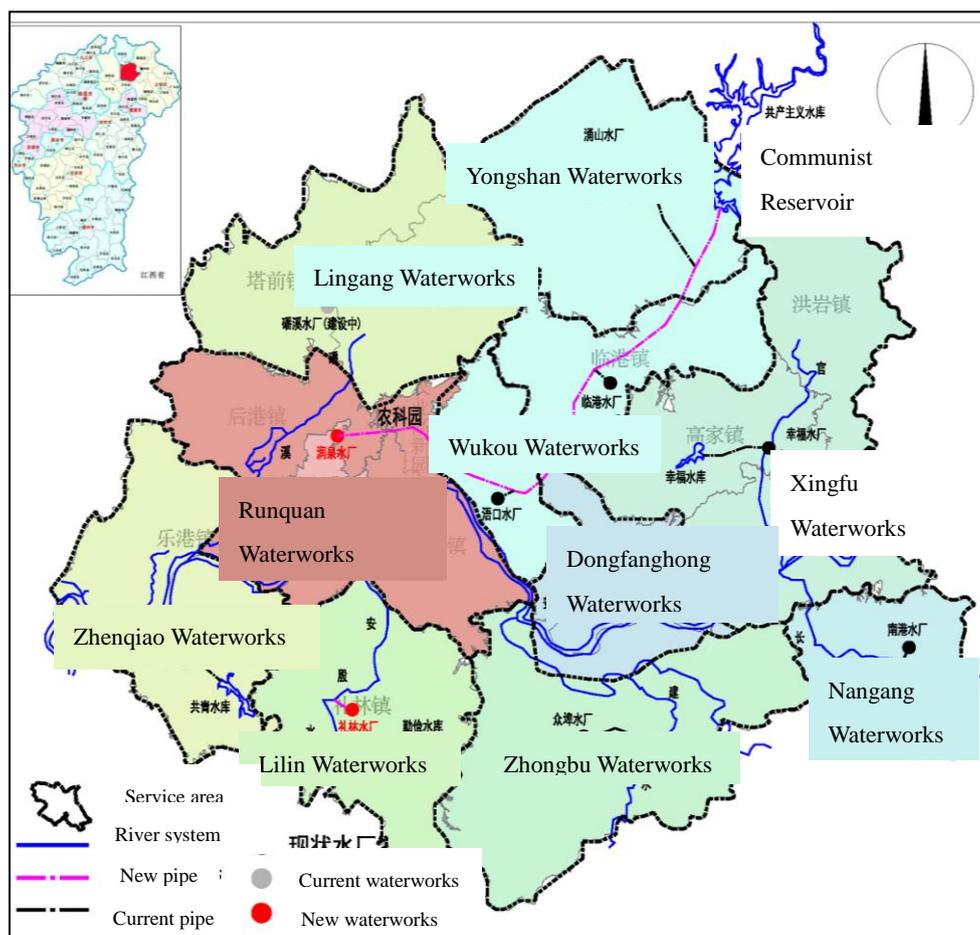


Figure 2.4-1 Distribution of Subprojects in Leping City

#### 2.4.2.1 Renovation and new construction of urban waterworks

##### (1) Water source demonstration

Currently, Runquan Waterworks in the city and Yongshan, Wukou, Lingang waterworks in the surrounding towns use Communist Reservoir as their water source. According to the Report on Water Source Demonstration, the annual water intake capacity of the waterworks accounts for 29.5% of the multi-year average water inflow of the reservoir, and the waterworks' water intake accounts for 58.1% of the annual inflow of the reservoir dam site ( $P=97\%$ ). Therefore, using Communist Reservoir as the source is reliable, with guaranteed 97% of designed water supply. According to the Testing Report, the reservoir's water quality meets the Class II water requirements in *Environmental Quality Standard for Surface Water* (GB3838-2002).

##### (2) Water intake engineering

New construction of equipment of 60,000 m<sup>3</sup>/d of its scale, with a total of 120,000 m<sup>3</sup>/d water intake scale. Replacing the existing two small pumps with big pumps and increasing two big pumps on the two prepared pump positions, forming the combination of pump of four-in-use and two-in-preparation.

Replacing two small-pump outlet pipes of DN400 with that of DN600 and increasing two DN600 pump outlet pipes. One group of the outlet pipes is converged to the original water delivery pipe of DN1000, and a new water delivery pipe needs to be increased after the converging of the other group of outlet pipes.

### (3) Raw water delivery engineering

Runquan Waterworks has one DN1000 raw water delivery pipe, a total length of 34.38 km and 60,000 m<sup>3</sup>/d of its water delivery capacity. This project adds one DN1000 raw water delivery pipe, delivering the increased water capacity of 60,000 m<sup>3</sup>/d.

### (4) Expansion of Runquan Waterworks

Its current water supply capacity is 50,000 m<sup>3</sup>/d. This engineering plans to expand it to 100,000 m<sup>3</sup>/d. By the treatment process of sedimentation tank +filtering tank, this project is mainly located in the southwest and northeast of Runquan Waterworks, with new construction of grid flocculation horizontal sedimentation tank, shutter filtering tank, sludge discharge tank and drying bed. The Phase I washing pumping house, coagulant and chlorine dosing room and water delivery pumping house will be still in use. Pump and other equipment will be added in the coagulant and chlorine dosing room and water delivery pumping house.

After the expansion, the service scope is the central urban area and its neighboring five towns of Leping City.

#### 2.4.2.2 Renovation of urban water supply pipe network

(1) Renovation of urban pipe network: a total of 15.34 km DN200~DN1000 nodular cast iron pipe, 112 m steel pipe across river, covering 17500 households.

(2) New construction of urban pipe network: new construction of 40.9 km DN200~DN700 nodular cast iron pipe.

#### 2.4.2.3 Extension of the county's pipe network

Extending to 28 villages in Jiedu Town, Legang Town and Hougang Town from the pipe network of the county's waterworks, new construction of 101.11 km DN100~DN300 pipe network.

(1) Hougang Town: 49.78 km of the total extended length of the main pipe, with nine villages as its service scope, covering 4396 households.

(2) Jiedu Town: 45.47 km of the total extended length of the main pipe, with 17 villages as its service scope, covering 13297 households.

(3) Legang Town: 5.86 km of the total extended length of the main pipe, with two villages as its service scope, covering 200 households.

#### 2.4.2.4 Renovation and extension of rural water supply pipe network

##### (1) Water source demonstration

In accordance with the Report on Water Source Demonstration, the current water production scale of Yongshan, Wukou and Lingang and other rural waterworks can meet the water supply demand. Lilin Waterworks has big water supply gap recently. This project intends to include the expansion of Lilin Waterworks in the scope of implementation, with 5,000 m<sup>3</sup>/d of its expanded scale. The water demand can be met after the expansion. According to related Testing Report, the quality of finished water and terminal tap water of all waterworks is qualified. As a result, the water capacity and quality of waterworks in the towns relating to this project can meet the demand.

##### (2) Project content

The main content of renovation and extension of Leping rural water supply pipe network is detailed in Table 2.4-1.

Table 2.4-1 Content of Renovation and Extension of Leping Rural Water Supply Pipe Network

No.	Name	Extended Length (km)	Pipe Diameter	Service Scope
1	Xingfu Waterworks	27.95	DN50-DN200	9 villages
2	Dongfanghong Waterworks	8.4	DN50-DN100	2 villages
3	Zhenqiao Waterworks	75.6	DN50-DN250	7 villages
4	Nangang Waterworks	10.7	DN50-DN200	5 villages
5	Lilin Waterworks	104.3	DN50-DN200	21 villages

6	Lingang Waterworks	20.84	DN50-DN150	4 villages
7	Wukou Waterworks	12.9	DN50-DN100	4 villages
8	Zhongbu Waterworks	30.55	DN50-DN200	13 villages
9	Yongshan Waterworks	67.3	DN50-DN300	12 villages

#### 2.4.2.5 New construction, renovation and expansion of rural waterworks

The current water supply capacity of Lilin Waterworks is 5,000 m<sup>3</sup>/d. This project plans to expand 5,000 m<sup>3</sup>/d and reach 10,000 m<sup>3</sup>/d. After the expansion, the service scope is 26 administrative villages in Lilin Town.

##### (1) Water source demonstration

The source of Lilin Waterworks is Anyin Water. According to the Report on Water Source Demonstration, under the design dependability of P=97%, the water intake capacity of this project can be guaranteed during the current year and the planning year. According to the Report on Water Quality Testing, the testing items for Anyin Water are in line with the Class III water requirements in *Environmental Quality Standard for Surface Water* (GB3838-2002).

##### (2) Project content

To expand the water intake equipment in pumping house by using the intake head in the type of rhombus-box, with 5,000 m<sup>3</sup>/d of the expanded scale. The original water inlet, regulating reservoir and water pump outlet pipe can meet the requirement of renovation of the pump, no need to remove or replace. The original DN400 water delivery pipe will still be used, with 11,000 m<sup>3</sup>/d of its water delivery capacity after the expansion.

The waterworks' treatment process is mix-flocculation-sedimentation-filtration. This project is located in the southeast of Lilin Waterworks, with new construction of grid flocculation inclined tube sedimentation tank, filtering tank, clean-water reservoir and drying bed.

## 2.5 General Introduction of the Subproject in Xiushui County

### 2.5.1 The baseline of water supply system in Xiushui County

#### 2.5.2.1 The baseline of water supply system in the county

The urban area has two waterworks, Luoqiao Waterworks (No.2 Waterworks) and No.3 Waterworks. Luoqiao Waterworks is located at Anping Road in the south of the city, 30,000 m<sup>3</sup>/d of its scale, with Anxi Water as its source, 97.48 m of the elevation of its secondary pumping house and 0.45 MPa of its finished water pressure, can basically meet the users' requirement for water pressure. No.3 waterworks is located in the west of the city, at Majia'ao, Zhuping Town, 50,000 m<sup>3</sup>/d of the Phase I scale. The water is from Dongjin Reservoir. Since 2014, the water of the central urban area has been supplied by No.3 Waterworks, with No.2 Waterworks as the standby. With the organized development of the central urban area, the future water supply capacity by the waterworks will be insufficient, with extended water supply scope and increased head loss. The water pressure in peripheral area will not meet the design requirement.

The current shape of the water supply pipe network in the urban area is annular and dendritic. The total length of urban water supply pipe is about 43.3 km, DN100-DN600 of its diameter, more than 0.7 m of thickness of covering soil. The newly-laid water supply pipes are mainly in nodular cast iron and PVC. The water supply pipes in the north old town are mainly in cast iron and pre-stressed concrete, with serious pipe aging and higher leakage rate of pipe network.

#### 2.5.2.2 The baseline of rural water supply systems

The drinking water engineering in part of the towns has strict budget. Only the waterworks and water purification equipment are completed. Water distribution pipe only covers the town or part of the administrative villages. The present water supply scale is far less than the design requirement, resulting in a waste of resource, and the residents' drinking water problem is not solved either. See Table 2.5-1 for details.

**Table 2.5-1 Problems in the Current Rural Centralized Water Supply**

<b>Engineering</b>			
No.	Name of Projects	Current Design Scale (m <sup>3</sup> /d)	Problems
1	Water Supply Engineering in Zhengcun Town	1,200	Incomplete water distribution pipe network

No.	Name of Projects	Current Design Scale (m <sup>3</sup> /d)	Problems
2	Rural Centralized Water Supply Engineering in Zhajin Town	5,000	Part of the water use population not covered, incomplete water distribution pipe network
3	Water Supply Engineering in Ma'ao Town	1,400	Part of the water use population not covered, incomplete water distribution pipe network
4	Tap Water Engineering in Shankou Town	2,500	Incomplete water intake facilities and water distribution pipe network
5	Rural Centralized Water Supply Engineering in Gangkou Town	1,100	Incomplete water distribution pipe network
6	Water Supply Engineering in Xigang Town	1,500	Incomplete water distribution pipe network

### 2.5.2 The baseline of rural drainage systems in Xiushui County

(1) There is one wastewater treatment plant in the central urban area of Xiushui County. It is located at the confluence of Anping Village, Xiu River and Anxi River. It was officially started on August 1, 2008, was in trial operation in the first lunar month of 2010. The design scale of urban wastewater treatment plant is 30,000 m<sup>3</sup>/d in the short term, 60,000 m<sup>3</sup>/d in the long term.

(2) There is no wastewater treatment plant in all the towns of Xiushui County. The current town domestic wastewater discharge in Zhajin Town, the second largest town of Xiushui County, is 1,200 m<sup>3</sup>/d. No wastewater treatment plant in the town area, the wastewater is directly discharged into the water without any treatment.

### 2.5.3 Content and scale of construction

The main construction in Xiushui County includes renovation and new construction of urban waterworks and the county's water supply pipe network, new construction and renovation of pipe network in six towns including Zhajin Town, new construction of wastewater pipe network and treatment plant in Zhajin Town. The

distribution of subprojects in Xiushui County is shown in Figure 2.5-1.

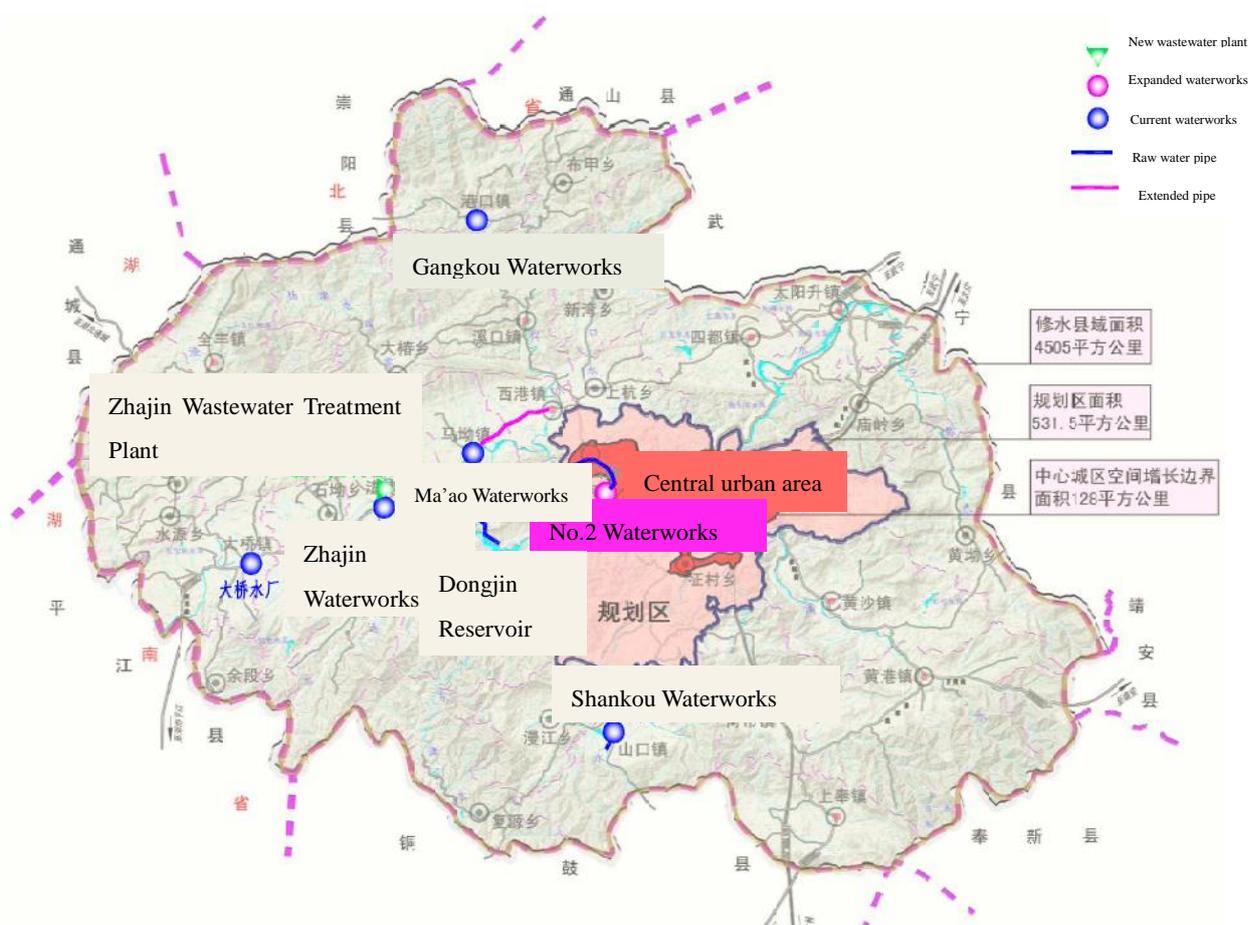


Figure 2.5-1 Distribution of Subprojects in Xiushui County

### 2.5.3.1 Renovation and new construction of urban waterworks

#### (1) Water source demonstration

The current water source of No.3 Waterworks is Dongjin Reservoir. According to the Report on Water Source Demonstration, the water intake from Dongjin Reservoir is reliable and feasible. Based on the Testing Report, the reservoir's water quality monitoring indicators meet the Class II water requirement in *Environmental Quality Standard for Surface Water* (GB3838-2002) and the Class II water quality requirement in *Standards for Water Quality of Source of Domestic Drinking Water* (CJ3020-93). The overall water quality is fine, can meet the quality requirement of urban water supply.

#### (2) Water intake engineering

To get water by floating-dock water intake pumping station and expand the water draw rate to 105,000 m<sup>3</sup>/d on the basis of the original pumping house. This project plans to add two pumps on the two prepared pump positions, forming the combination of pump of four-in-use and two-in-preparation. The pump is matched with DN400 outlet pipes. Every three outlet pipes are converged into one water delivery pipe of DN700, with two pipes of DN700 connected in parallel, finally, one water delivery pipe of DN1200 bears the delivery.

(3) Raw water pipe engineering

New construction of a single DN1200 nodular cast iron pressure delivery pipe, 105,000 m<sup>3</sup>/d of its delivery capacity.

(4) Extension of urban waterworks

The water supply capacity of No.3 Waterworks will be expanded to 100,000 m<sup>3</sup>/d from 50,000 m<sup>3</sup>/d, in the process of mix-horizontal reaction sedimentation tank-V-type filtering tank. This project land is mainly located in the south of No.3 Waterworks, with new construction of grid flocculation horizontal sedimentation tank and V-type filtering tank. The Phase I washing pumping house, coagulant and chlorine dosing room will be still in use. Pump and other equipment will be added in the coagulant and chlorine dosing room, covering 29430 households

2.5.3.2 Renovation and new construction of the county's water supply pipe network

Renovation of a total of 180.17 km DN100~DN600 pipe; new construction of a total of 37.87 km DN200~DN500 pipe.

2.5.3.3 New construction and renovation of the towns' pipe network

New construction and renovation of the towns' pipe network in Xiushui County is shown in Table 2.5-1.

Table 2.5-1 New Construction and Renovation of the Towns' Pipe Network in Xiushui

County

No.	Name	Length of the Pipe in Renovation and New Construction (km)	Pipe Diameter	Service Scope	households
1	Consolidation and	46	DN50-DN200	14 villages	

	Upgrading of Rural Drinking Water Safety in Zhajin Town				
2	Consolidation and Upgrading of Rural Drinking Water Safety in Ma'ao Town and Xigang Town	57	DN200	13 villages	14666
3	Consolidation and Upgrading of Rural Drinking Water Safety in Shankou Town	13.9	DN50-DN250	3 villages	2905
4	Consolidation and Upgrading of Rural Drinking Water Safety in Gangkou Town	24	DN50-DN350	9 villages	6419

#### 2.5.3.4 New construction of wastewater pipe network and treatment plant in Zhajin Town

New construction of wastewater treatment plant of 2,000 m<sup>3</sup>/d, with the long-term 3,000 m<sup>3</sup>/d site prepared. The integrated biological contact oxidation process and wastewater processor will be used. The main buildings and structures include regulating reservoir, grille well, integrated wastewater processor and upgrading pumping house. New construction of 27.2 km DN300~DN400 wastewater pipe network, covering 2,800 households. Class-I B Standard will be used for wastewater discharge.

## 2.6 General Introduction of the Subproject in Linchuan District

### 2.6.1 The baseline of water supply system in Linchuan District

(1) The urban water supply system in Linchuan District uses Yihuang River as its source. Yihuang River is a single-source water supply system, cannot cope with sudden water accidents.

(2) There is one waterworks in the urban area of Linchuan District. The Phase I water supply engineering of 20,000 m<sup>3</sup>/d was completed and put into production in July, 2006. After its expansion in 2012, its supply scale reached 30,000 m<sup>3</sup>/d. However, its current water supply scale is difficult to ensure the water demand of Shangdu.

(3) At present, there are 1,030 rural drinking water engineering in Linchuan District, 93,000 m<sup>3</sup>/d of the total design supply scale and 26,000 m<sup>3</sup>/d of its actual water supply scale, covering 243,241 people. The total length of water delivery and distribution pipes is about 1545.6 km. With the increase of the waterworks' water supply capacity, water delivery and distribution pipes fail to develop in time, with not enough coverage scope. The diameter of quite a few street and alley pipes appears to be small, with increasing water damage. Numerous pipes are out of repair for many years, with frequent accidents. There is no water supply pipe in some places.

### **2.6.2 Content and scale of construction**

The main construction in Linchuan District includes new construction of urban waterworks, renovation and new construction of urban water supply pipe network and extension of the county's pipe network. The distribution of subprojects in Linchuan District is shown in Figure 2.6-1.

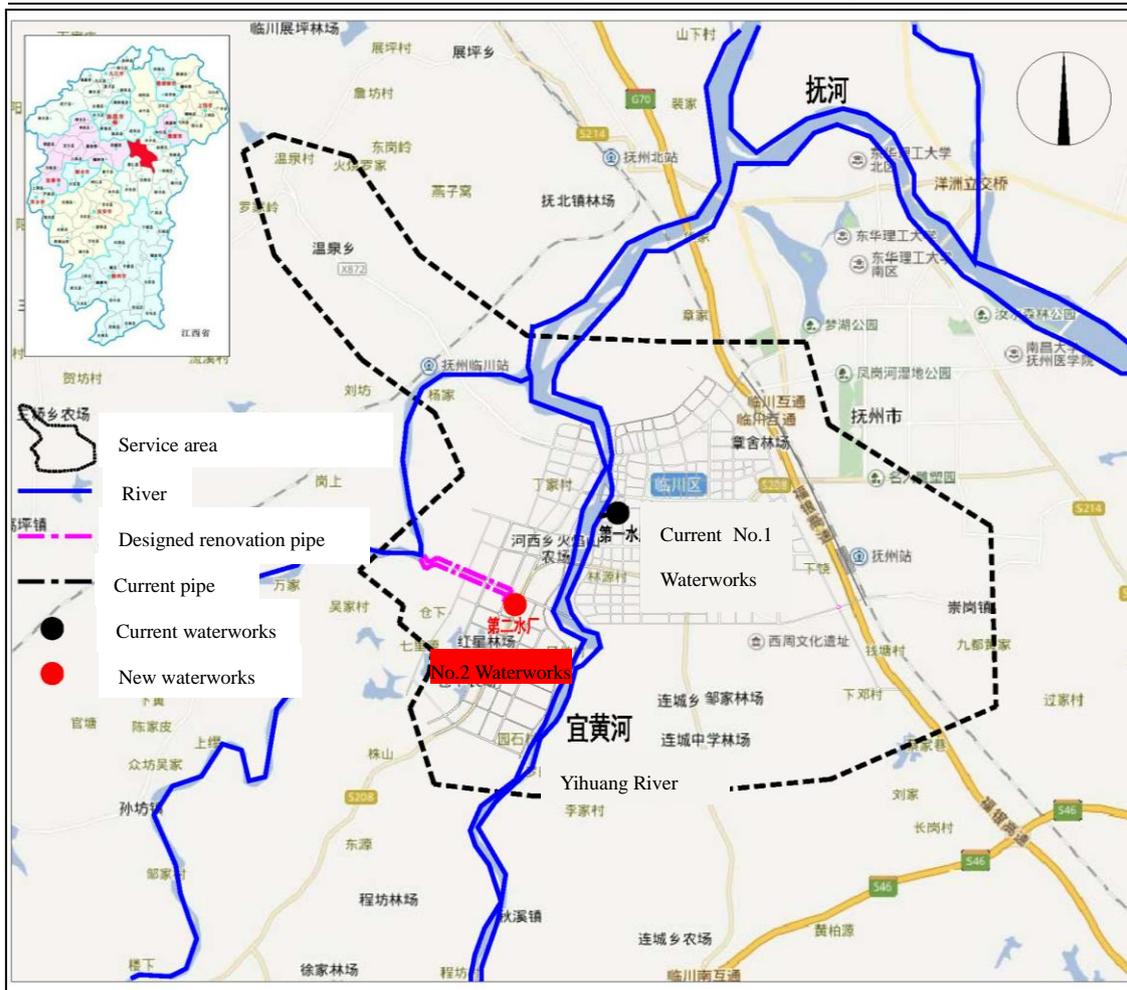


Figure 2.6-1 Distribution of Subprojects in Linchuan District

### 2.6.2.1 New construction of urban waterworks

#### (1) Water source demonstration

According to the Report on Water Source Demonstration, the project's short-term water draw rate accounts for 5.69% of the multi-year average minimum daily available water supply, and 26.49% of 95%-frequency average minimum daily capacity of the intake section. The project's short-term maximum water draw rate accounts for 7.51% of the multi-year average minimum daily available water supply, and 34.94% of 95%-frequency average minimum daily capacity of the intake section. The project's long-term water draw rate accounts for 11.54% of the multi-year average minimum daily available water supply, and 57.14% of 95%-frequency average minimum daily capacity of the intake section. The project's long-term maximum water draw rate accounts for 15.24% of the multi-year average minimum daily available water supply, and 75.47% of 95%-frequency average minimum daily capacity of the intake section. Therefore, the water capacity can meet the intake demand.

According to the Report on Water Quality Testing, the quality of Chongren Water meets the Class III water requirement in *Environmental Quality Standard for Surface Water* (GB3838-2002).

#### (2) New construction of water intake engineering

Chongren Water will be used as the source of new construction of No.2 Waterworks at Shangdudu in Linchuan District, 55,000 m<sup>3</sup>/d of the pumping house's short-term intake capacity and 110,000 m<sup>3</sup>/d of the long-term intake capacity.

#### (3) Raw water pipe engineering

To use two raw water delivery pipes, a total of 2.4 km, with 55,000 m<sup>3</sup>/d and 110,000 m<sup>3</sup>/d of the short-term and long-term delivery capacity.

#### (4) New construction of Linchuan District's No.2 Waterworks

The total design scale of the waterworks is 100,000 m<sup>3</sup>/d, built by two stages, 50,000 m<sup>3</sup>/d of the short-term construction scale. The primary buildings and structures including the main water treatment buildings and structures are: mechanical mixing, baffle flocculation, horizontal sedimentation tank, V-type filtering tank, backwash

pumping house, blower room, clean-water reservoir, coagulant and chlorine dosing room, recycling water tank, etc..

#### 2.6.2.2 Renovation and new construction of urban water supply pipe network

The content of renovation of urban pipe network is 13.4 km DN200~DN600 nodular cast iron pipe, and 150 m steel pipe.

The content of new construction of urban pipe network is to lay DN200~DN1000 water delivery and distribution pipes, with 22.9 km DN200~DN1000 nodular cast iron pipe and 200 m steel pipe laid, covering 2,8571 households.

#### 2.6.2.3 Extension of the county's pipe network

New construction of 14 km DN200~DN300 pipe and 280 m DN200~DN 300 steel pipe network, extending to Wenquan Town, Chonggang Town and Liancheng Town, covering 5643 households.

## **2.7 General Introduction of the Subproject in Dongxiang District**

### **2.7.1 The baseline of water supply system in Dongxiang District**

#### 2.7.1.1 The baseline of water supply system in the county

(1) There are two waterworks operating in Dongxiang District, 25,000 tons of No.2 Waterworks' daily water supply capacity, with Xingfu Reservoir as its source. Jixing Waterworks is built by two stages, 30,000 tons of its daily water supply capacity in the first stage, and 30,000 tons increased in the second stage, 60,000 tons of the total daily supply capacity. According to the Water Quality Report provided by Dongxiang Center for Disease Control and Prevention, the quality of Jixing Waterworks' finished water is fine; the individual indicators (turbidity, manganese) of quality of No.2 Waterworks' finished water exceed standard. In accordance with the local planning, No.2 Waterworks will be closed. Then the water supply capacity will decrease, cannot meet the supply demand.

(2) The water supply pipes in the old town of Dongxiang District are mainly cement, galvanized and some PVC pipes, with serious aging and leaking. The partial pipes in the new town are in nodular cast iron and PE, with small diameter, chaotic laying and low coverage.

#### 2.7.1.2 The baseline of rural water supply systems

The current rural centralized water supply engineering in Dongxiang District is mostly in small design scale, dispersed distribution and simple process, which leads to low pass percent of water quality and guarantee rate of water supply, and high scrap rate in small-scale centralized water supply engineering in Dongxiang District. With the town population growth and production development, the water supply capacity of the existing small-scale supply engineering is obviously insufficient.

At present, unqualified pipe network and pipe material aging are common to the rural centralized water supply engineering in Dongxiang District. The user coverage rate in Xiaohuang Town, Pogan Town and Xiaogang Town is much lower than 90 % of Jiangxi's goal of rural water supply coverage in 2020.

### **2.7.2 Content and scale of construction**

The construction in Dongxiang District includes new construction of urban waterworks, renovation and expansion of urban pipe network, extension of the county's pipe network. The distribution of subprojects in Dongxiang District is shown in Figure 2.7-1.

### 3. Investigation of Related Projects

#### 3.1 Due Diligence of Yongxin County's Related Projects

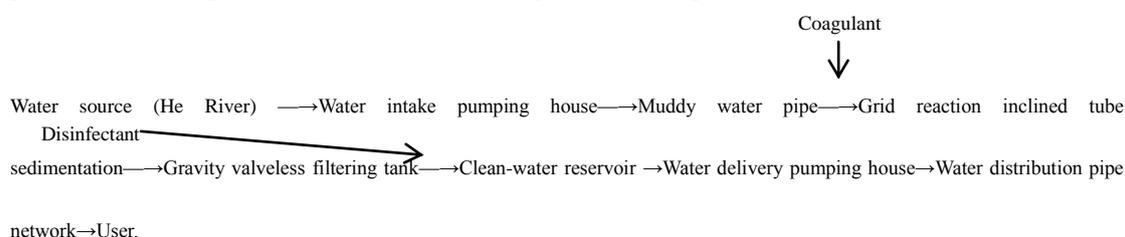
The related projects in Yongxin County are the existing No.2 Waterworks, Xiaowuling Waterworks, Yongxin's wastewater treatment plant and refuse landfill.

Table 3.1-1 Related Projects in Yongxin County

No.	Name of Projects	Connection with this Project
1	Yongxin County's No.2 Waterworks	This project includes the extension engineering of the county's water supply pipe, realizing the joint water supply from the existing No.2 Waterworks, Xiaowuling Waterworks and the proposed urban east waterworks to Shiqiao Town, Gaoqialou Town, Huaizhong Town, Lianzhou Town and Caifeng Town.
2	Xiaowuling Waterworks	
3	Yongxin County's Wastewater Treatment Plant	The effluent of the proposed urban southern waterworks will be delivered to the Yongxin County's wastewater treatment plant.
4	Yongxin County's Refuse Landfill	The sludge produced by the proposed urban southern waterworks will be delivered to the Yongxin County's refuse landfill for disposal.

##### 3.1.1 Yongxin County's No.2 Waterworks

The No.2 Waterworks was completed and put into operation in 2001, located in the north of Xiushui Road, 1.6 hm<sup>2</sup> of the floor space. With He River as its water source, its water intake is at 300 m the upstream of Paopi Dam, 20,000 m<sup>3</sup>/d of its designed and current water supply capacity. With the old town of Yongxin County as its service scope, its water supply pipe network covers 29,932 households. The waterworks has received the reply of environmental impact assessment (EIA) and passed the acceptance in 2001. Its water purification process is:

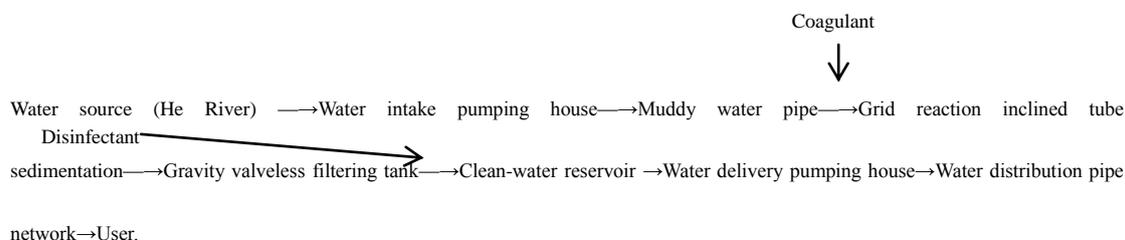


All the routine monitoring data of this waterworks' finished water quality meet the national standard. The sludge is transported to Yongxin County's refuse landfill for disposal. Its daily operation is normative, and the environmental protection

measures and environmental management satisfy the requirements of the local environmental protection department.

### 3.1.2 Xiaowuling Waterworks

Xiaowuling Waterworks is located in Xiaowuling industrial area, Buqian Town, Yongxin County, was completed and put into operation in September 2003, 1.6 ha of its floor space. With He River as its water source, its water intake is located in Tang’nan Village, Buqian Town, 5,000 m<sup>3</sup>/d of its water supply capacity. This waterworks was expanded in 2008, with 15,000 m<sup>3</sup>/d of its water supply capacity after the expansion based on the original scale. The construction content included the renovation of water intake engineering, muddy water pipe, water purification facilities, engineering pumping house, water delivery pipe network and supporting facilities. After the expansion and renovation, its floor space is 9,975 m<sup>2</sup>, with its water supply pipe network covering 5,365 households. The current water supply capacity is 15,000 m<sup>3</sup>/d. The waterworks has received the reply of EIA in 2008 and passed the acceptance. Its water purification process is:



All the routine monitoring data of this waterworks’ finished water quality meet the national standard. The sludge is transported to Yongxin County’s refuse landfill for disposal. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department.

### 3.1.3 Yongxin County’s urban wastewater treatment plant

The urban wastewater treatment plant is located in Lantian Village, Gaoxian

Village Committee, Buqian Town, Yongxin County. It was completed and put into use in 2009, 20,000 tons per day of the total treatment scale, about 10,000 tons per day of the current actual treatment scale, with Yongxin County's industrial and domestic wastewater as its service scope. It uses the two-stage treatment process, selects oxidation ditch of [././././././æœ%œ□“/Dict/7.5.0.0/resultui/dict/?keyword=front-anaerobic zone and anoxic zone as its process program. Its tail water discharge is in line with Standard B under the primary standard stipulated in \*Discharge Standard of Pollutants for Urban Wastewater Treatment Plant\* \(GB18918-2002\), with He River as the discharge direction. After dewatering, the sludge is transported to Yongxin's refuse landfill for sanitary landfill. This wastewater treatment plant has received the reply of EIA and passed the acceptance in 2009.](#)

The routine monitoring data of this wastewater treatment plant's discharge outlet meet the discharge standard. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. The effluent of waterworks under this project belongs to the service scope of this plant of which the treatment capacity can meet this project's treatment requirement. This plant promises that it can accept the effluent from the proposed urban southern waterworks.

### **3.1.4 Yongxin County's refuse landfill**

The refuse landfill is located in Yongxin County, was completed and put into use in 2012, mainly accepting Yongxin County's urban domestic refuse, 15 years of the designed service length. Its treatment scale is 400 tons per day, 134 tons per day of the current treatment capacity. This refuse landfill has received the reply of EIA and passed the acceptance in 2012. In 2016, due to the substandard treatment for landfill leachate, it carried out technical transformation on leachate treatment facility. After the transformation, it adopts biological treatment process for landfill leachate, and the routine monitoring data meet the requirement of up-to-standard discharge. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection

department. It promises that it can accept the sludge from the proposed urban southern waterworks in Yongxin County.

### 3.2 Due Diligence of Jinxi County’s Related Projects

The related projects in Jinxi County are its No.2 Waterworks, wastewater treatment plant and Fuzhou City’s refuse landfill.

Table 3.2-1 Related Projects in Jinxi County

No.	Name of Projects	Connection with this Project
1	Jinxi County’s No.2 Waterworks	This project will lay pipe from No.2 Waterworks to Duitang, Guanbian, Shuangtang, Bolin and Zhuqiao; from No.2 Waterworks to Chonglu, Xiaogong, Tiannan; from No.2 Waterworks to all villages in Zuofang Town.
2	Jinxi County’s Wastewater Treatment Plant	The wastewater from the renovation and extension engineering of Jinxi’s urban pipe network will be delivered to Jinxi County’s wastewater treatment plant.
3	Fuzhou City’s Refuse Landfill	The sludge from the newly-built Huangtong Town’s wastewater treatment plant will be delivered to Fuzhou’s refuse landfill for landfill.

#### 3.2.1 Jinxi County’s No.2 Waterworks

The No.2 Waterworks is located at Liwang Zhoujia, Xiugu Town, Jinxi County, was completed and put into use in December 2016; 88.72 mu of the floor space, RMB 75,742,000 of the total investment, 20,000 and 40,000 tons per day of the short and long-term water supply scale. With Gaofang Reservoir in Class II water quality as its source, its supply scope is Jinxi’s urban area and the surrounding towns. The length of its raw water delivery pipes is about 34 km, in two D800 nodular cast iron pipes, 16 km of the length of its water delivery pipe network. The routine monitoring data of this waterworks’ finished water quality meet the national standard. The sludge produced is transported to Jinxi County’s refuse landfill for disposal. It has received the reply of EIA and passed the acceptance in 2016. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department.

#### 3.2.2 Jinxi County’s wastewater treatment plant

The wastewater treatment plant is located in Daijia Village, Xiugu Town, Jinxi County, was completed and put into use in November 2009, mainly accepting the domestic and industrial wastewater from the old town of Jinxi County and A, B, C areas in Jinxi Industrial Park. The designed wastewater treatment scale is 20,000 m<sup>3</sup>/d, 15,000 m<sup>3</sup>/d and 5,000 m<sup>3</sup>/d of the domestic and industrial wastewater treatment respectively; 13,500 m<sup>3</sup>/d and 3,000 m<sup>3</sup>/d of the current actual treatment scale for domestic and industrial wastewater. The treatment system for industrial wastewater adopts the process: grilling+adjustment+coagulating sedimentation+circular anaerobic treatment+A/O (anaerobic aerobic process) +secondary sedimentation tank+BAF (biological aerated filter) +potassium monopersulfate disinfection+ultraviolet radiation disinfection. The tail water discharge executes Standard B under the primary standard stipulated in *Discharge Standard of Pollutants for Urban Wastewater Treatment Plant* (GB18918-2002), with Shuangchen River as the discharge direction. After dewatering, the sludge is transported to Fuzhou's refuse landfill for sanitary landfill. This wastewater treatment plant has received the reply of EIA and passed the acceptance.

The routine monitoring data of this wastewater treatment plant's discharge outlet meet the discharge standard. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. The effluent of waterworks under this project belongs to the service scope of this plant of which the treatment capacity can meet this project's treatment requirement. This plant promises that it can accept the effluent from the renovation and extension engineering of Jinxi's urban pipe network.

### **3.2.3 Fuzhou City's refuse landfill**

There is no refuse landfill in Jinxi County. The county's domestic refuse is transported to Fuzhou's refuse landfill for disposal through the secondary transfer station. The transfer station is located in the southwest of Jinxi County, at the intersection of the planned Weisan Road and Jingyi Road. The county's domestic refuse is transported by 10 t truck, 13 times per day of the transportation frequency.

Fuzhou City’s refuse landfill is located at Qianfang Kongjia, Zhanping Town, Fuzhou City, was completed and put into use in 2008, 20 years of the designed service length. Its service scope is the urban area in Fuzhou and the surrounding counties and cities, 500 t/d and 450 t/d of the designed and actual treatment respectively. The landfill’s bottom and side slope have artificial anti-permeation, and groundwater monitoring well is set up near the landfill for regular monitoring; adopting collection+ simultaneous nitrification denitrification+nanofiltration+reverse osmosis for leachate treatment. It has received the reply of EIA and passed the acceptance in 2008. Its daily operation is normative. The routine monitoring data of landfill leachate meet the discharge standard, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. The landfill promises that it can accept the sludge produced by the new construction of Huangtong Town’s waterworks in Jinxi.

### 3.3 Due Diligence of Nanfeng County’s Related Projects

The related projects in Nanfeng County are its urban north waterworks, No.2 Waterworks and wastewater treatment plant.

Table 3.3-1 Related Projects in Nanfeng County

No.	Name of Projects	Connection with this Project
1	Nanfeng County’s Urban North Waterworks	This project will lay pipe from Nanfeng’s urban north waterworks and No.2 Waterworks to Shishan Town, Qiawan Town and Laixi Town.
2	Nanfeng County’s No.2 Waterworks	
3	Nanfeng County’s Wastewater Treatment Plant	The wastewater produced by this project’s water supply engineering will be discharged into Nanfeng’s wastewater treatment plant.

#### 3.3.1 Nanfeng County’s urban north waterworks

Nanfeng County’s urban north waterworks is located at No.19 South Kangxin Road, was completed and put into operation in 1988, with the county area as its water supply scope. Its water purification area adopts the process of grid reaction inclined tube sedimentation and siphon filter, 20,000 m<sup>3</sup>/d of the scale. Xu River in Class III

water quality is its source. The routine monitoring data of this waterworks' finished water quality meet the national standard. The sludge produced is transported to Nanfeng County's refuse landfill for disposal. It has not received the reply of EIA. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department.

### **3.3.2 Nanfeng County's No.2 Waterworks**

The No.2 Waterworks is located at the intersection of North Huancheng Road and South Huancheng Road, 50,000 m<sup>3</sup>/d of the designed scale, with the county area as its supply scope, Xu River in Class III water quality as its source. The waterworks has received the reply of EIA. The construction of this waterworks was started in February 2017, and it is expected to be completed and put into operation in October 2018. While this project's extension engineering of Nanfeng County's urban pipe network is expected to be completed and put into use in 2022, therefore, this waterworks can meet this project's demand.

### **3.3.3 Nanfeng County's wastewater treatment plant**

The wastewater treatment plant is located on the west of the river in Fuxi Village, Qincheng Town, Nanfeng County, was completed and put into operation in 2010, 20,000 m<sup>3</sup>/d and 30,000 m<sup>3</sup>/d of the designed Phase I and Phase II treatment scale, 25,000 m<sup>3</sup>/d of the current actual treatment scale. Its service scope is mainly the built-up area on the west of Xujiang River in the planning area of Nanfeng County, 11.2 km<sup>2</sup> of the area of its coverage. The treatment process is the activated sludge process of biological treatment. The wastewater discharge performs Standard B under the primary standard stipulated in *Discharge Standard of Pollutants for Urban Wastewater Treatment Plant* (GB18918-2002), with Xu River as the discharge direction. After dewatering, the sludge is transported to Nanfeng's refuse landfill for sanitary landfill. This wastewater treatment plant has gotten the reply of EIA and passed the acceptance.

The routine monitoring data of this wastewater treatment plant’s discharge outlet meet the discharge standard. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. The effluent of waterworks under this project belongs to the service scope of this plant of which the treatment capacity can meet this project’s treatment requirement. This plant promises that it can accept the newly added wastewater produced by Nanfeng County’s water supply engineering.

### 3.4 Due Diligence of Leping City’s Related Projects

The related projects in Leping City are nine waterworks in its towns including Xingfu and Zhongbu waterworks; Leping City’s wastewater treatment plant and refuse landfill.

Table 3.4-1 Related Projects in Leping City

No.	Name of Projects	Connection with this Project
1	Xingfu Waterworks	This project include the extension engineering of pipe network of the original nine waterworks in towns, Wukou, Lingang, Yongshan, Xingfu, Dongfanghong, Nangang, Lilin, Zhongbu, Zhenqiao waterworks.
2	Zhongbu Waterworks	
3	Dongfanghong Waterworks	
4	Nangang Waterworks	
5	Zhenqiao Waterworks	
6	Lilin Waterworks	
7	Lingang Waterworks	
8	Wukou Waterworks	
9	Yongshan Waterworks	
10	Leping City’s Wastewater Treatment Plant	The effluent from the expanded urban waterworks will be delivered to Leping’s wastewater treatment plant.
11	Leping City’s Refuse Landfill	The sludge produced by the expansion of urban waterworks will be transported to Leping’s refuse landfill for disposal.

#### 3.4.1 The existing rural water supply engineering in Leping City

The basic information of the towns’ waterworks in Leping City is shown in Table

3.4-2.

According to the investigation, all the waterworks in Leping's towns have received the reply of EIA and passed the acceptance. The routine monitoring data of the waterworks' finished water quality meet the national standard. The sludge produced is transported to Leping's refuse landfill for disposal. Their daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. The residual water treatment capacity of all the waterworks can meet the demand of this project's pipe network extension.

**Table 3.4-2 Basic Information of the Waterworks in Leping's Towns**

Jiangxi Integrated Rural and Urban Water Supply and Wastewater Management Project

Name	Address	Time of Completion and operation	Water Supply Scope	Designed Scale (10,000 tons)	Actual Scale (10,000 tons)	Water Source	Water Source Quality	Whether the Finished Water Quality up to Standard or Not	Whether the EIA Procedure Fulfilled or Not	Whether Accepted or Not	Disposal of Sludge	Next Rectification Plan
Xingfu Waterworks	Mingkou Town	December, 2013	Mingkou, Hongyan, Gaojia	1	0.8	Xingfu Reservoir, Guanzhuang River	Class II	Yes	Yes	Yes	Landfill	No
Zhongbu Waterworks	Zhongbu Town	December, 2015	Zhongbu	1	0.33	Jianjie Water	Class II	Yes	Yes	Yes	Landfill	No
Dongfanghong Waterworks	Luci Town	December, 2013	Zhongbu, Luci	0.5	0.39	Dongfanghong Reservoir	Class II	Yes	Yes	Yes	Landfill	No
Nangang Waterworks	Shiligang Town	December, 2015	Shiligang	0.3	0.18	Changle River	Class II	Yes	Yes	Yes	Landfill	No
Zhenqiao Waterworks	Zhenqiao Town	December, 2013	Zhenqiao, Legang	1	0.78	Gongqing Reservoir	Class II	Yes	Yes	Yes	Landfill	No
Lilin Waterworks	Lilin Town	December, 2015	Lilin, Jiedu, Tashan	0.8	0.68	Anyin River	Class II	Yes	Yes	Yes	Landfill	No
Lingang Waterworks	Lingang Town	June, 2012	Lingang	0.3	0.21	Gongqing Reservoir	Class II	Yes	Yes	Yes	Landfill	No
Wukou Waterworks	Wukou Town	June, 2012	Wukou	0.3	0.23	Gongqing Reservoir	Class II	Yes	Yes	Yes	Landfill	No
Yongshan Waterworks	Yongshan Town	June, 2012	Yongshan	0.6	0.5	Gongqing Reservoir	Class II	Yes	Yes	Yes	Landfill	No

### **3.4.2 Leping City's wastewater treatment plant**

The wastewater treatment plant is located at Zhangjiaqiao, Legang Town, the southwest of Leping's urban area, was completed and put into operation in April, 2010, 43,152 m<sup>2</sup> of the floor space, 50,000 m<sup>3</sup>/d of the daily treatment capacity for urban wastewater, 36,000 m<sup>3</sup>/d of the current actual treatment scale, with Leping's urban domestic wastewater as its service scope. By two-stage biochemical process (oxidation ditch process), the wastewater after the treatment reaches Standard B under the primary standard stipulated in *Discharge Standard of Pollutants for Urban Wastewater Treatment Plant* (GB18918-2002), with Le'an River as the discharge direction.

This wastewater treatment plant has received the reply of EIA and passed the acceptance in 2010. The routine monitoring data of this wastewater treatment plant's discharge outlet meet the national standard. The sludge produced is transported to Leping's refuse landfill for disposal. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. This plant promises that it can accept the effluent produced by the expansion of Leping's urban waterworks.

### **3.4.3 Leping City's domestic refuse landfill**

The refuse landfill is located at Qianfang Kongjia, Zhanping Town, Fuzhou City, was completed and put into use in 2008, with Fuzhou's urban area and the surrounding cities and counties as its service scope, 15 years of the designed service length, 500 t/d and 450t/d of the designed and actual treatment scale. The landfill's bottom and side slope have artificial anti-permeation, and groundwater monitoring well is set up near the landfill for regular monitoring; adopting collection+ simultaneous nitrification denitrification+nanofiltration+reverse osmosis for leachate treatment. It has gotten the reply of EIA and passed the acceptance in 2008. Its daily operation is normative. The routine monitoring data of landfill leachate meet the

discharge standard, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. The landfill promises that it can accept the sludge produced by the expansion of Leping’s urban waterworks.

### 3.5 Due Diligence of Xiushui County’s Related Projects

The related projects in Xiushui County are seven waterworks in its towns including Zhengcun Town’s and Zhajin Town’s waterworks; Xiushui County’s wastewater treatment plant and the refuse landfill in Shizi Town, Jiujiang County.

Table 3.5-1 Related Projects in Xiushui County

No.	Name of Projects	Connection with this Project
1	Zhengcun Town’s Water Supply Engineering	This project includes the extension of pipe network of the original waterworks in seven towns, Zhengcun Town, Zhajin Town, Ma’ao Town, Shankou Town, Gangkou Town, Xigang Town.
2	Zhajin Town’s Water Supply Engineering	
3	Ma’ao Town’s Water Supply Engineering	
4	Shankou Town’s Water Supply Engineering	
5	Gangkou Town’s Water Supply Engineering	
6	Xigang Town’s Water Supply Engineering	
7	Xiushui County’s Wastewater Treatment Plant	The effluent from the expanded urban waterworks will be delivered to Xiushui County’s wastewater treatment plant.
8	The Refuse Landfill in Shizi Town, Jiujiang County	The sludge produced by the expansion of the urban waterworks and the new construction of Zhajin County’s wastewater treatment plant will be transported to the refuse landfill in Shizi Town, Jiujiang County for disposal.

#### 3.5.1 The existing rural water supply engineering in Xiushui County

The basic information of the towns’ waterworks in Xiushui County is shown in Table 3.5-2.

According to the investigation, the residual water treatment capacity of all the waterworks in Xiushui’s towns can meet the demand of this project’s pipe network extension. The routine monitoring data of all the waterworks’ finished water quality meet the national standard. After dewatering, the sludge produced is transported to the

spoil ground for disposal. All the waterworks have not handled the EIA and acceptance procedures. The operating organization of each waterworks (water company) shall go to the local environmental protection bureau as soon as possible to finish the relevant procedures, to ensure that the environmental protection measures and environmental management methods meet the supervisory requirement of the local environmental protection department.

**Table 3.5-2 Basic Information of the Waterworks in Xiushui's Towns**

Name	Address	Time of Completion and Operation	Water Supply Scope	Designed Scale (10,000 tons)	Actual Scale (10,000 tons)	Water Source	Water Source Quality	Whether the Finished Water Quality up to Standard or Not	Whether the EIA Procedure Fulfilled or Not	Whether Accepted or Not	Disposal of Sludge	Next Rectification Plan
Zhengcun Town's Waterworks	Fengshuao, Zheng Village	May, 2014	The whole town	0.12	0.02	Shankou River	Qualified	Yes	No	No	Transported to the spoil ground after dewatering	The operating organization of each waterworks (water company) shall go to the local environmental protection bureau as soon as
Zhajin Town's Waterworks	Shuaiduan, Zhajin Town	March, 2016	The whole town	0.5	0.35	Dongjin Reservoir	Qualified	Yes	No	No	Transported to the spoil ground after dewatering	shall go to the local environmental protection bureau as soon as

Ma'ao Town's Waterworks	Zhangjiashan, Ma'ao Town	December, 2016	The whole town	0.14	0.13	Dongjin Reservoir	Qualified	Yes	No	No	Transported to the spoil ground after dewatering	possible to supplement the relevant procedures, to ensure that the environmental protection measures and environmental management methods meet the requirement of the local environmental protection department.
Shankou Town's Waterworks	Zhepeng Village, Shankou Town	December, 2016	The whole town	0.25	0.15	Watercourse at Xinling Old Street	Qualified	Yes	No	No	Transported to the spoil ground after dewatering	
Gangkou Town's Waterworks	Aoshang Village, Gangkou Town	April, 2017	The whole town	0.11	0.09	Aoshang Linlong Gorge	Qualified	Yes	No	No	Transported to the spoil ground after dewatering	
Xigang Town's Waterworks	Zhangjiashan, Ma'ao Town	December, 2016	The whole town	0.15	0.12	Dongjin Reservoir	Qualified	Yes	No	No	Transported to the spoil ground after dewatering	

### **3.5.2 Xiushui County's wastewater treatment plant**

The wastewater treatment plant is located at Sub-village 2, Anping Village, Yining Town, Xiushui County, was completed and put into use in 2011, 30,000 tons of the current designed treatment capacity, 15,000 tons of the actual daily treatment capacity. By the upgraded oxidation ditch treatment process, the wastewater after treatment reaches Standard B under the primary standard stipulated in *Discharge Standard of Pollutants for Urban Wastewater Treatment Plant* (GB18918-2002), with Xiu River as the discharge direction.

This wastewater treatment plant has received the reply of EIA in 2010, and passed the acceptance in 2011. The routine monitoring data of this wastewater treatment plant's discharge outlet meet the national standard. The sludge produced is transported to Jiujiang City's refuse landfill for disposal. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. This plant promises that it can accept the effluent produced by the expansion of Xiushui's urban waterworks.

### **3.5.3 The refuse landfill in Shizi Town, Jiujiang County**

Xiushui County has no refuse landfill. While there are about 135 tons of the domestic refuse in the urban area of Xiushui County every day, through the waste compacting transfer station, which are transported to the refuse landfill in Shizi Town, Jiujiang County for disposal, RMB 213 per ton of the transportation and treatment expenses.

The refuse landfill is located in Shizi Town, Jiujiang City, was completed and put into use in August 2012, with Fuzhou's urban area and the surrounding counties and cities as its service scope, 15 years of the designed service length, 2,100 t/d and 1,500 t/d of the designed and actual treatment scale. The biological treatment process is adopted for landfill leachate. The refuse landfill has received the reply of EIA and passed the acceptance in 2011. Its daily operation is normative. The routine

monitoring data of landfill leachate meet the discharge standard, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. It promises that it can accept the sludge produced by the expansion of Xiushui’s urban waterworks and the new construction of Zhajin County’s wastewater treatment plant.

### 3.6 Due Diligence of Linchuan District’s Related Projects

The related projects in Linchuan District are Linchuan District’s No.1 Waterworks and wastewater treatment plant, and Fuzhou City’s refuse landfill.

Table 3.6-1 Related Projects in Linchuan District

No.	Name of Projects	Connection with this Project
1	Linchuan District’s No.1 Waterworks	The existing waterworks in Linchuan District, which will be modernized by this project.
2	Linchuan District’s Wastewater Treatment Plant	The effluent from the newly-built urban waterworks will be delivered to Linchuan District’s wastewater treatment plant.
3	Fuzhou City’s Refuse Landfill	The sludge from the newly-built Linchuan’s No.2 Waterworks will be transported to Fuzhou refuse landfill for disposal.

#### 3.6.1 Linchuan District’s No.1 Waterworks

The No.1 Waterworks is located at No.394 Longjin Road, Shangdu, Linchuan District. The Phase I project was completed and put into production in July 2006, 20,000 m<sup>3</sup>/d of the scale. The waterworks was expanded in 2012, 30,000 m<sup>3</sup>/d of the designed and the current actual water supply scale. With Yihuang River in Class III water quality as its source, its water supply scope is the county area.

The waterworks has received the reply of EIA and passed the acceptance in 2012. The routine monitoring date of this waterworks’ finished water quality meet the national standard. The sludge produced is transported to Fuzhou City’s refuse landfill after being discharged into the sludge tank. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department.

#### 3.6.2 Linchuan District’s wastewater treatment plant

The wastewater treatment plant is located in the north of Linchuan Road, Linchuan District (at the intersection of Liuzhi Canal and Tiaoshi Canal), was completed and put into production in 2011, 15,000 m<sup>3</sup>/d of the daily treatment capacity for urban wastewater, 12,000 m<sup>3</sup>/d of the current actual treatment scale, with Linchuan's urban area as its service scope. By the two-stage treatment process, the wastewater after treatment reaches Standard B under the primary standard stipulated in *Discharge Standard of Pollutants for Urban Wastewater Treatment Plant* (GB18918-2002), with Fu River as the discharge direction.

The wastewater treatment plant has received the reply of EIA and passed the acceptance in 2010. The routine monitoring data of this wastewater treatment plant's discharge outlet meet the national standard. The sludge produced is transported to Fuzhou City's refuse landfill for disposal. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. This plant promises that it can accept the effluent from the newly-built Linchuan's urban waterworks.

### **3.6.3 Fuzhou City's refuse landfill**

Fuzhou City's refuse landfill is located at Qianfang Kongjia, Zhanping Town, Fuzhou City, was completed and put into use in 2008, with Fuzhou's urban area and the surrounding counties and cities as its service scope, 20 years of the designed service length; 500 t/d and 450 t/d of the designed and actual treatment scale. The landfill's bottom and side slope have artificial anti-permeation, and groundwater monitoring well is set up near the landfill for regular monitoring; adopting collection+ simultaneous nitrification denitrification+nanofiltration+reverse osmosis for leachate treatment. It has gotten the reply of EIA and passed the acceptance in 2008. Its daily operation is normative. The routine monitoring data of landfill leachate meet the discharge standard, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. The landfill promises that it can accept the sludge produced by the newly-built Linchuan's urban waterworks.

### 3.7 Due Diligence of Dongxiang District's Related Projects

The related projects in Dongxiang District are Dongxiang County's Jixing Waterworks, Dongxiang District's wastewater treatment plant and Dongxiang County's Yangyuanli domestic refuse landfill.

Table 3.7-1 Related Projects in Dongxiang District

No.	Name of Projects	Connection with this Project
1	Dongxiang Jixing Waterworks	This waterworks will be still in use after the construction of this project, involving the reconstruction of urban pipe network and the extension engineering of the county's pipe network.
2	Dongxiang District's Wastewater Treatment Plant	The effluent from the newly-built urban waterworks will be transported to Dongxiang District's wastewater treatment plant.
3	Dongxiang District's Yangyuanli Domestic Refuse Landfill	The sludge from the newly-built Dongxiang District's waterworks will be transported to Yangyuanli landfill for disposal.

#### 3.7.1 Dongxiang Jixing Waterworks

Jixing Waterworks is located in the Management Committee of Dongshan Economic Development Zone, Dongshan District (near the Grade I Donglin Highway), was prepared in July 2005, and completed and put into production in September 2007. Xingfu Reservoir in current Class II water quality is its source. The long-term designed scale is 60,000 m<sup>3</sup>/d, 52,000 m<sup>3</sup>/d of the current daily water supply capacity. Its service scope is Dongxiang County and the surrounding three towns and villages (Hongxing Xushangqiao, Dengjia, Huxu Town). The treatment process is:

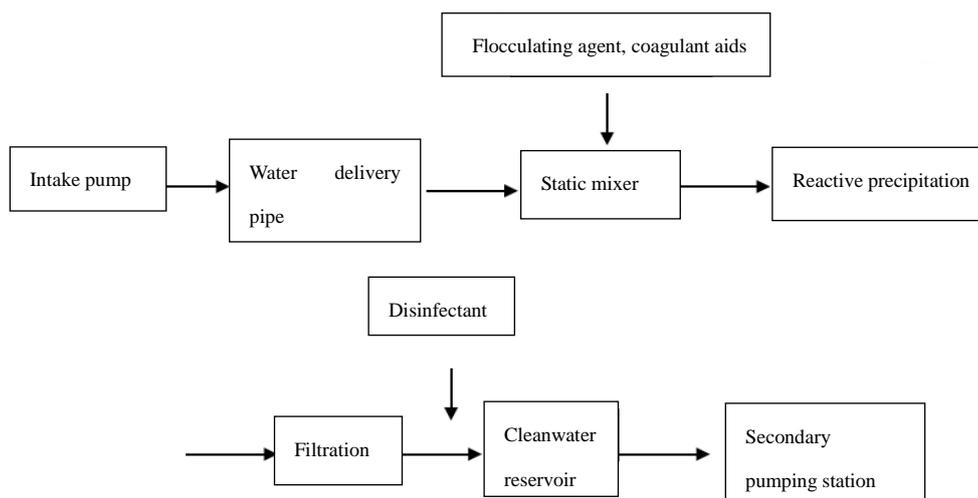


Figure 3.7-1 Treatment Process of Jixing Waterworks in Dongxiang District

Its daily operation is normative. The routine monitoring data of the finished water quality meet the national standard. The sludge produced is transported to Dongxiang’s Yangyuanli refuse landfill for disposal. At present, its environmental protection procedures are not perfect and the EIA procedure has not been fulfilled. It requires that the operating organization of this waterworks (water company) goes to the local environmental protection bureau as soon as possible to finish the relevant procedures, to ensure that the environmental protection measures and environmental management meet the requirement of the local environmental protection department.

### 3.7.2 Dongxiang District’s wastewater treatment plant

The wastewater treatment plant is located at Raojiayuan, Heshan Village, Xiaogang Town, Dongxiang County, 30,000 m<sup>3</sup>/d and 60,000 m<sup>3</sup>/d of the designed Phase I and Phase II treatment scale respectively, 50,000 m<sup>3</sup>/d of the current actual treatment scale, with Xiaogang Town in Dongxiang County as its service scope, covering 160,000 people, 23.05 km<sup>2</sup> of the service area. The modified oxidation ditch (in inverted umbrella surface aerator) process is adopted for wastewater treatment. The wastewater discharged meets Standard B under the primary standard stipulated in *Discharge Standard of Pollutants for Urban Wastewater Treatment Plant* (GB18918-2002), with Ru River as the discharge direction.

The plant has received the reply of EIA on its Phase I project in May 2008, and passed the environmental protection acceptance in November 2012; has gotten the reply of EIA on its Phase II project in July 2017, and now is handling the acceptance procedure on the Phase II project. According to the field investigation, the routine monitoring data of this wastewater treatment plant's discharge outlet meet the national standard. The sludge produced is transported to Jiujiang's refuse landfill for disposal. Its daily operation is normative, and the environmental protection measures and environmental management satisfy the requirements of the local environmental protection department. This plant promises that it can accept the effluent from the newly-built Dongxiang District's urban waterworks.

### **3.7.3 Dongxiang District's Yangyuanli domestic refuse landfill**

Dongxiang District's Yangyuanli domestic refuse sanitary landfill is located at the east of National Highway 320, Yangyuanli, Huling Village, Changlin Town, Dongxiang County, Fuzhou City, 93,000 m<sup>2</sup> of the total landfill area for domestic refuse, 2,600,000 m<sup>3</sup> of the total storage capacity, 300 tons per day of the treatment capacity, 90,000 tons of the yearly treatment capacity for domestic refuse, with all the domestic refuse produced in Dongxiang County's urban area as its service scope, 20 years (2007-2027) of the service length. The sanitary landfill adopts the operation process of unit landfill, refuse compacting and day-to-day covering. It has gotten the reply of EIA and passed the acceptance in 2007. Currently, about 200 tons of domestic refuse are accepted every day.

In 2016, the refuse landfill was found with faulty rain and wastewater diversion facilities, abnormal operation of online monitoring equipment, temporary storage and thus unexecuted up-to-standard discharge of some wastewater and no environmental protection acceptance procedure handled on time, the local environmental protection department has ordered a deadline for rectification. The specific measures are as follows:

(1) To perfect the rain and wastewater diversion facilities before October 30, 2017;

(2) To complete the environmental protection acceptance procedure before October 30, 2017;

(3) To draw back the wastewater in temporary storage and discharge it after standard treatment before September 30, 2017.

After the rectification requirements by the local environmental protection department, the refuse landfill carried out the Phase II renovation engineering aiming at the above problems in 2016. The content included adding one leachate treatment production line, by the process of “anaerobic treatment+aerobic treatment+ultrafiltration+nanofiltration+reverse osmosis”; replacing the impermeable membrane and increasing emergency lagoon in the Phase II landfill area; purchasing watering cart, bulldozer, etc.. At present, the new equipment has been put into use, 100 tons of the daily leachate treatment scale, which can meet the needs of the landfill’s leachate treatment and reach the discharge standard. The landfill has completed the corresponding rectification measures and has met the supervisory requirement of the local environmental protection department. The landfill promises that it can accept the sludge from the newly-built Dongxiang District’s urban waterworks.



Figure 3.7-2 Distribution of Subprojects in Dongxiang District

### 3.7.2.1 New construction of urban waterworks

#### (1) Water source demonstration

According to the Report on Water Source Demonstration, the average daily water intake capacity of Hefang Reservoir is 23,000 tons, and 12,000 tons for that of Hengshan Reservoir. Their water supply guarantee rates are more than 90%. Therefore, the water capacity can meet the intake demand.

According to the Report on Water Quality Testing, the water quality of Hefang and Hengshan reservoirs meets the Class III water requirement in *Environmental Quality Standard for Surface Water*.

#### (2) Water intake engineering

The water intake scale of Hefang Reservoir will be 30,000 m<sup>3</sup>/d by using pontoon; the water intake scale of Hengshan Reservoir will be 30,000 m<sup>3</sup>/d by using pontoon.

#### (3) Raw water pipe engineering

A total of 13.7 km raw water delivery pipe from Hengshan Reservoir to the water treatment plant. A total of 3.64 km raw water delivery pipe from Hefang Reservoir to the water treatment plant. The overall length is about 17.34 km.

#### (4) New construction of urban waterworks

New construction of water treatment plant, 40,000 m<sup>3</sup>/d and 100,000 m<sup>3</sup>/d of its short-term and long-term scale. The main buildings and structures include Integrated Water Purification Equipment, Clean-Water Reservoir, Water Delivery Pumping House, Dosing Room, Drying Bed, Complex Building, Maintenance Room, Warehouse, etc..

### 3.7.2.2 Renovation and expansion of urban pipe network

Renovation of a total of 19.5 km DN200~DN1000 pipe network, new construction of 6.74 km DN600~DN800 pipe network.

### 3.7.2.3 Extension of the county's pipe network

Extension of the county's pipe network in Dongxiang District is shown in Table 3.7-1.

Table 3.7-1 Extension of the County's Pipe Network in Dongxiang District

No.	Name	Extended Length (km)	Pipe Diameter	Service Scope	Household
1	Extension of Pipe Network in Dengjia Town	21.55	DN50~DN200	9 villages	6987
2	Extension of Pipe Network in Gangshangji Town and Hongliang Reclamation Farm	31.11	DN50~DN300	13 villages	8551
3	Extension of Pipe Network in Huxu Town	10.93	DN50~DN300	5 villages	4627
4	Extension of Pipe Network in Pogan Town	28.83	DN50~DN300	9 villages	5418
5	Extension of Pipe Network in Xushangqiao Town	15.85	DN50~DN300	5 villages	10010
6	Extension of Pipe Network in Xiaohuang Town	44.71	DN50~DN300	11 villages	16659
7	Extension of Pipe Network in Xiaogang Town	12.72	DN50~DN100	3 villages	

## **4. Environmental Baseline of Project Area**

### **4.1 Environmental Overview of Jiangxi Province**

Jiangxi Province is located in the southeastern part of China, the south bank of the middle and lower reaches of the Yangtze River, and situated in the north latitude 24°29'14" to 30°04'41", and the east longitude 113°34'36" to 118°28'58". The province has a total area of 166,900 square kilometers, with the total population of 43.39 million, and it has 11 districts and 99 counties (cities and districts).

#### (1) General overview of natural environment

The landform types are relatively complete in Jiangxi province, and the landform distribution is in irregular annular structure. In its normal landform type, the mountain area accounts for 60,101 square kilometers, hills for 70,117 square kilometers, hillock and plains for 20,022 square kilometers, water surface for 16,667 square kilometers. In addition to the normal landform types, there are also karst, ACI and glaciers and other special types of landforms.

Jiangxi province has a warm climate, abundant sunshine and rainfall, and long frost-free period, which is the sub-tropic warm-moist climate. The annual average temperature is about 18 °C, the total annual sunshine radiation amount is 97 kcal to 114.5 kcal per square centimeter. Rainfall is abundant, and the average annual precipitation is 1,341 millimeters to 1,940 millimeters. The main natural disasters are chilling injury, flood, drought and so on.

There are more than 2,400 large or small rivers in Jiangxi province, and Ganjiang River, Fu River, Xinjiang River, Xiu River and Rao River are five big rivers of Jiangxi province. The average runoff of rivers for many years is 138.5 billion cubic meters, which is equivalent to the average runoff depth of 828 mm, although the total runoff in Jiangxi River is abundant, the seasonal and interannual changes are large, and the regional distribution is varied. The trend of surface runoff distribution: the northeast area of the province is the largest, and the eastern frontline area of Wuyuan, Guixi and Lichuan is generally greater than 1,000 mm; The Poyang Lake Basin, Jitai

Basin and Ganzhou Basin are all low-value areas, generally between 600 mm to 700 mm; Other areas are generally from 700 mm to 900 mm. The river runoff in the province is mainly supplied by precipitation, therefore the seasonal variation is very large. In the flood season, the river surges, easily overrun; In the dry season, the water volume is small and the water source is insufficient. Data shows the annual distribution of runoff is as follows: January-March accounted for 14~17%, April-June accounted for 53~60%, July-September accounted for 18~22%, and October-December accounted for 6~10%.

### (2) Ecological environment

The forest coverage rate of Jiangxi Province is 60.05%, the representative vegetation type is the subtropical evergreen broad-leaved forest, the coniferous forest, the coniferous and broad-leaved mixed forest, the evergreen and deciduous broad-leaved mixed forest and the deciduous broad-leaved forest, in addition, the montane elfin forest and bamboo forest are also not few in its number. It is mainly distributed in the Binhu area of Poyang Lake. There is also barren mountains shrub grass slope, sandy vegetation, meadow vegetation and so on. The dominant plants include rhododendrons, gardenia, rosa laevigata, castanea seguinii, vaccinium bracteatum, syzygium grijsii, ilex pubescens, rhamnus crenata, vaccinium carlesii, beanstalk ridge, awn, arundinella anomala and so on, in addition to the distribution of the Poyang Lake area, it is also distributed in the surrounding hills and piedmont areas of the GanJiang alluvial plain. There are more than 600 species of vertebrates in the province, including 170 species of fish, 40 species of amphibians, 70 species of reptiles, more than 270 species of birds and more than 50 species of mammals.

### (3) Socio-economic conditions

Jiangxi province realizes the regional gross domestic product (GDP) of 1836.44 billion Yuan in 2016, with a per capita GDP of 40,106 Yuan, and year-end permanent population of 45.923 million people, in which, the urban population is 24,385 million people, accounting for 53.1 % (the resident population urbanization rate) of the total population, and the urbanization rate of the household registered population is 35.7 %.

## 4.2 Environmental Overview of Yongxin County

### 4.2.1 General overview of natural environment

#### (1) Geographical location

Yongxin county is located in the west of Jiangxi Province, the middle and upper reaches of the tributary, He river of Ganjiang river, located between the north latitude  $26^{\circ}47' \sim 27^{\circ}14'$  and east longitude  $113^{\circ}50' \sim 114^{\circ}29'$ , and it is 318 km away from Nanchang City and 100 km away from Ji'an City.

#### (2) Landform

The landform of Yongxin County is mainly mountainous and hilly, the four sides of the terrain are high, and the middle is low, sloping from the north and the south to the middle. As He river as the boundary, the whole county is divided into two parts of the southeast and the northwest, the soil in the southeast is mainly yellow red soil and yellow soil, which is respectively composed of Devonian system and carboniferous system sand shale strata and Cambrian system, Ordovician system and sand slate strata. The soil in northwest is mainly red soil, the soil forming rock originates from the cretaceous purple-red gravel, sandstone, siltstone, and mudstone and so on, the soil is thinner and the soil erosion is serious. There is no mineral resource below construction in the scope of the project.

#### (3) Surface water system

The river channels in Yongxin county take the He river as the main axis, the rest of the river flows from the south or from the north to the central part of the water, rivers of all sizes belong to the He river water system. The main rivers have He river water and its tributaries Wenzhu water, Ninggang River, Longyuan water, Rongjiangriver, Liuqi river and Luxi water, with the total length of 459 km, and the average annual runoff total of 3.01 billion cubic meters. The He River is the secondary tributary of Ganjiang River, with a flow length of 77 km in the county, the basin area of  $1,831\text{km}^2$ , the annual maximum flow of  $2,910\text{ m}^3/\text{s}$ , the annual average flow rate of  $72\text{ m}^3/\text{s}$ , the annual average water level of 5 m, and the river width of 80

m.

#### **4.2.2 Ecological environment**

The current situation of vegetation in the evaluation area is mainly the artificial planting of *pinus massoniana*, *dicranopteris dichotoma* or *poaceae* herbaceous plant, artificial planting of vegetation such as *cinnamomum camphora* and *eucalyptus* are common tree species. According to the baseline survey, the national key protection of wild plants, famous wood, and regional unique plants have not been found; Within the scope of the project, there is an old tree in Shiqiao town, the tree species is *cinnamomum camphora*, and the tree age is unknown. The terrestrial animals of the region are mainly birds and amphibians such as sparrows and frogs.

#### **4.2.3 Socio-economic conditions**

Yongxin County is a national poverty-stricken county. The county has a total area of 2,195 square kilometers, now governing 10 towns, 13 townships. At the end of 2014, the total population of the county was 524,560.

In 2014, the total GDP of Yongxin County was 7900.38 million Yuan, the per capita GDP was 16,398 Yuan, and the total annual fiscal income is 880.49 million Yuan; at the end of the year, the number of employees was 281,300, the county town of new employment was 12,000 people, and transfer of rural labor force was 16,000 people.

#### **4.2.4 Current situation of environmental quality in project area**

According to the Yongxin County 2015 Environmental Quality Status Bulletin and the Water Resource Quality Bulletin of Jian City in 2014 to 2015, the baseline of surface water, atmospheric environment and acoustic environment quality in Yongxin County in 2015 is as follows:

##### **4.2.4.1 Surface water environmental quality**

According to the water quality assessment results of Water Resource Quality

Bulletin of Jian City in 2014 to 2015, all the water quality testing projects of Longyuankou Reservoir are in line with the class III water quality standards of Environmental Quality Standards for Surface Water (GB3838-2002).

#### 4.2.4.2 Atmospheric environmental quality

In 2015, there are 2 atmospheric sampling points in the county area, and the main monitoring items are inhalable particulate matter, sulphur dioxide and nitrogen dioxide. The monitoring results are in accordance with the requirements of the class II functional area.

#### 4.2.4.3 Sound environment quality

According to the noise monitoring of many traffic trunk roads in the county, the average equivalent sound level of road traffic noise in 2015 urban area is 62.5 decibels, and the average equivalent sound level of ambient noise in urban areas is 48.7 decibels, which conforms to the functional area requirements.

### **4.3 Environmental Overview of Jinxi County**

#### **4.3.1 General overview of natural environment**

##### (1) Geographical location

Jinxi county is located in the east of Jiangxi province, midstream of Fu river, connecting with Guixi county and Zixi county in east, bordering on Nancheng county in south, adjacent to Linchuan district in west, and connecting to Dongxiang district and Yujiang county in north, with 316 national road and 206 national road crossing the border, and the total area of the county is 1,358 km<sup>2</sup>.

##### (2) Landform

Jinxi County is located between the northern edge of the northern Wuyi mountain uplift belt and the southern edge of the Guanmao mountain uplift belt, the county terrain is southeast high and northwest low, and there are three types of landforms, which mainly are mountains, hills and plains. The mountain lands are

distributed in the southeastern edge, belonging to the foothills of Tianxu mountain at the northeastern part of the Wuyi Mountains, the hills are mainly distributed in the northeast, the northwest and the central, accounting for about 65% of the total area of the county, the plains are distributed in the southwest along the Fu river and the Lu river and its west coast of tributaries, accounting for about 25%. There is no mineral resource below construction in the scope of the project

### (3) Surface water system

In the county area, there are 6 rivers. They are Fu river, Lu River, Jinxi Water, Dongxiang Water, Lufang Water and Qingtian Water, with total length of 203.3 km, and total collected water area of 1,764 km<sup>2</sup> in the county area. The annual average rainfall is 1,832 mm, and the annual average runoff depth is about 1,000mm.

Jinxi county has 2 medium-sized reservoirs (Majie reservoir and Gaofang reservoir), 14 small-sized type-I reservoirs, 54 small-sized type-II reservoirs. The Majie reservoir is located in the mountain area of Pingshang country, Lufang township, Jinxi county, the head of the reservoir is 18 km away from the county, the control basin area above the dam site is 27.5 k m<sup>2</sup>, the total storage capacity is 37.53 million m<sup>3</sup>, the reservoir regulation capacity is 15.4 million m<sup>3</sup>, which is a medium-sized reservoir. Gaofang reservoir is located in junction between Huangtong and Lufang Township in Jinxi County, Gaofang River originates in Chu Yunfeng Mountains, Jinxi County, which belongs to Xinjiang River. The Gaofang reservoir is about 15 km from the Jinxi County, with area of the reservoir control basin of 102 km<sup>2</sup>, the total design capacity of 67.5 million m<sup>3</sup>, and the reservoir regulation capacity of 57.11 million m<sup>3</sup>, which is a medium-sized reservoir.

### 4.3.2 Ecological environment

According to the Ecological Function Regionalization in Jiangxi Province, Jinxi County belongs to the ecological function area of agricultural environment protection and flood control and floodwater storage in the hilly plain of the middle reaches of Fu River. The vegetation types in the project area are coniferous and broadleaf mixed forest, and the main plant species include: the main arbor species are cedar, pinus

massoniana, phyllostachys edulis and schima superba; the shrub species are elaeagnus pungens, dcranopteris dichotoma, miscanthus floridulus and so on. In the scope of project evaluation area, there is no national key protection of wild plants, nor the distribution of ancient trees. Most of the wild animals in the area are common species, mainly birds, amphibians and reptiles.

### **4.3.3 Socio-economic conditions**

There are 8 towns, 5 townships, 1 state-owned overseas Chinese Farm, and 1 Provincial industrial park, with a total population of 280,000 in jurisdiction of Jinxi County.

In 2016, the county achieved a total production of 7.91 billion Yuan, the total fiscal income of 1.04 billion Yuan, fixed assets investment 9.1 billion Yuan, and the industrial value added above scale of 2.44 billion Yuan; The disposable income per capita of urban residents is 25,875 Yuan, and the disposable income of rural residents is 12,624 Yuan. The urbanization rate is 37.3%.

### **4.3.4 Current situation of environmental quality in project area**

#### 4.3.4.1 Surface water

##### (1) Jinxi county Gaofang reservoir

Gaofang reservoir is the water source of the second water plant in Jinxi County, according to the test report on February 20, 2017; testing items (23 items of water temperature, pH, iron, manganese, copper, etc.) are in line with GB3838-2002 "Surface Water Environmental Quality Standards" class- II standards.

##### (2) Gaofang River upstream mountain stream

The mountain stream in the upper reaches of Gaofang river is the water source of newly-built water plant in Huangtong township of Jinxi county, according to the water quality test report on April 14, 2017, testing items (26 items of pH, dissolved oxygen, chemical oxygen demand and so on) are all in line with GB3838-2002 "Surface Water Environmental Quality Standards" class- II standards.

##### (3) Baima Lake in Jinxi County

Baima Lake in Jinxi County is the water source of the second water plant in Jinxi County, according to the test report on December 19, 2016 and January 20, 2017, testing items (23 items of water temperature, pH, iron, manganese, copper, etc.) are in line with GB3838-2002 "Surface Water Environmental Quality Standards" class- II standards.

#### 4.3.4.2 Atmospheric environmental quality

According to the atmospheric environmental quality test report of Jinxi county Meijia village and Liwang village on August 12, 2012, the test items (TSP, PM10, SO<sub>2</sub>, and NO<sub>2</sub>) all meet the requirements of the secondary functional areas.

#### 4.3.4.3 Sound environment quality

According to the test report of sound environment quality on Jinxi County's second waterworks site and Liwang village on August 12, 2012, the equivalent continuous A level sound monitoring result of Liwang village and plant site are in line with sound functional area requirements of class-I and class-II.

## **4.4 Environmental Overview of Nanfeng County**

### **4.4.1 General overview of natural environment**

#### (1) Geographical location

Nanfeng County is located in the east of Jiangxi province, a famous orange town, and in the administration, it belongs to Fuzhou city, Jiangxi province, east by Lichuan and Jianning in Fujian, south of Guangchang, west of Yihuang and Ningdou, and north of Nancheng. It is 104 km away from Fuzhou city, and 205 km away from Nanchang city. Nanfeng County is located in the upper reaches of the Xu River, and the 206 national highway runs through the county.

#### (2) Landform

Nanfeng County is located in the transitional zone between the Poyang Lake plain and Wuyi Mountain; mostly are hilly land and hillock areas, only a small number of low mountains on the southeast border, and some valley basins along the Fu River. The terrain is tilted from the southeast to the northwest, the site is a hilly

landform. There is no mineral resource below construction in the scope of the project.

### (3) Surface water system

The water area of Nanfeng is about 144,800 mu, which accounts for 5.06% of the total land area. The river in the county belongs to the Fu river water system of Yangtze river basin. Xu river (Fu river upstream) is the main river, which is from the south to the north through the central area of the county, and flows through Nanfeng county of 54 km long. There are also 16 first grade tributaries of Xu river such as Canglang water and Jiujuv water, and 6 second grade tributaries of Xu river such as Zhangfang water, the total length of 22 tributaries of Xu river is about 497 kilometers. The main surface water of the county is Xu river, according to the hydrological data provided by Nanfeng, Xu river's largest flow is 4,100 m<sup>3</sup>/s, the minimum flow is 12.6 m<sup>3</sup>/s, the highest water level is 92.28 m, and the lowest water level is 84.82m over the years.

Tan lake reservoir is located in Gaojia village of Taiyuan township in Nanfeng county, which is 19.0 km from Nanfeng city, the water originates in the elevation of 608.4 meters of the Jigong Mountain, and the reservoir site is located in the first grade tributary Canglang water of the Fu river water system. The geographical coordinates are east longitude 116°40'04" and north latitude 27°08'2.7". The control basin area above the dam site is 44.3km<sup>2</sup>, the elevation of the top of the reservoir dam is 146.60 m, the check flood level of the reservoir is 143.55 m, and the corresponding storage capacity is 50.67 million m<sup>3</sup>; The design flood level in the 50-year period is 142.67 m, and the corresponding storage capacity is 46.48 million m<sup>3</sup>; The normal water storage level is 141.20 m, and the corresponding storage capacity is 39.85 million m<sup>3</sup>; The dead water level of irrigation is 120.70 m, and the corresponding storage capacity is 85,000 m<sup>3</sup>.

#### 4.4.2 Ecological environment

The forest community types in Nanfeng County mainly include high hilly low mountain evergreen coniferous and broad-leaved mixed forest: the main tree species are pinus massoniana, taxodiaceae, aleurites, maple, lotus, kusahata tree, schima

superba, quercus, acer spp, myrica rubra etc. The middle-low mountain broad-leaved forest: mainly with sweet oak, evergreen chinquapin and quercus, usually with pinus massoniana; The low-hill coniferous tree: with the absolute advantage of pinus massoniana, more are firewood forest, sporadic distribution of mandarine, peach, plum, persimmon, pear, etc.; Phyllostachys edulis forest: distributed in rural areas throughout the county; Economic forest: camellia oleifera accounts for absolute advantage, which is widely distributed; Artificial forest: mainly distributed throughout the county, tree species are mainly pinus massoniana and cedar.

The main tree species of this project are pinus massoniana, cedar, quercus and sweet oak. Shrubs and herbs are mainly loropetalum chinense, rhododendrons, vaccinium bracteatum thunb, dicranopteris dichotoma and so on. The hills are dominated by poaceae such as imperata cylindrica and setaria viridis, the wood is mainly pinus massoniana, and there are also schima superba, liquidambar formosana hance, camellia oleifera, orange, phyllostachys edulis, and so on. According to the site investigation, there are ancient trees in China, and the tree species is the cinnamomum camphora. There are three ancient trees in Taoyuan village of Qiawan town, all of which are cinnamomum camphora, and the age of which respectively are 1000 years, 280 years, and unknown, belonging to the conservation ancient trees of national level-I and level-III;

Most of the wild animals in the area are common species, mainly birds, amphibians and reptiles.

#### **4.4.3 Socio-economic conditions**

Nanfeng is a county under the jurisdiction of Fuzhou, Jiangxi Province, China. The total area is 1909.28 square km, with a population of 288,000 in 2014. The total area of Nanfeng County is 1909.28 square km. It consists of 7 towns, 5 townships, 1 reclamation site, 175 village committees, 8 neighborhood committees, and 1,342 villagers' groups. The total population is 300,000, of which the non-agricultural population is 55,000.

The GDP of 2014 is 10 billion Yuan; the total fiscal income is 1.12 billion Yuan;

net income per capita of farmers is 15,429 Yuan; the natural population growth rate is controlled within 7.55‰; the registered unemployment rate in cities is controlled within 2.8%.

#### **4.4.4 Current situation of environmental quality in project area**

##### 4.4.4.1 Surface water

Wei River is the water source of Nanfeng water plant, according to the test report on September 26, 2016; testing items (20 items of PH, iron, manganese, copper, etc.) are in line with GB3838-2002 "Surface water environmental quality" class-III standards.

##### 4.4.4.2 Atmospheric environmental quality

According to the atmospheric environmental quality test report of Laowei county and Chexia Bay Village on November 9, 2015, the testing items (TSP, PM10, SO<sub>2</sub>, NO<sub>2</sub>) meet the requirements of class-II functional areas.

##### 4.4.4.3 Sound environment quality

According to the sound environmental quality test report of Laowei county and Chexia bay village and Shangche village from November 9 to 10, 2015, the results of equivalent continuous A level sound monitoring in Laowei county, Chexia bay village and Shangche village comply with the requirements of class-II sound functional areas.

### **4.5 Environmental Overview of Leping City**

#### **4.5.1 General overview of natural environment**

##### (1) Geographical location

Leping city is located in the northeast of Jiangxi province, in the middle reaches of Le'an river, east of Wuyuan county, Dexing city, south of Wannian county and Geyang county, west of Poyang county, north of Changjiang district, Jingde town and Fuliang county, the geographical coordinates are east longitude 113°53'36" to 117°32'40", north latitude 28°42'14" to 29°13'14". The distance from urban area to the provincial capital Nanchang is 208km by highway, 206 national road,

Anhui-Jiangxi railway, and Leping-Dezhou railway run through the border.

(2) Landform

The Leping city is located in the transition zone of the northeast Jiangxi province to the Poyang lake plain, and the Le'an river is crossing the border from the east to the west, and the three sides of the north and southeast are hilly. The ground elevation along the Le'an River and plain area is between 18 and 24 meters. There is no mineral resource below construction in the scope of the project.

(3) Surface water system

The water system of Leping city can be summarized as "one river and seven waters", that is, Le'an river, Anyin water, Jianjie water, Changle water, Ji water, Chexi water, Guanzhuang water and Panxi water, for many years, the average water resources amount is 2.227 billion m<sup>3</sup>, the transit water is 5.105 billion m<sup>3</sup>, the city's per capita water quantity is 2,779 m.

#### **4.5.2 Ecological environment**

The vegetation types in the project area are coniferous and broad-leaved mixed forest, the main plant species include: arbor, paulownia, sago cycas, cinnamomum camphora, pinus tabuliformis, pinus massoniana, cypress, etc.; For shrubs, there are camellia, rosa chinensis, rhododendrons, lindera aggregata, etc. For herbs, there are artemisia lavandulaefolia, amaranthus tricolor, prunella vulgaris, allium mongolicum regel, malachium aquaticum and so on. There are no national protected wild plants in the scope of the project evaluation area, and one tree is found in the Hougang town, Panxi village and Fangjia town, the tree species is the cinnamomum camphora and the age is unknown. Most of the wild animals in the area are common species, mainly birds, amphibians and reptiles.

#### **4.5.3 Socio-economic conditions**

Leping city has a total land area of 1,980 square kilometers, with jurisdiction of 19 counties and townships, there are 67 neighborhood committees and 266 village committees; The area of the city is 15 square kilometers. According to the 2015

Leping statistical yearbook, the total population of 2015 is 934,600, among which, the urban population is 136,300 people, and the township and township below (rural population) are 798,300. In 2015, the city achieves a regional production value of 25.719 billion Yuan, the city per capita GDP of 28,967 Yuan, the non-public economy rapidly develops, realizing an increase of 15.34 billion Yuan, which accounts for 64.35% of its GDP. The city's arable land is 758,000 mu, of which the paddy field is 568,000 mu, the rural per capita net income is 11,517 Yuan.

#### **4.5.4 Current situation of environmental quality in project area**

##### 4.5.4.1 Surface water

###### (1) Dongfanghong reservoir

Dongfanghong reservoir is the water source of Dongfanghong water plant of Leping city, according to the test report on March 19, 2012, the testing items (25 items of pH, dissolved oxygen, permanganate index, 5 daily biochemical oxygen demand and so on) are all in accordance with GB3838-2002 "Surface water environmental quality standards" class-III standards.

###### (2) Communist reservoir

Communist reservoir is the water source of Runquan water plant of Leping city, according to September 2016 ~January 2017 water quality test report, in testing items (29 items of pH, dissolved oxygen, permanganate index, 5 daily biochemical oxygen demand and so on), there occurs the phenomenon of exceeding standard of manganese and mercury, the remaining indicators are in line with GB3838-2002 "Surface water environmental quality standards" class-III standards.

###### (3) Anyin water

Anyin water is the water source of Lilin water plant, according to the water quality test report in January 2013, the testing items conform to the GB3838-2002 "Surface water environmental quality standards" class-III standards.

###### (4) Xingfu reservoir

The Xingfu reservoir is the water source of the Xingfu water plant, according to the water quality test report of January 2011, the testing items conform to the

GB3838-2002 "Surface water environmental quality standards" class-III standards.

(5) Guanzhuang water

Guanzhuang water is the water source of the Xingfu water plant, according to the January 2013 water quality test report, testing items (24 items of pH, dissolved oxygen, permanganate index, ammonia nitrogen, etc.) are in line with the GB3838-2002 "Surface water environmental quality standards" class-III standards.

4.4.4.2 Atmospheric environmental quality

According to "Leping Air Quality Monitoring Data Filling Report" (Source: Leping Government Information Public Website), in March, May, July, November 2006, the Leping atmospheric environment quality was monitored respectively, the monitoring items were mainly inhalable particulate matter, sulphur dioxide, nitrogen dioxide, and the monitoring results are in line with the requirements of the class-II of functional areas.

## **4.6 Environmental Overview of Xiushui County**

### **4.6.1 General overview of natural environment**

(1) Geographical location

Xiushui county is located in the north-west of Jiangxi province, the upper reaches of Xiu river, between Mufu mountain range and Jiuling mountain range, which is also located in the east longitude 113°56'23" to 114°56'49", north latitude 28°41'41" to 29°22'16", with the total area of 4,505 square kilometers, the county government is 277 km away from Nanchang, 210 km from Jiujiang, 398 km from Changsha and 374 km from Wuhan.

(2) Landform

Xiushui County is located in the northern margin of Jiangnan Fushilong pleated belt, across the lower Xiayangzi depression fold belt, belonging to the Jiangnan hilly topography, the county is surrounded by mountains, the middle of the lower hills goes up and down, with wide distribution of hills. The Xiu River and its first grade tributaries are developed into valley terraces. The terrain is high at surrounding and

low in the middle, the northwest Mufu range and the southeast Jiuling range show a close potential. There is no mineral resource below construction in the scope of the project

### (3) Surface water system

The surface water of the Xiushui is mainly for the Xiu River. Xiu River is one of the five rivers of Poyang lake river system, which is originated from Huanglong Mountain, Xiushui and Dawei Mountain, Tonggu County; the two rivers are called Xiu River after confluence of Licheng Fangzhou Maaotang Mountain. Xiu River flows from west to east, runs out east to Wuning, and pours into Poyang Lake after gathering in Ganjiang River through Wanghu pavilion, Wucheng town, Yongxiu County with the total length of 419 km and the main stream of 286 km. The main stream of Xiu river flows through 7 townships of Ma'ao, Xigang, Hangkou, Zhuping, Yining, Sidu, and Taiyangsheng, and enters Wuning County from the port of Taiyangsheng town, with a total length of 62.5 km. There are five main sections of Zhuping River, Penggu River, Sidu River, Miaoling River and Heyuan water, which are directly flowing into the main stream of Xiu river. Where above the Baozishi reservoir dam is the upstream section of the Xiu River, the area from Baozishi to Tuolin reservoir dam is the middle section of the Xiu River, and the area below the Tuolin River is downstream section of the Xiu River.

## 4.6.2 Ecological environment

The forest coverage of Xiushui County is 59.2 %, with relatively abundant plant resources, there are more than 2,000 varieties of seed plants in the county, the unique tree species include *chimonanthus salicifolius*, Jinqian willow, fragrant pine nuts, *bretschneidera sinensis*, and so on. The distribution of Xiushui economic crops is very extensive, including wild Chinese *actinidia chinensis*, chestnut, *myrica rubra*, *camellia oleifera*, tung, jujube, persimmon and so on.

The main plant species in the project area include: arbor, cedar, chestnut tree, *cinnamomum camphora*, *pinus tabuliformis*, *pinus massoniana* and so on; For shrubs, there are *camellia*, *rosa chinensis*, *camellia oleifera*, *lindera aggregata* and so on; For

herbs, there are plantago depressa willd, setaria viridis, artemisia lavandulaefolia, imperata cylindrica and so on. There is no national key protection wildlife in the scope of the project evaluation area, and the wild animals in the area are mostly common species, mainly birds, amphibians and reptiles.

#### **4.6.3 Socio-economic conditions**

There are 36 townships, 26 neighborhood committees and 361 administrative villages. At the end of 2014, the total population of the county is 864,800, of which the non-agricultural population is 102,100, accounting for 11.8% of the total population.

Xiushui is a major agricultural county and key poverty-stricken county aided by the State, which has 413,035 mu of paddy fields, 160,045 mu of dryland, and the main food crops are rice, sweet potatoes, corn, soybeans, etc., with tea garden area of 22,387 mu, silkworm area of 93,144 mu, medicinal herbs of 35,773 mu, aquaculture production 8,000 tons, and oil 4,497 tons. The county has more than 2700 households with large agricultural industry. At the end of 2014, the total GDP of the county is 12.213 billion Yuan.

#### **4.6.4 Current situation of environmental quality in project area**

##### 4.6.4.1 Surface water

###### (1) Dongjin reservoir

Dongjin reservoir is the third water source of Xiushui County, according to the test report in October 2011; the testing items (20 items of water temperature, pH, iron, manganese, copper and so on) are in line with GB3838-2002 "Surface Water Environmental Quality Standard" Class II standard.

###### (2) Water source of Shankou town water plant

All monitoring indexes (29 items of water temperature, pH, dissolved oxygen, permanganate index, chemical oxygen demand, etc.) of the drinking water source in Shankou town, Xiushui County reach the class-III water quality standard of "Surface Water Environmental Quality Standard" Class III standard (GB3838-2002).

#### 4.6.4.2 Atmospheric environmental quality

According to the "Environmental Air Quality Routine Monitoring Report form of Xiushuicounty" (source: portal website of county government of Xiushuicounty), on August 15, 2014, the atmospheric environment quality monitoring was made in Xiushui county environmental protection bureau and the Sanyuan middle school teaching building, the monitoring items mainly include inhalable particles, carbon dioxide and nitrogen dioxide, and the monitoring results show that the environmental air quality meets the requirements of class-II functional areas.

#### 4.6.4.3 Sound environment quality

According to the "Environmental Quality Noise Routine Monitoring Report of XiushuiCounty Urban Area" (source: portal website of county government of Xiushuicounty), on August 18, 2014, the sound environmental quality monitoring of Xiushuicounty Residential District, Industrial park, People's Hospital, square, Sanyuan middle school, Xincheng Garden and new county government were carried out, and the sound environmental quality of the monitoring and display were in accordance with the corresponding functional area requirements.

## **4.7 Environmental Overview of Linchuan District**

### **4.7.1 General overview of natural environment**

#### (1) Location

Linchuan district is located in the eastern part of Jiangxi province, the middle reach of the Fu river. Geographical coordinates are east  $116^{\circ}04'$ — $116^{\circ}39'$ , north latitude  $27^{\circ}31'$ — $28^{\circ}14'$ . Towards the Putie railway and Fuyin highway direction, the district longitudinally divides Fuzhou center city and the Shangdudu city, and is 9 km away from Fuzhou city, 114 km from the provincial capital Nanchang city.

#### (2) Landform

Linchuan is located in the transition zone of Jiangxi plain to Wuyi mountain area, the topography is long in north-south and narrow in east-west, the terrain is high in north and low in south, the periphery is hilly, there is a small basin formed by the

middle of the alluvial from the south to the north, the highest peak in the territory of the peak Furong mountain is 1,176 m above sea level, the lowest level is the Dagang township Qianhou Gang village, with altitude of 27.3. There is no mineral resource below construction in the scope of the project.

### (3) Surface water system

The water system in the Shangdundu border belongs to Poyang lake Fu river basin, the main rivers include Fu river, Yihuang water, Chongren water, Dongxiang river, Dongguan river, Fenggang river and so on, which meet at Fu river and pour in Poyang lake.

#### ① Fu river

Fu river originates from Limuzhuang, Guangchang county, which flows through Nanfeng and Nancheng gathering with Li water to Liaofang village, Pengtian township in this city, and the total length of the mainstream and tributary is 2700 km. The length in territory of the city is 127 km; the Fu River runs through the central city of Fuzhou city.

#### ② Yihuang water

Formed by Yi water and Huang water at the confluence of Yihuang county, the Yihuang water is first grade tributary of Lin water, and second grade tributary of Fu river, through Qiuxi, Hangbu, and Shangdundu, and is called Lin water after the confluence at Xiaduyao village, Hongqiao town and Chongren water, flows to the Huangtang mouth into Fu river, with full length of 119 km, the flow in this city is 38.5 km long.

#### ③ Chongren water

Chongren water is the first grade tributary of the Lin water, and the second grade tributary of Fu river, originated in Laohulao village, Gugang township, Le'an county, through Le'an, Chongren, and enter the border from Dongyuan bridge, Gaoping township, and is called the Lin water after the confluence at Xiaduyao village, Hongqiao town and Yihuang water, with a total length of 152 km.

## 4.7.2 Ecological environment

The zonal vegetation in Linchuan district is subtropical evergreen broad-leaved forest, and the floristic elements are mainly composed of fagaceae, lauraceae, theaceae, ternstroemiaceae, hamamelidaceae, aquifoliaceae, moraceae and other evergreen broad-leaf trees. The main tree species are: cedar, pinus massoniana, schima superba, liquidambar formosana hance, dalbergia hupeana, camphor wood and so on. The current vegetation in the project area is mainly composed of artificial pinus massoniana, camellia oleifera scrub forest, and barren hill scrub-grassland and so on. There is no national key protection wildlife in the scope of the project evaluation area, and the wild animals in the area are mostly common species, mainly birds, amphibians and reptiles.

#### **4.7.3 Socio-economic conditions**

Linchuan district has the jurisdiction of 9 townships, 17 towns, 2 reclamation fields, 5 street offices and 1 industrial development zone, with a population of 1.3 million. In 2015, the population of the region at the end of the year is 1,112,472, and the natural growth rate is 6.79 %.

In 2015, the GDP of Linchuan district is 34.162 billion Yuan, with a per capita GDP of 30,200 Yuan, and an average annual increase of 10.16 %; the total fiscal income is 2.11 billion Yuan, and the total fixed assets investment of the whole society is 18.371 billion Yuan. The per capita disposable income of rural residents is 13,925 Yuan, the urbanization rate is 51.5 %, the per capita disposable income of urban residents is 30,530 Yuan, and the per capita disposable income of rural residents is 13,925 Yuan.

#### **4.7.4 Current situation of environmental quality in project area**

##### 4.7.4.1 Surface water

###### (1) Yihuang River

Yihuang River is the water source of the first water plant in Linchuan district. according to the test report in February 2017, all the monitoring indexes (29 items of water temperature, pH, fecal coliform group, ammonia nitrogen, fluoride and so on)

reach the "Surface Water Environmental Quality Standard" (GB3838-2002) class-III water quality standard.

#### (2) Chongren River

According to the surface water environmental quality report, the intake water quality of the Chongren River meets the "Surface Water Environmental Quality Standard" (GB3838-2002) class-III water quality standard and the "Standard for Water Quality of Drinking Water Sources" (CJ3029-93) grade-II water resources standard .

## **4.8 Environmental Overview of Dongxiang District**

### **4.8.1 General overview of natural environment**

#### (1) Location

Dongxiang district is located in Gandong hills and plain transition zone of Hubin, Poyang Lake, which is also located in east longitude 116°20' to 116°51', north latitude 28°02' to 28°30'. East by Yujiang County, south of Jinxi County, west of Fuzhou City and Jinxian County, and north of Yugan County. The total area of the county is 1,275 square kilometers. It is 100 km away from the provincial capital Nanchang, 40 km away from the east to Yingtan city and 34 km away from the south to Fuzhou city.

#### (2) Landform

Dongxiang is located in the east province hill and plain transition zone of Poyang Lake, with flat terrain, and gentle hills. There is no mineral resource below construction in the scope of the project

#### (3) Surface water system

In Dongxiang district, there are 4 medium-sized reservoirs, 43 small-sized type-I reservoirs, 235 small-sized type-II reservoirs, and 634 hilly ponds, the total annual storage capacity of reservoirs is 0.224 billion m<sup>3</sup>, with effective irrigation area of 442,000 mu. In 2015, the total water consumption of Dongxiang area is 0.295 billion m<sup>3</sup>, among which: farmland irrigation use is 0.236 billion m<sup>3</sup>, industrial water consumption was 36 million m<sup>3</sup>, urban residents' water consumption is 13 million m<sup>3</sup>,

rural residents' water consumption is 9 million m<sup>3</sup>, eco-environment and other water consumption is 1 million m<sup>3</sup>, and the whole county water supply is 0.295 billion m<sup>3</sup>.

#### **4.8.2 Ecological environment**

Dongxiang is located in the subtropical region, because the climate is temperate and moist, the plant community is richer; the zonal plant is evergreen broad-leaved forest, deciduous broad-leaved forest, evergreen deciduous broad-leaved shrub, and coniferous forest. According to survey statistics, the county has more than 380 species of higher plants, of which 113 species and 22 families in arbors, 130 species and 28 families in shrubs, 130 species and 35 families in herbaceous plant and 7 species in bamboos. Natural timber forests mainly include *pinus massoniana*, *castanopsis sclerophylla*, *castanopsis eyrei*, *cyclobalanopsis glauca*, *castanopsis fargesii*, *liquidambar formosana* hance, *pterocarya stenoptera*, *schima superba*, *quercus acutissima*, *quercus chenii*, *cinnamomum camphora*, holly, *zizyphus spinosus* hu, *phyllostachys edulis* and so on, in which The distribution of *castanopsis sclerophyll* is wide and its quantity is large; *Schima superba* has more distribution in the Huxing mountain. *Cinnamomum camphora*, *platycladus orientalis*, dragon juniper, *sabina chinensis*, *cryptomeria fortunei*, *melia azedarach*, *triadica sebifera*, *CEDRELA* and other forest species are mostly sporadic.

#### **4.8.3 Socio-economic conditions**

The county has the jurisdiction of 9 towns, 4 townships, 3 reclamation sites, 1 forest farm, with a total of 16 neighborhood committees, and 138 village committees. County People's Government stays in Xiaogang town.

Dongxiang district in 2014 completed the GDP of 12.45 billion Yuan, fixed assets investment of 15 billion Yuan, the total fiscal income of 2.006 billion Yuan, the industrial added value above scale of 4.44 billion Yuan, and urban resident per capita disposable income of 24,942 Yuan, with growth of 9.8%; The average disposable income of rural residents is 12,163 Yuan, which increases by 10.2%.

#### **4.8.4 Current situation of environmental quality in project area**

##### 4.8.4.1 Surface water

###### (1) Hefang reservoir

Hefang reservoir is the water source of the newly-built project of the eastern city water plant, according to the water quality test report on May 8, 2017, all monitoring indexes (29 items of water temperature, pH, oxygen consumption, fecal coliform group, ammonia nitrogen, fluoride and so on) reach the "Surface Water Environmental Quality Standard" (GB3838-2002) class-III water quality standard.

###### (2) Hengshan reservoir

Hengshan reservoir is the water source of the newly-built project of the eastern city water plant, according to the water quality test report on May 8, 2017, all monitoring indexes (29 items of water temperature, pH, oxygen consumption, fecal coliform group, ammonia nitrogen, fluoride and so on) reach the "Surface Water Environmental Quality Standard" (GB3838-2002) class-III water quality standard.

##### 4.8.4.2 Atmospheric environmental quality

According to the "Inspection Report of Environmental Monitoring Station in Dongxiang County" (source: Fuzhou public website of government information), in August 2016, the atmospheric environmental quality monitoring is carried out in Dongxiang district, Guijia mountain and Zhangjia, and the monitoring items are mainly sulphur dioxide, nitrogen dioxide and inhalable particulate matter, and the monitoring results show that ambient air quality conforms to the requirements of the class-II functional area.

##### 4.8.4.3 Sound environment quality

According to the "Inspection Report of Environmental Monitoring Station in Dongxiang County" (source: Fuzhou public website of government information), in August 2016, the sound environment quality monitoring is carried out in the Dongxiang area, and the quality of the monitoring is in accordance with the corresponding functional area requirements.

## **5. Analysis, Evaluation and Prevention and Control Measures of Environmental Impacts of Water Supply Project**

### **5.1 Benefit Analysis Brought by the Implementation of Water Supply Project**

Part of the facilities and equipment of existing water plants are obsolete with small capacity in the project area, and they cannot meet the daily water needs of urban and rural residents within the area. Part of the water facilities and equipment suffer losses and serious aging, and they are hard to cope with the seasonal fluctuations of poor water source quality. And the water supply capacity has reached the upper limit. The construction of this project can improve the water supply and drainage facilities in urban areas, enhance the water supply capacity, so as to provide clean water with good water quality and stable water pressure to residents, helping enhance the life quality of local residents. After the implementation of this project, the water plant projects of five urban areas will be newly built / expanded, and the water supply pipeline network projects of six counties will be renovated / newly built, and the pipeline network extension projects of six counties, the water supply pipeline network renovation and extension projects of three villages, as well as the new construction and extension projects of water plant of two villages will be newly built. The project will newly add the water supply scale of 245,600 m<sup>3</sup>/d. Among which, the newly increased water supply scale in urban areas is 240,000 m<sup>3</sup>/d, and 5,600m<sup>3</sup>/d in rural areas. It will reduce 38929.5m<sup>3</sup>/d leakage loss of the pipeline network, and the total benefited population is 2946577 (According to the 2015 population statistics yearbook, there are discrepancies with the latest data) .

### **5.2 Evaluation and Prevention and Control Measures of Environmental Impacts During the Construction Period**

The contents of each subproject of this project have similarities, so they have generalities in their impact analysis. However, there are also some issues with

characteristics because of the different sensitive targets involved in each project. Therefore, environmental impact analysis has found out the generalities, and incorporated the generalities measures into the Environmental Enforcement Procedures (ECOP), which has been submitted as annex I of the environmental management plans. At the same time, it has put forward the targeted characteristic impacts and measures on the specific environmental impacts according to the features of each subproject, and especially for the relevant environmentally and socially sensitive sites.

### **5.2.1 Generality impacts and mitigation measures**

#### **5.2.1.1 Atmospheric environment**

Water plant construction, pipeline construction, loading and unloading, transportation, stacking and other processes will generate a large amount of dust emission during the construction period. An effective way to curb dust emission is water spraying. According to the survey, nearly 70% of dust emission can be reduced after adopting the measure of watering (four to five times per day), and the influenced scope is about 50 m. The TSP concentration in the ambient air can basically reach the secondary standards of the Ambient Air Quality Standards outside the range of 50 m. According to the identification and screening results of environmental protection targets of this project, the nearest distance between the pipeline network construction site of each project and the residential area is 5 m. As a result, the dust emission does have impact on the surrounding atmospheric environment during the construction, but such impacts are relatively short, and they will disappear with the end of construction period.

During the construction, effective measures must be taken to mitigate the adverse impacts of the construction dust on the surrounding environmental sensitive sites. Specifically, such measures include setting up fences around the construction site, strengthening the planning and management of the construction area, properly spraying water on the dry working site, and covering the stacked sand and other construction materials and so on. Please refer to the ECOP for the detailed

environmental protection measures during the construction.

### 5.2.1.2 Noise environment

The main contents of this water supply project include the construction of water plants, pipelines and pumping houses, and the sensitive sites around the construction involve settlements, schools, geracomiums and so on. Due to the wide distribution of the project, the affected area of the whole project construction is also relatively wide. However, the construction of the project is the local segmental construction with few local projects, so the local construction period is relatively short.

#### 1) Construction of large-scale pipeline

The construction noise during the pipeline network construction mainly comes from the construction machinery and the transportation vehicles. The construction noise is periodical, temporary and not fixed. The varied construction equipment will generate different noise, and the main noise sources are shown in Table 5.2-1.

Table 5.2-1 Noise Level of Main Construction Machinery and Equipment

S/N	Construction Machinery	Noise Level /dB(A)	Measured Distance /m
1	Excavator	64	10
2	Roller	75	10
3	Blender	68	10
4	Bulldozer	66	10
5	Scraper	75	10
6	Loader	85	10

In the construction site, noise source refers to multiple noise sources having an impact on the outside, and it will be weakened due to the attenuation of screening, transmission distance, air absorption and etc. during the transmission process. Project construction often involves using a variety of machineries. As a result, it shall be superimposed as the total noise source to predict its impact on the surrounding environment.

After calculation, the noise values with the distance attenuation are shown in Table 5.2-2.

Table 5.2-2 Predictions of Construction Machinery Noise with Distance Attenuation  
Unit: dB(A)

S/ N	Constr uction Machi nery	Distance (m)									Standard s
		10	20	40	60	80	100	150	200	300	
1	Excava tor	64	58	52	48.4	45.9	44	40.5	38	34.5	Daytime 70 dB(A), nighttim e 55 dB(A)  Emissio n Standard of Environ ment Noise for Boundar y of Constr uction Site (GB 12523-2 011)
2	Roller	75	69	63	59.4	56.9	55	51.5	49	45.5	
3	Blende r	68	62	56	52.4	49.9	48	44.5	42	38.5	
4	Bulldo zer	66	60	54	50.4	47.9	46	42.5	40	36.6	
5	Scrapp er	75	69	63	59.4	56.9	55	51.5	49	45.5	
6	Loader	85	79	73	69.4	66.9	65	61.5	59	55.5	
Total Noise Source		85.9	79.9	73.9	70.0	67.8	65.9	62.4	59.9	58.2	

From Table 5.2-2, it can be seen that the transmission distance of machinery noise in the open area is relatively far. The noise emission standard for the daytime construction site can be beyond 60 m on the both sides of the pipeline, while the noise impact of the nighttime construction is relatively large, and the noise standard for the nighttime construction site at 300 m still cannot be reached. The impacted scope of project construction noise is about 0~60 m on the both sides of the pipeline. The impacts during the construction period are short, and they will disappear with the end of construction period. As there are the sensitive sites on the both sides of pipeline construction route of this project, the impact analysis and mitigation measures for the sensitive sites are shown in the characteristic analysis. Certain measures must be taken in the process of construction to control the noise within the acceptable range during the construction. Reasonably arrange the construction time and prohibit the construction of high-noise equipment at nighttime (22:00 to 6:00 of next day) to minimize the impacts of construction noise on the surrounding environment. At the

same time, by setting up fences, reasonably arranging the construction camp, prohibiting construction at nighttime and other measures, such impacts can be mitigated. The specific mitigation measures are described in detail in ECOP.

2) Site and pumping house construction

The noise of the construction of site and pumping house is mainly generated in the process of piling, concrete mixing, earthwork carrying and etc., and the maximum noise level is about 85 dB. After calculation, the noise values with the distance attenuation are shown in Table 5.2-3.

Table 5.2-3 Predictions of Construction Machinery Noise with Distance Attenuation  
Unit: dB(A)

S/ N	Construction Machinery	Distance (m)									Standards
		10	20	40	60	70	100	150	200	300	
1	Excavator	64	58	52	48.4	45.9	44	40.5	38	34.5	Daytime 70 dB(A), nighttime 55 dB(A)  Emission Standard of Environment Noise for Boundary of Construction Site (GB 12523-2011)
2	Roller	85	84.0	78.0	74.4	71.9	70.0	66.5	64.0	84.0	
3	Blender	68	62	56	52.4	49.9	48	44.5	42	38.5	
4	Bulldozer	66	60	54	50.4	47.9	46	42.5	40	53.6	
5	Scraper	85	79	73	69.4	66.9	65	61.5	59	55.5	
Total Noise Source		88.1	82.9	75.9	72.0	69.8	67.9	64.4	61.9	60.2	

From Table 5.2-3, it can be seen that the transmission distance of machinery noise in the open area is relatively far. The noise emission standards for the daytime construction sites can be reached beyond 70 m from the site and pumping house construction, while the noise impact of the nighttime construction is relatively large, and the noise emission standard for the nighttime construction site at 300 m still cannot be reached.

In addition to the sensitive sites around the site of the new construction of water plant in Linchuan district (Huangshi village, 70 m away from the site), there are no sensitive sites in other sites and around the pumping house. According to the prediction results, the noise values at 70 m around the construction site can reach the

standard requirements. However, the corresponding protective measures also must be taken, such as reasonably arrange the construction time, prohibit the construction at nighttime (22:00 to 6:00 of next day) to avoid disturbing the residents, and set up fences in the construction site to avoid the impacts of site construction on the life of residents. As the impacts during the construction period are short, they will disappear with the end of the construction period. At the same time, by setting up fences, reasonably arranging the construction camp, prohibiting construction at nighttime and other measures, such impacts can be mitigated, and the noise can be controlled within the acceptable range. The specific mitigation measures are described in detail in ECOP.

#### **5.2.1.3 Water environment**

The wastewater in the construction period mainly includes the domestic wastewater of the construction workers and the construction wastewater. Among which, the domestic wastewater mainly contains  $\text{COD}_{\text{Cr}}$ ,  $\text{BOD}_5$ , SS,  $\text{NH}_3\text{-N}$  and other pollutants. The construction scope of this project is relatively wide, and the project is relatively dispersed. However, the main construction scope is located in towns and the surrounding areas, and the existing living facilities and municipal engineering in the town areas can be used. There is no need to set up a separate construction camp, and the existing rural houses can be used. The wastewater discharge can be treated by using the existing municipal facilities.

The construction wastewater includes a small amount of the concrete construction wastewater and the backwashing wastewater of the construction machinery, as well as the pressure test wastewater. The major pollutants include COD,  $\text{BOD}_5$ , SS, petroleum and so on. A pit pool is required to be established in the construction site, and the supernatant of the suspended sediment after the precipitation and filtration in the wastewater will be recycled for dust fall and watering on the site. Meanwhile, strengthen the management of construction machinery, and set up a simple sedimentation tank and oil separate tank for oily wastewater, and recycle such wastewater for watering and dust suppression on the site after precipitation. Carry out regular monitoring on the construction wastewater discharge during the construction period. The specific mitigation measures are described in details in ECOP.

#### **5.2.1.4 Solid wastes**

The solid wastes mainly come from the discarding dregs, the construction

wastes, and the household refuses of the construction workers during the construction period. In this project, the discarding dregs will be discarded in the centralized slag dump. After the stacking of the discarding dregs, engineering and greening measures will be taken to protect the slag dump, so as to avoid the water and soil loss. The specific analysis and measures will be described in details in the section (Section 5.2.2.1) of characteristic analysis of “Impacts and Measures on Water and Soil Loss”. The construction wastes mainly include the steel bar, discarded packing bags, waste bricks, etc., which are general solid wastes. The construction wastes should be promptly transported to the designated municipal construction waste landfills of each county for treatment. And the household refuses should be promptly transported to the household refuse landfills of each county to reduce the impacts on the environment.

#### **5.2.1.5 Ecological environment**

##### 1) Impact on animals and plants

During the construction, the land occupation of building structures, spoil, temporary facilities and so on such as water delivery pipelines, water plants and etc. have direct impact on the diversity of vegetation and plant. According to the survey, there is no distribution of national key wild vegetation in the project area. The macrophanerophyte species within the project area are mainly the paulownia, camellia, palm, cycas, camphor, Chinese Red Pine, masson pine, cypress and so on. The tree species composition is relatively simple. The herbaceous plants are mainly the artemisia lavandulaefolia, amaranth, barnyard grass, selfheal, crickweed, garden cress, scallion and other common species. During the construction, the direct impact on the plants is the destruction of vegetation within the project area. Due to the small land occupation of the construction compared with the total area, the project construction will not have a significant impact on the quantity and distribution of the vegetation. Due to the simple community structure of vegetation, low level of biodiversity and no wild plants under national key protection along the project pipeline, the plant losses will be quickly mitigated and recovered caused by land occupation after the immediate adoption of ecological restoration measures of temporary land occupation after finishing the construction. The specific measures are described in details in the section (Section 5.2.2.1) of characteristic analysis of “Impacts and Measures on Water and Soil Loss”.

The construction scope of this project is mainly in the area where mankind develops and live for a long time, with fewer wild animals and plants and no wild animals under the national key protection, so the impact on the wild animals is

limited.

## 2) Impact on landscape

Due to the project construction, the intensity of water and soil loss within the construction area has been greatly increased compared with that before the project, and a certain landscape damage has been made. As a result, the effective protection and treatment measures should be taken on each exposed surface and slag dump. The specific measures are described in detail in the section (Section 5.2.2.1) of characteristic analysis of “Impacts and Measures of Water and Soil Loss”. Because the construction areas are all relatively remote, and there are no distributions of scenic spots nearby, the impact on landscape during the construction period is limited.

The mitigation measures for the impact on ecological environment are described in details in ECOP.

### **5.2.1.6 Impact on traffic**

The impact of pipeline network construction on road traffic is relatively obvious. When the pipeline crosses the town road, if adopting the slotting method, the amount of spoil transportation during the construction period will lead to an increase of traffic volume in a short time, which will easily obstruct the vehicles on the road and greatly affect the traffic conditions. Therefore, if the geological and soil conditions permit, adopting the construction method of pipe jacking will reduce the impact of road excavation during the construction. However, at this time, the road bearing pressure will decline, trucks must be prohibited in a short time, all of which will affect the traffic in urban areas. According to the estimation, 20 days will be taken for the pipeline to cross every road, so the impact on the road traffic will last about 20 days. In terms of pipeline network construction, the construction on the main road will exert a particularly evident impact on the traffic. Therefore, we must make a complete and thorough plan and pay close attention to the construction, and adopt the construction method of pipe jacking as much as possible. Transportation time must avoid the peak hours of road traffic, and especially the peak hours of people going to work and getting off work. At the same time, we should negotiate with the local traffic management department to develop a temporary traffic route before the construction, and inform the residents within the construction affected areas in advance. Set up the nameplates on the construction site and arrange a special person to disperse the traffic. In addition, we should take measures to prevent traffic jams by further strengthening

the management of construction period, shortening the construction cycle and etc.

### **5.2.1.7 Community Health Security**

The project is generally located in the towns and the surrounding areas, supported by existing facilities without construction camps. The employees are mainly locals, with the limitations of migrant employees which spares the increase of the staff families and the pressure on community service. China possesses a comprehensive law system over contracted labor and various types of criminal offence (such as sexual assault) with strict enforcement. The 7 counties and cities involved in this project enjoy a good public security and a harmonious community. In short, the project employees may bring little harm to the local community.

The following measures shall be taken to ensure the community health and prevent the negative impact caused by on-site staff on the community.

(1) To promote the safety awareness related to the law, public security and traffic safety of the employees.

(2) To impart health knowledge to employees, particularly HIV information; to encourage individuals to take protective measures by using condoms to avoid passing the disease on to others.

(3) Environmental protection education shall be given to employees to ensure that the on-site water sewage and solid waste are treated in accordance with the requirements of ESMP lest the spread of disease occur.

## **5.2.2 Characteristic impact and mitigation measures**

### **5.2.2.1 Impact and measures on water and soil loss**

Jiangxi Province is one of the areas with serious water and soil loss in Southern China. According to the relevant materials, in 2014, the total area of soil erosion in Jiangxi Province was 26,496.87 km<sup>2</sup>, accounting for 15.87% of the total land area of the province, and 26.34% of the total mountain area of the province. The levels are divided by the intensity of soil and water loss, and the soil erosion areas within the province of all levels including mild, moderate, intense, extremely intense and violent are as follows: 14,895.82 km<sup>2</sup>, 7,557.66 km<sup>2</sup>, 3,158.15 km<sup>2</sup>, 776.42 km<sup>2</sup>, and 108.82 km<sup>2</sup>, accounting for 56.22%, 28.52%, 11.92%, 2.93% and 0.41% of the total soil

erosion area of the province respectively. However, in recent years, with the increase of the investment in the ecological soil and water conservation, the great improvement of the comprehensive governance standards, quality and efficiency of soil and water conservation, and the further strengthening of the supervision and law enforcement of soil and water conservation, the water and soil loss in Jiangxi Province is mitigating in general, and the intensity is decreasing.

The construction activities including the clearing of the construction site, the topography reform, the road construction, the construction of pipeline network infrastructure and so on, and they have caused the eradication of surface vegetation, resulting the formation of a bare surface. The excavation of drainage basin has led the temporary stacking of earthwork. The excavation or fill or other activities of earthwork has changed the original landscape, and formed a new unstable exposed slope. Under the impact of the above construction activities, the surface of the project area will suffer the surface erosion, gully erosion and other water and soil losses due to rainfall. Due to the construction of this project, the total area of the earthwork excavation will reach 1,759,000 m<sup>3</sup>, which will generate 882,900 m<sup>3</sup> discarding dregs, and the total area of the original landscape disturbance, and land and vegetation damage will reach 222.20hm<sup>2</sup>. The intensity of water and soil loss in the project construction area has greatly increased than that before the project.

According to the soil and water conservation report, the impacts of water and soil loss on subprojects in all counties and cities of this project are as follows:

(1) Xiushui County

The area of the original landscape disturbance, and the damage of the soil and water conservation facilities caused by the subproject construction in Xiushui county is 40.09hm<sup>2</sup>. The total amount of the earthwork excavation and fill of this project is 410,800 m<sup>3</sup>, among which, 410,800 m<sup>3</sup> is excavated, and 205,400 m<sup>3</sup> is filled. After the balanced allocation of earthwork, there is no debit record and credit record.

We should, in accordance with the water and soil loss features, prevention and control responsibilities and goals in each prevention and control area, and follow the principles of combining the governance and the prevention and control, the vegetation

measures and the engineering measures, the water and soil loss governance and the restoration and rebuilding of land productivity, the environment greening and landscaping, to plan and arrange the soil and water conservation measures of each prevention and control area as a whole, so as to form a complete prevention and control system for water and soil loss. The major project quantities of soil and water conservation measures in each prevention and control area are as follows:

① Prevention and control area in the plant area

Project measures: 0.28 hm<sup>2</sup> of site formation, 7,700 m<sup>3</sup> of topsoil backfill, and 2,340 m of drainage ditch.

Plant measures: 0.28 hm<sup>2</sup> of landscaping, 886m<sup>2</sup> of seed sowing, 208 m<sup>2</sup> of parking lot greening, and 46 of street trees planting.

Temporary measures: 7,700 m<sup>3</sup> of topsoil stripping, 202 m of retaining wall of soil bags, 2,566m<sup>2</sup> of trapaulin coverage, 1,286m of drainage ditch, four sedimentation basins and one car washing tank.

② Prevention and control area of pipeline project

Project measures: 8.70 hm<sup>2</sup> of site formation, 2,600 m<sup>3</sup> of topsoil backfill, and 15.02 hm<sup>2</sup> of rehabilitation.

Plant measures: 7.84hm<sup>2</sup> of green belt restoration, and 0.86hm<sup>2</sup> of afforestation and grass planting.

Temporary measures: 2,600 m<sup>3</sup> of topsoil stripping, 5,400 m of retaining wall of soil bags, 38,880 m<sup>2</sup> of trapaulin coverage, 5,400 m of color steel tile, and 41 sedimentation basins.

③ Prevention and control area of crossing project

Project measures: 0.18hm<sup>2</sup> of rehabilitation.

Temporary measures: 678 m of color steel tile, 650 m of drainage ditch and 16 sedimentation basins.

Monitoring on soil and water conservation: The monitoring contents include the monitoring on land disturbance, water and soil loss, as well as the soil and water conservation measures. The monitoring period of soil and water conservation starts from the construction preparation period to the end of the design level year, that is,

from January, 2018 to December, 2019, a total of 24 months. The monitoring scope is the project construction area and the direct impact area with a total area of 66.51hm<sup>2</sup>. The monitoring method is the combination of the observation of fixed station and the survey monitoring, and predict the results in accordance with the project construction characteristics and water and soil loss. There are three observation sampling plots and five survey sampling plots.

## (2) Yongxin County

The disturbance and damage area of the original landscape, land and vegetation is 86.69hm<sup>2</sup>. In case of no soil and water conservation measures, the area of damage of soil and water facilities is 86.69hm<sup>2</sup>, the largest amount of water and soil loss may reach to 44,532 t, and the newly increased amount of water and soil loss is 44,302 t.

The total amount of the earthwork excavation and fill of this project is 1,135,700 m<sup>3</sup>, among which, 829,300 m<sup>3</sup> is excavated, and 306,400 m<sup>3</sup> is filled. After the balanced allocation of earthwork, there is no debit record and 522,900 m<sup>3</sup> of credit record. The credit record comes from the excess earthwork generated from the site formation of water plants and the spoil generated from the pipeline project construction. The debit record of this project will be allocated by the Urban Construction Administration Bureau of Yongxin county in unification, and will be treated and handled in comprehension as a whole. There is no construction road in this project.

The major measures and main project quantities in each prevention and control area for soil and water conservation of subprojects of Yongxin county are as follows:

### ① Prevention and control area of water plants

Project measures: 2.78 hm<sup>2</sup> of site formation, 9,700 m<sup>3</sup> of topsoil backfill, 1.78hm<sup>2</sup> of arch skeleton slope protection, 442 m of intercepting ditch, 680 m of drainage ditch, 1,760 m of storm sewer, and 26 rain wells.

Plant measures: 1.47 hm<sup>2</sup> of landscaping, and 200 m<sup>2</sup> of parking lot greening.

Temporary measures: 9,700 m<sup>3</sup> of topsoil stripping, 210 m of retaining wall of soil bags, 7,000 m<sup>2</sup> of trapaulin coverage, 220 m of drainage ditch, two sedimentation basins, one car washing tank, and 450 m<sup>3</sup> of concrete floor demolition.

② Prevention and control area of pipeline project and affiliated facilities

Project measures: 28.63 hm<sup>2</sup> of site formation, 85,900 m<sup>3</sup> of topsoil backfill, and 8.90 hm<sup>2</sup> of rehabilitation.

Plant measures: 13.00 hm<sup>2</sup> of green belt restoration, 1.65 hm<sup>2</sup> of afforestation and grass planting, 5.08 hm<sup>2</sup> of sowing and grass planting.

Temporary measures: 85,900 m<sup>3</sup> of topsoil stripping, 2,500 m of retaining wall of soil bags, 5,000 m<sup>2</sup> of tarpaulin coverage, and 100 m of color steel tile.

Monitoring on soil and water conservation: The monitoring scope of soil and water conservation of this project is the responsibility scope of water and soil loss prevention and control of this project, and the area of the project monitoring is 160.95 hm<sup>2</sup>. With reference to the water and soil loss zones, we can divide the entire monitoring scope into two monitoring areas of water plant area and pipeline project and affiliated facility area for monitoring.

The key monitoring period of soil and water conservation monitoring of this project is the construction period, and the key monitoring area is the water plant area. The monitoring period starts from the construction preparation period (September, 2017) to September, 2023, a total of 72 months. Carry out key monitoring on the key areas and key period from April to September of water and soil loss in the project construction area. The main contents include the disturbance, water and soil loss, soil and water conservation measures and so on.

(3) Jinx County

The construction in Jinx County has disturbed the original landscape, land and vegetation, and the total area of disturbance and damage is 92.02 hm<sup>2</sup>, and the damage of the soil and water conservation area is 92.02 hm<sup>2</sup>. After the balance allocation of earthwork, there is no debit record and credit record. In case of no soil and water conservation measures, the total amount of water and soil loss that may be caused by the project is 2,999 t, and the newly increased amount of water and soil loss is 2,393 t.

The total amount of the earthwork excavation and fill of the subproject in Jinx County is 759,800 m<sup>3</sup>, among which, 379,900 m<sup>3</sup> is excavated, and 379,900 m<sup>3</sup> is filled. After the balance allocation of earthwork, there is no debit record and credit

record. A total of 181,100 m<sup>3</sup> of topsoil will be stripped by this project. The topsoil will be stacked within the area of project construction, and it will be used for greening and land improvement project after the completion of the construction.

The major project quantities of soil and water conservation measures in each prevention and control area are as follows:

1. Prevention and control area in the purification water plant area

Project measures: 600 m<sup>3</sup> of topsoil backfill, 0.21 hm<sup>2</sup> of site formation, and 369 m of drainage ditch.

Plant measures: 36 of street trees planting, and 1,044 m<sup>2</sup> of landscaping.

Temporary measures: 600 m<sup>3</sup> of topsoil stripping, 67 m of retaining wall of soil bags, 200 m<sup>2</sup> of trapaulin coverage, 184 m of drainage ditch, one sedimentation basin and one car washing tank.

2. Prevention and control area of pipeline project

Project measures: 46.92 hm<sup>2</sup> of rehabilitation, 180,200 m<sup>3</sup> of topsoil backfill, 46.92 hm<sup>2</sup> of site formation, 10.05 hm<sup>2</sup> of concrete floor demolition.

Plant measures: 25.17 hm<sup>2</sup> of sowing and grass planting.

Temporary measures: 180,200 m<sup>3</sup> of topsoil stripping, 1,176 m of retaining wall of soil bags, 60,067 m<sup>2</sup> of trapaulin coverage, and 17,300 m of color steel tile.

3. Prevention and control area of crossing project

Project measures: 700 m<sup>3</sup> of rehabilitation, 300 m<sup>3</sup> of topsoil backfill, and 300 m<sup>2</sup> of site formation.

Plant measures: 300 m<sup>2</sup> of sowing and grass planting.

Temporary measures: 300 m<sup>3</sup> of topsoil stripping, 80 m of retaining wall of soil bags, 120 m<sup>2</sup> of trapaulin coverage, 34 sedimentation basins, six sedimentation tanks, and 960 m of color steel tile.

Monitoring on soil and water conservation: The monitoring scope of soil and water conservation in this project include the project construction area and its direct impact area, and the total monitoring area is 128.76 hm<sup>2</sup>. The monitoring period of soil and water conservation starts from the construction preparation period to the end of the design level year, that is, from January, 2018 to March, 2021, a total of 30

months. There are six observation sampling monitoring sites and eight survey sampling monitoring sites. The monitoring contents of soil and water conservation in this project include the monitoring of the water and soil loss background value, the change of soil and water conservation ecological environment, the dynamics of water and soil loss, the prevention and control effects of soil and water conservation measures, the events of major water and soil loss, etc.. The methods are mainly including the positioning observation and monitoring, detailed survey, sample survey, data collection and inquiry and so on.

#### (4) Nanfeng County

The construction in Nanfeng County has disturbed the original landscape, land and vegetation, and the total area of disturbance and damage is 44.22 hm<sup>2</sup>, and the damage of the soil and water conservation area is 44.22 hm<sup>2</sup>. After the balance allocation of earthwork, there is no debit record and credit record. In case of no soil and water conservation measures, the total amount of water and soil loss that may be caused by the project is 1,202 t, and the newly increased amount of water and soil loss is 920 t.

The total amount of the earthwork excavation and fill of the subproject in Nanfeng County is 372,000 m<sup>3</sup>, among which, 186,000 m<sup>3</sup> is excavated, and 186,000 m<sup>3</sup> is filled. After the balance allocation of earthwork, there is no debit record and credit record. A total of 83,600 m<sup>3</sup> of topsoil will be stripped by this project. The topsoil will be stacked within the area of project construction, and it will be used for greening and land rehabilitation project after the completion of the construction.

The major project quantities of soil and water conservation measures in each prevention and control area are as follows:

##### 1. Prevention and control area of pipeline project

Project measures: 18.11 hm<sup>2</sup> of rehabilitation, 83,300 m<sup>3</sup> of topsoil backfill, 9.67 hm<sup>2</sup> of site formation.

Plant measures: 9.67 hm<sup>2</sup> of sowing and grass planting.

Temporary measures: 83,300 m<sup>3</sup> of topsoil stripping, 802 m<sup>3</sup> of retaining wall of soil bags, 27,767 m<sup>2</sup> of trapaulin coverage, and 3,246 m of color steel tile.

## 2. Prevention and control area of crossing project

Project measures: 500 m<sup>3</sup> of rehabilitation, and 300 m<sup>3</sup> of topsoil backfill.

Temporary measures: 300 m<sup>3</sup> of topsoil stripping, 40 m of retaining wall of soil bags, 100 m<sup>2</sup> of trapaulin coverage, 400 m of drainage ditch, 18 sedimentation basins, two sedimentation tanks, and 480 m of color steel tile.

Monitoring on soil and water conservation: The monitoring scope of soil and water conservation in this project includes the project construction area and its direct impact area, and the total monitoring area is 61.93 hm<sup>2</sup>. The monitoring period of soil and water conservation starts from the construction preparation period to the end of the design level year, that is, from January, 2019 to December, 2020, a total of 24 months. There are three observation sampling monitoring sites and six survey sampling monitoring sites. The monitoring contents of soil and water conservation in this project include the monitoring of the water and soil loss background value, the change of soil and water conservation ecological environment, the dynamics of water and soil loss, the prevention and control effects of soil and water conservation measures, the events of major water and soil loss, etc.. The methods mainly include the positioning observation and monitoring, detailed survey, sample survey, data collection and inquiry and so on.

### (5) Leping City

The subproject construction in Leping City disturbed the original landscape, land and vegetation, resulting in an area of 46.14 hm<sup>2</sup> for disturbance and damage. The damage area of soil and water conservation facilities is 46.12hm<sup>2</sup>. After the balanced allocation of earthwork, the debit record is 67,700 m<sup>3</sup>, and the credit record is 72,300 m<sup>3</sup>. In case of no soil and water conservation measures, the amount of water and soil loss caused by the project may reach to 3,515t, and the newly increased amount of water and soil loss is 3,321t.

The total amount of the earthwork excavation and fill of the subproject construction in Leping City is 605,000 m<sup>3</sup>, among which, 304,800 m<sup>3</sup> is excavated, and 300,200 m<sup>3</sup> is filled. After the balanced allocation of earthwork, there is 67,700

m<sup>3</sup> of debit record and 72,300 m<sup>3</sup> of credit record. The credit record mainly comes from the excess topsoil generated from the site formation of water purification plant and water intake pump house, as well as the spoil generated in the process of pipeline project construction. The debit credit is the earthwork needed for backfilling of site formation of the first phase of water purification plant (the debit record of the first phase of water purification plant is 67,700 m<sup>3</sup>, and the second phase is estimated to be 43,800 m<sup>3</sup>, and the total debit record is estimated to be 111,500 m<sup>3</sup>). The debit record and credit record of this project will be allocated and treated by the Chihu Industrial Park Administration Bureau in Jiujiang county in unification.

The major project quantities of soil and water conservation measures in each prevention and control area are as follows:

① Prevention and control area of water purification plant

Project measures: 2.68 hm<sup>2</sup> of site formation, 7,700 m<sup>3</sup> of topsoil backfill, and 2,340m of drainage ditch.

Plant measures: 2.57 hm<sup>2</sup> of landscaping, 886m<sup>2</sup> of seed sowing, 208m<sup>2</sup> of parking lot greening, and 46 of street trees planting.

Temporary measures: 7,700 m<sup>3</sup> of topsoil stripping, 202 m of retaining wall of soil bags, 2,566m<sup>2</sup> of trapaulin coverage, 1,286m of drainage ditch, four sedimentation basins and one car washing tank.

② Prevention and control area of pipeline project

Project measures: 8.70 hm<sup>2</sup> of site formation, 2,600 m<sup>3</sup> of topsoil backfill, and 15.02 hm<sup>2</sup> of rehabilitation.

Plant measures: 7.84hm<sup>2</sup> of green belt restoration, and 0.86hm<sup>2</sup> of afforestation and grass planting.

Temporary measures: 2,600 m<sup>3</sup> of topsoil stripping, 5,400 m of retaining wall of soil bags, 38,880 m<sup>2</sup> of trapaulin coverage, 5,400 m of color steel tile, and 41 sedimentation basins.

③ Prevention and control area of crossing project

Project measures: 0.18hm<sup>2</sup> of rehabilitation.

Temporary measures: 678 m of color steel tile, 650 m of drainage ditch and 46 sedimentation basins.

Monitoring on soil and water conservation: The monitoring scope of soil and water conservation of this project includes the project construction area and the direct impact area with a total area of 69.01hm<sup>2</sup>. The monitoring period starts from the construction preparation period of the project to the end of the design level year, that is, from February, 2014 to June, 2016, a total of 29 months. There are four observation sampling plot monitoring sites and six survey sampling plot monitoring sites. The monitoring contents of soil and water conservation of this project include the monitoring on the ecological environmental changes of soil and water conservation, the dynamic of water and soil loss and the prevention and control effectiveness of water and soil loss. The methods of positioning monitoring, survey monitoring and so on are mainly adopted.

#### (6) Linchuan District

The subproject construction in Linchuan District disturbed the original landscape, land and vegetation, resulting in an area of 9.96hm<sup>2</sup>for disturbance and damage. The damage area of soil and water conservation facilities is 9.96 hm<sup>2</sup>. After the balanced allocation of earthwork, the debit record is 67,700 m<sup>3</sup>, and the credit record is 72,300 m<sup>3</sup>. In case of no soil and water conservation measures, the amount of water and soil loss caused by the project may reach to 3,515t, and the newly increased amount of water and soil loss is 3,321t.

The total amount of the earthwork excavation and fill of this project is 605,000 m<sup>3</sup>, among which, 304,800 m<sup>3</sup>is excavated, and 300,200 m<sup>3</sup>is filled. After the balanced allocation of earthwork, there is 67,700 m<sup>3</sup>of debit record and 72,300 m<sup>3</sup>of credit record. The credit record mainly comes from the excess topsoil generated from the site formation of water purification plant and water intake pump house, as well as the spoil generated in the process of pipeline project construction. The debit credit is the earthwork needed for backfilling of site formation of the first phase of water purification plant (the debit record of the first phase of water purification plant is 67,700 m<sup>3</sup>, and the second phase is estimated to be 43,800 m<sup>3</sup>, and the total debit

record is estimated to be 111,500 m<sup>3</sup>). The debit record and credit record of this project will be allocated and treated by the Chihu Industrial Park Administration Bureau in Linchuan county in unification. The new construction of water plant requires the construction of a construction road from the existing road to the main entrance of the factory, which will be renovated and hardened into the factory road after the completion of the construction. The width of this road is 6 m, and the length is 70 m, covers an area of 0.04hm<sup>2</sup>, and it is the permanent land occupation.

The major project quantities of soil and water conservation measures in each prevention and control area are as follows:

① Prevention and control area of water intake pumping house

Project measures: 1,487 hm<sup>2</sup> of site formation, 700 m<sup>3</sup> of topsoil backfill, and 408 m of drainage ditch.

Plant measures: 1,487 hm<sup>2</sup> of landscaping, and 46 of street trees planting.

Temporary measures: 700 m<sup>3</sup> of topsoil stripping, 500m<sup>2</sup> of concrete floor demolition, 64 m of retaining wall of soil bags, 233 m<sup>2</sup> of trapaulin coverage, 125 m of drainage ditch, and one sedimentation basins.

② Prevention and control area of water purification plant

Project measures: 2.68 hm<sup>2</sup> of site formation, 7,700 m<sup>3</sup> of topsoil backfill, and 2,340m of drainage ditch.

Plant measures: 2.57 hm<sup>2</sup> of landscaping, 886m<sup>2</sup> of seed sowing, 208m<sup>2</sup> of parking lot greening, and 46 of street trees planting.

Temporary measures: 7,700 m<sup>3</sup> of topsoil stripping, 202 m of retaining wall of soil bags, 2,566m<sup>2</sup> of trapaulin coverage, 1,286m of drainage ditch, four sedimentation basins and one car washing tank.

③ Prevention and control area of pipeline project

Project measures: 8.70 hm<sup>2</sup> of site formation, 2,600 m<sup>3</sup> of topsoil backfill, and 15.02 hm<sup>2</sup> of rehabilitation.

Plant measures: 7.84hm<sup>2</sup> of green belt restoration, and 0.86hm<sup>2</sup> of afforestation and grass planting.

Temporary measures: 2,600 m<sup>3</sup> of topsoil stripping, 5,400 m of retaining wall of soil bags, 38,880 m<sup>2</sup> of trapaulin coverage, 5,400 m of color steel tile, and 41 sedimentation basins.

④ Prevention and control area of crossing project

Project measures: 0.18hm<sup>2</sup> of rehabilitation.

Temporary measures: 678 m of color steel tile, 650 m of drainage ditch and 46 sedimentation basins.

Monitoring on soil and water conservation: The monitoring scope of soil and water conservation of this project includes the project construction area and the direct impact area with a total area of 69.01hm<sup>2</sup>. The monitoring period starts from the construction preparation period of the project to the end of the design level year, that is, from October, 2017 to December, 2019, a total of 27 months. There are four observation sampling plot monitoring sites and six survey sampling plot monitoring sites.

The monitoring contents of soil and water conservation include the monitoring on the ecological environmental changes of soil and water conservation, the dynamic of water and soil loss and the prevention and control effectiveness of water and soil loss. The methods of positioning monitoring, survey monitoring and so on are mainly adopted. In the annual flood season (from April to September), the monitoring shall be carried out every month, and in the annual non-flood season, the monitoring shall be carried out once every three months. The irregular monitoring is mainly based on the rainfall conditions. The monitoring frequency should be increased appropriately when the rainfall is more than 50 mm per day. The construction of soil and water conservation measures being implemented should be monitored at least once every ten days.

(7) Dongxiang District

The disturbance and damage area of the subproject construction in Dongxiang District is 22.13 hm<sup>2</sup>. The damage area of soil and water conservation facilities is 22.13 hm<sup>2</sup>. In case of no soil and water conservation measures, the amount of water

and soil loss caused by the project may reach to 3,515t, and the newly increased amount of water and soil loss is 3,321t.

The total amount of the earthwork excavation and fill of the subproject in Dongxiang District is 230,500 m<sup>3</sup>, among which, 150,800 m<sup>3</sup> is excavated, 79,700 m<sup>3</sup> is filled, and 71,100 m<sup>3</sup> is discarded. The discarded earthwork will all be transported to the surrounding road project construction site to work as the subgrade for filling. Among which, the directional crossing boring mud will be transported to the outside after the drying and hardening of the mud pit along the pipeline. The excavation of earthwork means the excavation and landfill should be carried out simultaneously. The landfill earthwork of the reserved pipe groove will be stacked on one side. The excavation of excess earth will be used for the site formation and the landfill construction surrounding the roads. During the construction period, a total of eight temporary land mines have been set up along the pipeline with a land area of 0.87hm<sup>2</sup>. The pipeline height is less than 3.0 m and the total stacking capacity is 26,100 m<sup>3</sup>. They are used for the temporary stacking of peeled topsoil and tillage soil for land greening and rehabilitation and restoration. The new construction of water plant requires the establishment of a construction road from the existing road to the main entrance of the plant, which will be reformed and hardened into the plant road after the completion of the construction. The width of the road 6 m, and the length is 70 m, and it is the permanent land occupation.

The prevention and control area of water and soil loss in this project is divided into four prevention and control areas, namely, the prevention and control area of water intake pumping house, the prevention and control area of water purification plant, the prevention and control area of pipeline project and the prevention and control area of crossing project.

① Prevention and control area of water intake pumping house

Project measures: 1,487 hm<sup>2</sup> of site formation, 700 m<sup>3</sup> of topsoil backfill, and 408 m of drainage ditch.

Plant measures: 1,487 hm<sup>2</sup> of landscaping, and 46 of street trees planting.

Temporary measures: 700 m<sup>3</sup> of topsoil stripping, 500m<sup>2</sup>of concrete floor demolition, 64 m of retaining wall of soil bags, 233 m<sup>2</sup>of trapaulin coverage, 125 m of drainage ditch, and one sedimentation basins.

② Prevention and control area of water purification plant

Project measures: 2.68 hm<sup>2</sup>ofsite formation, 7,700 m<sup>3</sup>of topsoil backfill, and 2,340m of drainage ditch.

Plant measures: 2.57 hm<sup>2</sup>of landscaping, 886m<sup>2</sup>of seed sowing, 208m<sup>2</sup>of parking lot greening, and 46 of street trees planting.

Temporary measures: 7,700 m<sup>3</sup> of topsoil stripping, 202 m of retaining wall of soil bags, 2,566m<sup>2</sup>of trapaulin coverage, 1,286m of drainage ditch, four sedimentation basins and one car washing tank.

③ Prevention and control area of pipeline project

Project measures: 8.70 hm<sup>2</sup>ofsite formation, 2,600 m<sup>3</sup>of topsoil backfill, and 15.02 hm<sup>2</sup>of rehabilitation.

Plant measures: 7.84hm<sup>2</sup>of green belt restoration, and 0.86hm<sup>2</sup>of afforestation and grass planting.

Temporary measures: 2,600 m<sup>3</sup> of topsoil stripping, 5,400 m of retaining wall of soil bags, 38,880 m<sup>2</sup>of trapaulin coverage, 5,400 m of color steel tile, and 41 sedimentation basins.

④ Prevention and control area of crossing project

Project measures: 0.18hm<sup>2</sup>of rehabilitation.

Temporary measures: 678 m of color steel tile, 650 m of drainage ditch and 46 sedimentation basins.

Monitoring on soil and water conservation: It includes the project construction area and the direct impact area with a total area of 25.45 hm<sup>2</sup>. The distribution of monitoring site is determined on the basis of the function layout, landscape characteristics, and types of soil and water conservation measures. The monitoring sites are mainly located in the areas where the original landscape, land and vegetation

are disturbed or damaged or easily to be eroded. There are four observation sampling plot monitoring sites and six survey sampling plot monitoring sites.

### 5.2.2.2 Impacts and measures on the underground infrastructure

#### (1) Gas pipeline

The gas pipelines involved in the pipeline construction of this project are shown in Table 5.2-4

Table 5.2-4 Pipelines Involved in the Water Supply Project

County and City	Subproject Name	Location	Construction Content	Name	Distance
Nanfeng	Pipeline network extension project in Nanfeng county	Shishan township	Pipeline construction which extends from the water plant in the county to Shishan township	Gas pipeline	15m
Dongxiang	New construction of water plant in urban area of Dongxiang district	Dongxiang county	Construction of the original water pipeline from Hengshan reservoir to the new water plant	Pipeline of project of natural gas transmission from West to East China	Crossing
Leping	Pipeline network extension project in township of Leping city	Hougang township	Pipeline construction which extends from the water plant in the county to Hougang township	Gas pipeline	Crossing

The construction of gas project has its own industry regulations and requirements. In the construction of this project, the construction unit may cause the impact or damage on gas pipeline network due to the lack of proper construction or supervision duties. For example, causing the leakage and damage during the construction due to

the excavation of gas pipelines, and carrying out forced construction of the ambiguous pipeline locations without the communications with the gas pipeline network company, or causing the breakdown of pipeline network by arbitrarily changing the distribution and structure of gas pipeline network due to the lack of protection awareness, and other accidents. Before the construction, we should communicate with the management department about the construction plans, and the construction activities can be carried out after obtaining the consent. We should strictly implement relevant measures during the construction to ensure that the project construction will not adversely affect the gas pipeline.

The specific measures include: Carry out the construction plans after obtaining the consent of the company. The distance between the construction scope and gas pipeline should be more than 50 cm, and we should pay attention not to damage the pipeline during the construction. Reduce the driving of the large-scale vehicles on the gas pipeline, and strictly control the width of the construction belt, as well as reduce the cross-laying of the pipelines. Do a good job of the corresponding safety management plan. Do not make a fire, take the soil, or stack the discarding dregs and spoil and other heavy objects and corrosive substances within the range of 5 m on the both sides of the gas pipeline center line. Do not use the mechanical tools for excavation construction, and do not set up the temporary dormitory. Prohibit the mechanical excavation, blasting, lifting and hoisting and other operations near the gas pipeline. Eliminate the brutal construction. At the same time, prohibit the opening of temporary roads above the gas pipeline facilities, as well as the stay and walking of load-carrying vehicles, bulldozers and so on. Emergency measures should be made in advance for the accidents that may occur during the construction, and the repair equipment for emergency should be prepared. Once the damage of gas pipeline and other accidents occur, we should immediately report such accidents to the gas pipeline unit for the emergent repair. Increase the distribution of piles and beams or local undercut protections and so on to protect the above pipeline, as well as to ensure the normal operation during the construction and the safety after the completion of the construction. Carry out the vegetation restoration around the pipeline after the

construction.

In addition, we should strictly comply with the regulations of the management department of pipeline of the project of natural gas transmission from West to East China during the construction period. For the construction projects involving in the pipeline of the project of natural gas transmission from West to East China, we should develop the detailed construction plans prior to the construction, and submit them to the pipeline management department. After obtaining the consent of the department, the construction activities can be carried out. During the construction, the main pipeline should go through under the cross pipelines. Temporary measures should be taken during the construction (such as increase the distribution of piles and beams or local undercut protections and so on), so as to protect the pipeline above and ensure the normal operations during the construction and the safety after the completion of the construction.

(2) Optical fiber cable

The optical fiber cables involved in the pipeline construction of this project are shown in Table 5.2-5.

Table 5.2-5 Optical Fiber Cables involved in the Water Supply Project

<b>County and City</b>	<b>Subproject Name</b>	<b>Location</b>	<b>Construction Content</b>	<b>Name</b>	<b>Distance</b>
Nanfeng	Pipeline network extension project in Nanfeng county	Shishan township	Pipeline construction which extends from the water plant in the county to Shishan township	Optical fiber cable	15m
Leping	Renovation and new construction of water plant in urban area	Wukou village	Construction of the original water pipeline from Communist reservoir to Runquan water plant	Optical fiber cable	10m

As most part of the pipeline in this project will be laid along the road, there is a

situation that the pipeline laying is parallel or crossed with the optical fiber cable, and the construction site is relatively close to the location of optical fiber cable. The project construction involves the excavation, compaction and rolling of land, thus causing some hidden dangers and threats on the direct burial fiber cable. Before the construction, we should communicate with the management department about the construction plans, and the construction activities can be carried out after obtaining the consent. In dealing with the construction of external forces, we should still ensure that there is 0.5 m of soil covering the optical fiber cable. Try hard not to allow the heavy machinery or a large amount of construction materials to be parked or stacked over the optical fiber cable for a long time by the construction side. In the construction area with hard soil, make sure to lay 8~10cm of pure soil below the optical fiber cable to ensure its safety. As the anti-pressure ability of the auxiliary materials of optical fiber cable is not strong, we should take protective measures as far as possible when dealing with the construction of external forces.

For the construction projects involving in the optical fiber cable, we should develop the detailed construction plans prior to the construction, and submit them to the pipeline management department. After obtaining the consent of the department, the construction activities can be carried out. During the construction, we should strictly comply with the national standards, and well protect the optical fiber cable facilities. Set up the warning signs in front of or behind the construction area during the construction, and do a good job in the corresponding safety management plans, so as to reduce the crossed laying of the pipelines. We should strongly prohibit the stacking of inflammable and explosive goods next to the pipeline of the optical fiber cable communication, and prohibit the stacking of the construction waste, earthwork, construction materials and so on above the surface of the optical fiber cable. The main pipeline should be laid below the crossed pipelines. Temporary measures should be taken during the construction (such as increase the distribution of piles and beams or local undercut protections and so on), so as to protect the pipeline above and ensure the normal operations during the construction and the safety after the completion of the construction. The restoration around the construction site should be carried out in

a timely manner after the completion of the construction.

### 5.2.2.5 Impacts and measures on transport facilities

The pipeline network in some counties and cities of this project adopts the form of laying along the highway or crossing the highway and railway, and the impact analysis and measures are shown in Table 5.2-6.

Table 5.2-6 Impact Analysis and Mitigation Measures of the Transport Facilities Involved in the Project

County and City	Subproject Name	Highway Name	Location Relation with This Project	Distance
Yongxin County	Pipeline network extension project in Yongxin county	G319	Parallel	20m
		S228	Parallel	15m
Nanfeng County	Pipeline network extension project in Nanfeng county	G206	Parallel	20m
Dongxiang District	Pipeline network extension project in Dongxiang county	G320	Parallel	20m
		S210, S208, S213	Parallel	15m
		G60, High-Speed Railway	Crossed	/
Leping City	Renovation and new construction of water plant in urban area	S307	Parallel	15m
Xiushui County	New construction and renovation of pipeline network in Xiushui county	S304	Parallel	15m
Note: G means national highway, and S means provincial highway				

The pipeline construction will have an impact on the highway, including the subsidence of the highway surface during and after the construction, as well as the road hump caused by the pipe jacking excavation and so on. According to the opinion investigation of highway management department, the design unit should propose the construction plans for the pipeline area which involved in the highway facilities during the preparation period, and inform the highway management department in advance. The construction can be started after obtaining the permission from the

highway department. During the construction of this project, we should strictly implement the management requirements of the highway department, to ensure no damage of highway facilities and no occupation of highway land. Strictly control the width of the construction area, and comply with relevant national standards. The restoration on the affected area should be carried out in a timely manner after the completion of the construction.

Relevant protective measures should be taken for the area crossing the highway and railway. During the construction, we should adopt the pipe jacking method and the crossing plan that entangling the steel pipe with the reinforced concrete pipe, and the inner diameter of the pipe should be 0.4 m more than the external diameter of the steel pipe. According to the Technical Specification for Pipe Jacking of Water Supply and Sewerage Engineering (CECS246-2008), the thickness of the top pipeline coverage should be 1.5 times greater than the external diameter of the pipeline in the unstable soil and should be greater than 1.5 m. Considering the stability requirements of the base soil, the thickness of the covering soil above the top surface of the pipe jacking should not less than 3 m, and at the same time we should use the pipe jacking machine in the way of earthwork pressure balance for construction, so as to ensure that there is no road hump and collapse, as well as to ensure the traffic safety.

#### 5.2.2.6 Impacts and measures on material and cultural resources

The main material and cultural resources involved in the water supply project are old trees, and the specific list is shown in Table 5.2-7

Table 5.2-7 Impact Analysis and Mitigation Measures of the Old Trees Involved in the Project

County and City	Subproject Name	Location	Construction Content	Name	Distance	Description
Yongxin	Pipeline network extension project in	Shiqiao township	Pipeline construction which extends from the water	Old trees	15m	Camphor tree, which is located in Zhangshi village. Its age is unknown, and it is growing well

	Yongxin county		plant in the county to Shiqiao township			
Nan feng	Pipeline network extension project in Nanfeng county	Qiawan township	Pipeline construction which extends from the water plant in the county to Qiawan township	Old trees	15m	Camphor tree, which is located in Taoyuan village, with the age of 1,000 years. It is the old tree protection at the national level and is growing well
				Old trees	15m	Camphor tree, which is located in Taoyuan village, with the age of 280 years. It is the old tree protection at the third national level and is growing well
				Old trees	15m	Camphor tree, located in Taoyuan village. Its age is unknown, and it is the old tree protection at the third national level and is growing well
Lepi ng	Pipeline network extension project in township of Leping city	Hougang township	Pipeline construction which extends from the water plant in the county to Hougang township	Old trees	10m	Camphor tree, which is located in Zhangshi village. Its age is unknown, and it is growing well
	Pipeline renovation and extension project of water supply in rural area	Yongshan township	Pipeline network extension construction in water plant of Yongshan	Old trees	8m	Camphor tree, which is located in Zhangshi village. Its age is unknown, and it is growing well

Since all the old trees involved in this project are not in the scope of construction and have a distance of 8~15m from the construction area, the impact of the project on

them is mainly indirect. The impact of the pipeline network construction on old trees mainly reflects in two aspects of ecological impact and atmospheric environment impact during the construction. The impact of construction dust on old trees is the direct impact on the plant due to the sedimentation of the particular matters on the plant ground organs (leaves, stems, flowers and fruits) which generated from the dust. The sedimentation accumulates on the plant surface in the form of dry dust, mud film and etc.. The sedimentation subsidence on the plant surface blocks the stoma, resulting in the decrease of gas exchange, the increase of leaf temperature and the decrease of photosynthesis, which affects the plant.

The scope of the atmospheric environment of the pipeline network construction in this project is about within 50 m around the construction area. During the construction, we should strictly follow the Methods for the Protection of Ancient and Famous Trees and other relevant laws and regulations to ensure that the project construction will have no adverse impact on the old trees. The specific measures include: prepare a number for each tree and implement the listing management, indicate the name, diameter, age, protection precautions, etc. of each tree, and equip special tools. Set up tree archives with the photo of each tree in addition to the literal data, so as to implement the tracking management of the whole process of the construction. Strengthen the environmental management during the construction period. Regularly watering the dust to reduce the amount of dust production which generated from the construction, and avoid the dust sedimentation on the surface of the plant which will cause an impact on the growth of old trees. Strengthen the construction management, prohibit the arbitrary discharge of construction wastewater, and avoid the construction liquid waste to immerse in the root of the soil which will cause soil hardening, all of which will affect the growth of old trees or directly damage the tree roots. Prohibit the fire and gas operations around the old trees, clean up everything around the trees with no stacking of sundries, and equip adequate fire-fighting equipment. We should use the planting soil for backfill in layers to ensure the backfill soil meet the needs of tree growth. Strengthen the protection awareness of the construction workers. The relevant protection measures are implemented by the local forestry department. Please refer to

the PCR management plan of project ESMP for the detailed analysis and measures.

### **5.2.2.7 Impacts and measures on atmosphere and noise**

According to the identification and screening results of the environmental protection targets, the closest distance between each construction site of the pipeline network in this project and the residential area is 5 m. Therefore, there are the impacts of the construction dust on the surrounding environment. The main impact of the construction on the surrounding environment mainly reflects in the two aspects of atmosphere and noise, especially for the surrounding sensitive sites such as schools, geracomiums, etc.. As a result, in addition to the generality mitigation measures stipulated in ECOP, the targeted measures are supplemented and developed as follows:

(1) The construction activities surrounding the Duanshang Primary School in Maaotownship, Xiushui county, the Laixi Primary School in Nanfeng county, the Liangxian Primary School in Wenquan township, Linchuan district, the Dongxing Technical School in Dongxiang district, the Guangchang Primary School in Dongxiang district, the Bogan Middle School in Dongxiang district, and the Qimingxing Experimental Kindergarten in Leping city, should be arranged in the non-teaching time to avoid the impacts on teaching order as far as possible.

(2) In particular, we should pay great attention to control the construction period for the construction surrounding the geracomium in Xiaohuang township, Dongxiang district, so as to avoid the noon and night rest periods, as well as to avoid the impact of the construction noise on the aged people in the geracomium.

(3) In the construction area near the above units, a temporary noise barrier with the great noise reduction effect and the height of no less than 2 m should be established to reduce the noise impact. According to relevant data, after the establishment of the temporary noise barrier, the noise contribution values of the sensitive sites surrounding the construction area can be reduced by 10dB(A)~15dB(A). The specific establishments are shown in Table 5.2-8.

Table 5.2-8 Establishments of Temporary Noise Barriers During the Construction Period for the Water Supply Project of This Project

S/N	County and City	Subprojects	Location	Construction Contents	Names of Sensitive Sites	Noise Mitigation Measures
1	Xius hui	New construction of water plant in urban area	Mao township	Construction of the original water pipeline	Duanshang Primary School in Mao township	Establish the temporary noise barriers with the height of no less than 2 m in the construction area
2	Nan feng	Pipeline network extension project in urban area	Laixi township	Construction of the pipeline network extension project	Laixi Primary School in Nanfeng county	
3	Linc huan	Pipeline network extension project in urban area	Wenquan township	Construction of the pipeline network extension project	Liangxian Primary School	
4	Don gxiang	New construction of water plant in urban area of Dongxiang district	Xiaohuan g, Bogan	Construction of the original water pipeline in Hengshan reservoir	Dongxing Technical School in Dongxiang district	
5		New construction of water plant in urban area of Dongxiang district		Construction of the pipeline network extension project	Guangchang Primary School in Dongxiang district	
6					Bogan Middle School,	
7					Geracomium in Xiaohuang township	
8	Lepi ng	Pipeline network extension project of water supply in urban area	Hougang township	Construction of the pipeline network extension project	Qimingxing Experimental Kindergarten in Leping city	

## **5.3 Environmental Impact Analysis and Prevention and Control Measures During the Operation Period**

### **5.3.1 Generality impact and mitigation measures**

#### **5.3.1.1 Water environment**

The wastewater generated from the water purification plant is mainly the backwash wastewater of filter tank, the sludge discharging wastewater of sedimentation tank, and the dewatering wastewater of dewatering room. The backwash wastewater of filter tank will be recycled in the distribution well after the lifting of the recycling pool. The supernatant of the sludge discharging wastewater of sedimentation tank will be recycled in the recycling pool after the concentration of the sludge concentration tank. The sludge discharging wastewater will go into the dewatering room after the sludge balance tank, and the filtrate will be recycled for green land irrigation and road washing after the sedimentation and meeting the urban miscellaneous water standards. Therefore, the wastewater generated from the water supply project of this project will have a relatively limited impact on the environment.

The number of the staff in the water plant of each county is about 80, and the production amount of domestic wastewater is about 4.8 m<sup>3</sup>/d in the calculation unit of 60 L/people·d. The number of the staff in the water plant of township is about ten, and the production amount of domestic wastewater is about 0.6 m<sup>3</sup>/d. The major pollutants of domestic wastewater are COD and BOD<sub>5</sub>. During the construction period, the domestic wastewater from the water plant will be discharged to the municipal pipe network after being treated by the septic tank in the plant. Therefore, the domestic wastewater of the workers of this project will have a relatively limited impact on the environment.

#### **5.3.1.2 Noise environment**

##### **(1) Prediction mode**

According to the prediction method recommended by the Technical Guidelines for Noise Impact Assessment - Noise Environment of the

Environmental Protection Industry Standards of People's Republic of China HJ2.4—2009, the operation noise of the equipment is similar to that of the industrial noise sources. According to the requirements of the Guidelines, the industrial noise sources can be divided into the indoor noise source and the outdoor noise source, and they should be calculated separately. The prediction and calculation mode of noise impact on the environment in the area is as follows:

① Prediction and calculation mode of industrial noise

$$L_{Ai(r)} = L_{Ai(r_0)} - 20Lg(r/r_0) - \Delta L$$

Where:  $L_{Ai(r)}$ —The noise level of the point source at the prediction point, dB(A).

$L_{Ai(r_0)}$ —The noise level of  $r_0$ reference position.

$r$ —The distance from the prediction point to the noise source, m.

$r_0$ —The distance from the reference position to the noise source, m.

$\Delta L$ —The amount of attenuation caused by various factors (including the amount of attenuation caused by the barrier, obstructions, air absorption, and ground effect).

② The calculation of the equivalent predicted noise level at the prediction point

$$L_{eq} = 10lg (10^{0.1L_{eqg}} + 10^{0.1L_{eqb}})$$

Where:  $L_{eqg}$ --The equivalent noise level contribution value of the noise source of the construction project at the prediction point, dB(A).

$L_{eqb}$ -- Background value of prediction point, dB(A).

(2) Analysis of noise source intensity

During the operation period of this project, the noise mainly comes from the water plant, water intake pump house and other kind of pumps. The main noise source intensity is shown is Table 5.3-1.

Table 5.3-1 Noise Source Intensity and Treatment Measures of Major Power Plant

Unit: dB(A)

S/N	Name of Pollution Source		Intensity	Treatment Measures	Effect after Treatment
1	Water plant	Water pump of water inflow lifting pump house	85~95 dB(A)	Carry out indoor layout and basic vibration reduction	≤75
2		Water pump of sludge lifting pump house	85~95dB(A)	Install the muffler at the air outlet	≤75
3		Dosing pump	75~80dB(A)	Carry out indoor layout and basic vibration reduction, install the shock throat at the water inlet and outlet, and bind up the wall pipeline with the elastic materials	≤65
4	Water intake pump house	Water pump	85~95dB(A)	Indoor layout and basic vibration reduction	≤75

(3) Analysis of prediction results

Prediction of Noise Discharging at Boundary of Water Plant in This Project

During the Operation Period is shown in Table 5.3-2~5.3-3

Table 5.3-2 Predictions of Noise with the Distance Attenuation at the Boundary of Water Plant During the Operation Period Unit: dB(A)

S/	Noise Source	Distance (m)	Standards
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N		10	20	30	40	60	80	100	150	300	rds
1	Water pump of water inflow lifting pump house	75	69.0	65.5	63.0	59.4	56.9	55.0	51.5	49.0	Daytime 60dB(A), nighttime 50dB(A)
2	Water pump of sludge lifting pump house	75	69.0	65.5	63.0	59.4	56.9	55.0	51.5	49.0	
3	Dosing pump	65	59.0	55.5	53.0	49.4	46.9	45.0	41.5	39.0	
Total Noise Source		78.2	72.2	68.7	66.2	62.7	60.0	58.2	54.7	49.3	

Table 5.3-3 Predictions of Noise with the Distance Attenuation at the Boundary of Water Intake Pump House During the Operation Period Unit: dB(A)

S/N	Noise Source	Distance (m)									Standards
		10	20	30	40	60	80	100	150	200	
1	Water pump	75	69.0	65.5	63.0	59.4	56.9	55.0	51.5	49.0	Daytime, 60dB(A), nighttime 50dB(A)

From Table 5.3-3 and Table 5.3-4, it can be seen that the noise value at 80 m around the water plant at daytime can meet the standard requirements, while the noise value at 300 m around the water plant at nighttime can meet the standard requirements. The noise value at 60 m around the water intake pump house at daytime can meet the Emission Standard for Industrial Enterprises Noise at Boundary, while at 200 m at nighttime can meet such standards.

In this project, in addition to the sensitive sites (in Huangshi village with the distance of 70 m) around the sites of the newly-built water plants in Linchuan district, there is no sensitive sites around the sites of other water plants and around the water intake pump houses. Therefore, the noise during the operation period of this project will not have a significant impact. We should take the corresponding noise prevention measures for Huangshi village. For example, establish the noise barrier with the great noise reduction effect and the height of no less than 2 m in the water plant which towards the side of Huangshi village in Linchuan district, and at the same time, adopt

the shock pad, soundproof door and windows and other noise reduction and noise prevention measures for water plant, and use materials with great sound-absorbing effect as far as possible. Strictly control the key noise sources (such as water pump and so on), put forward noise control requirements to equipment manufacturers, and try to choose the low-noise equipment as far as possible. Strengthen the maintenance of the equipment to ensure that the equipment is in good working conditions, so as to eliminate the high noise generated when the equipment is not operating normally. In the design phase of construction drawing, we should further optimize the layout of the plant area, and ensure that the equipment with a great noise impact be far away from the residential area. Establish the green belt to reduce the noise and beautify the environment. We should ensure that the Huangshi village will not be affected by the operation of the water plant by taking the effective measures.

### **5.3.1.3 Solid waste**

#### **(1) Sludge of water plant**

During the construction period of this project, the sludge of water purification plant will form mud cakes after drying and dewatering. Since there is basically no toxic and harmful substance in the sludge of water purification plant, the sludge can be regularly transported to the landfill site for treatment after the internal drying of the water plant.

According to the requirements of sludge landfill in landfill site, the moisture content of the sludge should be less than 60%, so the sludge of the water plant in this project needs a further drying. For example, dry the sludge after mixing the quick lime to meet the requirements of the landfill site. The sludge generated in the process of water purification mainly comes from the suspended solids of the original water, and it is mainly the surface soil and soil of water source area, as well as some water purification agent components and organic matters (mainly the plankton or residue). The sludge of water plant in this project will be landfilled after dewatering and drying. Under the premise of temporary storage within the plant, and the management during the transportation, the sludge will have little impact on the surrounding environment after the sanitary landfill.

#### **(2) Household refuse of the staff**

The household refuse of the staff in this project will be calculated in the unit of 0.5 kg/d. The number of the staff in the water plant of the county is about 80, and the production amount of the household refuse is about 40 kg/d. The number of the staff in the water plant of the township is about ten, and the production amount of the household refuse is about 5 kg/d. The number of the staff in the water intake pumping house is about two, and the production amount of the household refuse is about 1 kg/d. After the collection of the household refuse, it will be regularly sent to the local environmental sanitation department for treatment.

### 5.3.2 Characteristic impacts and mitigation measures

#### 5.3.2.1 Impact analysis and mitigation measures on the water amount and the downstream water consumption of water source location

According to the relevant conclusions of the Water Resource Demonstration Report of this project, the impact of project water intake on water resource areas of Longyuankou Reservoir, Chongren River, the upstream water of Gaofanghe River and Hefang Reservoir is relatively limited. After the project water intake, the minimum ecological environmental water demand of the reservoir can be met, and water consumption has a relatively small impact on the amount of water resource within the area. The water-break of this project will have a relatively small impact on the water environment, the decontamination capacity in the water functional zone, the water intake of other users and the aquatic organism within the water area, and has a slight impact on the aquatic ecological environment. The individual water intake project will divert the downstream power generation. The specific analysis is shown in Table 5.3-1

Table 5.3-1 Impact Analysis of Water Amount, Water Quality and Downstream Water Consumption During the Operation Period of Each Water Source Location

County or City of Project	Subproject Name	Reservoir Name	Impact Analysis	Mitigation Measures
Yongxin County	New construction of water	Longyuankou reservoir	In accordance with the calculation of multi-year regulations, the guarantee rate of water consumption in	1. It is suggested to sign an agreement with Longyuankou hydropower station.

	plant in urban area		<p>the water plant is 99.8%, and it can meet the requirements of water intake (99,000 m<sup>3</sup>/d) guarantee rate (95%) in the water plant.</p> <p>2. The water quality is the class II ~III, and it meets the national standards of class III of Environmental Quality Standards for Surface Water (GB3838-2002), as well as meet the requirements of water intake source and water quality.</p> <p>3. The flat water year will cause the Longyuankou reservoir generator to reduce the power generation capacity by 1.13 million degrees.</p>	<p>Electricity will be generated on the premise of meeting urban water supply and irrigation water use, and a corresponding compensation will be made to Longyuankou hydropower station at a rate of 0.07 yuan / m<sup>3</sup>. Relevant compensation measures have been included in the social appraisal report.</p> <p>2. Install the online water amount and water quality monitoring system.</p>
Leping City	Extension project of water plant in urban area	Communist reservoir	<p>1. The guarantee rate of water consumption in the water plant is 90%, and it can meet the requirements of water intake guarantee rate in the water plant.</p> <p>2. The water quality meets the national standards of class III of Environmental Quality Standards for Surface Water (GB3838-2002).</p> <p>3. Reduce the 0.365×10<sup>8</sup>m<sup>3</sup> of pipeline water amount downstream the Gongxiang dam, Chexi river, resulting in a decrease of 260,000 kWh power generation amount in Yongshan, Gutian and Guxi hydropower plants downstream the reservoir.</p>	<p>1. It is suggested to sign an agreement with Yongshan, Gutian and Guxi hydropower station. Electricity will be generated on the premise of meeting urban water supply and irrigation water use, and a corresponding compensation will be made to Yongshan, Gutian and Guxi hydropower station at a rate of 0.07 yuan / m<sup>3</sup>. Relevant compensation measures have been included in the social appraisal report.</p> <p>2. Install the online water amount and water quality monitoring system.</p>
Xiushui County	Extension project of water plant in urban area	Dongjin reservoir	<p>1. The annual water intake amount in the water plant accounts for 3.71% of the annual average water intake of the intake section, and 6.90% of the annual water amount at the design guarantee rate of P=95%. In various typical years, from</p>	<p>1. It is proposed to sign an agreement with Dongjin Power Generation Co., Ltd., Jiangxi Province. Electricity will be generated on the premise of meeting urban water supply and irrigation water</p>

			<p>the annual runoff and runoff analysis of each month during the year, the water amount under the baseline conditions of the water intake section can basically meet the water intake requirements in the water plant.</p> <p>2. The water quality meets the national standards of class II of Environmental Quality Standards for Surface Water (GB3838-2002).</p> <p>3. The annual water intake amount of the project accounts for 3.51%~8.43% of the power generation of Dongjin reservoir in typical years, which will squeeze the power generation water of Dongjin reservoir.</p>	<p>use, and a corresponding compensation will be made to Dongjin Power Generation Co., Ltd. at a rate of 0.07 yuan / m<sup>3</sup>. Relevant compensation measures have been included in the social appraisal report.</p> <p>2. Install the online water amount and water quality monitoring system.</p>
Dongxian District	New construction of water plant in urban area	Hefang reservoir and Hengshan reservoir	<p>1. The guarantee rate of water supply is 90%, and it can meet the requirements of water intake guarantee rate in the water plant.</p> <p>2. The water quality meets the national standards of class III of Environmental Quality Standards for Surface Water (GB3838-2002).</p> <p>3. The water intake of this project has taken full account of the ecological flow of the downstream rivers, with the average flow of 10% as the ecological flow, and can meet the needs of the ecological water demand of the downstream rivers.</p> <p>4. At present, the Hefang reservoir and Hengshan reservoir only undertake the irrigation task. After the water intake of this project, the guarantee rate of the irrigation water consumption in the two irrigated areas will reach 75% or above in the</p>	<p>1. Take water strictly in accordance with the approved scale.</p> <p>2. Build the soil and water conservation project.</p> <p>3. Strengthen the water-saving and environmental protection propaganda.</p> <p>4. Install the online water amount and water quality monitoring system.</p>

			<p>baseline year and planning year. Therefore, the water intake of this project has little impact on the irrigation water consumption and there is no other larger water intake users in the downstream of the reservoir, so it has little impact on other users.</p>	
Jinxi County	New construction of water plant in Huangtong township	Gaofang river	<p>1. The guarantee rate of water consumption in the water plant is 90%, and it can meet the requirements of water intake guarantee rate in the water plant.</p> <p>2. The water quality meets the national standards of class II of Environmental Quality Standards for Surface Water (GB3838-2002).</p> <p>3. The construction project has no other important water users outside of the water supply scope, and will not have a great impact on other users.</p>	<p>1. Take water strictly in accordance with the approved scale.</p> <p>2. Build the soil and water conservation project.</p> <p>3. Strengthen the water-saving and environmental protection propaganda.</p> <p>4. Install the online water amount and water quality monitoring system.</p>
Linchuan District	New construction of the secondary water plant in Linchuan district	Chongren river	<p>1. The guarantee rate of water consumption in the water plant is 90%, and it can meet the requirements of water intake guarantee rate in the water plant.</p> <p>2. The water quality meets the national standards of class III of Environmental Quality Standards for Surface Water (GB3838-2002).</p> <p>3. The water intake of the secondary water plant comes from the Chongren River, and there is no larger water intake user within the scope of water intake source demonstration. The water intake downstream the water intake section is basically 10 km away. Therefore, water intake will not affect other water users.</p>	<p>1. Take water strictly in accordance with the approved scale.</p> <p>2. Build the soil and water conservation project.</p> <p>3. Strengthen the water-saving and environmental protection propaganda.</p> <p>4. Install the online water amount and water quality monitoring system.</p>

### **5.3.2.2 Impact analysis and mitigation measures on water resource protection areas**

According to the site investigation, in addition to the water resource protection area established in Dongjin reservoir, Xiushui county at present, no water resource protection area has been divided in other water resource areas. In response to this situation, the following measures are proposed:

(1) For this project, set up the first-level and the second-level protection area for Longyuankou reservoir in Yongxin county, Communist reservoir in Leping city, Happiness reservoir, Gongqing reservoir, Dongfanghong reservoir, Hefang reservoir in Dongxiang district, Hengshan reservoir, Happiness reservoir, Gaofang river in Jinxi county, and Chongren river in Linchuan district. The scope of the first-level protection area includes the water area from 1 km of the upstream water to 100 km of the downstream water, the beach on one side of the water intake site, and the land area extending 100 m from the breakwater at the surface of water to the back of water. The scope of the second-level protection area includes the water area 3,000 m upper the upper boundary of the first-level protection area, the beach on one side of the water intake site, and the land area extending 100 m from the breakwater at the surface of water to the back of water.

(2) Prohibit the activities that will damage the forest for water source conservation and protective belt, discharge and dump the industrial waste, municipal solid waste and other wastes, and newly build and extend the enterprises of chemical pulp, printing, dyeing, tanning, electroplating, refining, pesticide, fertilizer and other enterprises that will pollute the drinking water sources in the protected area of project water intake site,

(3) Strengthen the management of the sewage outlets in rivers in the drinking water source location. Improve the management regulations on the registration, approval and supervision of the sewage outlets in rivers in the drinking water protection area according to the Measures for the Management of Sewage Outlets in Rivers. Establish the control system for the total amount of the sewage outlets in rivers to strengthen the management of the sewage outlets in rivers in the drinking

water protection area. Standardize the livestock breeding activities around the water source location. Prohibit the industrial solid waste, hazardous waste, municipal solid waste and other pollutants to shift to the protection area.

(4) Carry out the soil and water conservation work within the water area. Plant trees and grasses in the upstream of the water source location to reduce the impact on the water quality in water source location and the deposition of rivers of water and soil loss. And further improve the monitoring system of water source location to timely grasp the changes of water quality.

(5) Establish the monitoring and information management system for drinking water source location. Establish a classified monitoring system for drinking water source to monitor the water quality, water amount, water and soil loss, non-point source pollution, so as to improve the ability of early warning and forecasting of drinking water source. Combine the fixed and mobile monitoring system to strengthen the automatic monitoring and real-time monitoring of drinking water source.

(6) The management unit of the project construction should strengthen the comprehensive coordination and close cooperation with the local governments and all relevant functional departments to clear the coal docks and temporary stopping berths, sporadic residential buildings and offshore household refuse in the protection areas according to the relevant regulations of environmental protection area in water source location, so as to strengthen the inland greening area and provide a safe and good environment for water intake project.

### **5.3.2.3 Safety analysis and mitigation measures for dam**

During the preparation period of the project, the EIA unit has identified and investigated the dam for the project to understand the general conditions and baseline maintenance of the dam. There are ten dams involved in this project, and the Provincial Project Office has hired the dam safety experts to develop the dam Safety Assessment Report. The summary of the dam information and the next action plan is shown in Table 5.3-2.

Table 5.3-2 The Summary of Dam Information and the Next Action Plan Under This Project

S/N	Reservoir Name	Location (Township, River)	Total Storage Capacity (10,000 m <sup>3</sup> )	Reservoir Functions	Dam Type	Dam Height (m)	Construction Year	Last Time for Reinforcement	Last Time for Safety Identification	Identification Conclusion	Action Plan for Reinforcement and Improved Management	Estimated Costs (10,000 Yuan)	Operation Management Department
1	Dongjin reservoir in Xiushui county	Upstream of Xiuhe river in Xiushui county, northwest of Jiangxi Province	79500	It is mainly used for power generation, and it also has the flood prevention, irrigation, aquaculture and other comprehensive utilization functions	Reinforced concrete face rock-fill dam	85.5	1995	2012	2010	The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37	Keep observing during flood time.	0	Jiangxi Dongjin Power Generation Co., Ltd
2	Communist Reservoir in Leping City	Middle and upstream of Chexi, tributary of Lean river	14370	It is mainly used for water supply in urban area and irrigation, and it also has the flood prevention, power generation, aquaculture and other comprehensive utilization functions	Earth dam with inclined clay core	34.2	1959	2006	2001	The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37 (1) Due to the lack of supporting funds, part of the danger elimination and reinforcement project of the reservoir will not be completed according to the approval plan. Therefore, this project has not yet been completed and accepted. Although it does not affect normal and safe operation, we suggest to complete the project as soon as possible. (2) The road upstream of 1# dam is the debris road and is not hardened, and it is relatively simple. There are more weeds and shrubs on both sides, and vehicles are not easy to go on the dam in flood or rainseason, which is not conducive to flood prevention. It is recommended to harden and broaden the road. Weeds upstream and downstream of dam have a rapid speed of growth, and we suggest to regularly clear them. (3)Some rain stations, the tubing have been damaged, it's better to repair them	(1)Due to the lack of supporting funds, part of the danger elimination and reinforcement project of the reservoir will not be completed according to the approval plan. Therefore, this project has not yet been completed and accepted. Although it does not affect normal and safe operation, we suggest to complete the project as soon as possible. (2)The road upstream of 1# dam is the debris road and is not hardened, and it is relatively simple. There are more weeds and shrubs on both sides, and vehicles are not easy to go on the dam in flood or rainseason, which is not conducive to flood prevention. It is recommended to harden and broaden the road. Weeds upstream and downstream of dam have a rapid speed of growth, and we suggest to regularly clear them. (3)Some rain stations, the tubing have been damaged, it's better to repair them	60	Leping Communist Reservoir Engineering Management Bureau

3	Dongfanghong reservoir in Leping City	Tributary of upstream of Lean river, Raohe	1381	It is mainly used for irrigation, and it also has the flood prevention, water supply, aquaculture and other comprehensive utilization functions	Earth dam with cement core	24.0	1969	2010	2005	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>(1) The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable.</p> <p>(2) We suggest that the piezometer tubes should be regularly monitored for reorganization and record keeping</p>	<p>(1) The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable.</p> <p>(2) We suggest that the piezometer tubes should be regularly monitored for reorganization and record keeping</p>	13	Leping Dongfanghong Reservoir Management Institute
4	Happiness reservoir in Leping City	Guanzhuang water tributary of middle of Lean river, Raohe	1267	It is mainly used for irrigation, and it also has the flood prevention, aquaculture and other comprehensive utilization functions	Earth dam with cement and clay core	22.8	1958	2010	2002	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>(1)The piezometer tubes should be regularly monitored for reorganization and record keeping.</p> <p>(2) The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable.</p>	<p>(1)The piezometer tubes should be regularly monitored for reorganization and record keeping.</p> <p>(2) The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable.</p>	13	Leping Happiness Reservoir Management Institute

5	Gongqiang reservoir in Leping City	Kengpan water of downstream of Lean river	1412	It is mainly used for irrigation, and it also has the flood prevention, aquaculture, travel and other comprehensive utilization functions	Homogeneous earth dam	16.0	1958	2012	2008	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>(1) The weeds in the downstream slope of the dam grow faster and are regularly cleared. The water level of downstream dam is higher than that of the drainage dikes. It is suggested to reduce the water level in the ponds and to inspect whether there is abnormal water seepage in the ponds during the flood season.</p> <p>(2) There is water resistance phenomenon in the inlet of spillway, and we suggest to remove.</p> <p>(3) It is suggested that the flood prevention contingency plan prepared by the reservoir management townships should be refined, specific and operable with the relevant charts.</p> <p>(4) We suggest to improve the relevant safety management system</p>	<p>(1) The weeds in the downstream slope of the dam grow faster and are regularly cleared. The water level of downstream dam is higher than that of the drainage dikes. It is suggested to reduce the water level in the ponds and to inspect whether there is abnormal water seepage in the ponds during the flood season.</p> <p>(2) There is water resistance phenomenon in the inlet of spillway, and we suggest to remove.</p> <p>(3) It is suggested that the flood prevention contingency plan prepared by the reservoir management townships should be refined, specific and operable with the relevant charts.</p> <p>(4) We suggest to improve the relevant safety management system</p>	33	Leping Town Qiaozhen Water Management Station
6	Gaofang reservoir in Jinxi county	Junction of Huangtong and Lufang in Jinxi county	6750	It is mainly used for water supply, with irrigation, flood prevention and power generation	Homogeneous earth dam	40.2	1959	2013	2002	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>We suggest to update and improve the flood prevention plan and relevant management system</p>	<p>We suggest to update and improve the flood prevention plan and relevant management system</p>	8	Jinxi County Gaofang Reservoir Management Bureau

7	Hefang reservoir in Dongxiang district	Hefang village of Dongjiaoxiaogang in Dongxiang district	1138	It is mainly used for water supply, and combined with irrigation, flood prevention and other comprehensive utilization functions	Earth dam with inclined clay core	16.7	1961	2009	2002	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable</p>	The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i> , making the plan more scientific and operable	5	Dong Xiang District Hefang Reservoir Engineering Management Bureau
8	Hengshan reservoir in Dongxiang district	Hengshan village of Xiaohuang township in Dongxiang district	2879	It is mainly used for irrigation, and it also has the flood prevention, daily water supply, aquaculture, and other comprehensive utilization functions	Earth dam with cement core	25.2	1959	2010	2004	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>The mountain formed of the new construction of road on the right bank of the dam near the upper reaches of the bank is relatively steep, the rock mass is broken and the weathering is serious, forming a hidden danger. It is suggested that the contractor should take appropriate safety measures.</p>	The mountain formed of the new construction of road on the right bank of the dam near the upper reaches of the bank is relatively steep, the rock mass is broken and the weathering is serious, forming a hidden danger. It is suggested that the contractor should take appropriate safety measures.	20	Dongxiang District Hengshan Reservoir Engineering Management Bureau
9	Happiness Reservoir in Dongxiang district	Zhujiayuan of Xiaomin Town in Dongxiang district	4675	It is mainly used for urban industry, domestic water supply, agriculture irrigation, flood prevention and aquaculture	Earth dam with clay core	21.0	1958	2004	2000	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>Being flushed by wind and waves, the rocks piled up at the upstream of the reservoir are very messy, which should be smoothed out timely.</p>	Being flushed by wind and waves, the rocks piled up at the upstream of the reservoir are very messy, which should be smoothed out timely.	30	Dongxiang district Happiness Reservoir Engineering Management Bureau

10	Longyuankou reservoir in Yongxin county	Upstream of Longyuankou, and upstream of Hengxi village in Longyuankou township, Yongxin county	4560	It has irrigation, flood prevention, power generation and other comprehensive benefits	Fine stone concrete block stone hyperbolic arch dam	57.3	1992	2010	2007	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>(1) The mountain and rock body of dam left bank near the dam road bend and the right dam abutment roadside are relatively steep, broken and weathering is serious, forming a hidden danger. We suggest to take safety measures;</p> <p>(2) We suggest that the reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, and we should make the plan more scientific and operable</p>	<p>(1) The mountain and rock body of dam left bank near the dam road bend and the right dam abutment roadside are relatively steep, broken and weathering is serious, forming a hidden danger. We suggest to take safety measures;</p> <p>(2) We suggest that the reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, and we should make the plan more scientific and operable</p>	25	Yongxin County Longyuankou Reservoir Engineering Management Bureau
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## **6. Environmental Impact of Wastewater Treatment Project and Prevention and Control Measures**

### **6.1 Analysis of the Benefit of the Implementation of Wastewater Project**

According to the field investigation, the current domestic wastewater discharge volume in Zhajin's town area is 1,200 m<sup>3</sup>/d. The town has no wastewater treatment plant, and the wastewater is directly discharged into water without any treatment.

After the implementation of this project, Zhajin Town's wastewater collection rate can reach 80%, covering 2,800 households of the wastewater pipe. The implementation of the project will improve the river water quality and ecological environment in the project area, have great positive environmental benefit on the local water environment quality, further improve the rural living conditions, promote the comprehensive, coordinated and sustainable development of the economic society and will be conducive to the improvement of living quality of the local residents. At the same time, this project sets an example for the town wastewater treatment project and the wastewater collection and pipe network renovation in the town area, will provide a model of popularization for wastewater treatment in the rural area of Jiangxi Province.

### **6.2 Environmental Impact During the Construction Period and Mitigation Measures**

#### **6.2.1 Atmospheric environmental impact and mitigation measures**

##### **6.2.1.1 Analysis of atmospheric environmental impact**

The main atmospheric pollution sources during the construction period of wastewater treatment plant are construction dust and vehicle exhaust, including: earthwork excavation, site stacking, dust caused during earthwork backfilling; site road dust caused by people and vehicles coming and go; dust caused by earthwork

carrying vehicle scattering.

In accordance with the relevant data, the range of impact of construction dust is about 100 m down the wind. An effective measure of restraining dust is watering. Based on analogy investigation, after taking the measure of decreasing dust by watering (sprinkling water four to five times a day), the dust can be reduced by about 70%, and the range of impact is reduced from 100 m to 50 m. Outside the 50 m range, the concentration of TSP in ambient air basically reaches the secondary standard in *Ambient Air Quality Standard* (GB3095-1996). According to the identification and selected results of environmental protection target, the nearest distance between the wastewater treatment plant site and wastewater pipe network construction point and the residential area is 80 m. Therefore, construction dust has limited environmental impact on the peripheral sensitive points.

There is one sensitive point around the wastewater treatment plant site, the ancestral temple of Putian Village (30 m from the southeast of the wastewater treatment plant). The town wastewater pipe network involves three sensitive points, Sub-village 6 of Putian Village (20 m from the west/east of the pipe network, 40 households), Sub-village 13 of Putian Village (15 m from the west/east, 35 households), Sub-village 5 of Putian Village (20 m from the west/east, 38 households), Sub-village 13 of Putian Village (15 m from the west/east, 26 households). The ancestral temple of Putian Village is located at the Sub-village 13, which is used in common by the 16 sub-villages of Putian Village, mainly used for the villagers' worship activities during festivals, about two to three times a year of the frequency.

#### 6.2.1.2 Mitigation measures for atmospheric environmental impact

The prevailing wind direction in this area is south-southeast. In order to reduce the impact on the peripheral sensitive points, during the construction process, it is necessary to set up fence around the wastewater treatment plant construction site, and sprinkle water to decrease dust to lessen the atmospheric environmental impact.

For earthwork excavation, earthwork and material transportation, buildings and structures construction and other links in this project's construction period, the corresponding environmental protection enforcement procedures are attached in the

Environment Management Plan to regulate the activities during the construction period, so as to lessen the impact of construction dust. The main measures are as follows:

(1) To fence or partially fence the construction site, so as to reduce the diffusion range of construction dust and minimize the impact of dust on the surrounding environment. The fence not less than 2.5 m shall be set up around the construction base.

(2) To strengthen the planning and management of the construction area, prevent or reduce the dust escaping in the process of loading and unloading, stacking and mixing of building materials. Building materials stacking yard and concrete mixing place shall be fixed, and dust prevention and suppression measures shall be taken, for example, spraying water on dry working plane to maintain a certain humidity on the working plane and reduce dust emission; spraying water on bulk material stacking yard to reduce dust. The earth excavated shall not be piled up too high and stacked for long time, shall be timely removed and transported to prevent being washed by rain or risen by wind. When the wind speed is too fast, the construction shall be stopped, and sand and gravel and other building materials that are stacked shall be covered.

(3) To reinforce the transportation management. To adhere to civilized loading and unloading, avoid sacked cement baling off. Transport vehicles and carriages shall be in good condition and shall not be in superelevation or overloading. When carrying building materials by bulk cargo truck, covering and other sealing measures shall be taken to avoid dust escaping caused by vehicle bumping; the carriages shall be cleaned after unloading. The main roads for transport vehicles entrance and exit shall be cleaned regularly by sprinkling water to keep the vehicle entrance and exit roads clean and humid, and reduce the ground dust pollution caused by the contact between vehicle tires and road surface. The wheels of vehicles that go to the construction site shall be cleaned.

(4) To strengthen environmental education for the construction personnel, improve the environmental awareness of all the construction personnel, adhere to civilized construction and scientific construction to reduce atmospheric pollution

during the construction period.

In particular, during the construction of wastewater treatment plant, in order to avoid the impact on Putian ancestral temple's normal worship activities, more stringent management measures shall be adopted where the worship activities are carried out; see Section 6.2.3 for specific measures.

## 6.2.2 Acoustic environment impact and mitigation measures

### 6.2.2.1 Analysis of acoustic environment impact

This project's content includes the construction of wastewater treatment plant and wastewater pipe. The noise from the construction of wastewater treatment plant mainly occurs in the process of piling, concrete mixing and earthwork transportation, etc.. The range of impact is the construction site and the surrounding certain range. The main sources of noise in pipe construction are construction machinery and transport vehicles. The pipe is in partial section construction, little content and short construction period of the partial project, and construction machinery carries out fixed construction or moves slowly in each construction site, therefore, this evaluation uses point-source model to predict the impact of noise.

The sound source is the external impact of multiple sound sources, and is weakened by shielding, propagation distance and air absorption in the propagation process. According to the characteristics of this project and the functional area, the noise source of the construction site is a multi-sound source, the impact of which on the surrounding environment is predicted after the superposition of the total sound source. The noise level of main construction machinery equipment is shown in Table 6.2-1.

Table 6.2-1 Noise Level of Main Construction Machinery Equipment

No.	Construction Machinery	Noise Level/dB(A)	Measuring Distance/m
1	Excavator	64	10
2	Road roller	75	10
3	Mixer	68	10
4	Bulldozer	66	10

5	Scraper	75	10
6	Loader	85	10

(1) Construction site of wastewater treatment plant

The noise from the wastewater treatment construction site mainly occurs in the process of piling, concrete mixing and earthwork transportation, etc.. The maximum noise level is about 85 dB.

After calculation, the attenuation of noise value with distance is shown in Table 6.2-2.

Table 6.2-2 Prediction of Attenuation of Construction Machinery Noise with Distance  
Unit: dB(A)

N o.	Constr uction Machi nery	Distance (m)									Standard
		10	20	40	60	70	100	150	200	300	
1	Excava tor	64	58	52	48.4	45.9	44	40.5	38	34.5	Daytime 70dB(A) , nighttim e 55dB(A) , <i>Standard of Environ mental Noise for Construc tion Site at Boundar y (GB125 23-2011)</i>
2	Pile driver	85	84.0	78.0	74.4	71.9	70.0	66.5	64.0	84.0	
3	Mixer	68	62	56	52.4	49.9	48	44.5	42	38.5	
4	Bulldo zer	66	60	54	50.4	47.9	46	42.5	40	53.6	
5	Loader	85	79	73	69.4	66.9	65	61.5	59	55.5	
Total Sound Source		88.1	82.9	75.9	72.0	69.8	67.9	64.4	61.9	60.2	

From Table 6.2-2, it can be seen that the propagation distance of mechanical noise in open area is far. The daytime discharge standard of noise for construction site at boundary can be met outside 70 m range from the construction site. However, the range of impact of construction noise in the nighttime is large, with the nighttime discharge standard of noise for construction site at boundary still unmet at 300 m from the site.

According to the prediction results, the noise level at 70 m from the construction

site in the daytime can reach the standard. There is one sensitive point near the wastewater treatment plant, namely, Putian's ancestral temple (30 m from the southeast of the wastewater treatment plant). Fence shall be put up around the construction site of the wastewater treatment plant, and sound barrier shall be set up on the side facing Putian's ancestral temple during the construction period. By setting up fence and sound barrier, the noise value can be reduced by 15-25 dB(A). After taking the measures, the noise value at the construction site boundary is between 53-63 dB(A), which can meet the daytime construction standard stipulated in *Standard of Environmental Noise for Construction Site at Boundary* (GB12523-2011). Especially, during the construction of wastewater treatment plant, in order to avoid the impact on Putian ancestral temple's normal worship activities, more stringent noise attenuating measures shall be adopted or the construction shall be stopped where the worship activities are carried out. Although the impact during the construction period is transient, and it will disappear with the end of the construction period, prohibition of nighttime construction and other measures shall still be taken to mitigate the impact to control the noise during the construction period within people's acceptable level.

(2) Construction of wastewater pipe network

The noises in the pipe network construction are mainly construction machinery and transport vehicles, are phased, temporary and unfixed. Different construction equipment produces different noises. The noise level of main noise sources is shown in Table 6.2-3.

Table 6.2-3 Noise Level of Main Construction Machinery Equipment

No.	Construction Machinery	Noise Level/dB(A)	Measuring Distance/m
1	Excavator	64	10
2	Road roller	75	10
3	Scraper	75	10

On the construction site, the sound source is the external impact of multiple sound sources, and is weakened by shielding, propagation distance and air absorption in the propagation process. The construction process often involves the simultaneous construction by a variety of equipment, therefore, the impact on the surrounding environment is predicted after the superposition of the total sound source.

After calculation, the attenuation of noise value with distance is shown in Table 6.2-4.

Table 6.2-4 Prediction of Attenuation of Construction Machinery Noise with Distance  
Unit: dB(A)

No.	Construction Machinery	Distance (m)									Standard
		10	20	30	40	60	80	100	150	200	
1	Excavator	64	58	54.5	52	48.4	45.9	44	40.5	38	Daytime 70dB(A) , nighttime 55dB(A) , <i>Standard of Environmental Noise for Construction Site at Boundary</i> (GB12523-2011)
2	Road roller	75	69	65.5	63	59.4	56.9	55	51.5	49	
3	Scrapper	75	69	65.5	63	59.4	56.9	55	51.5	49	
Total Sound Source		78.2	72.2	68.6	66.2	62.6	60.1	58.2	54.7	52.2	

According to Table 6.2-4, the daytime discharge standard of noise for construction site at boundary can be met outside 30 m range from the both sides of the pipe. Whereas the range of impact of construction noise in the nighttime is large, with the nighttime discharge standard of noise for construction site at boundary met at the 150 m. This project's town wastewater pipe network involves three sensitive points, Sub-village 6 of Putian (20 m from the west/east of the pipe network, 40 households), Sub-village 13 of Putian (15 m from the west/east, 35 households), Sub-village 5 of Putian (20 m from the west/east, 38 households), Sub-village 10 of Putian (15 m from the west/east, 26 households). The impact during the construction period is transient, and it will disappear with the end of the construction period, but during the construction process, fence setting, reasonable arrangement of construction camp and construction time, prohibition of construction of high-noise equipment in the nighttime (10:00 p.m. to 6:00 a.m.) and other measures shall be taken to mitigate the impact of noise to make the noise during the construction period within people's acceptable level.

#### 6.2.2.2 Mitigation measures for acoustic environmental impact

The noise during this project’s construction period will have some impact on the surrounding acoustic environment, but it is temporary, short-term and irregular. Therefore, the management of the construction period shall be strengthened, which requires that the following measures shall be taken during this period:

(1) To use low-noise construction equipment and construction methods as much as possible; to set shielding around the high-noise equipment during operation to avoid its impact on the surrounding environment; to reinforce the management of transport vehicles, to transport building materials in the daytime as far as possible, and to control vehicle whistle; to set temporary sound barrier for specific sensitive points. The specific setting is shown in Table 6.2-5.

Table 6.2-5 Temporary Sound Barrier Setting During the Construction Period of this Project’s Wastewater Treatment Engineering

No.	County	Subproject	Location	Construction Content	Name of Sensitive Points	Noise Attenuating Measure
1	Xiushui County	New construction of wastewater pipe network and treatment plant in Zhajin Town, Xiushui County	Zhajin Town	Plant construction	Putian Village’s ancestral temple	To set temporary sound barrier not less than 2 m around the construction area
2				Wastewater pipe network construction	Sub-village 6	
3					Sub-village 5	
4					Sub-village 13	
5					Sub-village 10	

(2) To do well in the communication with the surrounding residents and units and accept social supervision.

(3) To develop standby emergency plan for the control of construction noise and attach importance to the management of noise sources. Where the conventional noise control measures cannot meet the requirements and the residents are disturbed by noises, the equipment and construction process that generate the noises shall be stopped in time, and the reliability of noise prevention and control measures shall be checked.

By taking the above measures, the construction noise will not have great impact on the surrounding environment.

### **6.2.3 Analysis of the impact on physical cultural resources and mitigation measures**

#### 6.2.3.1 Analysis of the impact on physical cultural resources

There is one Putian's ancestral temple about 30 m from the southeast of the wastewater treatment plant. The ancestral temple is located at the Sub-village 13, shared by Putian's 16 sub-villages, serving about 2,000 people. It is mainly used for the villagers' worship activities during festivals, about two to three times a year of the frequency. During the actual construction operation, the management shall be reinforced to avoid damage of the ancestral temple's building structure, appearance defacing, or even destruction and other irreversible results arising from the savage construction and weak awareness of protection of the construction personnel. In accordance with the field visit and investigation, the villagers' main intention is to avoid the impact of construction on the normal worship activities, to minimize the impact of construction activities on the atmosphere and noise, and to restore the landscape which is destroyed by vegetation deterioration and earthwork stacking caused by the construction activities.

#### 6.2.3.2 Mitigation measures for the impact on physical cultural resources

Construction management shall be strengthened and corresponding protection measures shall be taken for the noise and dust impact of the construction on the ancestral temple.

1. Before the construction, the project owner shall negotiate with the patriarch of the tribe that the ancestral temple belongs to and the village head to formulate effective protection plan.

2. To develop detailed construction plan before the construction, to clearly show the sign of protecting the ancestral temple at the construction site. The nature, village that the ancestral temple belongs to, protection scope and measures and other information, and the contact person and information of the ancestral temple

management shall be detailed in the sign.

3. To organize all the construction personnel to deeply study the construction operation regulations before the construction team entering the site, to standardize the construction and to prohibit expanding construction scope at will.

4. To set fence and temporary sound barrier around the construction site during the construction process, to sprinkle water regularly to reduce construction dust. In order to avoid the impact on the ancestral temple's normal worship activities, where villagers carry out worship activities during the construction period, only by seeking for their opinions in advance and being approved, can the construction be continued.

5. To immediately conduct ecological restoration for the range of impact after finishing the construction activities.

The Physical Cultural Resources Management Plan attached to this project's Environmental Management Plan has made regulatory requirements for the construction activities involving physical cultural resources.

## **6.2.4 Analysis of the impact of water and soil loss and mitigation measures**

### 6.2.4.1 Analysis of the impact of water and soil loss

Site surface cleaning, pipe network foundation construction and other construction activities of the wastewater treatment plant lead to land vegetation removal, earthwork excavation or stacking or filling, change the original landform and form a new unstable bare slope. Under the impact of the above construction activities, in case of rain, surface and gully erosion and other types of water and soil loss will occur on the surface in the project area.

The total earthwork excavation and filling in the construction of the wastewater treatment plant is 1,300 m<sup>3</sup>, and the total earthwork excavation and filling in the construction of the wastewater pipe network is 319,700 m<sup>3</sup>, 160,500 m<sup>3</sup> of earthwork excavation and 160,500 m<sup>3</sup> of earthwork filling. Through balanced deployment, there is no earthwork being carried from the outside or being discarded. The intensity of soil and water loss in the construction area is much greater than that before the project. With the site surface cleaning, the amount of suspended matter and other organic and

inorganic pollutants entrained into the water by the surface runoff increases, which reduces the water function of the waters, imposes an adverse impact on the water environment of regional water supply resource and causes inconvenience to the living of the local residents.

#### 6.2.4.2 Mitigation measures for the impact of water and soil loss

The major soil and water conservation measures in the construction process of the wastewater treatment plant include site leveling, surface soil backfilling, surface soil stripping, drainage ditch, landscaping, etc.. The details are as follows:

(1) To strip the surface soil in the plant area before the construction, and stack it nearby in the idle area of the Phase I construction, temporarily fence and cover it by soil-loading straw bag retaining wall and tarpaulin, and to use it for plant greening after the end of the construction.

(2) To set temporary drainage ditch around the plant during the construction process and to set desilting basin at the drainage ditch's outlet. The surface runoff is collected through the temporary drainage ditch, after subsidence by the desilting basin, is discharged into the nearby natural water system.

(3) To arrange drainage ditch with cover along the road for water drainage in the plant according to its vertical arrangement. After being collected by the drainage ditch with cover, rainwater is finally discharged into the nearby trench. The discharge method is: roof of buildings and structures (or top surface of platforms) →site→road→outside rainwater ditch and other drainage facilities, or roof of buildings and structures (or top surface of platforms) →site→water spilling hole of wall→outside the plant.

(4) To clear and break the hardened ground in the construction site after completing the construction. The hardened layer cleared is used for the nearby road subgrade filling or backfilling in low-lying areas.

(5) The plant greening is mainly in evergreen. The greening is divided according to functional areas and afforestation tree and grass species are scientifically selected. With garden hard land properly matched, the greening is implemented by the combination of trees, shrubs and grassland.

## **6.2.5 Water environmental impact and mitigation measures**

### 6.2.5.1 Analysis of water environmental impact

There is no construction camp in this project. The construction personnel's living facilities rely on the existing infrastructure, no domestic wastewater produced during the construction period. The construction wastewater includes a small amount of concrete construction wastewater, construction machinery washing wastewater and the waste water from the septic tank, The main pollution factors are SS, COD, BOD<sub>5</sub>, NH<sub>4</sub>, oil and so on.

### 6.2.5.2 Mitigation measures for water environmental impact

The construction machinery washing wastewater, after centralized collection and treatment, shall be reused for water sprinkling and dust suppression on the construction site, and shall not be discharged outside. The oily wastewater and vehicle washing water, after the oil-separation and sedimentation treatment by simple sedimentation tank and oil-separation tank, shall be reused for the site water sprinkling and dust suppression. The muddy water produced during precipitation shall be collected by setting interception ditch and collecting tank, not free to flow, and shall be recycled for the site water sprinkling and dust suppression after the sedimentation. Waste water from septic tanks is transported to treatment plants by special transport vehicles

## **6.2.6 Environmental impact of solid waste and mitigation measures**

### 6.2.6.1 Analysis of the environmental impact of solid waste

The solid wastes during the construction period are mainly the abandoned construction wastes (such as gravel, lime, concrete, timber, waste brick, earthwork, etc.) produced in the new construction of the wastewater treatment plant. The total earthwork excavation in this project's construction process is 1,300 m<sup>3</sup>, the same as the total earthwork filling. Through balanced deployment, there is no earthwork being carried from the outside or being discarded. Construction waste and sludge will be produced by the removal of the original pipe and old septic tank, and the construction waste generated by the original pipeline and septic tank shall be estimated to be 20t

There is no construction camp during the construction period of this project, no construction domestic waste.

#### 6.2.6.2 Mitigation measures for the environmental impact of solid waste

The project owner requires the construction unit to standardize the transport of construction wastes, to regularly transport them to the place designated by Xiushui County Bureau of City Administration and Law Enforcement for landfill. The sludge from the original septic tank will remove for landfill.

### **6.2.7 Ecological environmental impact and mitigation measures**

#### 6.2.7.1 Analysis of ecological environmental impact

The impact of project implementation on vegetation is mainly the direct impact of wastewater pipe network, wastewater treatment plant and other buildings and structures and temporary facilities and other land occupations on vegetation. Based on the investigation, there is no national key wild vegetation in the construction area, local common species of all the vegetation. The wastewater treatment plant covers a small area, and the original landform in the pipe construction area will be restored in time after the completion of the construction, therefore, the construction will not have a great impact on the quantity and distribution of vegetation.

#### 6.2.7.2 Mitigation measures for ecological environmental impact

(1) To strengthen the construction management, strictly control the width of operation belt, pay attention to the protection of vegetation outside the sideline in the construction process, control the construction activities within the scope of land acquisition, reduce land disturbance.

(2) To strip the area where the surface soil is strippable in the construction area of the wastewater treatment plant for the vegetation measure in the later stage of this project and separately store the stripped soil, which will be used for soil-covered greening in the later stage.

(3) Restoration and compensation measures for temporary land occupations in the construction: To timely carry out ecological restoration for the temporary land occupations, recovering the original vegetation form as far as possible.

(4) To conduct greening restoration for the green belt occupied by the construction area and temporary roads after the end of the construction. Due to the laying of water supply pipe, planting trees will have a certain impact on the pipe, so shrub and grass will be matched after the construction.

(5) To strengthen the environmental protection propaganda and education on all the construction units and construction personnel, develop rules and regulations, set up relevant signs, strictly control the range of impact of construction.

### 6.3 Environmental Impact During the Operation Period and Mitigation Measures

#### 6.3.1 Water environmental impact and mitigation measures

##### 6.3.1.1 Analysis of water environmental impact

In this project, Zhajin Town’s wastewater is discharged into Zhajin River after the centralized treatment. Zhajin River is the first-level tributary of Xiu River, and its current water quality is Class III. The wastewater discharged into Zhajin River executes Standard B under the primary standard stipulated in the state’s *Comprehensive Discharge Standard of Wastewater* (GB8978-1996). The designed influent and effluent quality of the wastewater treatment plant are shown in Table 6.3-1.

Table 6.3-1 Designed Influent and Effluent Quality of the Wastewater Treatment Plant Unit: mg/L

Item	COD <sub>Cr</sub>	BOD <sub>5</sub>	SS	Ammonia nitrogen	Total phosphorus
Influent Quality	250	120	160	25	2
Effluent Quality	≤60	≤20	≤20	≤8	≤1.0

The main environmental impact on surface water during the operation period of this project’s wastewater treatment engineering is the water environmental impact of the wastewater treatment plant’s wastewater discharge on receiving water. The wastewater entering the wastewater treatment plant is discharged into Zhajin River

after reaching the standard. Under the normal conditions, the discharge concentration of COD is 60 mg/L, 20 mg/L of that of BOD<sub>5</sub>, 8 mg/L of that of NH<sub>3</sub>-N and 1 mg/L of that of TP. After the wastewater is discharged into Zhajin River, by complete mix model, the concentration of COD at the wastewater outlet is predicted to be about 20 mg/L, 4 mg/L of that of BOD<sub>5</sub>, 1 mg/L of that of NH<sub>3</sub>-N and 0.2 mg/L of that of TP, which will not have a great impact on the water quality of the river.

#### 6.3.1.2 Mitigation measures for water environmental impact

Prevention and control measures for surface water environmental pollution include:

(1) To strengthen the construction of wastewater collection pipe network in the area

To speed up and strengthen the construction of wastewater collection system in the project's wastewater collection area, implement rain and wastewater diversion system, avoid a large amount of rainwater entering the wastewater treatment plant. The wastewater interception and receiving rate of the pipe network shall reach more than 80%. When designing the wastewater treatment plant's treatment process and selecting the design parameters, the water capacity and quality changes shall be analyzed and checked to ensure that the treatment plant's effluent reaches the standard.

(2) To strengthen operation management to ensure the up-to-standard discharge of wastewater

To strengthen the wastewater treatment plant's operation management, enhance the supervision on the tail water quality, establish online monitoring on the effluent quality of the wastewater treatment project; to strengthen the operation management and inspection of structures of the wastewater treatment project, enhance the inspection and overhaul of the instrument and equipment in each wastewater treatment process to ensure safe operation.

(3) Accident prevention and emergency measures

(4) To reinforce daily operation management

To strengthen the training on employees of the wastewater treatment plant, to

develop rules and regulations and operation procedures, execute system of post responsibility for the employees and avoid pollution accidents caused by employees' misoperation.

### 6.3.2 Atmospheric environmental impact and mitigation measures

#### 6.3.2.1 Analysis of atmospheric environmental impact

According to the project analysis, the major atmospheric pollutant is the foul gas (NH<sub>3</sub> and H<sub>2</sub>S) produced in the wastewater treatment process. The evaluation selects NH<sub>3</sub> and H<sub>2</sub>S as the main predictors for predictive analysis.

##### (1) Pollution source intensity

The foul gas in this project's wastewater treatment process mainly comes from the regulating tank. The main components of the gas are hydrogen sulfide, ammonia gas and methyl mercaptan. The mixed foul gas has strong pungent odor and is toxic. The high-concentration foul gas in sludge treatment workshop threatens the health and safety of the employees, and has a negative impact on the residents' life, causing harm to the body and spirit of the crowd.

The foul gas emission parameters of the wastewater treatment station are shown in Table 6.3-2.

Table 6.3-2 Statistics of Emission Parameters

Pollution Source	Exhaust Gas Factors	Source Intensity (t/a)	Area of Surface Source	Height of Surface Source
Regulating tank (2,000t/d)	NH <sub>3</sub>	2.3×10 <sup>-3</sup>	20m×5m	0.2m
	H <sub>2</sub> S	1.37×10 <sup>-4</sup>		

##### (2) Estimation model and calculation results

The prediction adopts the estimation model (SCREEN3) recommended by *Technical Guideline for Evaluation of Environmental Impact-Atmospheric Environment* (HJ2.2-2008) to forecast the maximum hourly ground level concentration within the evaluation scope of NH<sub>3</sub> and H<sub>2</sub>S. The prediction results are

detailed in Table 6.3-3.

Table 6.3-3 Calculation Results of Estimation Model for the Concentration of Atmospheric Pollutants

Distance down the Wind from the Source Center D (m)	NH <sub>3</sub> (mg/m <sup>3</sup> )	P <sub>i</sub> (%)	H <sub>2</sub> S (mg/m <sup>3</sup> )	P <sub>i</sub> (%)
1	0.0106	5.29	4.39×10 <sup>-4</sup>	4.39
6	0.0163	8.13	6.73×10 <sup>-4</sup>	6.73
100	2.06×10 <sup>-4</sup>	0.1	8.52×10 <sup>-6</sup>	0.085
200	5.59×10 <sup>-5</sup>	0.028	2.32×10 <sup>-6</sup>	0.023
300	2.67×10 <sup>-5</sup>	0.013	1.11×10 <sup>-6</sup>	0.011
400	1.61×10 <sup>-5</sup>	0.008	6.67×10 <sup>-7</sup>	0.0067
500	1.09×10 <sup>-5</sup>	0.005	4.54×10 <sup>-7</sup>	0.0045

Based on the prediction results, the maximum ground level concentration of NH<sub>3</sub> in the operation period of the proposed wastewater treatment plant is 0.0163 mg/m<sup>3</sup>, 8.13% of P<sub>i</sub>, 6 m of the distance; the maximum ground level concentration of H<sub>2</sub>S is 6.73×10<sup>-4</sup> mg/m<sup>3</sup>, 6.73% of P<sub>i</sub>, 6 m of the distance. The ground level concentration is much lower than the environmental standard value.

There are three sensitive points around the wastewater treatment plant, Sub-village 6 of Putian (70 m from the southwest of the plant, three households), Sub-village 13 of Putian (80 m from the southeast of the plant, ten households) and Putian's ancestral temple (30 m from the southeast of the plant). During the plant's operation, deodorization measures shall be taken to lessen the impact of foul gas on the surrounding residents.

### 6.3.2.2 Mitigation measures for atmospheric environmental impact

According to the analysis of this project, the exhaust emissions are mainly the foul gas produced in the wastewater treatment and sludge thickening process. In line with its generation, emission characteristics and the nature of pollutants, the main prevention and control measures are as follows:

- (1) To prepare foul gas collection system

The facultative FMBR system used in this project does not produce exhaust gas. Therefore, the main unit of foul gas in the wastewater treatment station is the collecting tank. Due to the small scale, the amount of exhaust gas generated by this project is small, after unorganized emission and air diffusion, it has little impact on the surrounding environment. It requires the construction unit to make green around the wastewater treatment plant to reduce the impact of foul gas produced in this project on the environment.

(2) To strengthen greening in this plant

To minimize the impact of the foul smell, it is recommended that a certain width of green belt shall be built around the plant, planting seeds of trees, grass, etc., forming a three-dimensional protection forest system of grass, shrubs and trees. In the plant, greening shall be made in the interspace between various structures, especially, more flowers and trees shall be planted around the place where the foul smell comes into being to ensure that the green area in the plant is not less than 30%.

**6.3.3 Acoustic environmental impact and mitigation measures**

6.3.3.1 Analysis of acoustic environmental impact

The noises during this project’s operation period mainly come from the lift pump and membrane treatment facilities in the wastewater treatment project. The noise source intensity of main equipment is shown in Table 6.3-4.

Table 6.3-4 Noise Source Intensity of Main Equipment

No.	Name of Equipment	Equivalent Noise Value dB(A)	Location
1	Lift pump	60-70	Collecting tank
2	Membrane treatment facility	55-60	/

According to the prediction method recommended by the environmental protection industry standard of the People’s Republic of China, *Technical Guideline for Evaluation of Environmental Impact-Acoustic Environment* (HJ2.4—

2009), the running noise of the supporting equipment in the area is similar to industrial noise source. The predictive calculation model is as follows:

① Predictive calculation model for industrial noise

$$L_{Ai(r)} = L_{Ai(r_0)} - 20Lg(r/r_0) - \Delta L$$

In this formula:  $L_{Ai(r)}$ —Sound level produced by point sound source at the prediction point, dB(A);

$L_{Ai(r_0)}$ — Sound level at reference position  $r_0$ , dB(A);

$r$ — Distance between prediction point and sound source, m;

$r_0$ — Distance between reference position and sound source, m;

$\Delta L$ —Attenuation caused by various factors (including barrier, shelter, air absorption, ground effect).

② Calculation of predictive equivalent sound level at the prediction point

$$L_{eq} = 10lg (10^{0.1L_{eqg}} + 10^{0.1L_{eqb}})$$

In this formula:  $L_{eqg}$ --Equivalent sound level contribution value of the construction project's sound source at the prediction point, dB(A);

$L_{eqb}$ --Background value at the prediction point, dB(A).

This project's wastewater flows by gravity into the collecting tank in artificial grilling. Therefore, the noise source is the lift pump in the collecting tank and the subsequent complete processing equipment. After calculation, the attenuation of noise value with distance is shown in Table 6.3-5.

Table 6.3-5 Prediction of Attenuation of Noise with Distance During the Operation Period Unit: dB(A)

N	Constru	Distance (m)	Standard
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No.	Location Machinery	10	20	30	40	60	80	100	150	200	
1	Lift pump	70	64.0	60.5	58.0	54.4	51.9	50.0	46.5	44.0	Daytime 60dB(A), nighttime 50dB(A)  <i>Discharge Standard of Environmental Noise for Industrial Enterprise at Boundary (GB 12348-2008)</i>
2	Wastewater treatment facility	60	54.0	50.5	48.0	44.4	41.9	40.0	36.5	34.0	
Total Sound Source		70.4	64.4	60.9	58.4	54.9	52.4	50.4	46.9	44.4	

From Table 6.3-2, where noise attenuating measures are not adopted, the contribution value of the wastewater treatment plant at 30 m outside the boundary can meet Class I standard in *Discharge Standard of Environmental Noise for Industrial Enterprise at Boundary (GB 12348-2008)*, and the contribution value to the boundary is smaller taking into account the sound insulation effect of structures and wall on the lift pump.

There are three sensitive points around the wastewater treatment plant, Sub-village 6 of Putian (70 m from the southwest of the plant, three households), Sub-village 13 of Putian (80 m from the southeast of the plant, ten households) and Putian's ancestral temple (30 m from the southeast of the plant). Judged by the prediction results, the noise value of the wastewater treatment plant at the three sensitive points in the daytime can reach the standard. In the actual operation process, where the noise value at the three sensitive points exceeds the standard due to the plant's operation, effective measures shall be taken to ensure the up-to-standard daytime noise value at the sensitive points, including setting acoustic shield around the lift pump and setting sound barrier on the side facing the villagers, etc..

### 6.3.3.2 Mitigation measures for acoustic environmental impact

The main mitigation measures include: Submersible pump and other advanced low-noise equipment shall be selected by preference. Pump shall be placed in the

room as far as possible, the noise of which can be insulated by buildings. In the design of construction drawing, the plane layout of the plant shall be further optimized, and the equipment which has greater impact on the noise shall be far away from the residential area. Because the pump is a long-term operation equipment, the pump body foundation shall be solid, with uniform grouting, and can absorb all kinds of vibration, also, one solid supporting point shall be made on the base board. To strengthen the maintenance of pump, regularly check the concentricity of the motor and the pump spindle, ensure good lubrication of the bearing and reduce the wear of parts in the pump; to reasonably arrange acoustic absorbing material and vibration damping device around the interior wall, roof, floor of the pumping house and around the machine set, such as asbestos board, absorber, etc., which can effectively control and eliminate the noise propagation and reflection.

### **6.3.4 Environmental impact of solid waste and mitigation measures**

#### 6.3.4.1 Environmental impact of solid waste

Solid wastes of the wastewater treatment plant are mainly from four aspects: sludge; grille barrier; sediments in the collecting tank, chippings, silt and other fine sediments; employees' domestic refuse.

According to feasibility research and other data, the facility of biological contact oxidation process basically does not produce organic excess sludge. Generally, the complete equipment of biological contact oxidation is maintained every two to three years. A small amount of sludge will be produced in the cleaning process, about 20 t/a (60% of the moisture content) of the average.

In addition, there will be some slag and grit in the grilling well and regulating tank, mainly come from the grilling tank of the wastewater treatment plant and the pumping station and the grit tank of the wastewater treatment plant. The common grilling scum is some domestic refuse and leaves. The grille slag comes from coarse and fine grilles, mainly the municipal domestic refuse mixed with wastewater, such as plastic bag, paper, finger stone, large-particle matter, etc.. According to analogy, wastewater of per ton produces about 0.01 kg slag separated from the grille between

grilles, then, there will be slag of 30 kg/d, 10.95 t/a produced in this project. A certain amount of grit will be produced in the use of the regulating tank, 3 m<sup>3</sup> of the output in every 100,000 m<sup>3</sup> wastewater, 60% of the moisture content, and the unit weight is calculated according to 1,500kg/m<sup>3</sup>, then the amount of grit (containing moisture) produced in this project is 135 kg/d, 49.27 t/a. The scum and grit can be removed by grilling cleaning machine and rotary solid-liquid separator. They will have little impact on the further treatment of wastewater, as long as they are cleaned up in time. They can be considered as general solid wastes and can be disposed with sludge after collection, and shall not be discarded at will. They will have little impact on the surrounding environment.

#### 6.3.4.2 Mitigation measures for the environmental impact of solid waste

To set the collecting box in the plant to separately collect the slag and grit, to timely transport them with domestic refuse to domestic refuse landfill for disposal. After dewatering, the moisture content of sludge shall be reduced to less than 60%, and the sludge shall be stored in the plant's temporary sludge storage area and transported to Jiujiang's refuse landfill for sanitary landfill every quarter. Enclosed room shall be used for temporary sludge storage and anti-seepage measures shall be applied to the floor to avoid secondary pollution.

## **7. Environmental Risk Analysis**

### **7.1 Environmental Risk Identification**

#### **7.1.1 Environmental risk identification of water supply project**

##### **7.1.1.1 Environmental risk during construction period**

The underground infrastructure such as the West-East Gas transmission, optical cable, gas pipeline and so on, laid in the vicinity of the excavation location of the water supply pipeline of this project, will have serious damage if no appropriate protective measures are taken during the construction process.

##### **7.1.1.2 Environmental risk during operational period**

###### **(1) Leakage of chlorine**

According to the characteristics of water supply project, the environmental risk mainly comes from the leakage of chlorine that may occur between the newly-built water plant and the intake pump station. Chlorine is a pungent yellow-green odor of gas, easily soluble in water and lye. Chlorine is a highly toxic substance, irritating to eyes and respiratory mucosa, and can cause vagus nerve excitation and sudden cardiac arrest.

Chlorine disinfection is used in the production process of water plant and the water intaking pumping station. The leakage risk may be caused by the improper operation in the cylinder change-over, excessive use of the pipeline, damaged gasket of the valve connecting parts and the low quality of the valve, in which the most common cause of chlorine leakage is the improper operation in the cylinder changing.

###### **(2) Water contamination risk of water intake and water supply pipeline**

The traffic accidents or leakage of vehicles carrying dangerous goods on the cross buildings at the upstream reach of each intake will cause the contamination of the river water by toxic and harmful pollutants; The project has many water delivery pipelines with long length, part of the pipeline adjacent to roads and cross buildings, and the traffic accidents or leakage of vehicles carrying hazardous materials in the pipeline near the road and cross buildings will lead to the contamination of the water

supply pipeline due to toxic and harmful pollutants.

### **7.1.2 Environmental risk identification of sewage water treatment project**

The main environmental risks of the Zhajin town sewage water treatment plant project are:

#### (1) Site flood risk

(1) In case of power failure, sudden natural disaster, equipment failure and other unexpected accidents, the sewage water treatment facility will stop operation, and a large quantity of untreated sewage will be discharged directly;

(2) In case of the sewage pipeline rupture and damage, the sewage water may flow into the rainwater pipe and be discharged into the surface water without treatment.

(3) In case of repair and maintenance of pipeline network, the accumulation of harmful gas may hurt the health of workers.

## **7.2 Environmental Risk Analysis**

### **7.2.1 Environmental risk analysis of water supply project**

#### **7.2.1.1 Environmental risk during construction**

In the construction process, if no appropriate protective measures are taken, it will lead to significant consequences, such as damaged drainage, gas pipeline, power cable, communication lines and other underground infrastructure, resulting in supply interruption; or communication equipment and construction equipment damage, personnel casualties and so on.

#### **7.2.1.2 Chlorine leakage**

It is estimated that in case of chlorine leakage accident, the leakage time is usually less than 3 minutes because of the alarm device in place, the leakage amount is 10 % of the added chlorine. Considering the treatment rate of the chlorine absorption device is 50%, the discharge source is strong, and the chlorine leakage of the water pumping station and the single chlorination machine of the water plant are

both 0.3kg/h, the leakage time is calculated as 3 minutes.

It is calculated that when the chlorine leakage occurs and the chlorine treatment rate is 50 %, the maximum chlorine landing concentration in the leading wind is 0.36318 mg/m<sup>3</sup>, exceeding the permissible concentration (0.1 mg/m<sup>3</sup>) of hazardous substances in the residential area according to the "Hygienic Standard for Design of Industrial Enterprises" (TJ36-79), within a range of 150 m from the chlorination workshop, but the leakage time is so short, after 5 minutes of leakage, chlorine is not detected 600 meters away from the chlorination workshop, and the concentration of chlorine in the ambient air can meet the standards.

### **7.2.1.3 Water contamination at water intake and water supply pipeline**

The upstream of the water intake of each river in this project are residential areas, companies and government institutions, etc., if not properly managed, domestic waste or industrial waste water and waste are discharged into the river or stacked by the riverside, it may cause water pollution; The traffic accidents or leakage of vehicles carrying hazardous materials such as pesticides, chemical fertilizers and chemical raw materials on the upstream reach of each water intake (such as road bridges, culverts, etc.) will also cause the pollution of the river water due to toxic and harmful pollutants. All the above factors have the possibility of polluting river water and then become the major risk at the water intake of this project.

In addition, this project includes a large number of water pipelines with long length. Some pipelines are adjacent to the road (mostly rural and county roads, less are provincial and highway) and cross buildings (mainly bridges and culverts), and there are more passing vehicles in the vicinity of roads and cross buildings, as a result, in case of traffic accidents or leakage of the dangerous materials such as the transportation of pesticides, chemical fertilizers and chemical raw materials, the water pipeline will be polluted by the toxic and harmful pollutants, resulting in the water contamination.

## **7.2.2 Environmental risk analysis of sewage treatment project**

### **7.2.2.1 Sewage discharge accident**

According to the biological treatment mechanism of sewage and the operation practice of similar treatment plant in China, the main reasons for the effluent overflow from treatment plants are as follows:

(1) Equipment and facilities failure, caused by poor quality or improper maintenance of treatment equipment and facilities, resulting in the treatment efficiency reduction and even direct discharge without treatment.

(2) Direct sewage discharge without treatment in case of power failure.

(3) In case of power failure in the pumping station, the sewage cannot be discharged into the treatment plant.

All the above three cases have an impact on the surface water quality nearby.

The effect of direct discharge of untreated sewage into the river is calculated by using S-P mode to predict the effect of COD on river water quality. S-P mode is as follows:

$$c = c_0 \exp\left(-K_1 \frac{x}{86400u}\right)$$

Where: C- mixed concentration of pollutants, mg/L;

*C<sub>0</sub>*- pollutant concentration in initial section, mg/L;

*K<sub>1</sub>*- self-purification coefficient, 1/d;

*x*- distance from the prediction point to the initial section, m;

*u*- average velocity in *x* direction, m/s.

The predicted result is shown in Table 7.2-1.

Table 7.2-1 The predicted results (unit: mg/L)

County	Project name	Discharged into	Predictive section	Pollutant	Predictive value	Standard value
Xiushui County	Zhajin town, Xiushui County	Zhajin river	Discharge outlet	COD	20.35	20

	newly-built sewage pipe network and sewage treatment plant project		Downstream 1km		20.14	
			Downstream 2km		19.94	
			Discharge outlet	NH3-N	1.16	1.0
			Downstream 1km		1.14	
			Downstream 2km		1.13	
			Downstream 3km		0.98	

From the prediction, it can be seen that when accident discharge occurs in the sewage treatment plant of Zhajin town, the excess water area of COD is the length of 2 km and the width of 10m at downstream of the discharge outlet, with the maximum exceeding limit of 1.02 times, and the excess water area of ammonia nitrogen is the length of 3 km and the width of 10 m at downstream of the discharge outlet, with the maximum exceeding limit of 1.16 times. Therefore, when the accident discharge occurs at treatment plant, it will cause a certain degree of impact on the water quality of the Zhajin river, even lead to a certain range of the lower reaches exceed the standard. Therefore, the operation and management of sewage treatment plant shall be strengthened and the accidental discharge of sewage shall be strictly prevented.

#### 7.2.2.2 Sewage water pipeline leakage

The leakage of the sewage pipeline will cause the inability to collect sewage, and the untreated sewage will be discharged into the surface water system, which will affect the surface water environment. After the sewage from the pipeline leaking into the ground, it will not only pollute the surrounding soil and its environment, but also will adversely affect the groundwater quality. According to the operation of the

existing pipeline network, except for the brutal construction and man-made destruction, the probability of pipeline rupture is not high.

### **7.2.2.3 Accident of a system failure of a sewage treatment plant causing a risk to the health of the staff**

Because the accident risk of the sewage treatment system is abrupt, it will bring significant damage to the staff of the maintenance system, which may endanger life when it is serious. In the event of an environmental risk accident, the first affected is the health and safety of the staff in the sewage treatment plant.

#### **(1) Analysis on the risk of personnel intoxication caused by toxic gases**

When an accident occurs in a structure of the sewage treatment system, it is necessary to remove it immediately. In the meantime, the maintenance personnel must enter the sewage pipeline, collect wells or sewage tank to carry out operation, these places can easily generate and accumulate toxic gas in high concentration, such as hydrogen sulfide, methane, carbon dioxide, etc., if preventive measures are not taken in maintenance, the maintenance personnel will suffer from dizziness, disturbance in respiration and other symptoms caused by the inhalation of the toxic gas under poor ventilation environment, in serious cases, even leading to death.

Evidence accumulates that more than 20 domestic sewage pipelines and confluent pipelines in China have dozens of such accidents where toxic gas in the pipeline cause the intoxication and casualties of staff, or explosion due to contact between open flame and the flammable gas methane generated by pipelines, such accidents endanger personal safety. Therefore, it is very important to take personal safety measures to prevent the harmful gas. The most effective way to stop intoxication is ventilation, having the toxic and harmful gas completely dissipate and fill the working space with fresh air. If adequate ventilation is not possible, access to hazardous space shall be avoided and when it is necessary to access, the effective protective equipment must be used. The protective equipment is gas mask and air

supply mask, etc. The detection equipment includes gas detection instrument and detection test paper.

## **(2) Analysis of the impact of pathogens on health**

In sewage or sludge, there are various pathogens and parasitic eggs, the fog, moist air produced in the sewage treatment facilities can spread bacteria and viruses, and the workers of the sewage treatment plant are exposed to such microorganisms in sewage and sludge, and may be infected and have diseases. Infection may be caused by direct inhalation of gas or indirectly by water droplets on skin or clothing. Aeration tank, water weir, irrigation water spray, blower room, dehydration machine room and so on will coagulate the gas. In places where water vapor is highly condensed, the use of thin-gauze respirator can reduce the inhalation of toxic substances. Such environmental risks are mainly caused by plant operators who are likely to be directly infected by pathogens leading to diseases, and people in the environment outside of plants may be directly infected leading to diseases with a small risk, but the spread of diseases caused by uncontrolled infection by plant operators endangers the health of the people outside the plant.

## **7.3 Environmental Risk Prevention and Mitigation Measures**

### **7.3.1 Risk prevention and mitigation measures of water supply project**

#### **7.3.1.1 Mitigation measures for environmental risk during construction period**

Before starting the construction, it is necessary to know the distribution of municipal facilities in the construction area from the relevant departments, make well on-site safety technical disclosure and designate the on-site safety officer. Find out the accurate location of underground facilities such as drainage, gas, power cable and communication lines, and designer, supervisor, project leader shall come to the site to recheck before excavation. For the sections of underground pipelines that have been buried near the construction area, large mechanical excavation shall not be used at the time of construction, and if the leakage or damaged cable is found during excavation,

the work shall be stopped immediately to protect the site and report to the superior. Provide protection measures and warning marks for underground facilities such as drainage, gas, power cable, communication lines, etc. Formulate "Emergency Plan for Emergency Repair of Construction Site", and prepare personnel, tools, vehicles and so on. Work shall be carried out according to the "Emergency Plan for Emergency Repair of Construction Site". When the underground pipeline is excavated and suspended, the appropriate package shall be hanged with iron wire hanging from the top surface of the trench to prevent sinking.

### **7.3.1.2 Mitigating measures for exposure to chlorine gas**

A chlorination workshop is used in the water plant of this project to disinfect the original water. Under normal conditions, chlorine will not be discharged, but once an accident occurs, the leakage of chlorine will cause a greater impact on the environment, causing harm to the human body. Therefore, it is necessary to take preventive measures against the leakage of chlorine gas.

(1) Establish safe operation procedures, staff must be specially trained, operate strictly according to the operating procedures, and strengthen education management to avoid leakage of chlorine caused by operation failure.

(2) Strengthen the storage and transportation management of liquid chlorine

Liquid chlorine cylinders shall be stored in a special liquid chlorine warehouse, cylinders are prohibited from open storage, and cylinders shall not be installed in such places as ventilation system suction ports.

Liquid chlorine adopts the principle of first-entry with first-use, the empty bottle and the refilled heavy bottle must be placed separately to prohibit mixing. It is prohibited to store inflammable and explosive substances and those that have occurred chemical reaction in the warehouse.

Liquid chlorine transport unit must obtain the relevant qualification identification and permission transport certification, the motor vehicles transporting liquid chlorine shall be equipped with necessary repair and protection equipment, and strictly abide by the driving route specified by the local transportation department.

(3) Strengthen the repair and management of equipment

Staff shall regularly check and repair the chlorine dosing device, the leakage alarm device, chlorine absorption and neutralization device, so that it will always be in the normal working state, to avoid the occurrence of leakage accidents.

(4) Equip with the necessary protective equipment

Equip with gas masks and other safety equipment, so as to get into the scene in time to deal with the accident when an accident occurs.

(5) Formulate emergency plan for the accident

Formulate emergency response plan for chlorine leakage accidents, once an accident occurs, the staff member shall immediately enter the site to shut down the chlorine bottles, cut off the leakage source, and immediately notify the residents at the lower wind direction to evacuate, in the case of accidents such as leakage during transportation, the vehicle shall be drove to desolate areas for treatment, and if necessary, prompt alarm and timely cooperate to deal with the accident.

(6) For the greening tree species near the water plant, the strong resistance to chlorine shall be selected, such as ground hemlock, tsuga chinensis, oleaster, holly, etc.

### **7.3.1.3 Mitigation measures of water quality pollution risk in water supply engineering**

For water supply projects, drinking water sources must be protected at any time to meet or exceed the relevant national standards; if there is no national standard, the current version of the Health Organization Guidelines for Drinking Water Quality shall be met. In accordance with the guidelines provided in the relevant chapters of the General EHS Guidelines, manage air emissions, waste water, oily substances, hazardous substances, wastes, and so on, to protect soil and water resources.

Sustainability of water supply in the project: water supply works will be supplied to local villagers or community users, the water supply may be used for drinking, cooking, washing, bathing, water quality shall be in line with national standards; If there is no national standard, the current version of the Health Organization

Guidelines for Drinking Water Quality shall be met. At the same time, water supply projects shall be planned and managed to ensure the sustainability of water supply.

Relevant departments in accordance with the design code construction shall do a good job in the day-to-day maintenance of the pipeline and emergency work, pipeline maintenance workers shall be specially trained and clear identification shall be established at the important nodes along the pipeline so as to avoid the destruction of pipelines by other units' construction operations. When crossing the main river and highway, the materials shall be used to improve the ability to resist risk, the pipeline shall be spaced at a certain distance to the cut-off valve, and a bypass pipe shall be set up.

The project shall establish a sound emergency response plan for water quality pollution at the water intake of the project. Once the upstream pollution incident is found, relevant measures such as closing the water intake shall be taken in time to optimize the water transfer scheme in real time according to the pollution disposal situation, and ensure the quality safety of transferring water as much as possible.

### **7.3.2 Risk prevention and mitigation measures for sewage water treatment projects**

#### **7.3.2.1 Security measures for equipment safety**

When equipment such as pumps, valves, electrical appliances and meters used in the processing facilities system, failure occurs during operation will cause the wastewater treatment efficiency to be reduced, or if it is serious, it will lead to the stop operation accident of the sewage treatment plant, which has a certain probability of occurrence. The emergency measures for such accidents are mainly:

(1) In the process design, the sewage treatment system shall have a certain buffer, which shall be reserved for the maximum processing capacity of 0.5 times, with the buffer capacity in the accident condition, and equipped with equivalent treatment equipment (return pump, return pipeline, valves and meters, etc.), in case the equipment failure affecting the normal operation of the treatment system, start the

system buffer and return equipment, and re-process the unqualified effluent until the discharge standard is met.

(2) For vulnerable equipment, adopt multiple sets of standby equipment, and ensure that there are enough spare parts for maintenance and repair. The mechanical and electrical equipment in the treatment system shall be at least one with a backup mode.

(3) Select high quality equipment. For all kinds of machinery, electrical appliances, meters and other equipment in the processing facilities, the product must be selected with good quality, low failure rate, meeting the design requirements, suitable for long-term operation and easy maintenance.

(4) During the operation period, the operating personnel on duty shall strictly follow the rules and regulations of the treatment facilities, conduct regular tour inspection of the equipment, maintain timely maintenance and reduce the failure rate of the equipment.

(5) The usage of electrical equipment shall follow the grounding protection regulations; And equipped with automatic trip circuit, the operation of the main equipment adopts computer data monitoring, which can alarm timely, and can record the location, the nature and the occurrence time and so on of the accident, in order to organize personnel to repair it in time. The installation protection of all electrical equipment shall meet the relevant safety requirements of the electrical equipment.

(6) Adopt the power supply with double circuit to ensure the normal operation of power supply facilities and lines

### **7.3.2.2 Prevention of abnormal sewage discharge**

1, The design shall fully consider the emergency measures when the water quantity is unstable due to various factors, in order to alleviate the unfavorable situation.

2, Operation technical management measures of sewage treatment plant

(1) Establish the operation management and operation responsibility system of sewage treatment plant;

(2) Offer training to managers and operators, and establish technical examination files, unqualified persons shall not go on duty;

(3) Employ experienced professional technicians to be responsible for the technical management work within the plant;

(4) Select professional and technical personnel to conduct technical training at home and abroad;

(5) Strengthen the inspection of water pipeline, timely find problems in time to solve;

(6) Strengthen the maintenance and management of equipment and facilities, the key equipment shall be equipped with back-up to ensure the power supply with double circuit;

#### **7.3.2.3 Emergency measures of sudden sewage water discharge risk accident**

The following measures shall be taken when a **sewage** water treatment plant is exposed to an accidental discharge:

(1) Strive to ensure the normal operation of the grid and the detritus chamber, so that the SS and COD in the water will be reduced to a certain extent;

(3) If there is an irresistible external cause, such as the double circuit power failure, sudden natural disasters and other conditions, it will cause the sewage to be discharged without treatment, at this time, the **sewage** water shall be discharged into the emergency pool, and shall be treated after the system is repaired, so as to ensure the safety of the water body;

(4) During the occurrence and handling of the accident, the warning marks shall be hoisted at the water area near the discharge port, and the relevant parties shall be reminded to take preventive measures.

#### **7.3.2.4 Prevention and treatment measures of pipeline leakage risk**

(1) In the pipeline design, according to the specific characteristics of the city, select the appropriate pipe, and ensure the quality and service life of the pipeline. The foundation of the pipeline drainage engineering must meet the mechanical requirements of the design, and the design requirements must be handled accordingly.

The foundation construction shall be strictly according to the width, thickness and strength requirements of the design drawings, and ensure the quality.

(2) Before laying pipelines, make a good job of the corresponding inspection. On the one hand, the pipelines entering the construction site need to be carefully inspected to avoid the trench with cracks or holes in the pipelines; On the other hand, carefully check whether the center line and sideline of the pipe foundation, the size and strength of the well base, etc. meet the requirements; Finally, the location, distance, the strength grade of concrete in each part and provision of anti-seepage mortar in interface of the shaft shall be checked to determine whether they meet the national requirements.

(3) In pipeline installation, the required cement mortar shall be prepared according to the prescribed ingredients ratio. When installing the interface between the two drainage pipes, the squeeze will often lead to a protruding seam at the interface. In order to ensure the smooth flow of the drainage pipe, the protruding seams of the interface of the two pipelines shall be treated in time so as not to reduce the flow section, affect the flow speed, even cause the pipeline debris accumulation and blockage.

(4) When the trench is backfilled, it is necessary to wait until the pipe seat concrete and the plastering mortar are formed to form certain strength before it can be carried out, and the sand-gravel material cannot directly impact the pipe body. Sand-gravel material can not contain large pieces of gravel and bricks and other hard objects, the two sides of the pipe shall be backfilled and compacted at the same time, the upper part of the pipe shall be backfilled and compacted by layers, so that the filling part forms a forced whole, and acts as a diffusion and unloading force at the top of the arch to protect the safety of the pipe body.

(5) During the project operation period, the construction unit shall establish a perfect pipe network supervision system, timely dredge the pipe network, replace damaged pipe network, and avoid the running, leakage, and pollution of the surrounding water and underground water.

#### **7.3.2.5 Security measures for staff members' personal safety**

(1) Before the operation of the sewage treatment plant, the operators and managers must be educated in safety and the safety operation rules and management system must be established. After the operation, they shall be strictly implemented and inspected regularly.

(2) The design of buildings shall all take into account water supply and drainage, heating ventilation, lighting and other sanitation requirements, the air conditioning facilities shall be provided in the places where the staff members work for a long time. For some sealing structures and poor ventilation conditions, mechanical ventilation shall be adopted.

(3) The plant area shall be equipped with labor protection articles such as life vest, life buoy, safety belt, safety helmet, etc. The operator of the inspection or operation of the pipeline under well must wear the necessary protective equipment, such as the safety clothing, gas mask, air supply mask, gas detection instrument, test paper, etc., in case of poisoning, and at least two people shall be present.

(4) The walkway edges of the pool shall be provided with a handrail and lighting facilities to ensure pedestrian safety.

(5) The installation and protection of all electrical equipment shall meet the relevant safety requirements of the electrical equipment, and make the grounding protection of the high voltage equipment.

(6) Protective devices must be installed in the hazardous parts of the mechanical equipment, such as the driving belt, gears, grinding wheels, etc.

(7) It is necessary to strengthen the management of safety work and set up post responsibility system, set up warning signs in all dangerous areas of the plant, set guard rails at platforms above 1.2 m, set up ventilation equipment for places where toxic and harmful gas may be gathered, set up safety labor protection organization, and be responsible for safe production and labor protection.

(8) According to the actual needs and convenient use of each section, the production hygiene room (toilet, lavatory, storage room, etc.) shall be set up, in case of harsh environment and open air operations, in addition to strengthening ventilation, a rest room shall be provided. A centralized bathroom shall be set up in the plant.

(9) Workers who have direct contact with sewage, sludge and domestic waste shall regularly check the body and inject the relevant vaccines regularly (such as hepatitis A, hepatitis B, etc.).

#### **7.3.2.6 Safeguard measures for flood impact**

### **7.4 Contingency Plans for Environmental Risks**

(1) The accident discoverer shall immediately report to the workshop leader and the production control room, under the condition of ensuring their own safety, the accident ignition source shall be eliminated, and emergency measures shall be taken to cut off the gas source.

(2) After the accident workshop leaders receives the accident alarm, they shall wear the full cover self-contained air respirator and the anti-static clothing, rush to the scene immediately, simultaneously, alarm to the company emergency rescue leadership team, the production general dispatch room and the safety and environmental protection department.

(3) If people are found to be poisoned, the alarm shall be reported to the designated hospital in time, and the necessary on-site first-aid measures shall be taken for the poisoned personnel.

(4) Set up emergency rescue headquarters, and form plugging, emergency, rescue, medical rescue and other professional teams.

(5) All professional emergency, rescue, and firefighting teams shall be individually protected before entering the scene, wearing a full cover self-supporting type air respirator and anti-static clothes; Reasonable ventilation. If safe, the ignition leakage can be considered to reduce the spread of toxic gases; Build a dike or dig a pit to accommodate a large amount of waste water.

(6) The environmental monitoring group is responsible for monitoring the concentrations of harmful gases in the air and determining the areas of evacuation and isolation according to the areas affected by gases and toxic fumes, and the security group is responsible for organizing the evacuation and isolation of the regional personnel, and strictly limiting the access; And timely report to the scene emergency

rescue headquarters.

(7) According to the needs of on-site emergency rescue, the on-site emergency rescue command shall timely contact with the government, public security, safety production supervision bureau and environmental protection department of Tancheng county, and report the accident situation, so as to obtain the support and help of the relevant functional departments of the local government.

(8) The department of safety and environmental protection shall designate a person to monitor the site and report the situation to the field headquarters at any time.

(9) For areas with large concentrations of toxic gases, it is possible to dilute poisonous gas by fog-like water of fixed-form, mobile or fire-engine to protect rescue personnel; the leaking gas can be blown away by forced ventilation, and the leakage source can be completely eliminated and treated harmlessly.

(10) Organize accident investigation and disposal, summarize the accident, report to the company emergency rescue team timely and make recommendations for preventing such accidents.

For the accident of water pipeline, the emergency treatment plan is as follows:

(1) The discharge source shall be cut off quickly;

(2) Monitor the concentration of the main pollutants in the affected water body;

(3) When the conditions permit, quickly organize the power to seal the leakage pipeline and repair it;

(4) Immediately report to the local government authority of local traffic, and request the corresponding emergency plan of the local government department;

(5) Immediately organize to clear the traffic arteries, and fully restore the traffic.

(6) When the accident occurs, the accident scene and adjacent buildings, residential area (or residence) and traffic road surrounding the scene of the accident shall be the dangerous area, and the monitoring of the dangerous area shall be strengthened.

(7) Organize accident investigation and disposal, summarize the accident, report to the company emergency rescue team timely and make recommendations for preventing such accidents.

## 8. Resettlement and Social Impact Analysis

### 8.1 Assessment and Measures for Impact of Resettlement

#### 8.1.1 Permanent/Temporary Land Acquisition of Project Construction on Resettlement

According to the subproject of the list specified by Jiangxi Province, and cities / counties of the project, we conduct identification and survey of the impact of resettlement. Land acquisition and resettlement of the project are caused by water supply and wastewater treatment system construction (including newly-built water plant and rural sewage treatment plant of Cheng Ji Town) and pipeline network laying.

Impacts of resettlement of the project are collective land acquisition, temporary occupation, state-owned land permanent occupation and temporary occupation, without involving demolition of housing, enterprises and institutions.

285.4 mu of collective land will be acquired, 1 mu of state-owned land occupied permanently and 988.6 mu of land occupied temporarily for the Project. 332 households with 1,242 persons will be affected by permanent LA, and 485 households with 2,085 persons affected by temporary land occupation. 6 small waterworks in 6 townships in 3 counties (districts) will be closed down for the Project, affecting 36 employees. In addition, the Project will also affect scattered trees, telegraph poles and other ground attachments.. The Project involves neither house demolition nor tomb relocation. See Table 8.1-1.

**Table 8.1-1 Summary of impacts of the project relocation**

No .	Item	Unit	Yongxi n	Linchua n	Dongxian g	Jinx i	Nanfen g	Xiushu i	Lepin g	Subtotal	
1	LA	mu	108.8	79.18	91	4.4	0	2	0	285.4	
2	Occupation of state-owned land	mu	0	1	0	0	0	0	0	1	
3	Temporary land occupation	mu	184.9	61.1	109.7	53.3	57.31	90.6	431.7	988.6	
4	Directly affected population	Permanent LA	HH	17	275	31	3	0	6	0	332
			Person	74	973	145	15	0	35	0	1242
	Temporari	Temporar	HH	156	2	52	80	39	158	85	485

	y affected population	y land occupation	Person	638	6	169	326	99	574	279	2085
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### 8.1.2 Resettlement Compensation Policy and Livelihood Restoration

#### (1) Resettlement compensation policy

Based on RAP policy framework, through full consultation with relevant units of the project of cities and counties (e.g. land bureau), affected towns & villages and people the compensation standards of the project are as follows:

##### ✧ Collective-owned land compensation standards

In accordance with *Land Administration Law of the PRC*, *Notice of the People's Government of Jiangxi Province on Promulgation of minimum protection standards of land requisition compensation*, and related policies of cities and counties of the project, collective-owned land acquisition of the project involves Yongxin County, Jinxi County, Linchuan District, Dongxiang district and Xiushui County. Collective-owned land acquisition compensation standards for the cities and counties of the project are shown in Table 8.1-2.

**Table 8.1-2 Collective-owned Land Acquisition Compensation Standards for the Cities and Counties of the Project**

Counties	Project name	Townships / neighborhoods	Compensation standards (ten thousand / mu)		
			Paddy field	Forest land	Others
Yongxin	Longyuankou standby water supply project	Caifeng village	—	1.1	—
Jinxi	Huangtong village water supply project	Huangtong village	3.7	—	—
Linchuan	New construction of the second waterworks in Linchuan District	Shangdudu town	—	1.5	—
Dongxiang	New construction of Chengdong waterworks	Xiaogangtown	3.9	—	—

ng					
Xius hui	New construction of waterworks of Zhajin Town	Zhajin town	—	—	1.3

◇ **State-owned land acquisition compensation standards**

Linchuan District is the only area of state-owned land involved in the project. The state-owned land occupied by Linchuan District shall be in accordance with compensation policy of forest land expropriation. State-owned land (permanent expropriation) compensation standards are shown in Table 8.1-3.

**Table 8.1-3 State-owned Land (permanent) Acquisition Compensation Standards**

Project name	Town, village / street	Compensation standards (ten thousand Yuan/ mu)			Remark
		Land type 1 (Arable land, garden plot, other agricultural land, construction land)	Land type 2 (forest land)	Land type 3 (unused land)	
New construction of the second waterworks in Linchuan District	Shangdundu town	4.1582	1.4937	0.8078	Land involved

◇ **Temporary land acquisition compensation standards**

Collective-owned land and state-owned land temporarily occupied by the project shall be returned by the project construction unit at the expiration of acquisition, and restored to the original condition, with no need of payment of compensation.

Under the compensation standards for collective-owned land temporarily occupied by the project, the compensation shall be in accordance with the time and loss of acquisition, including crop compensation and land compensation. Time of acquisition is as same as time of compensation. Compensation standards for temporary land acquisition consist of losses, reclamation and young crops costs. Temporary acquisition compensation standards are shown in Table 8.1-4.

**Table 8.1-4 Temporary Land Acquisition Compensation Standards for the Project**

City/ county	Type	Temporary land acquisition compensation (Yuan / mu)				Remark
		Loss of soil fertility	Reclamation	Young crops	Total	
Yong xin	Arable land	200	1000	2300	3500	Temporary land acquisition compensation consisted of reclamation, young crops
	Forest land	60	280	660	1000	
	Unused land	37.5	175	412.5	625	
Linc huan	Arable land / Forest land	280	2020	2200	4500	
Dong xiang	Arable land	60	280	660	1000	
Jinxi	Arable land	200	1000	2300	3500	
	Forest land	110	500	1190	1800	
Nanf eng	Arable land	200	1000	2300	3500	
Xius hui	Arable land	200	1000	2300	3500	
	Forest land	60	280	660	1000	
	Unused land	37.5	175	412.5	625	
Lepi ng	Arable land	200	1000	2300	3500	

**(2) Livelihood recovery for migrants**

Resettlement of the project aims to ensure that migrants can be paid the compensation for their losses, and provided reasonable placement and recovery, so that the migrants can share the benefits of the project, and be provided with support when facing temporary difficulties. Thus, their income level, living standard and enterprise production and profitability can be improved or resumed to at least the level before resettlement or start of

the project.

✧ **Collective-owned land acquisition restoration measures**

Based on the analysis of the impact of permanent acquisition of arable land, forest land and other types of land, Subproject management offices of cities / counties where the project is located, Project Implementing Unit (PIU) and all the villages under the influence of land acquisition and resettlement held the forum, discussing resettlement scheme and determining overall planning of resettlement, i.e. direct monetary compensation, employment training and social security measures.

✧ **Temporary land acquisition restoration measures**

Temporary land acquisition restoration measures of the project shall be supervised by the project owner and land and resources bureau, and determined by affected representatives of rural household, and villagers through collective consultation.

In order to minimize the impact of temporary land acquisition, the restoration measures shall be adopted as follows :

1) Temporary recruitment during the construction: The affected rural household should have priority in the recruitment. 2) During the construction period of temporary land acquisition, strict measures should be adopted to protect the topsoil to prevent the non-recoverable impact. 3) For part of wasteland and old borrow pit, fertile river silt may be used to fill up the pit, so that the wasteland can become arable land to increase land resources.

In general, as for the compensation for temporary collective-owned and state-owned land acquisition, it shall not cause the loss of property if there are no buildings and structures on the land. Subproject management offices of cities / counties and Project Implementing Unit (PIU) guaranteed the timely restoration through consultation with relevant related property units. The restoration fees shall be included in the construction cost. Temporary land acquisition restoration shall be supervised by Subproject management offices, PIUs, and bureau of land and resources of cities / counties; The village collectives, village project teams, and immigration representatives shall jointly conduct supervision and organize the inspection and acceptance.

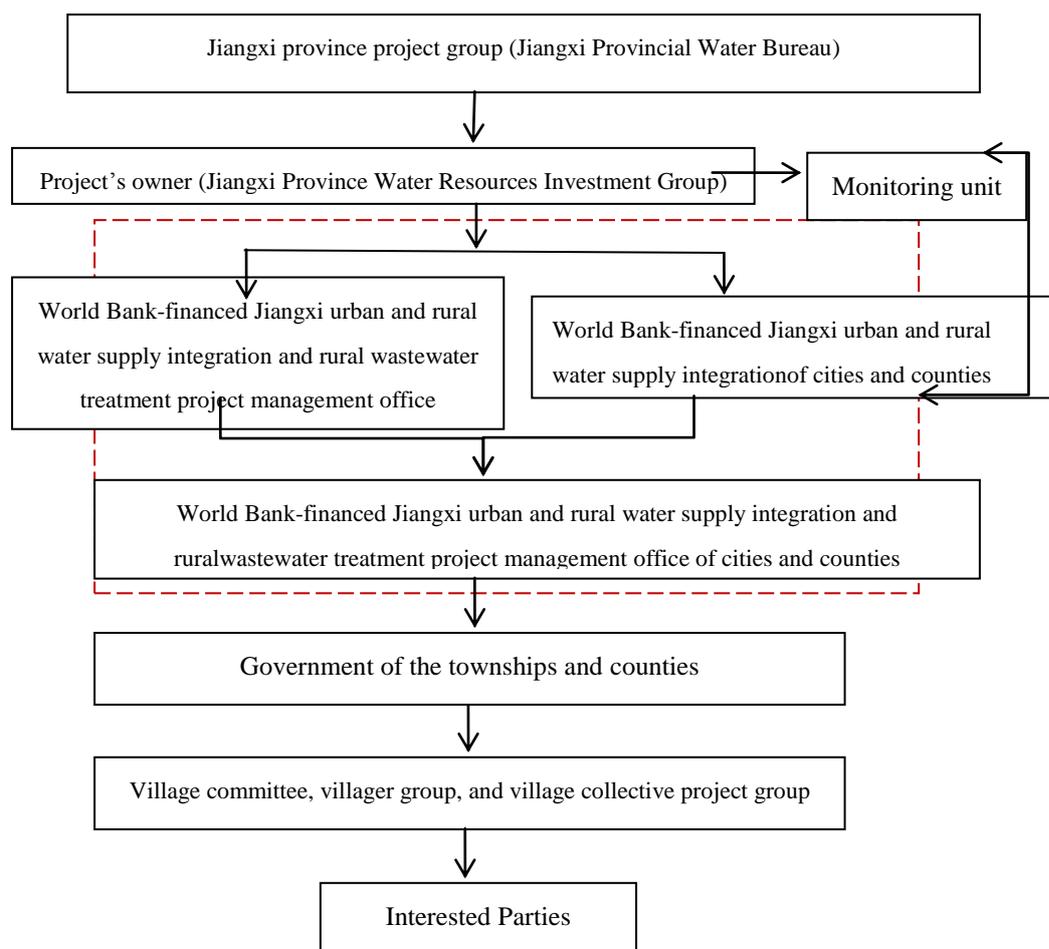
### **8.1.3 Resettlement organization**

To ensure the smooth construction of demonstration project of Jiangxi rural wastewater treatment system, Jiangxi provincial government, governments of cities and counties, and owner's units of all subprojects set up necessary coordination institutions to ensure the planning, coordination and monitoring of resettlement activities.

The institutions responsible for land acquisition and resettlement for the demonstration project of Jiangxi rural wastewater treatment system,

- (1) Jiangxi province project group (Jiangxi Provincial Water Bureau)
- (2) Project's owner (Jiangxi Province Water Resources Investment Group)
- (3) World Bank-financed Jiangxi urban and rural water supply integration and rural wastewater treatment project management office
- (4) Leading group of subproject of cities and counties
- (5) Management offices of subproject of cities and counties
- (6) Affected townships / neighborhoods
- (7) Village committee, villager group, and village collective project group
- (8) External independent monitoring and evaluation institution

Resettlement organization network is shown in Table 8-1.



**Table 8.1-1 Project Implementing Unit of Resettlement**

### 8.1.4 Public consultation and complaint

According to land acquisition and resettlement policies and regulations of the state, Jiangxi province and affected cities, to protect legitimate rights and interests of migrants and relocated units, and reduce dissatisfaction and disputes, we further formulate the relevant policies and implementation rules for the resettlement, develop resettlement plan, implement organizational work to achieve the purpose of the resettlement of the project. As for this project, in the stages of formulation of resettlement policies, and preparation and implementation of plans, we'll attach great importance to the migrants' participating in consultation, and listen to their views.

On the basis of existing complaint mechanism, in order to ensure the smooth and effective implementation of resettlement of the project, management offices of cities / counties set up the project complaint mechanism through the basic channels as follows:

1<sup>st</sup> stage: If the migrants are dissatisfied with resettlement plan, they may lodge a complaint in either oral or written form, to village collective project group, village committee, township / neighborhood. If the complaint is in oral form, village collective project group, village committee, township / neighborhood shall handle it and keep the records. The complaint shall be settled by village committee or township / neighborhood within one week.

2<sup>nd</sup> stage: If the migrants are dissatisfied with the decision for the complaint in the 1<sup>st</sup> stage, they may lodge a complaint to the owner of the project after accepting the decision. The owner of the project shall make the decision within 2 weeks after accepting the complaint.

3<sup>rd</sup> stage: If the migrants are dissatisfied with the decision for the complaint in the 2<sup>nd</sup> stage, they may lodge a complaint to the project management office of city / county. The project management office of city / county shall make the decision within 2 weeks after accepting the complaint.

4<sup>th</sup> stage: If the migrants are dissatisfied with the decision for the complaint in the 3<sup>rd</sup> stage, they may lodge a complaint to the project management office of Jiangxi Province. The project management office of Jiangxi Province shall make the decision within 2 weeks after accepting the complaint.

In any stages, if the migrants are dissatisfied with the complaint procedure or decision, the affected people may directly file a lawsuit to civil court.

Migrants may also reflect the condition to external monitoring unit. All the complaints (in either oral or written form) shall be included in Migrant Monitoring Report, and reported to world bank.

All the complaints and claims from the affected people shall be accepted by the institutions for free. The reasonable expenses incurred shall be included in the unexpected fees. During

the whole project construction, the complaint procedures shall remain in effect to ensure the affected people may deal with relevant problems by use of such expenses. As to the approaches of the above complaints, migrants will be told that they may submit complaints through participating in public meetings and being issued resettlement brochure. At the same time, complaint procedures shall be published by the media to the affected population.

The offices of Jiangxi Province and cities / counties, and owners of the project shall arrange main persons in charge of collecting and receiving complaints and claims from affected population.

## **8.2 Social Impact Assessment and Protection Measures**

### **8.2.1 Public participation in survey in early period**

(1) Awareness of cadres in the project area about the project

Through earlier participation by, and investigation and propaganda conducted by project management offices, owners of project area, as well as research, social assessment and EIA units, people who have heard of it reached 62.4% of the total, which means that people in the project area have raised awareness about the project. During on-the-spot investigation, interview and discussion process, social assessment group finds the relevant functional departments or grass-roots government departments have raised awareness about the project. However, villagers, even village head, and related persons in charge of the project area still need to raise awareness about the project.

(2) Daily water consumption mainly involves well water and tap water, and the satisfaction degree of water supply is low.

In daily water consumption by urban and rural residents in the project area, 66.6% respondents use well water (killing well, open well, etc.), and tap water is used by 23.5% respondents, river water by 5.3% respondents, bottled water by 1.9% respondents, and other type of water by 2.8% respondents. Among the population using tap water,

27.9% respondents (6.4% very satisfied, and 21.5% satisfied) are satisfied with the present application situation of tap water; 31.5% respondents are not satisfied and not quite satisfied with it; 33.5% respondents express average satisfaction with it; 7.1% know nothing about it. In the reasons of dissatisfaction, 51.9% is due to poor quality of water, 38.0% due to water quantity instability, 5.8% due to unclear about the situation, and 4.3% due to others.

(3) Residents of the project area show support for the project. Self-supply source water will be gradually replaced by tap water

From the perspective of urban and rural water supply integration, 86.7% respondents express support for the project implementation. Especially in the villages / neighborhoods without connection of tap water, and in part of villages without integral connection of tap water (tap water used by individual groups in villages only). Residents hope to see the implementation of urban and rural water supply integration, and use of tap water as early as possible. When tap water is used, 78.9% respondents believed they would gradually stop using well water or other water sources within 5 years after the project implementation. 30.9% respondents expressly indicated that they will gradually stop using well water or other water sources within 1-2 years after the connection of tap water. 91.9% respondents believed they would stop using well water or other water sources after connection of tap water for 5 years (or above).

(4) Residents of the project area have the need to participate in the project construction, with high enthusiasm

Results of the questionnaire survey show that during the project construction, implementation, operation and maintenance, the project of cities / counties can provide part of employment opportunities and jobs, such as any work in the construction site, transportation of materials; During the project operation and maintenance, the project of cities / counties can provide the jobs, like pipeline care, maintenance, and plant cleaning etc. 73.7% respondents expressly indicated that they are willing to participate in related work; 92.1% respondents considered after the construction of wastewater treatment project, nearby villagers have the responsibility to participate in daily operation and maintenance management of the sewage system after the construction of wastewater treatment project.

If remuneration for labor can be provided, 86.8% respondents wanted to participate in the operation and maintenance of wastewater treatment system.

(5) After the project implementation, residents' showed a higher degree of willingness to change living habits, and potential environmental awareness enhanced.

When residents of the project area are asked whether they want to change living habits after the project implementation, 89.5% respondents are willing to change their living habits, and 7.9% respondents want to change their living habits (97.4% are taken together), and only 2.6% respondents expressed dissatisfaction with the change.

### **8.2.2 Positive impacts**

Generally, during on-the-spot investigation, and according to statistical analysis results of questionnaire survey, residents of the project area in 7 counties (cities / townships) considered that the project implementation would have the positive impacts as follows : 1) Improvement of ecological residential environment is considered by 26.1% residents; 2) Mitigation of pollution to drinking water considered by 31.0% residents; 3) Mitigation of outbreaks of disease considered by 23.7% residents; 4) Mitigation of impact of wastewater on crops considered by 7.8% residents; 5) Offering jobs considered by 7.8% residents; 6) Promotion of economic growth considered by 6.0% residents; Others considered by 0.6% residents

(1) Conducive to improvement of water supply infrastructure, to meet water demands of residents

With an increasing population in the 7 counties (cities / townships), water demands increase rapidly. Equipment in some existing water plants in the project area has become obsolete, with small capacity, which makes it difficult to meet urban and rural residents in their ever-increasing demands for water; Part of water facilities and equipment have become aged and deteriorated, which makes it difficult to meet the seasonal fluctuations due to poor quality source, and water supply capacity has reached upper limit. Some villages which are not provided (full) access to tap water still use well water, lake water or river water; Such groups have a strong demand for clean water sources, and eagerly wait for the full access to tap water. The construction of the project can also improve urban

water supply and drainage facilities, improve water supply capacity, and provide residents with clean water sources with good quality and stable water pressure.

(2) Promoting regional economic development and increasing employment opportunities

The project implementation will greatly improve the regional social and environmental conditions of the project area. The implementation of urban and rural water supply integration helps to further enhance the image of cities, optimize the environment for attracting investment, improve the quality and quantity of investment, promote local economic development. In addition, some non-technical positions will be created during the project construction and operation. For example, transportation of construction materials, and catering service for construction team during the project construction etc., and operation and maintenance of wastewater treatment system during the project operation increase local labor force participation.

(3) Conducive to safe drinking water and water quality improvement in the project area, reducing the occurrence of water source induced diseases

Domestic sewage and wastewater in some villages are discharged to individual septic tank arbitrarily or discharged directly without treatment. Since natural percolation is adopted in septic tank, sewage is seeped into the ground after the precipitation and digestion, which causes certain pollution to the underground water source. However, sewage overflow makes it easy to breed mosquitoes and bacteria, and lead to related diseases, which helps reduce sewage water pollution, and probability of sewage contact with clean water.

(4) Improvement of rural sewage collection and treatment system, and living environment, and increasing residents' awareness of environmental protection

During on-the-spot investigation, domestic sewage and wastewater in some villages of the project area are discharged to individual septic tank arbitrarily or discharged directly without treatment due to the lack of sewage collection and treatment facilities, which may cause certain pollution to surrounding environment. The project construction is conducive to improvement of rural sewage collection and treatment system, environmental infrastructure in the project area, and domestic sewage effluent discharges, to reduce the

odor and mosquitoes and flies breeding caused by domestic sewage, and greatly improve people's living environment. Residents also requested more about safety and health of water sources (met with antipathy and resistance from the residents of the project area with unsanitary and unsafe water sources). At the same time, residents who are beset by domestic sewage waste have a better understanding of environmental improvement. Thus, during the public participation and construction implementation process in the early stage of the project, the residents' environmental awareness has gradually increased, which also helps to increase the environmental awareness of the residents of the project area.

### **8.2.3 Negative impact**

#### (1) Impact of Permanent / Temporary Land Acquisition of Project Construction

Permanent land acquisition is required by newly-built water supply plant, which involved sasanqua economic forest, Long'an village, Caifeng township, Yongxin county, and orange tree and sasanqua forest of Linchuan district, and paddy field of Dongxiang district. Vegetable garden for rural residents is required to be permanently expropriated and used as newly-built wastewater treatment plant of Zhajin Town, Xiushui County. There are a total of 343 households (1294 residents) who are impacted by the project's permanent land acquisition. The land acquisition causes a reduction in the land sources on which the residents are relied. Thus, sustainable income on land is reduced or unsustainable, which causes the livelihood capital is under threat. During the soil excavation caused by the project's underground pipe network laying, farmland of the project area is required to be temporarily occupied, by which a total of 554 households (2052 residents) are impacted. This further involves the compensation for temporary land and buildings and structures on the ground. In addition, during the project construction, the excavation of roads at the county/ province/city level would cause certain traffic barriers to urban and rural residents' travel. Underground pipe network laying or extension would have impact on longitudinal and transverse placement of public facilities in parts of region, i.e. natural gas pipeline (Dongxiang District, Yongxin county), communication optical cable (Nanfeng county, Yongxin county), high-speed railway (Dongxiang District) etc.

(2) After the acquisition of the original private water plants, the existing employees will face the problem of reemployment and resettlement

According to the site survey of the existing water plants of seven project counties (cities / districts), we can find that, some private small water plants will be acquired or closed within the project area after the new construction of water plants in these seven project counties (cities / districts). This will result in the reemployment and resettlement of the existing employees in private small water plants.

According to the verification of Provincial World Bank office and various World Bank project offices, and among the current three project Counties (Cities / Districts), the water plants in six Townships such as Zhajin Township of Xiushui County, Shishan Township of Nanfeng County, Qiawan Township, Bogan Village of Dongxiang District, Xiaohuang Township, Gangshangji Township, etc. are all the private water plants. There are about 3 to 12 employees working in each water plant, and the number of total employees is 36. They are all the temporary contract employees. If the Runquan Water Supply Company, which the project County (City / District) currently affiliated to or soon to be affiliated to, acquires these private water plants, the currently employed employees in these private water plants will face the problem of lay-off or transfer of employment. Then the problems of employment or resettlement of these people are remain to be solved.

After the consultation of World Bank experts to relevant person in charge of Jiangxi Water Group Co., Ltd., and the interviews of social assessment survey group with various water companies, we can know that, after the acquisition of private water plants by Runquan Water Supply Company, the employees of the original water plants will be resettled in accordance with the labour law, and follow the principles of voluntary stay or leave, two-way selection and free employment. The stay or leave of the employees in the original water plants: 1) Inform every employee in relevant water plants with the information of water plant shutdown, employee resettlement, etc. at least three months in advance. 2) Make the one-off monetary compensation to the employees by the original private enterprise owners in accordance with the labour law and follow their aspirations, so as to enable the employees to make their own choices of other careers. 3) For those who

have abilities and skills to work, and if they are willing to stay in the reorganized new water plants, they will be given the business skills and induction training. Then we will sign the labor contracts with them to make them become the contract works hired by the Runquan Water Supply Company. In this way, the problems of lay-off and re-employment can be solved. 4) Provide the posts with low skills which provided during the project implementation process and the afterwards operation period to these people in priority, so that they can be employed in the new water plant.

**Table 8.2-1 Statistics of Private Water Plants and Their Employees Involved in the Project Area**

County City District / Township		Statistical Indicators	Private Water Plant		
			Name of Private Water Plant in Township	Number of Existing Employees	Proposed Resettlement Methods
Xiushui County	Zhajin Township		Zhajin Jinda Tap Water Plant in Xiushui County	10	Monetary compensation + employment training + contract induction
Nanfeng County	Shishan Township		Shishan Tap Water Plant in Nanfeng County	3	Monetary compensation + employment training + contract induction
	Qiawan Township		Qiawan Tap Water Plant in Nanfeng County	3	Monetary compensation + employment training + contract induction
Dongxiang District	Bogan Township		Huimin Tap Water Plant in Dongxiang District	4	Monetary compensation + employment training + contract induction
	Xiaohuang Township		Xiaohuang Tap Water Plant in Dongxiang District	4	Monetary compensation + employment training + contract induction
	Gangshang ji Township		Gangshangji Wangsheng Tap Water Plant in Dongxiang District	12	Monetary compensation + employment training + contract induction
Total			6	36	/

(3) Solicit public opinions on schemes of water pipeline and laying & extension of pipeline

Water pipelines (Yongxin County) extending outward from outlet of hydraulic power station needs the temporary occupation of land, at which Hengxi Village III is located. Through public participation, they made it clear that they did not want the original water pipelines to be laid through the fields in their village as they would affect farming, and they required the pipelines to be laid along the river as much as possible. Feedback to the design organization has been made in the design phase, which will be used for the protection of farmland. Pipeline construction will be installed along the channel Current routine of design for water pipelines extension of Dongxiang District passed through High-speed rail line, west-east gas pipeline, and other national projects. Relevant departments' disagreement with the design proposal may hinder the progress of construction. During the laying of pipelines, workers should try to avoid the cultural relics. Otherwise, the construction may be in conflict with cultural sites and temples.

(4) Possible impacts during the period of construction and operation

Environmental problems, like noise, dust and exhaust emissions caused by construction machinery and material transport vehicle during the construction activities of the project, and domestic sewage effluent discharges and household waste treatment during the construction may have impacts on the living and production of villagers in the area surrounding the project area. In addition, residents in the project area believe that the possible impacts after the implementation of the project also include sludge produced in operation, which may produce secondary pollution.

(5) Burst of pipelines in some areas has brought potential resistance to pipeline laying

As for the distance from pipeline laying to the village, some villagers believed that the distance should be taken into consideration in the laying of water pipelines. If water pipelines are laid quite near the villagers' houses, the villagers are worried the water pipelines would impact the houses' pad footing, which would pose a threat to the stability of the houses. At the same time, the villagers also worry that in case of a burst rupture of pipelines, it would have an impact on their lives if their houses are quite near the pipelines. From the view of depth of pipeline laying, the villagers are worried that farmer and water

buffalo would sink during the ploughing when pipelines are laid in paddy field, which would affect their personal and financial security. If water pipelines or water distribution network are laid along the residents' living area, this may be subject to greater resistance from the villagers.

As for wastewater treatment project, some villagers have different views about the laying of wastewater collection pipelines. They believed that the distance should be taken into consideration in the laying of wastewater collection pipelines. If wastewater pipelines are laid quite near the villagers' houses, the villagers are worried the wastewater pipelines would give off an odor and impact their normal life. It is better that wastewater collection pipelines are paved along the roads outside the houses. At the same time, it is difficult to consult with some villagers. For example, the villagers may be reluctant to the pipelines' passing by their houses, which would prevent and interfere with the normal construction, and form "resistance risk".

(6) Disputes caused by water supply installation costs higher than residents' expectation and unreasonable collection of water fees

Through inquiry, Social Assessment (SA) Team knew that ①The account opening fee of the original private water supply plant is 400 Yuan / household (260 Yuan / house hold in some places). After the private water supply plant ceases operation, the water will not be supplied any more, and account opening fee will not be refunded. The focus of the villagers' willingness to pay is the price of the fee. The villagers generally believe that the price is relatively expensive, and hope to reduce the fee. ② The villagers considered water fee of cities and counties is a little bit high, and are not sure whether the water fee includes water fee and wastewater treatment fee. As for the wastewater treatment fee 0.8Yuan/m<sup>3</sup>, the villagers considered such fee shall not be paid, since there is no wastewater treatment equipment in most of project area in rural area, and wastewater treatment process is not conducted. ③ Residents in the project area in some regions are not satisfied with the water sources. For example, in Chenfangji village, the reservoir is restricted to use as water sources. However, rural residents considered the reservoir has been used for fishery activities, which causes severe contamination to water sources. Quality of water in reservoir is poor, and hard to reach the standard. Water in reservoir

used as water source will endanger the physical and mental health of users. If the tap water (water supply) originates from the reservoir, most of the surrounding rural areas and their residents will not use it.

(7) Water from the reservoir has impact on the benefits of power generation enterprises

Leping project and Xiushui project proposed to withdraw water from Communist reservoir and Dakouwu reservoir. Though it has little impact on pollutant carrying capacity, river water environment, river aquatic life, and other water users, each year, Leping project's withdrawal of water from Chexi River Basin will make the reduction of downstream channel water capacity  $0.365 \times 108 \text{m}^3$ , which causes the decrease in energy output of Yongshan, Gutian and Guxi hydropower station of 260000 kwh. In addition, Xiushui project's withdrawal of water will squeeze water consumption of Dongjin reservoir due to power generation, resulting the reduction in power benefit of hydropower station.

(8) Avoid potential social risks due to foreign labor inflow during the project construction process

During the project construction process, water supply plant and sewage treatment plant of 7 counties (cities / townships) involve a wide range and great extent in terms of construction and laying of water pipeline network, which need to organize specialized construction team for construction. However, when specialized construction team fails to meet the qualification and construction requirements, this requires the introduction of labor force from outside (province, city, county). A large number of external construction personnel assigned to the project area will increase the exchange and interaction with local residents, which can trigger social and health risks. For example, in terms of health of residents, it may result in the transmission and diffusion conditions for some epidemic diseases and infectious diseases (including AIDS, influenza, and etc.). At the same time, if external personnel have little understanding of social culture and traditional customs, this may cause a contravention of local traditional and cultural practices (including religion, mountain, water, tree, weddings and festivals etc.), which would lead to potential crisis and trouble.

#### **8.2.4 Social action plan**

According to the potential negative impacts of the project, Social Assessment (SA) Team will have a full understanding of their needs and wishes through the consultation with interested parties, based on on-the-spot investigation, and put forward policies and suggestions in a targeted manner, and form a social action plan to avoid or minimize the potential negative impacts as follows:

(2) Reduction of risks of land acquisition and house demolition

a. Make a detailed resettlement action plan; b. In resettlement action plan, focus on how female householder, household enjoying the five guarantees, and household subsistence allowances resettle by use of resettlement compensation.

(2) Using appropriate construction methods to avoid lives of residents of the project area are affected by the construction

a. Choose the flat terrain for laying of water distribution network, and try to avoid the residents living area, to reduce construction resistance; b. Strengthen the supervision of pipeline material source, ensure the pipeline quality of water distribution network, establish pipeline maintenance and repair mechanism, repair broken pipeline in a timely manner to avoid the risk of pipeline rupture; c. Before the construction, project units should arrange propaganda work, and start the construction by sections to minimize the impact of business activities of the enterprises and shops on both sides of road; d. Take measures to reduce noise pollution, control the noise of construction site and traffic road, reduce the impact of noise on surrounding villagers and construction personnel; e. Arrange regular watering to entrance road and haul road to prevent dust pollution; f. Put up Horn Prohibition Sign in the population cluster on where vehicles pass, and try to avoid working at night.

(3) Guide villagers to treat water supply and sewage projects in a correct manner and reduce the damage to interior decoration

a. Increase advocacy efforts in urban and rural water supply integration and rural wastewater treatment project, and guide the villagers to use tap water, and sewage collection and treatment system; b. in the design of scheme for renovation of indoor pipelines for water supply and wastewater, Solicit villagers' opinions and suggestions through consultation. Try to minimize the destruction of villagers' wall and interior

decoration through optimization of design; c. Conduct an investigation of willingness for the inevitable destruction; Arrange functional rehabilitation or compensation.

(4) Determination of maintenance and training of personnel, to avoid the risk of project operation and management

a. Arrange related personnel involved in urban and rural water supply system operation and maintenance; The contractor is responsible for specialized training of the project in the trial operation period of 18 months. b. Trainees of villages in each trial operation period may not be changed, to ensure the stabilization of personnel, and strengthen the education to participants to ensure the fulfillment of work responsibilities; c. Establish Complaint Monitoring System and project contact outlets at village level (or above), improve project identity, endow villagers with the role of supervisor to participate in the project

(5) By scheme selection, reduce collective economic pressure of weak economy village

a. Take into consideration the factors of the project operation and maintenance costs when choosing the project design scheme; Recommend the design scheme requiring less costs of the project operation and maintenance under the same conditions and factors, or with little difference. b. For a part of wastewater treatment system operation and maintenance costs borne by the village collective, project management office of Jiangxi province and offices of cities / counties shall deal with it according to the local village-level collective economy, and make a reduction or exemption of system operation and maintenance costs for the villages with less collective income. The relevant costs may be borne by the government to support the operation and maintenance of wastewater treatment system.

(6) Cost reduction or exemption scheme for disadvantaged groups

a. Make preferential policies for water and wastewater treatment for the household subsistence allowances and other poor groups; b. Hold hearings and seek public opinions in case of adjustment of water fee and wastewater treatment charge.

(7) Coordinating the impacts of reservoir water supply on the benefit of power generation enterprises

a. In the process of the project implementation, it is necessary to deal with and coordinate the specific interests between the water supply companies and power stations, and make scientific and reasonable compensation; b. Make appropriate compensation or implementation measures with the owners of hydropower station, to make up for the losses

caused by water supply.

(8) Expanding publicity of health and safety, and standardizing the education management of construction personnel to prevent social risks

a. Develop publicity and education activities for public health and AIDS prevention(including AIDS and other infectious diseases), and include them into EPC contract; b. Include public health and AIDS prevention and education into construction contract, and ensure effective implementation of it; c. Arrange physical examination for the workers of the project construction; d. Carry out AIDS prevention campaigns; e.Strengthen public education and publicity campaigns for social culture and traditional customs of the project area, to promote external personnel’s understanding and respect of the local culture and traditional customs.

Social Assessment (SA) Team prepared Social Action Plan and Gender Action Plan on the project’s impacts and potential risks in terms of society and female through full consultation with the project management offices, owner’s units, Project Implementing Unit (PIU) and related institutions, and residents of the project area, the details shown in Table 8.1-5.

**Table 8.1-5 Social Action Plan**

Project risks	Measures and actions	Organizer	Time	Source of fund	Monitoring indicator
<p><b>1. Insufficiency of project information awareness, and participation; Strengthen project information publicity, interpretation and education</b></p>	<p>a. Strengthen the publicity, interpretation and education of urban and rural water supply integration and rural wastewater treatment project, guide villages to treat the project in a correct manner; Use water supply and wastewater treatment system;</p> <p>b. Strengthen the publicity of project information in the project area, such as announcement, WeChat / micro-blog platform information, lectures, brochures and so on;</p> <p>c. In the design of scheme for renovation of indoor pipelines for water supply and wastewater, solicit villagers' opinions and suggestions through consultation.;</p> <p>d. Make the compensation for the inevitable destruction;</p> <p>e. Set the villagers who have strong awareness of water saving and environmental protection as model; Issue them rewards and honorary certificates;</p>	<p>Project management office, Designer, Project area, Counties and townships, Neighborhood committee, Village committees, and residents</p>	<p>Preparation period, Construction period, Operation period</p>	<p>Project funds; Government finance</p>	<p>a. Publicity materials, frequency and participant signature form;</p> <p>b. Time, place, number of participants of propaganda;</p> <p>c. Number of villagers' complaints about destruction of wall and interior decoration, and settlement;</p> <p>d. Number of villagers who are given awards;</p>
<p><b>2. Risks caused by land acquisition and resettlement</b></p>	<p>a Make a detailed resettlement action plan; b. In resettlement action plan, focus on how female householder, household enjoying the five guarantees, and household subsistence allowances resettle by use of resettlement compensation.</p>	<p>Project management office, Project owner, Resettlement plan compilation unit, and external monitoring unit</p>	<p>Preparation period, Construction period,</p>	<p>Project funds;</p>	<p>a. Resettlement plan</p>

Project risks	Measures and actions	Organizer	Time	Source of fund	Monitoring indicator
<p><b>4. Determination of maintenance and training of personnel, and scheme comparison</b></p>	<p>a. Arrange related personnel involved in urban and rural water supply integration and rural wastewater treatment system operation and maintenance; Provide professional training to the related personnel;                      b. Related personnel may not be changed; Ensure the stabilization of personnel, and strengthen the education to participants to ensure the fulfillment of work responsibilities;                      c. Establish Complaint Monitoring System and project contact outlets at village level (or above);                      d. In selection of design scheme, choose the design scheme requiring less costs of the project operation and maintenance under the same conditions</p>	<p>Project management office;                      Owner's unit;                      Village committees, and villagers</p>	<p>Preparation period,                      Construction period,                      Operation period</p>	<p>Project budget,                      Related township government finance;                      Village collective finance</p>	<p>a. Time and content of training;                      b. Stability of participants of operation and maintenance;                      c. Establishment of Complaint Monitoring System and project contact outlets at village level (or above),                      d. Project design scheme</p>
<p><b>5. Affordability risks vulnerable groups</b></p>	<p>a. Make preferential policies for water and wastewater treatment for the household subsistence allowances and other poor groups; b. Hold hearings and seek public opinions in case of adjustment of water fee and wastewater treatment charge.</p>	<p>Water supply company,                      Department of civil affairs,                      Development and reform bureau</p>	<p>Operation period</p>	<p>Government finance</p>	<p>a. Persons enjoying preferential policies, amount of reduction and exemption;                      b. Time and place of convening of hearings, and number of participants</p>
<p><b>6. Promote women's participation in all stages of the project</b></p>	<p>a. In public activities of preparatory stage of the project, especially in the survey of willingness of village selection and household, ensure the women's participation proportion is no less than 40%;                      b. During the project construction stage, the community maintenance team consisted of women ensures that proportion of</p>	<p>Design unit,                      Construction unit,                      Owner's unit,                      Project management offices, Housing</p>	<p>Construction period,                      Operation period</p>	<p>Project budget,                      government finance;</p>	<p>a. Number of women attendees of the public meetings held in early stage of the project, and minutes of meetings;                      b. Number and proportion of women members participating in the community</p>

Project risks	Measures and actions	Organizer	Time	Source of fund	Monitoring indicator
	<p>women members is no less than 30%;</p> <p>c. In case of payment of compensation for land acquisition, the funds shall be distributed to the household after the husband and wife whose land is requisitioned put signatures. Women shall enjoy the right to know and right of share for land acquisition.</p> <p>d. In the project operation and maintenance stage, ensure that there are at least 2 women members in project organization and implementation units (including project management offices, water supply company, wastewater treatment company, community autonomy groups etc.) at all levels</p> <p>e. During the publicity campaign for the project, women's needs and characteristics of labor activities should be taken into consideration in determination of time, place and form of the publicity campaign of project information. The activities shall be carried out in the women's idle time;</p> <p>f. Conduct publicity campaign according to women's culture degree and cognitive ability, in an acceptable way;</p> <p>g. Organize publicity and training on water saving and usage, to ensure the safety and efficiency of women's daily water use.</p>	<p>and construction bureau, Civil affair bureau, Women's federation, Transportation bureau, Project counties / townships, Community / village committees, Women and poor groups in the project areas</p>			<p>maintenance; Feedback, comments and suggestions of the women members;</p> <p>c. Family women's signing during handling withdrawal procedure for compensation for land acquisition;</p> <p>d. During the operation and maintenance stage, women members (and its number) of Project Implementing Units at all levels;</p> <p>e. Carry out information publicity and training of the project under the condition that the time, place and manner can be acceptable.</p>
<p><b>7. Provide employment opportunities for women, poverty</b></p>	<p>a. During the project construction, on the premise that women's wishes are fully respected, ensure non-technical employment opportunities should be given priority to the disadvantaged groups, including women;</p> <p>b. According to the actual situation of work, provide the labor</p>	<p>Project management office; Contracting unit, Labor bureau, community / village</p>	<p>Construction period,</p>	<p>Contractor Budget</p>	<p>a. During the project construction, proportion of women and impoverished group taking on non-technological jobs;</p> <p>b. During the project operation, proportion of women and impoverished group taking</p>

Project risks	Measures and actions	Organizer	Time	Source of fund	Monitoring indicator
<b>groups and other vulnerable groups</b>	remuneration of no less than local minimum wage, equal pay for equal work, environmental supervision work should be given subsidies.	committee, and women in the project area			on jobs for public interest
<b>8. Employment of women members in Project Implementing Unit</b>	<p>a. During the recruitment of the project management offices at all levels, give priority in recruitment to women who are engaged in the women related work;</p> <p>b. In water supply companies and community maintenance agencies, employ a certain number of female staff, such as meter reader, coordinator and etc.</p> <p>c. Provide training opportunities for recruited and employed women</p>	Project management office; Contracting unit, Labor bureau, community / village committee, and women in the project area	Construction period,	Contractor Budget	<p>a. During the project construction, proportion of women and impoverished group taking on non-technological jobs;</p> <p>b. During the project operation, proportion of women and impoverished group taking on jobs for public interest</p> <p>c. Location, content and times of training for female workers or employees</p>
<b>9. Coordination of impact of reservoir's water supply on power generation enterprises</b>	<p>a. Handle and coordinate the interests of all water supply companies and power plants, and ensure the compensation in a scientific and reasonable manner;</p> <p>b. Develop appropriate compensation or measures with the owners' of hydropower stations of all reservoirs according to local conditions, to compensate for losses caused by water supply.</p>	Owner unit, project office, water supply company, power generation enterprise	Construction period,	Project budget, Water supply company benefits	<p>a. Compensation or implementation measures between water supply companies and different power stations;</p> <p>b. Specific amount and payment of compensation each year;</p>
<b>10.Measures to reduce potential social crisis</b>	<p>1)Strengthen educational propaganda of health and AIDS prevention, and include the contents into the contract, including AIDS and other prevention of infectious diseases.</p> <p>2) Public health and AIDS prevention education should be included in the project contract; The education and publicity of employment</p>	Investment promotion bureau, Contractor, Health bureau, Project owner,	Construction period	Project construction contract funds,	<p>a. Terms of construction contract and implementation</p> <p>b. Public safety and AIDS prevention training courses and the number of trainees involved;</p> <p>c. Number of health centers;</p> <p>d. Propaganda of AIDS prevention during</p>

Project risks	Measures and actions	Organizer	Time	Source of fund	Monitoring indicator
	<p>personnel in industrial parks should be effectively implemented;</p> <p>3) Arrange medical examination for the project construction workers (like establishment of a temporary clinic, make full use of local medical resources etc.);</p> <p>4) Carry out diversified campaigns of HIV / AIDS prevention, such as brochures, posters, photographs etc.;</p> <p>5) Invite the prestigious elders or knowledgeable community cadres in the project area to conduct publicity campaigns for local social and cultural customs, including brochures, posters and photo albums;</p>	<p>Enterprise, Women's federation, Related townships and counties</p>		<p>Health bureau and cultural bureau budget</p>	<p>the project construction stage, including the number of brochures, posters and photo albums;</p> <p>e. Propaganda and education of local culture and customs, including the number of brochures, posters and photo albums;</p>

## 9. Analysis of Alternative Plans

The analysis of alternative plans aims to optimize the project design from the aspect of resource environment, and compare and analyze the impact scope and its extent of different design plans on ecological environment, as well as recommend the project construction to optimize the design from the perspective of environmental protection, so as to provide scientific decision-making basis for the project construction. The general principles for the comparison and analysis of alternative plans are as follows:

(1) Quantitative comparison principle: Quantify the impacts of the project implementation on the environment as far as possible for each alternative plan.

(2) Comprehensive comparison principle: Carry out the comprehensive comparison and analysis from the aspects of environment, technology, economy, society and etc..

(3) Consistent comparison principle: The selected plans should be in consistence with the requirements of relevant development planning and standards, and suitable for local conditions.

### 9.1 Water Supply Project

#### 9.1.1 The comparison before project and after project

The comparative analysis before and after project is shown in Table 9.1-1.

**Table 9.1-1 Analysis of a Project and No Project**

Categories	Implementation of the Project Plan	No Project Plan (Zero Plan)
Major Advantages	After the implementation of this project, five urban water plant projects will be newly built / expanded, and the water supply pipeline network projects of six counties will be renovated / newly built, and six county pipeline network extension projects, three rural water supply pipeline network renovation and extension projects, as well as one rural	(1) The current situations of the project will be maintained, such as the vegetation will not be destroyed, and the land use value will not be changed (land will not be occupied and etc.). (2) There will be no environmental impact problems such as construction noise, waste gas,

	<p>water plant new construction and extension project will be newly built. The project will newly increase the scale of the water supply of 248,000 m<sup>3</sup>/d. Among which, The project will newly add the water supply scale of 245,600 m<sup>3</sup>/d. Among which, the newly increased water supply scale in urban areas is 240,000 m<sup>3</sup>/d, and 5,600m<sup>3</sup>/d in rural areas. It will reduce 38929.5m<sup>3</sup>/d leakage loss of the pipeline network, and the total benefited population is 2946577 (According to the 2015 population statistics yearbook, there are discrepancies with the latest data) .</p>	<p>wastewater, solid waste, and etc. which caused by infrastructure construction during the construction period</p>
<p>Major Disadvantages</p>	<p>(1) After the implementation of the project, the construction of water purification plants, the pressurized pumping stations and their supporting office spaces and other infrastructure will occupy the land.                  (2) After the implementation of the project, the vegetation will be destroyed, land will be disturbed during the construction period, causing the soil erosion. And the dust, noise, waste water, waste gas, solid waste, etc. will be generated, affecting the surrounding environment.                  (3) After the implementation of the project, the farmland vegetation and the shrubs in the permanent occupation areas will be completely destroyed, and the type of construction land will be formed. Dust, noise, waste water, waste gas, solid waste and etc. will be generated, affecting the surrounding environment</p>	<p>Part of the existing water plant facilities and equipment are obsolete with small capacity in the project area, and they are not sufficient to meet the daily supply of water demands of urban and rural residents within the area. Part of the water facilities and equipment suffer losses and serious aging, and they are hard to cope with the seasonal fluctuations due to poor water quality. And the water supply capacity has reached the upper limit</p>

From the above table, it can be seen that although the no project plan will not bring the environmental problems, the water supply capacity of all counties cannot meet the needs of sustainable economic and social development and continuous improvement of people’s livelihood. Although the implementation of this project plan will bring some environmental impacts, these impacts can be avoided and mitigated by adopting corresponding environmental protection measures (the detailed mitigation measures are in Chapter 5 and Chapter 6). And the environmental impacts during the construction period are temporary, but the social and environmental benefits of the project implementation and operation are long-term. Therefore, from the perspective of promoting social and economic development and environmental protection, the

implementation of the project plan is superior to the zero plan, and the project construction is necessary.

## 9.1.2 Comparison of water source plans

### 9.1.2.1 Yongxin County

According to the Feasibility Study Report, there are two plans for the source of water supply in the neighboring townships (Caifeng township, Lianzhou township, Huaizhong township, Gaoqiaolou township and Shiqiao township) of Yongxin county. Plan A is the pipeline network extension of the county, and the water source is the Longyuankou Reservoir and Wo River. Plan B is to restart the water source of original water plants, among which, the water source of water plants in Caifeng township, Gaoqiaolou township and Huaizhong township is Wo River, (the water quality of this river is up to class III, but there is the industrial wastewater discharging from the upstream, and there are hidden dangers in the water quality, and local residents have a great deal of complaints on this water source). The water source of water plants in Lianzhou township is Rongjiang River, and Shengkoushui River in Shiqiao township. The comparison is shown in Table 9.1-2.

**Table 9.1-2 Comparison of Alternative Plans for the Water Source of Water Supply Projects in the Surrounding Townships of Yongxin County**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	To newly build 73.75 km of DN80-DN500 ductile cast iron pipes, and four non negative pressure pump rooms	To newly build 61 km of DN80-DN300 ductile cast iron pipes, and look for new water source, and to newly build four water intake heads and muddy water pipes, as well as one water plant renovation	Plan A is superior
	Earth volume	110,625m <sup>3</sup>	91,500 m <sup>3</sup>	Plan B is superior
	Volume of water intake	9,110 t/d	9,110 t/d	/
Technology	Construction difficulty	Comparatively easy	It is difficult to look for new water source	Plan A is superior
	Operation and maintenance	Convenient	Separate management with more complexities	Plan A is superior

Environment	Impacts of environmental sensitive sites	There are 26 villages in total along the pipes involved in the sensitive site of atmospheric noise	The existing water plants and water supply pipes have been built, and there are no environmental impacts during the construction period	Plan B is superior
	Water quality	The Longyuankou Reservoir of water source of water plant in the south of the county, and Wo River of water source of water plant in Xiaowuling both have reached the water standards of class II	The water quality of He River is up to class III, but there is the industrial wastewater discharging from the upstream, and there are hidden dangers in the water quality, and local residents have a great deal of complaints on this water source	Plan A is superior
	Water volume	The guarantee rate is over 95%	The guarantee rate is over 95%	Plan A is superior
Society	Number of settlers	17 households with 74 people	20 households with 86 people	Plan A is superior
	Land occupation	The permanent land occupation is 7.25 ha, and the temporary land occupation is 12.2 ha	The permanent land occupation is 8.15 ha, and the temporary land occupation is 14.75 ha	Plan A is superior
	Number of beneficiaries	212,910 people	212,910 people	/
Expense	Construction investment	34.2229 million yuan	31 million yuan	Plan B is superior
	Operation cost	0.03 yuan/m <sup>3</sup>	0.35 yuan/m <sup>3</sup>	Plan A is superior

From Table 9.1-2, it can be seen that although Plan B is superior to Plan A in earth volume, temporary land occupation, expense and other aspects, Plan A is superior to Plan B in key water source and quality, operation expense and other aspects. The adoption of Plan A is more reasonable from the comprehensive perspective of environmental impacts and technical and economic aspects. As a result, Plan A is recommended.

#### 9.1.2.2 Jinxi County

According to the Feasibility Study Report, there are mainly two plans for the water source of the new construction of water plant in Huangtong township, Jinxi county. Plan A is the pipeline network extension of the second water plant in the county, and the water source is the Gaofang Reservoir. Plan B is the new construction water supply, and take the mountain stream in the upper of Gaofang River as the water source. The comparison is shown in Table 9.1-3.

**Table 9.1-3 Comparison of Alternative Plans for the Water Source of New Construction of Water Plant in the Huangtong Township, Jinxi County**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	To use the current water intake, water delivery and production facilities and to newly build 34 km of water distribution pipe network	To newly build a water intake facility, two original water pipelines with the length of 90 m, and a water purification plant, and to newly build 13.7 km of water distribution pipeline network	Plan B is superior
	Earth volume	68,000m <sup>3</sup>	30,000m <sup>3</sup>	Plan B is superior
	Volume of water intake	1,200 m <sup>3</sup> /d	1,200 m <sup>3</sup> /d	/
Technology	Construction difficulty	The overall East-West span from county to Huangtong township of water distribution pipeline is relatively large, and it crosses mountains in the middle. To lay 34 km of pipelines along the route, the construction difficulty is relatively great	To newly build the water plant in the original water source, and the construction difficulty is relatively low	Plan B is superior
	Operation and maintenance	The water pressure of pipeline is relatively high, and the difficulty in operation and maintenance is relatively great	Supply water in the gravity artesian way with no need of setting up the lifting pump, and the operation and maintenance difficulty is relatively low	Plan B is superior
Environment	Impact of environmental sensitive sites	There is no sensitive site along the original water pipeline	There is no sensitive site surrounding the water intake project	/
	Water quality	The Gaofang Reservoir of the water source of the second water plant in Jinxi county meets the water standards of class II	The mountain stream in the upper of Gaofang River meets the water standards of class II	/
	Water volume	The guarantee rate of water supply is 95%	The guarantee rate of water supply is 90%	Plan A is superior
Society	Number of settlers	13 households with 57 people	Three households with 15 people	Plan B is superior
	Land occupation	0.68ha	0.29ha	Plan B is superior
	Number of beneficiaries	3059 households	3059 households	/
Expense	Construction investment	10.20 million yuan	6.34 million yuan	Plan B is superior
	Operation cost	1.50 yuan/m <sup>3</sup>	1.05 yuan/m <sup>3</sup>	Plan B is superior

From Table 9.1-3, it can be seen that although the guarantee rate of water supply of Plan A is slightly superior to Plan B, Plan B is superior to Plan A in the key project size, construction difficulty, operation and maintenance, land acquisition and resettlement, and other aspects, and the guarantee rate of water supply can meet the needs of this project. As a result, Plan B is recommended.

### 9.1.2.3 Nanfeng County

According to the Feasibility Study Report, there are two plans for the source of water supply in the surrounding townships (Shishan township, Qiawan township, and Laixi township) of Nanfeng county. Plan A is the pipeline network extension of county, and the water source is Wei River. Plan B is to renovate the original water plants of townships, and each township will retain its independent centralized water supply project. The water source of water plant in Shishan township is the groundwater, in Qiawan township is the Chuanshangkeng Reservoir, and in Laixi township is the groundwater. The comparison is shown in Table 9.1-4.

**Table 9.1-4 Comparison of Alternative Plans for the Water Source of Water Supply Projects in the Surrounding Townships of Nanfeng County**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	To newly build 88,446 m of DN50-DN350 pipelines, and one non negative pressure pump room	Water plant in Shishan township: newly build a set of water purifiers with the scale of 1,000 m <sup>3</sup> /d, and expand them to the scale of 2,600 m <sup>3</sup> /d, as well as renovate and expand the distribution system. Water plant in Qiawan township: renovate the original water plant with the scale of 2,300 m <sup>3</sup> /d, as well as renovate and expand the distribution system. Water plant in Laixi township: newly build a set of water purifiers with the scale of 800 tons/day, as well as the supporting pipelines	Plan A is superior
	Earth volume	132,669 m <sup>3</sup>	21,245 m <sup>3</sup>	Plan B is superior

	Volume of water intake	5,050 m <sup>3</sup> /d	5,700 m <sup>3</sup> /d	Plan A is superior
Technology	Construction difficulty	Relatively easy with the only need of pipeline extension	The water plant needs to be renovated, and it is more complex	Plan A is superior
	Operation and maintenance	Convenient	Separate management with more complexities	Plan A is superior
Environment	Impact of environmental sensitive sites	A total of 40 villages are involved in the sensitive sites along the pipeline, and the pipeline goes through the optical fiber cable, gas pipeline and other sensitive targets	This plan refers to all the existing water plants, and only expands part of the supporting pipelines with relatively small impact of environmental sensitive sites	Plan B is superior
	Water quality	The current situation of Wei River has reached the water standards of class III	Water plant in Shishan township: adopt the groundwater as the water source, and it meets the water standards of class III. Water plant in Qiawan township: regard the Chuanshangkeng Reservoir as the water source, and the water quality meets the water standards of class III. Water plant in Laixi township: it meets the water standards of class III.	/
Society	Number of settlers	39 households with 99 people	35 households with 87 people	Plan B is superior
	Land occupation	No permanent land occupation, and the temporary land occupation is 3.4 ha	No permanent land occupation, and the temporary land occupation is 3.3 ha	Plan A is superior
	Number of beneficiaries	6,807 households	6,807 households	/
Expense	Construction investment	11.7128 million	15.0121 million	Plan A is superior
	Operation cost	0.03 yuan/m <sup>3</sup>	0.03 yuan/m <sup>3</sup>	Plan A is superior

From Table 9.1-4, it can be seen that although Plan B is superior to Plan A in the aspects of earth volume and impacts of environmental sensitive sites, Plan A is superior to Plan B in construction difficulty, operation and maintenance, and construction investment. As a result, Plan A is recommended.

#### 9.1.2.4 Leping City

According to the Feasibility Study Report, Runquan water plant and Lilin water plant of Leping city are both the expansion of current water plants, and the current

water source can meet the requirements of water intake. The alternative plan comparison of water source is not needed.

### 9.1.2.5 Xiushui County

According to the Feasibility Study Report, the water supply project in the urban area of Xiushui county is the expansion of old water plant, and the water intake pumping has been reserved in the water intake pumping house of old water plant. As a result, the alternative plan comparison of water source is not needed.

### 9.1.2.6 Linchuan District

According to the Feasibility Study Report, there are three plans for the water source of the second water plant in Linchuan district. Plan A is Fu River, Plan B is Yihuang Water, and plan C is Chongren Water. The comparison is shown in Table 9.1-5.

**Table 9.1-5 Comparison of Alternative Plans for the Water Source of the New Construction of the Second Water Plant in Linchuan District**

Categories		Plan A	Plan B	Plan C	Advantages and Disadvantages
Comparison Items		Plan A	Plan B	Plan C	Advantages and Disadvantages
General Plans		Fu River	Yihuang River	Chongren River	/
Scale	Project size	To newly build a water intake pump house with the scale of 50,000 m <sup>3</sup> /d, and 50 km of DN800 original water pipes	To newly build a water intake pump house with the scale of 50,000 m <sup>3</sup> /d, and 1.38 km of DN800 original water pipes	To newly build a water intake pump house with the scale of 50,000 m <sup>3</sup> /d, and 4.8 km of DN800 original water pipes	Plan B is superior
	Earth volume	30,000 m <sup>3</sup>	8,300 m <sup>3</sup>	28,800 m <sup>3</sup>	Plan B is superior
	Volume of water intake	55,000 m <sup>3</sup> /d	55,000 m <sup>3</sup> /d	55,000 m <sup>3</sup> /d	/
Technology	Construction difficulty	The distance between Fu River and Shangdudu urban area is 20 km, and the construction difficulty is great	The distance between Yihuang Water and water plant is 20 km, and the construction difficulty is low	The distance between Chongren River and water plant in urban area is 2.6 km, and the construction difficulty is low	Plan B and plan C are superior
	Operation and maintenance	The original water pipeline is relatively long, and the maintenance difficulty is great	The original water pipeline is relatively short, and the maintenance difficulty is low	The original water pipeline is relatively short, and the maintenance difficulty is low	Plan B and plan C are superior

Environment	Impact of environmental sensitive sites	No sensitive site is involved in around the water source	No sensitive site is involved in around the water source	No sensitive site is involved in around the water source	/
	Water quality	It meets the water standards of class III	It meets the water standards of class III	It meets the water standards of class II~III	Plan C is superior
	Water volume	The guarantee rate of water supply is 95%	The guarantee rate of water supply is 95%, but it will lead two water plants in the Shangdundu urban area to share one water source, and the water supply safety is poor	The guarantee rate of water supply is 95%	Plan A and plan C are superior
Society	Number of settlers	None	None	None	/
	Land occupation	0.067ha	0.067ha	0.067ha	/
	Number of beneficiaries	0.3 million	0.3 million	0.3 million	/
Expense	Construction investment	7.9 million	725万 7.25 million	7.5 million	Plan B is superior
	Operation cost	0.1 yuan/m <sup>3</sup>	0.1 yuan/m <sup>3</sup>	0.1 yuan/m <sup>3</sup>	/

From Table 9.1-5, it can be seen that both Plan B and plan C are superior to Plan A in the aspects of key project size, construction difficulty, construction investment, etc., and Plan B will lead two water plants in the Shangdundu urban area to share one water source, and the water supply safety is poor. As a result, plan C is adopted after the comprehensive comparison.

### 9.1.2.7 Dongxiang District

According to the Feasibility Study Report, there are two plans for the water source of new water plant in Dongxiang district. Plan A is the Happiness Reservoir, and Plan B and plan C are the Hengshan Reservoir and Hefang Reservoir which jointly supply water. The comparison is shown in Table 9.1-6.

**Table 9.1-6 Comparison of Alternative Plans for the Water Source of the New Construction of Water Plant in Dongxiang District**

Categories Comparison Items	Plan A	Plan B	Advantages and Disadvantages
	Happiness Reservoir	Hengshan Reservoir and Hefang Reservoir jointly supply water	

Scale	Project size	To newly build a water intake pump house with the scale of 42,000 m <sup>3</sup> /d, and 22 km of DN800 original water pipes	To newly build a water intake pump house with the scale of 42,000 m <sup>3</sup> /d, and 17.43 km of DN800 original water pipes	Plan B is superior
	Earth volume	232,800 m <sup>3</sup>	184,500 m <sup>3</sup>	Plan B is superior
	Volume of water intake	42,000 m <sup>3</sup> /d	42,000 m <sup>3</sup> /d	Plan B is superior
Technology	Construction difficulty	It needs to go through about 8 km of urban area, and the demolition difficulty is relatively great	The urban demolition is not involved in, the pipeline is laid around the current road, and the construction is relatively simple	Plan B is superior
	Operation and maintenance	The line is relatively long, the pump head is about 35 m, and the operation expense is relatively high	The line is relatively short, the pump head is about 24 m, and the operation expense is relatively high	Plan B is superior
Environment	Impact of environmental sensitive sites	A total of four villages are involved in the sensitive sites along the pipeline	A total of ten villages are involved in the sensitive sites along the pipeline, and the pipeline goes through the optical fiber cable, pipeline of project of natural gas transmission from West to East China, high-speed railway, G60 expressway and other sensitive targets	Plan A is superior
	Water quality	It meets the water standards of class III	It meets the water standards of class III	/
	Water volume	At present, it has been used as the water source for water supply of Jixing water plant, and such water source is single with relatively low guarantee rate of water supply	The guarantee rates of water supply are all greater than 90%, and they can meet the requirements of water intake	Plan B is superior
Society	Number of settlers	60 households with 219 people	42 households with 197 people	Plan B is superior
	Land occupation	The land occupation of pump house is about 0.02 ha	The land occupation of pump house is about 0.02 ha	/
	Number of beneficiaries	447,900	447,900	/
Expense	Construction investment	84.70 million	67.10 million	Plan B is superior
	Operation cost	0.22 yuan/m <sup>3</sup>	0.18 yuan/m <sup>3</sup>	Plan B is superior

From Table 9.1-12, it can be seen that Plan A has been used as the water source for water supply of Jixing water plant, and such water source is single with relatively low guarantee rate of water supply. Plan B is superior to Plan A in key water quantity. Moreover, Plan B is superior to Plan A in project quantity, construction difficulty,

operation and maintenance and other aspects. As a result, Plan B is recommended.

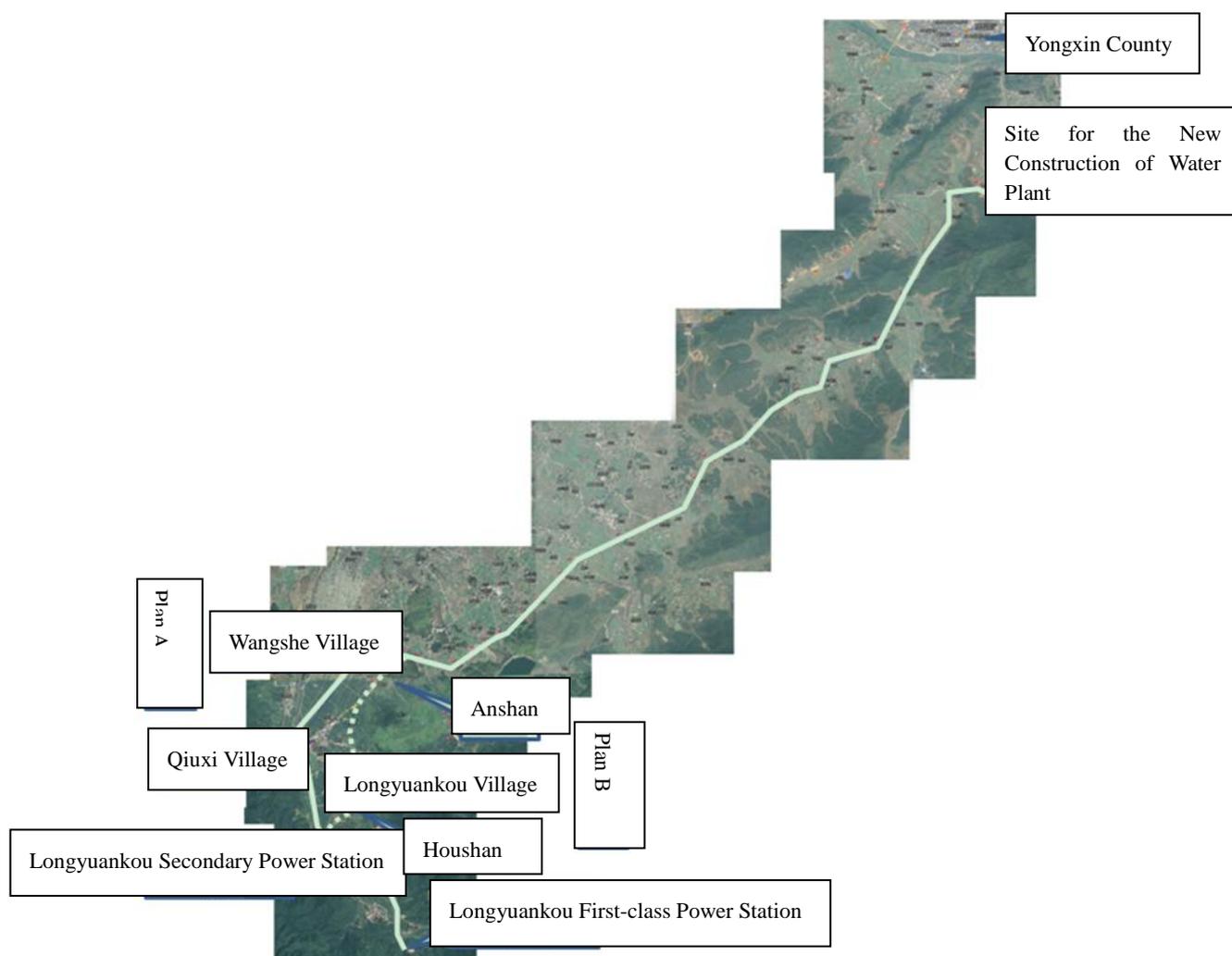
### **9.1.3 Comparison of route plans**

#### **9.1.3.1 Yongxin County**

According to the Feasibility Study Report, the original main water pipeline connected from the water outlet channel of Longyuankou first-class power station. A gas pipeline is under construction within the scope of the original water pipeline routing, and a construction road has been built. This project is considering to use the construction road of the existing gas pipeline, and to newly build an access road to enter the factory along the water plant. There are two routing plans for the extension from Longyuankou first-class power station to the built construction road of the original water pipeline. See Figure 9.1-1.

Plan A: Longyuankou first-class power station (the connection point of the original water pipeline) - Longyuankou secondary power station - West of Qiuxi village - Northeast of Wangshe village - along the construction road of gas pipeline to the newly-built water plant in the South

Plan B: Longyuankou first-class power station (the connection point of the original water pipeline) - Longyuankou secondary power station - East of Longyuankou village - Northeast of Wangshe village - along the construction road of gas pipeline to the newly-built water plant in the South. The comparison is shown in Table 9.1-7, and the schematic diagram is shown in Figure 9.1-1.



**Figure 9.1-1 Comparison Plan of the New Construction of the Original Water Pipeline in Yongxin County**

**Table 9.1-7 Comparison of Alternative Plans for the New Construction of the Original Water Pipeline in Yongxin County**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	To newly build 21,210 km of DN1200 ductile cast iron original water pipelines	To newly build 21,000 km of DN1200 ductile cast iron original water pipelines	Plan B is superior
	Pipeline length	The total length is about 21 km	The total length is about 21 km	/
	Earth volume	311,900 m <sup>3</sup>	320,500 m <sup>3</sup>	Plan A is superior

Technology	Construction difficulty	The pipeline is laid along the river, and the construction difficulty is low	The pipeline crosses over the Houshan and Anshan, and only the limited part of it has the construction road, and most of it is laid along the mountain forest with no construction road, and the construction difficulty is great	Plan A is superior
	Construction period	12 months	15 months	Plan A is superior
	Operation and maintenance	The pipeline network is laid along the open area, and it is convenient for people to enter and leave for maintenance	Part of the pipeline network is laid along the mountain forest, and it is not convenient for people to enter and leave for maintenance	Plan A is superior
Environment	Impact of environmental sensitive sites	A total of two villages are involved in the sensitive sites along the pipeline	A total of three villages are involved in the sensitive sites along the pipeline	Plan A is superior
	Impact of soil erosion	The earth volume is small, and the impact of soil erosion is relatively low	The earth volume is big, and the impact of soil erosion is relatively big	Plan A is superior
Society	Permanent / temporary land occupation of arable land	No permanent land occupation is involved in, and the temporary land occupation is 4.24 ha	No permanent land occupation is involved in, and the temporary land occupation is 4.24 ha	Plan B is superior
Expense	Construction investment	7,302.12	7,500	Plan A is superior
	Operation cost	0.03 yuan/m <sup>3</sup>	0.03 yuan/m <sup>3</sup>	/

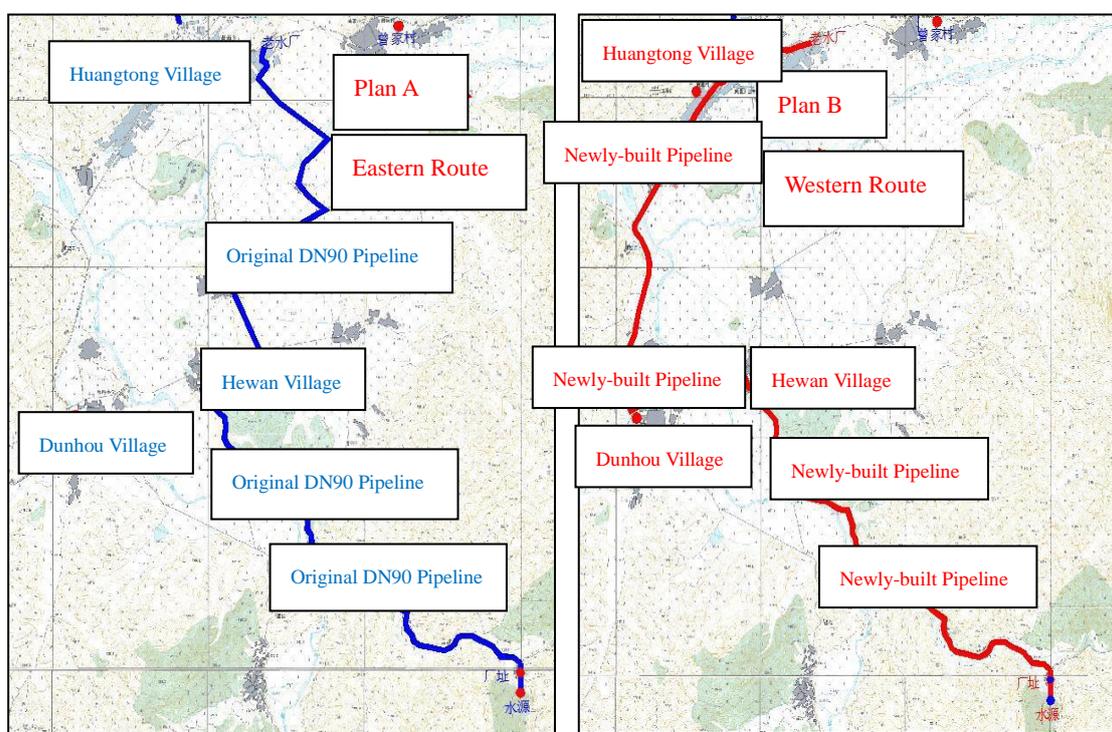
From Table 9.1-8, it can be seen that although Plan B is superior to Plan A in project size and land occupation, Plan A is superior to Plan B in key construction difficulty, environmental impacts, construction investment and other aspects. As a result, Plan A is recommended.

### 9.1.3.2 Jinxin County

The distance between water intake of Jinxi county and the water purification plant is only 90 m, so the comparison of the original water pipeline routing plan has not been made.

According to the Feasibility Study Report, there are two plans for the water distribution system project in Huangtong township, Jinxi county. Plan A is the Eastern route plan, and is to lay the pipeline from the newly-built water plant to North along

the Hewan village, using the original DN90 pipeline to the old water plant. The total length of this plan is about 7.5 km, and the original DN90 pipeline will be fully utilized in the near future. Plan B is the Western route plan, and is to relay the pipeline from the newly-built water plant to Hewan village, Dunhou village successively, and finally to the Huangtong village along the 943 county road. The total length of this plan is about 8 km, and the original DN90 pipeline will be used as the backup one. The comparison is shown in Table 9.1-8, and the schematic diagram of comparison plan is shown in Figure 9.1-2.



**Figure 9.1-2 Schematic Diagram of Comparison of Alternative Plans for Water Distribution Pipeline in Jinxi County**

**Table 9.1-8 Comparison of Alternative Plans for Distribution System in Huangtong Township of Jinxin County**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	The original pipeline will be used in the near future	To newly build the DN 50~250 ductile cast iron pipes	Plan A is superior
	Pipeline length	5 km	13.78km	Plan A is superior
	Earth volume	10,000m <sup>3</sup>	27,560m <sup>3</sup>	Plan A is superior

Technology	Construction difficulty	Pipeline laying; The pipeline will be eliminated after the increase of water volume, and the pipeline needs to be laid again, resulting in the secondary construction of the pipeline	Pipeline laying and pipeline laying of Dunhou village along the 943 county road. The pipeline is built in unification to reduce the construction of secondary pipeline	Plan B is superior
	Construction period	60 days	90 days	Plan A is superior
	Operation and maintenance	The construction of the original pipeline is below the standard, and it uses PE pipe. This part is located in the mountain area, and the pipe is seriously damaged, and it is difficult to operate	The current design is the ductile cast pipe with strong resistance strength. There is less damage in the pipeline and less difficulty in operation	Plan B is superior
Environment	Impact of environmental sensitive sites	A total of two villages are involved in the sensitive sites along the pipeline	A total of four villages are involved in the sensitive sites along the pipeline, and the pipeline goes through the subterranean cable	Plan A is superior
	Impact of soil erosion	The route is short, and the impact of soil erosion relatively small	The route is long, and the impact of soil erosion is relatively big	Plan A is superior
Society	Permanent / temporary land occupation	The temporary land occupation is 0.13 ha	The temporary land occupation is 0.43 ha	Plan A is superior
	Occupation of arable land	The temporary occupation of arable land is 0.06 ha	The temporary occupation of arable land is 0.2 ha	Plan A is superior
Expense	Construction investment	1.5 million	4.34 million	Plan A is superior
	Operation cost	0.13 yuan/m <sup>3</sup>	0.11 yuan/m <sup>3</sup>	Plan B is superior

From Table 9.1-9, it can be seen that although Plan A is superior to Plan B in project size, environmental impacts, land occupation and etc., Plan B is superior to Plan A in key construction difficulty, operation and maintenance and operation cost. The early investment is large, but it is conducive to the safety of water supply of Huangtong township to reduce the secondary construction of water supply pipeline. As a result, Plan B is adopted.

### 9.1.3.3 Nanfeng County

According to the Feasibility Study Report, the water plant and original water pipeline in the east of Nanfeng county do not belong to this project. This project only involves the distribution system which connects with Shishan township, Qiawan

township and Laixi township. The distribution system is laid along the road which towards to township. Comparison of route plans is not involved in.

### 9.1.3.4 Leping City

According to the Feasibility Study Report, there are two routes of original water pipelines of the water supply project in the urban area of Leping City. The first one is to lay the water pipes in the west, and the specific directions are as follows: Reservoir - Guankou village - Chexi grain depot - Yongshan township - Shuangtian township - Yangjialing. The total length is about 41 km. The second one is to lay the water pipes along the Chexi River in the east, and the specific directions are as follows: Reservoir - Guankou village - Chexi grain depot - Dutou village - Houtian village - Hongyuan village - Lingang township - Gutian bridge - Wukou township - Wule highway - Yejiawu. The total length is about 35.66 km. The specific comparison is shown in Table 9.1-9 and Figure 9.1-3.

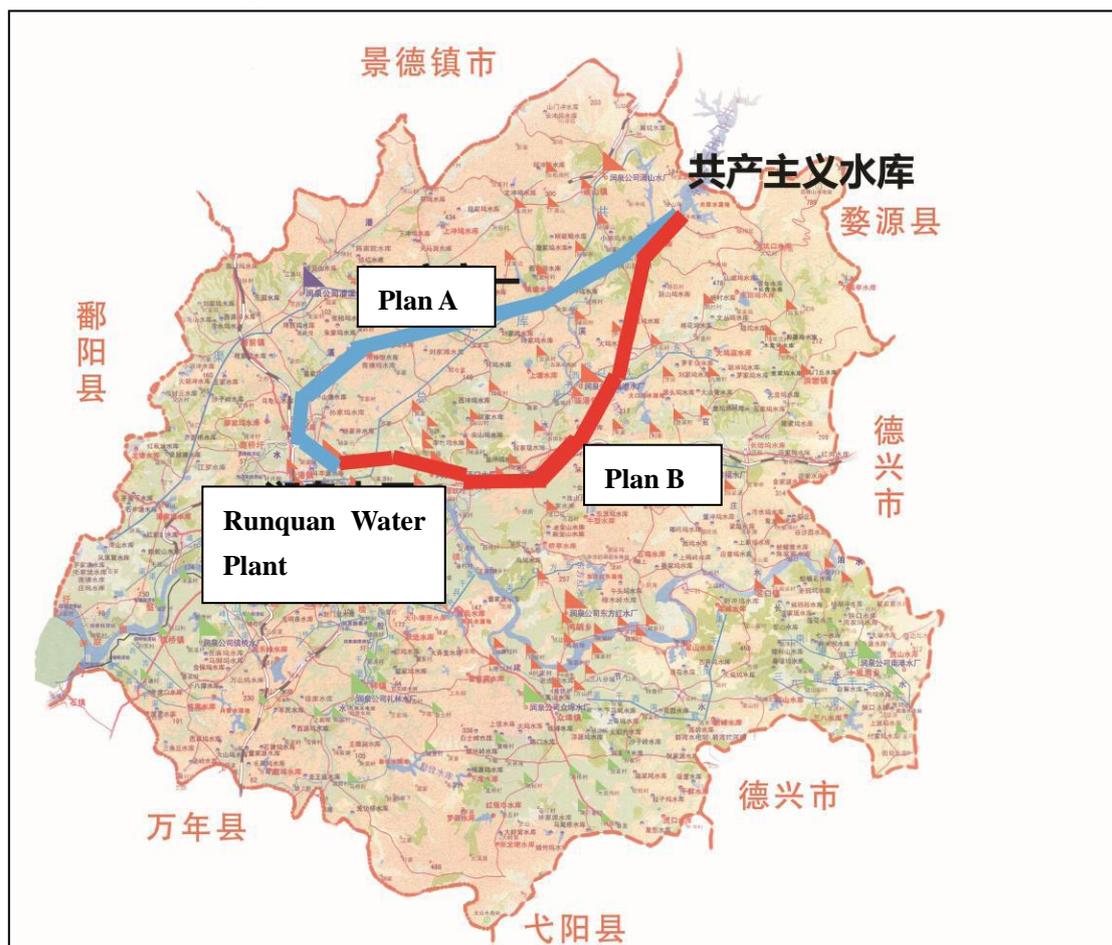


Figure 9.1-3 Schematic Diagram of Alternative Plans of Original Water Pipeline in Runquan Water Plant of Leping City

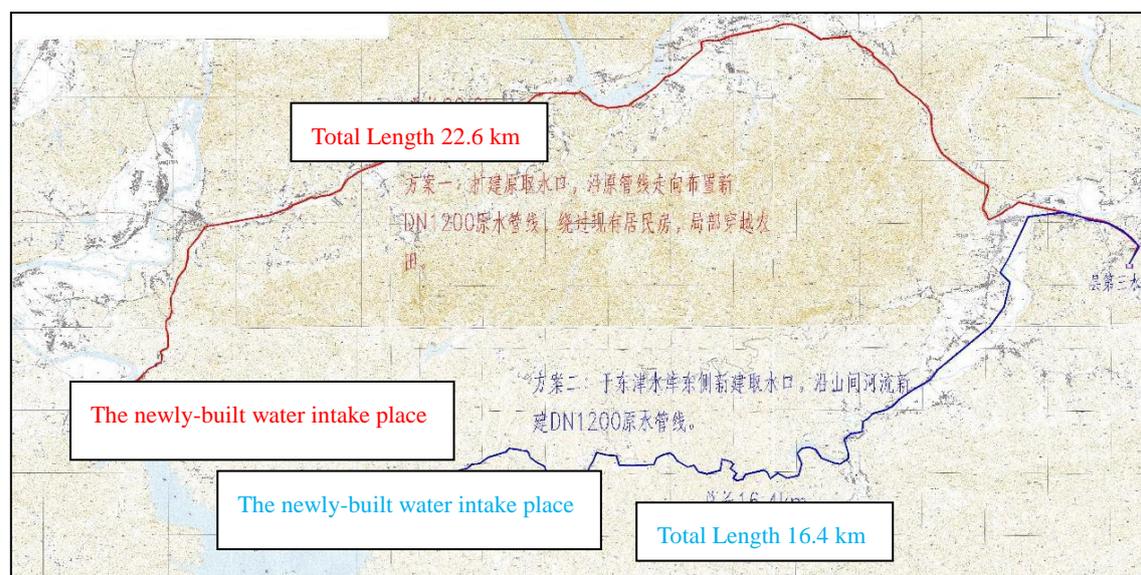
**Table 9.1-9 Comparison of Alternative Plans for the New Construction of the Original Water Pipeline in Runquan Water Plant of Leping City**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	To lay 40,465 m of DN1000 ductile cast iron pipes and 682 m of DN1000 steel pipes	To lay 33,661 m of DN1000 ductile cast iron pipes and 820 m of DN1000 steel pipes	Plan B is superior
	Pipeline length	41.15km	34.48km	Plan B is superior
	Earth volume	164,588m <sup>3</sup>	137,924 m <sup>3</sup>	Plan B is superior
Technology	Construction difficulty	The pipeline is laid along the road, and the construction difficulty is less	The pipeline is laid along the river with many times of crossing the river, and the construction conditions are slightly worse	Plan A is superior
	Construction period	Six months	Seven months	Plan A is superior
	Operation and maintenance	The route is relatively long, the head loss is relatively big, the original pump is relatively high, and the operation cost is relatively high	The route is relatively short, the head loss is relatively small, the original pump is relatively low, and the operation cost is relatively low	Plan B is superior
Environment	Impact of environmental sensitive sites	A total of five villages are involved in the sensitive sites along the pipeline	A total of eight villages are involved in the sensitive sites along the pipeline	Plan A is superior
	Impact of soil erosion	The route is relatively long, and the impact of soil erosion is relatively big	The route is relatively short, and the impact of soil erosion is relatively less small	Plan B is superior
Society	Permanent/temporary land occupation	The temporary land occupation is 8.81 ha	The temporary land occupation is 7.38 ha	Plan B is superior
	Occupation of arable land	The temporary occupation of arable land is 3.25 ha	The temporary occupation of arable land is 2.67 ha	Plan B is superior
Expense	Construction investment	128 million yuan	107 million yuan	Plan B is superior
	Operation cost	0.17 yuan/m <sup>3</sup>	0.16 yuan/m <sup>3</sup>	Plan B is superior

From Table 9.1-10, it can be seen that although Plan A is superior to Plan B in construction difficulty, environmental impacts and other aspects, Plan B is superior to Plan A in maintenance expense, construction investment and other aspects. As a result, Plan B is adopted.

### 9.1.3.5 Xiushui County

According to the Feasibility Study Report, there are two routes of original water pipelines of the water supply project in the urban area of Xiushui county. The first one is to lay the water pipes in the north, and the specific directions are as follows: Dongjing Reservoir - Dongjin reservoir road - S304 highway (some of it along the old road) - the third water plant of the county. The total length is about 22.6 km. The second one is to lay the water pipes in the south, and the specific directions are as follows: Dongjing Reservoir - Zhoujia - Yuling - Shenfang Reservoir - Shenfang village - Shanfengyan village - Yuling - Zhuping village - Nanzhen village - S304 highway - the third water plant of the county. The total length is about 16.4 km. The specific comparison is shown in Table 9.1-10. The schematic diagram is shown in Figure 9.1-4.



**Figure 9.1-4 Schematic Diagram of Alternative Plans for the New Construction of the Original Water Pipeline of Water Supply in the Urban Area of Xiushui County**

**Table 9.1-10 Comparison of Alternative Plans for the New Construction of the Original Water Pipeline of Water Supply in the Urban Area of Xiushui County**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	22,600 m of DN1200 ductile cast iron pipes	16,400 m of DN1200 ductile cast iron pipes	Plan B is superior

	Pipeline length	22.6km	16.4km	Plan B is superior
	Earth volume	149,200 m <sup>3</sup>	108,200 m <sup>3</sup>	Plan B is superior
Technology	Construction difficulty	To lay the pipeline along the road, and the construction difficulty is relatively low	Part of the pipeline will be laid in the mountain areas. The construction conditions are poor and the construction difficulty is relatively great	Plan A is superior
	Construction period	Six months	Ten months	Plan A is superior
	Operation and maintenance	Relatively easy	Relatively easy	/
Environment	Impact of environmental sensitive sites	A total of ten villages are involved in the sensitive sites along the pipeline. It goes through the S304 provincial road for several times, and may have an impact on traffic	A total of seven villages are involved in the sensitive sites along the pipeline	Plan B is superior
	Impact of soil erosion	The route is relatively long, and the impact of soil erosion is relatively big	The route is relatively short, and the impact of soil erosion is relatively small	Plan B is superior
Society	Permanent / temporary land occupation	The temporary land occupation is 6.78 ha	The temporary land occupation is 4.92 ha	Plan B is superior
	Occupation of arable land	No occupation of arable land	No occupation of arable land	/
Expense	Construction investment	86.20 million	88.70 million	Plan A is superior
	Operation cost	0.1 yuan/m <sup>3</sup>	0.1 yuan/m <sup>3</sup>	/

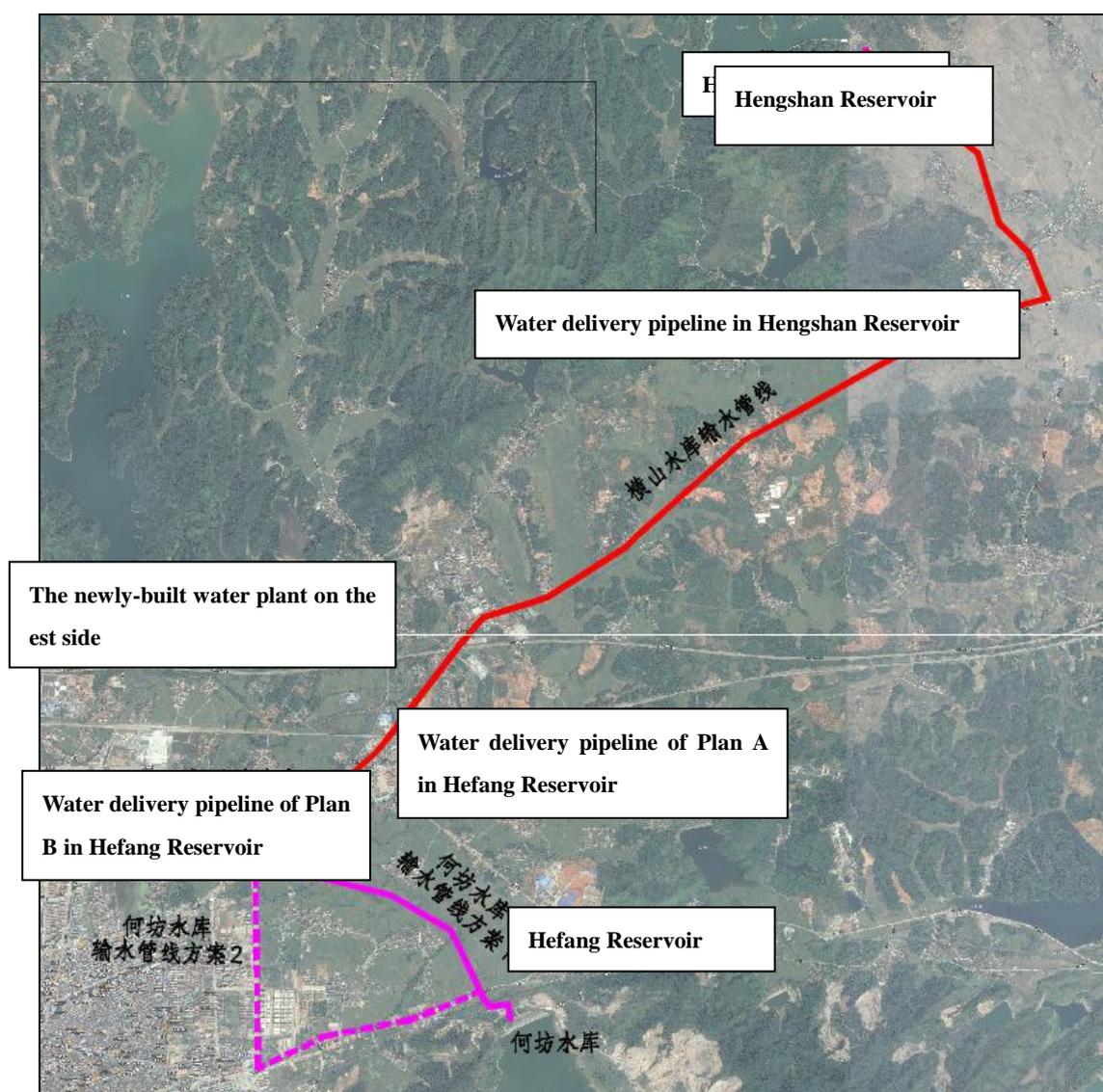
From Table 9.1-11, it can be seen that although Plan B is superior to Plan A in project size, pipeline length, impacts of environmental sensitive sites and other aspects, the construction conditions are poor and the construction difficulty is relatively great. Plan A is superior to Plan B in key construction difficulty, construction investment and other aspects. As a result, Plan A is recommended.

#### 9.1.3.6 Linchuan District

According to the Feasibility Study Report, the original pipeline in Linchuan district will be laid on the planning road. The route is short and simple, and it is already the optimal plan. Therefore, it does not involve the comparison of the original pipeline plan.

#### 9.1.3.7 Dongxiang District

There are two routes of the original water pipelines of water supply project in Dongxiang district. Among which, the water intake routes in Hengshan Reservoir of Plan A and Plan B are the same (to lay the pipeline along the 208 provincial road). However, the water intake route in Hefang Reservoir have both the western plan and eastern plan. Among which, the eastern plan is to lay the pipeline roughly along a straight line from Hefang Reservoir to the water plant. The total length is about 3.6 km. The western plan is to lay the original pipeline along road from Hefang Reservoir to water plant. The total length is about 6.1 km. The specific comparison is shown in Table 9.1-11. The schematic diagram is shown in Figure 9.1-5.



**Figure 9.1-5 Schematic Diagram of Alternative Plans for the New Construction of the Original Water Pipeline of Water Supply in the Urban Area of Dongxiang**

**District**
**Table 9.1-11 Comparison of Alternative Plans for the New Construction of the Original Water Pipeline of Water Supply in the Urban Area of Dongxiang District**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	3.6 km of DN800 ductile cast iron pipes	6.1 km of DN800 ductile cast iron pipes	Plan A is superior
	Pipeline length	3.6 km	6.1km	Plan A is superior
	Earth volume	38,100 m <sup>3</sup>	64,600 m <sup>3</sup>	Plan A is superior
Technology	Construction difficulty	To lay the pipeline along the current road, and the construction difficulty is relatively low	To lay the pipeline along the village boundary, and a lot of pipeline under crossings are involved in. The construction difficulty is great	Plan A is superior
	Construction period	Three months	Six months	Plan A is superior
	Operation and maintenance	The pipeline will work in the way of gravity artesian, and the pressurized pumping house is not involved in	Pressurized pumping house is needed to be newly built	Plan A is superior
Environment	Impact of environmental sensitive sites	A total of one village is involved in the sensitive sites along the pipeline	A total of five villages and one school are involved in the sensitive sites along the pipeline	Plan A is superior
	Impact of soil erosion	The route is relatively short, and the impact of soil erosion is relatively small	The route is relatively long, and it needs to be laid along the village boundary. The impact of soil erosion is relatively big	Plan A is superior
Society	Permanent / temporary land occupation	The temporary land occupation is 9.3 ha, and the permanent land occupation is 0.47 ha	The temporary land occupation is 15.76 ha, and the permanent land occupation is 0.80 ha	Plan A is superior
	Occupation of arable land	No occupation of arable land	The occupation of arable land is 1.6 ha	Plan A is superior
Expense	Construction investment	13.86 million	23.49 million	Plan A is superior
	Operation cost	0.47 yuan/ton	1.12 yuan/ton	Plan A is superior

From Table 9.1-12, it can be seen that Plan A is superior to Plan B in project size, construction difficulty, construction investment and other aspects. Moreover, there are less environmental sensitive sites in Plan A. As a result, Plan A is recommended.

## 9.1.4 Comparison of site plan

### 9.1.4.1 Yongxin County

According to the Feasibility Study Report, the site of Yongxin county is located on the Bamboo mountain which is on the east side of Huayuan village. At present, the land acquisition and site formation have been completed, and the comparison of route plans is not involved in.

### 9.1.4.2 Jinxi County

According to the feasibility study report, there are sites to be selected for the new construction of water plant in Huangtong township, Jinxi county. The first site to be selected is located near the 943 County Road of Huangtong township, and the second one is located near the Kaokeng group of Huangtong township. The specific comparison is shown in Table 9.1-12.

**Table 9.1-12 Comparison of Alternative Plans for the Sites of the New Construction of Water Plant in the Huangtong Township, Jinxi County**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	To newly build about 16 km of the original water pipeline DN200 ductile cast iron pipes. To newly build the integrated pool, clean-water reservoir, dosage room, power distribution room and multi-use building	To newly build 180 m of the original water pipeline DN200 ductile cast iron pipes. To newly build the integrated pool, clean-water reservoir, dosage room, power distribution room and multi-use building	Plan B is superior
	Land occupation area	0.32 ha	0.29ha	Plan B is superior
	Earth volume	3.8万m <sup>3</sup> 38,000 m <sup>3</sup>	0.8万m <sup>3</sup> 8,000 m <sup>3</sup>	Plan B is superior
Technology	Construction difficulty	It is near the road which is in front of the township government, and the construction is convenient	At present, it is located in the barren mountains, and it is not convenient for the access of construction workers and materials	Plan A is superior

	Construction period	360 days	300 days	/
	Operation and maintenance	The original water pipeline is relatively long and double, and the operation and maintenance difficulty is great	The maintenance for the water intake and delivery by gravity is relatively convenient	Plan B is superior
Environment	Impact of environmental sensitive sites	Huangtong township is near the site	There is no concentrated settlements near the site	Plan B is superior
	Impact of soil erosion	The earth volume is relatively large, and the impact of soil erosion is relatively small	The earth volume is relatively small, and the impact of soil erosion is relatively small	Plan B is superior
Society	Number of settlers	None	None	/
	Occupation of arable land	0.32 ha	0.29ha	Plan B is superior
	Number of beneficiaries	12,236 people	12,236 people	/
Expense	Construction investment	7.27 million	1.55 million	Plan B is superior
	Operation cost	1.1 yuan/m <sup>3</sup>	1.05 yuan/m <sup>3</sup>	Plan B is superior

From Table 9.1-13, it can be seen that although Plan A is superior to Plan B in construction difficulty, Plan B is superior to Plan A in key project size, environmental impact, construction investment and other aspects. As a result, Plan B is recommended.

#### 9.1.4.3 Nanfeng County

According to the Feasibility Study Report, the water plant and original water pipeline in the east of Nanfeng county do not belong to this project. This project only involves the distribution system which towards to Shishan township, Qiawan township and Laixi township. The distribution system is laid along the road which towards to township. Comparison of route plans is not involved in.

#### 9.1.4.4 Leping City

According to the Feasibility Study Report, Runquan water plant and Lilin water plant of Leping city are both the expansion of the current water plants, and the

construction land of the current period has been reserved within the plant. The comparison of site plans is not involved in.

#### 9.1.4.5 Xiushui County

According to the Feasibility Study Report, the third water plant of Xiushui county is the extension project, and the extension land has been reserved by the current water plant. As a result, there is no plan comparison.

#### 9.1.4.6 Linchuan District

According to the Feasibility Study Report, there are two sites to be selected in Linchuan district. The first one to be selected is located at the mountain areas next to Lingshan which is near the rural highway, and it is about 500 meters away from the water intake place. The second one to be selected is located at the mountain area with high relief which is in the south of the planning ring road in the Talent Industrial Park, and in the west of the current Fuba line. The specific comparison is shown in Table 9.1-13.

**Table 9.1-13 Comparison of Alternative Plans for the Sites of the New Construction of Water Plant in Linchuan District**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	To newly build two original water pipelines DN800, and 1,000 m of ductile cast iron pipes	To newly build two original water pipelines DN800, and 4,800 m of ductile cast iron pipes	Plan B is superior
	Land occupation area	5.30ha	5.28ha	Plan B is superior
	Earth volume	132,500 m <sup>3</sup>	105,600 m <sup>3</sup>	Plan B is superior
Technology	Construction difficulty	The new construction of access road is needed	The new construction of access road is not needed	Plan B is superior
	Construction period	18 months	18 months	Plan B is superior
	Operation and maintenance	Simple	Simple	/

Environment	Impact of environmental sensitive sites	Close to Ruanjia village	It is 120 m away from the nearest village-Taoxia village	Plan B is superior
	Impact of soil erosion	Land occupation area and earth volume are relatively large, and the impact of soil erosion is relatively great	Land occupation area and earth volume are relatively small, and the impact of soil erosion are relatively small	Plan B is superior
Society	Number of settlers	572 households with 2,023 people	275 households with 973 people	Plan B is superior
	Occupation of arable land	No occupation of arable land	No occupation of arable land	/
	Number of beneficiaries	300,000	300,000	/
Expense	Construction investment	77.5 million	75 million	Plan B is superior
	Operation cost	1.28 yuan/m <sup>3</sup>	1.25 yuan/m <sup>3</sup>	Plan B is superior

In summary, Plan B is superior to Plan A in key project size, construction difficulty, construction investment and other aspects, and there are less impacts of environmental sensitive sites and number of settlers. Therefore, Plan B is recommended after the comprehensive consideration.

#### 9.1.4.7 Dongxiang District

According to the Feasibility Study Report, there are two sites to be selected in Dongxiang district. The first one to be selected is located at the area which is near the 208 provincial road in Dongxiang district. The second one to be selected is located on the west side of Wangyuan village. The specific comparison is shown in Table 9.1-14.

**Table 9.1-14 Comparison of Alternative Plans for the Sites of the New Construction of Water Plant in Dongxiang District**

Categories Comparison Items	Plan A	Plan B	Advantages and Disadvantages
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Scale	Project size	Water delivery project: Hefang Reservoir water delivery pipeline (3.6 km, gravity flow) + Hengshan Reservoir water delivery pipeline (13.7 km, pressure flow)	Water delivery project: Hefang Reservoir water delivery pipeline (4.3 km, gravity flow) + Hengshan Reservoir water delivery pipeline (14.39 km, pressure flow)	Plan A is superior
	Land occupation area	6.07ha	6.07ha	/
	Earth volume	85,000 m <sup>3</sup>	85,000 m <sup>3</sup>	/
Technology	Construction difficulty	It is located near the 208 provincial road in Dongxiang district with less construction difficulties	There is a 35 kv high voltage pole in the second site, causing great difficulties in construction	Plan A is superior
	Construction period	18 months	18 months	/
	Operation and maintenance	Relatively simple	Relatively simple	/
Environment	Impact of environmental sensitive sites	It is 2.5 km from the nearest Xialonggang village	It is about 50 m from the nearest Wangyuan village	The impact of environmental sensitive sites is relatively small
	Impact of soil erosion	The earth volume and land occupation area are the same, and they also have the same impacts	The earth volume and land occupation area are the same, and they also have the same impacts	/
Society	Number of settlers	None	None	/
	Occupation of arable land	6.07ha	6.07ha	/
	Number of beneficiaries	447,900	447,900	/
Expense	Construction investment	108.47 million	105.84 million	Plan B is superior
	Operation cost	1.15 yuan/ton	1.22 yuan/ton	Plan A is superior

In summary, although Plan B is superior to Plan A in construction investment, Plan A is superior to Plan B in key project size, environmental impacts, operation cost and other aspects. As a result, Plan A is recommended.

## 9.1.5 Comparison of process plans

### 9.1.5.1 Comparison of process plans of water purification plants in the county

This comparison of process plans of water purification plants in the county will be carried out in the four plans of sedimentation tank, filter tank, disinfection methods and sludge treatment methods. The new water plant of Yongxin county and the third water plant of Xiushui county are mainly involved in. Among which, both the two water plants will adopt the same measures in sedimentation tank, filter tank and disinfection methods. Due to the factor of land occupation, the new water plant of Yongxin county will adopt the measure of mechanical drying for sludge treatment methods, and the third water plant in Xiushui county will adopt the measure of natural drying.

According to the Feasibility Study Report, Runquan water plant and Lilin water plant of Leping city are both the expansion of the current water plants, and the construction land of the current period has been reserved within the plant. The existing process is in good conditions, so the process comparison is not involved in. The water plant and original water pipeline in the east of Nanfeng county do not belong to this project. This project only involves the distribution system which connects to Shishan township, Qiawan township and Laixi township. Comparison of process plans is not involved in.

The specific comparison of process plans is in Table 9.1-15

**Table 9.1-15 Comparison of Process Plans of Water Purification Plants in the County**

Plans	Process	Advantages	Disadvantages	Yongxin County	Xiushui County
Sedimentation tank	Inclined pipe sedimentation tank	The land occupation area is small, and the sedimentation efficiency is high	The adaptability of water quality change is bad, and the effect of sludge discharge is poor	Choose the horizontal flow sedimentation tank	Choose the horizontal flow sedimentation tank

	Horizontal flow sedimentation tank	It has the simple structure, shallow pool, and is easy to operate and manage	The land occupation area is relatively large		tion tank
Filter tank	V-filter	Water is evenly distributed, and it is easy to manage. The filter materials have the strong sewage containing abilities to reduce the filter depth	The civil engineering expense and the operation power consumption are relatively high. It covers a large area. The water consumption of backlash is relatively large and the filter materials are easy to lose	Choose the V-filter	Choose the V-filter
	Flap filter	The sewage containing ability is strong, the effect of backlash is good and the water consumption is small. The civil engineering structure is simple, so that it is easy to manage. The filter cycle is long and the filter effect is good.	The initial investment in the equipment is higher than other filters, and the area of the single pool should not be too large		
Disinfection methods	Sodium hypochlorite	The disinfection effect is good, and the chemical dosage and injection is accurate. The operation is safe, and it is easily to be used. It is easily to be stored and has no toxicity to the environment	The sodium chlorate solution is not easily to be stored. A large number of containers are needed for the procurement. The transportation is cumbersome and inconvenience. And it is easy to volatile	Choose the sodium hypochlorite	Choose the sodium hypochlorite

	Ozone disinfection	The disinfection and sterilization is complete and reliable. It is less dangerous and almost has no side effects to the environment	The disadvantage is that the ozone is difficult to be saved. The infrastructure investment for the on-site preparation is large and the operation costs are high		
Sludge treatment methods	Natural drying	The process is simple with less operation costs	The land occupation area is relatively large	Choose the mechanical drying	Choose the natural drying
	Mechanical drying	The moisture content of sludge is relatively low, and the treatment effect is good	The investment in the equipment is large and the operation costs are high		

### 9.1.5.2 Comparison of process plans of water purification plants in the township

The comparison of process plans of water purification plants in the township will be carried out in the two plans of the integrated water purification equipment and the traditional water purification equipment. The new construction of water plant of Huangtong township, Jinxi county is involved in. The total scale of the water plant design is 1,200 m<sup>3</sup>/d. The comparison of process plans of township water plants is shown in Table 9.1-16.

**Table 9.1-16 Comparison of Process Plans of Water Purification Plants in the Township**

Plans	Advantages	Disadvantages	Advantages and Disadvantages
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<p>Integrated water purification equipment</p>	<p>1. The equipment is simple with no land occupation                  2. It is convenient and practical, and easy to operate. The quality requirements for the operator are not high                  3. It can be put into use immediately after the installation and adjustment, and the construction cycle is fast                  4. It has complete functions. The integrated water purification equipment meets the requirements for automatic operation from reaction, coagulation, precipitation, sludge collection and discharging, water collection and distribution, filtration, recoil, sewage discharging and other series of operation procedures. The operator on duty only needs to monitor and test water quality without the operation and management of water purification equipment                  5. Save money. It can save a lot of infrastructure investment and the expenses of daily operation, repair and maintenance</p>	<p>It shall be used in the water plant with the scale below 5,000m<sup>3</sup>/d</p>	<p>Choose the integrated water purification equipment</p>
<p>Traditional water purification equipment</p>	<p>1. It has high processing efficiency and great processing capacity                  2. It has high stability</p>	<p>The land occupation area is relatively large, and the costs are high. The expense for the management and repair in the future is high</p>	

## 9.2 Wastewater Treatment Project

### 9.2.1 The comparison before and after project

The Analysis of this wastewater treatment project with a project and without a project shown in Table 9.2-1.

**Table 9.2-1 Analysis of a Project and No Project**

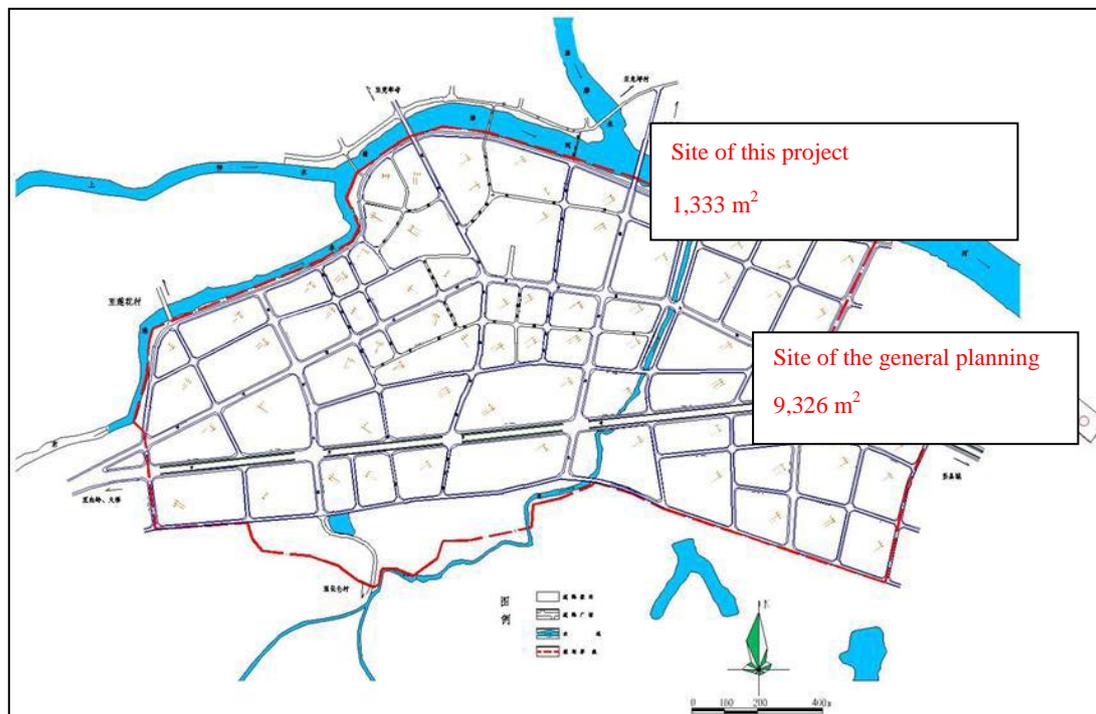
Categories	Implementation of the Project Plan	No Project (Zero Plan)
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<p>Major Advantages</p>	<p>At present, there is no sewage treatment project in Zhajin township, Xiushui county, resulting in a large number of disordered discharges of domestic sewage. After the implementation of this project, the collection rate of sewage in Zhajin township can reach 80%, and nearly 2,800 households of sewage connection. As a result, it will further improve the living conditions of township, and promote the comprehensive, coordinated and sustainable economic and social development, which is beneficial to the improvement of the quality of life of local residents</p>	<p>(1) The current situations of the project will be maintained, such as the vegetation will not be destroyed, and the land use value will not be changed (land will not be occupied and etc.). (2) There will be no environmental impact problems such as construction noise, waste gas, waste water, solid waste, and etc. caused by infrastructure construction during the construction period</p>
<p>Major Disadvantages</p>	<p>(1) After the implementation of the project, the construction of sewage treatment station and its supporting office sites will occupy a lot of land. (2) After the implementation of the project, the construction period will destroy the vegetation, disturb the land, and cause the soil erosion. And it will also produce the dust, noise, waste water, waste gas, solid waste, etc., and affect the surrounding environment. (3) After the implementation of the project, the wastewater, foul gas, noise, sludge and other solid wastes will be generated during the operation period. The farmland vegetation and brush grass with permanent occupation of farmland will be completely destroyed, affecting the surrounding environment.</p>	<p>At present, there is no drainage system in the town area. The urban rainwater and the untreated domestic sewage are discharged in an unorganized manner, causing serious pollution to the environment and waterbody in the planning area.</p>
<p>Comprehensive analysis</p>	<p>From the social and environmental point of view, the implementation of this project is superior to zero project</p>	

### 9.2.2 Comparison of alternative plans of the sites

According to the Feasibility Study Report, there are two sites to be selected for the sewage treatment plant in Zhajin township, Xiushui county. The first one to be selected is located at the intersection of No.2 Road and Yanhe Road on the east side of

Yangjiakeng. The second one to be selected is located at 1 km lower course of the boundary of the town area. The site comparison is shown in Figure 9.2-1 and the specific comparison is shown in Table 9.2-2.



**Figure 9.2-1 Site Comparison of Wastewater Treatment Plant of Zhajin Township**

**Table 9.2-2 Comparison of Alternative Plans of the Sites**

Categories		Plan A	Plan B	Advantages and Disadvantages
Comparison Items				
Scale	Project size	To newly build 20,100 m of DN300 HDPE sewage pipeline in the urban area and 7,100 m of DN400 HDPE pipeline	To newly build 20,100 m of DN300 HDPE sewage pipeline in the urban area and 8,100 m of DN400 HDPE pipeline	Plan A is superior
	Land occupation area	0.13ha	0.93ha	Plan A is superior
	Earth volume	1,300 m <sup>3</sup>	9,300 m <sup>3</sup>	Plan A is superior
Technology	Construction difficulty	There is no obstacle near the access pipeline and surrounding area of the plant, and the existing access road can be used as the construction road, and the construction difficulty is relatively low	The access pipeline is deeply laid and crosses a lot of surrounding rural households. There is a large amount of removes and the implementation of the construction is difficult	Plan A is superior

	Construction period	12 months	12 months	/
	Operation and maintenance	Convenient	Convenient	/
Outlet	Pipeline length	100m	100m	/
	Sensitive targets	There is no water intake site within 5 km of lower course	There is no water intake site within 5 km of lower course	/
Environment	Impact of environmental sensitive sites	None	None	/
	Impact of soil erosion	The land occupation area and earth volume are relatively small, and the impact of soil erosion is relatively low	The land occupation area and earth volume are relatively large, and the impact of soil erosion is relatively big	Plan A is superior
Society	Number of settlers	None	None	/
	Occupation of arable land	0.13ha	0.93ha	/
	Number of beneficiaries	59,440 people	59,440 people	/
Expense	Construction investment	0.4 million	2.85 million	

### 9.2.3 Comparison of process alternative plans

According to the Feasibility Study Report, the CASS process, oxidation ditch process (Aobel), constructed wetland and integrated sewage processor have been selected for comparison. The specific comparison is shown in Table 9.2-3.

**Table 9.2-3 Comparison of Alternative Plans of Sewage Treatment Process**

Categories		Plan A	Plan B	Plan C	Plan D	Advantages and Disadvantages
Comparison Items						
General Plans		Oxidation ditch	CASS	Constructed wetland	Integrated sewage processor	/
Scale	Suitable scale	It is suitable for the centralized and large-scale sewage treatment projects	Centralized and large-scale	Centralized and small-scale	Appropriate size, and appropriate centralization and decentralization	Plan D is superior
	Land occupation area (m <sup>2</sup> /m <sup>3</sup> )	1.0~1.2	0.9~1.1	7~10	0.3~0.4	Plan D is superior

Technology	Effluent water quality	The effluent water quality is moderate	The effluent water quality is good	The effluent water quality is not stable	The effluent water quality is good, and can reach the reuse standards	Plan D is superior
	Operation and management	It is complex to operate and manage	It is complex to operate and manage	It has moderate complexity to operate and manage	It is easy to operate and manage with fully automatic operation and remote monitoring	Plan D is superior
	Anti-impact load	Moderate	Relatively strong	Poor	Strong	Plan D is superior
Energy Consumption	Power consumption	0.3kWh/m <sup>3</sup>	0.68kWh/m <sup>3</sup>	0	0.66kWh/m <sup>3</sup>	Plan C is superior
Environment	Sludge production	0.1kg/m <sup>3</sup>	0.1kg/m <sup>3</sup>	0.02 kg/m <sup>3</sup>	0.05kg/m <sup>3</sup>	Plan C and plan D are superior
Expense	Investment in processing station (yuan / ton water)	4,500~5,500	4,000~5,000	2,500~3,500	3,500~4,500	Plan C and plan D are superior
	Direct operation expense (yuan / ton water)	0.70	0.60	0.25	0.65	Plan C is superior

In summary, the integrated sewage processor has the advantages of small land occupation area, stable effluent water quality, high automation, simple operation and etc., but the operation expense is relatively high. The CASS has the advantages of good effluent water quality and low processing expense, but the land occupation area is relatively large. Considering the approval of the planning land occupation area of sewage treatment plant site of Zhajin government, the process of integrated sewage treatment processor with relatively small land occupation area is recommended to be adopted as the major process of domestic sewage process plant of this project.

## 10. Public Participation

### 10.1 Purposes and Methods

Public participation of the Environmental Impact Assessment (EIA) is a way to understand the attitudes and opinions of groups and people from all walks of life on construction project, and it is also an opportunity for people to participate in the EIA of construction project. Therefore, public participation can make the EIA of the construction project more democratized and publicized, so as to avoid the unilateral decisions which may bring difficulties and obstacles to the future work. According to the provisions of The Environmental Impact Assessment Law of the People's Republic of China and World Bank, the EIA of the construction project must put the opinions of the involved people into consideration.

(1) Let the public participate in the project construction to understand the purpose, scale and site of the construction, and the possible pollution on the surrounding environment during the project construction and the operation after the completion of construction, as well as the prevention and control measures which will be taken, so that the public can express their opinions and we can finally get the understanding, support and cooperation of the public.

(2) The results which consulted from the local long-term residents about the personnel experience and intuitive feeling on their living environment can help to analyze the baseline quality and level of all environmental factors within this area, so as to reflect the objectiveness of the EIA and protect the vital interests of the public.

The method of public participation in this EIA is mainly to release information bulletin and social survey. Namely, enable the public to understand the general situation of this project through bulletin release, and collect all kinds of information through interviews and questionnaires. The methods commonly used include quantitative survey and semi-quantitative survey. We can get the statistics with high accuracy through quantitative survey in the form of questionnaire usually. The semi-quantitative survey is not limited to its form. By social survey, we can get a comprehensive and deep understanding of the impacts on local environment and economy of the areas which involved in the project.

## 10.2 Identifications of Stakeholders

Focus on the consultation of public participation from government, enterprises and institutions and relevant departments in the assessment area. For the identified stakeholders, we should try to understand their thoughts, opinions and suggestions. After the public consultation, we should summarize all the problems found and all the opinions collected, and give replies to them, and send the feedback to the stakeholders. The contents and process descriptions of these activities, as well as the contents of resettlement plans and social assessment reports which related to public participation should be summarized in the EIA report, and incorporate the relevant contents of social management plans into the environmental management plans. For the local areas where schistosomiasis exists, we should know the baseline of local schistosomiasis, and list the health and epidemic prevention departments as the stakeholders.

According to the specific situations of different subprojects, the stakeholders in this project include the following institutions. The specific identifications are shown in Table 10.2-1.

Table 10.2-1 Major Stakeholders in the Project

/N	Categories	Subproject Names	Stakeholders	
			Affected Groups	Relevant Departments and Experts
	Improvement project of water supply project in urban area			
.1	Renovation and new construction project of water plant in urban area	New construction project of water plant in urban area of Yongxin County	Residents around the water plant site and along the original water pipeline (urban area of Yongxin County and Wenzhu Township)	Government of Yongxin County, Water-control Bureau of Yongxin County, State Environmental Protection Administration of China, Agricultural Bureau, Roads and Traffic Authority, Bureau of Land and Resources, Forestry Bureau, Health and Epidemic Prevention Department
		New construction project of water plant in urban area of Linchuan District	Residents around the water plant site and along the original water pipeline (urban area of Linchuan District)	People's Government of Shangdudu Township in Linchuan District, State Environmental Protection Administration of China of Linchuan District, Highway Sub-bureau, Bureau of Municipal and Rural Construction, Sub-bureau of Land and Resources, Planning Sub-bureau, Water-control Bureau, Health and Epidemic Prevention Department
		New construction project of water plant in urban area of Dongxiang District	Residents around the water plant site and along the original water pipeline (urban area of Dongxiang District)	Government of Dongxiang District, Bureau of Municipal and Rural Construction, Bureau of Land and Resources, Planning Bureau, State Environmental Protection Administration of China, Liwen High Speed of Dongxiang District in Jiangxi Province, Fuzhou Station of Chinese Petroleum Project of Natural Gas Transmission from West to East China, Health and Epidemic Prevention Department
		Extension project of water plant in urban area of Xiushui County	Residents around the water plant site and along the original water pipeline (urban area of Xiushui County)	State Environmental Protection Administration of China of Xiushui County, Highway Administration Bureau, Jiangxi Dongjin Power Generation Co., Ltd., Health and Epidemic Prevention Department
		Extension project of water plant in urban area of Leping City	Residents around the water plant site and along the original water pipeline (urban area of Leping City)	Government of Leping City, State Environmental Protection Administration of China, Planning Bureau, Highway Sub-bureau, Bureau of Municipal and Rural Construction, Bureau of Land and Resources, Health and Epidemic Prevention Department, Qimingxing Experimental Kindergarten in Leping city, Troop Security Department 96712 of Peoples Liberation Army

/N	Categories	Subproject Names	Stakeholders	
			Affected Groups	Relevant Departments and Experts
.2	Renovation and new construction project of water supply pipeline network in urban area	Renovation project of tap water pipeline network in urban area of Yongxin County	Residents in urban area of Yongxin County	Government of Yongxin County, Water-control Bureau of Yongxin County, State Environmental Protection Administration of China, Agricultural Bureau, Roads and Traffic Authority, Bureau of Land and Resources, Forestry Bureau, Health and Epidemic Prevention Department
		Renovation and new construction project of running water pipeline network in urban area of Linchuan District	Residents in urban area of Linchuan District	People's Government of Shangdudu Township in Linchuan District, State Environmental Protection Administration of China of Linchuan District, Highway Sub-bureau, Bureau of Municipal and Rural Construction, Sub-bureau of Land and Resources, Planning Sub-bureau, Water-control Bureau, Health and Epidemic Prevention Department
		Renovation project of running water pipeline network in urban area of Dongxiang District	Residents in urban area of Dongxiang District	Government of Dongxiang District, Bureau of Municipal and Rural Construction, Bureau of Land and Resources, Planning Sub-bureau, State Environmental Protection Administration of China, Health and Epidemic Prevention Department
		Renovation and new construction project of running water pipeline network in urban area of Jinxi County	Residents in urban area of Jinxi County	Government of Jinxi County, Forestry Bureau, State Environmental Protection Administration of China, Highway Bureau, Bureau of Municipal and Rural Construction, Health and Epidemic Prevention Department

/N	Categories	Subproject Names	Stakeholders	
			Affected Groups	Relevant Departments and Experts
		New construction and renovation project of pipeline network in urban area of Xiushui County	Residents in urban area of Xiushui County	Government of Xiushui County, Water-control Bureau of Xiushui County, State Environmental Protection Administration of China, Agricultural Bureau, Roads and Traffic Authority, Bureau of Land and Resources, Forestry Bureau, Health and Epidemic Prevention Department
		New construction and renovation project of pipeline network in urban area of Leping City	Residents around the water plant site and along the original water pipeline (urban area of Leping City)	Government of Leping City, State Environmental Protection Administration of China, Planning Bureau, Highway Sub-bureau, Bureau of Municipal and Rural Construction, Bureau of Land and Resources, Health and Epidemic Prevention Department
		Pipeline network extension project in township of Yongxin County	Residents along the pipeline network (Yongxin County and Lianzhou Township)	Government of Yongxin County, Water-control Bureau of Yongxin County, State Environmental Protection Administration of China, Agricultural Bureau, Roads and Traffic Authority, Bureau of Land and Resources, Forestry Bureau, Health and Epidemic Prevention Department
.1	Pipeline network extension project	Pipeline network extension project in township of Jinxi County	Residents along the pipeline network (Zuofang Township)	Government of Jinxi County, Forestry Bureau, State Environmental Protection Administration of China, Highway Bureau, Bureau of Municipal and Rural Construction, Health and Epidemic Prevention Department
		Pipeline network extension project in township of Linchuan District	Residents along the pipeline network (Shangduzhen Township, surrounding villages and other townships)	People's Government of Shangdudu Township in Linchuan District, State Environmental Protection Administration of China of Linchuan District, Highway Sub-bureau, Sub-bureau of Municipal and Rural Construction, Sub-bureau of Land and Resources, Planning Sub-bureau, Water-control Bureau, Health and Epidemic Prevention Department

/N	Categories	Subproject Names	Stakeholders	
			Affected Groups	Relevant Departments and Experts
		Pipeline network extension project in township of Dongxiang District	Residents along the pipeline network (urban area of Dongxiang District and Xiaogang Township of Dongxiang District)	Government of Dongxiang District, Bureau of Municipal and Rural Construction, Bureau of Land and Resources, Planning Bureau, State Environmental Protection Administration of China, Health and Epidemic Prevention Department, Geracomium in Xiaohuang township of Dongxiang District
		Pipeline network extension project in township of Nanfeng County	Residents along the pipeline network (urban area of Nanfeng County, Laixi Township and Shishan Township)	Government of Nanfeng County, Forestry Bureau of Nanfeng County, State Environmental Protection Administration of China, Highway Bureau, Bureau of Municipal and Rural Construction, Health and Epidemic Prevention Department, Government of Qiawan Township of Nanfeng County, The People's Government of Laixi Township, The People's Government of Shishan Township, Nanfeng Kuangyuan Energy Co., Ltd., Central Primary School in Laixi Township of Nanfeng County, Nanfeng Branch of China Unicom
		Pipeline network extension project in township of Leping City	Residents along the pipeline network (Hougang Township)	Government of Leping City, State Environmental Protection Administration of China, Planning Bureau, Highway Sub-bureau, Bureau of Municipal and Rural Construction, Bureau of Land and Resources, Health and Epidemic Prevention Department, Leping China Resource Gas Co., Ltd., Jiangxi Provincial Natural Gas Co., Ltd.
.2	Renovation and extension project of water supply pipeline network in rural area	Safety consolidation and improvement project of drinking water in rural area of Yongxin County	Residents along the pipeline network (residents in Longyuankou Township)	Government of Yongxin County, Water-control Bureau of Yongxin County, State Environmental Protection Administration of China, Agricultural Bureau, Roads and Traffic Authority, Bureau of Land and Resources, Forestry Bureau, Health and Epidemic Prevention Department
		New construction and renovation project of pipeline network in Township of Xiushui County	Residents along the pipeline network (Zhanjin Township, Zhengcun Township, Yugang Township, Gangkou Township and Shankou Township)	Government of Xiushui County, Water-control Bureau of Xiushui County, State Environmental Protection Administration of China, Agricultural Bureau, Roads and Traffic Authority, Bureau of Land and Resources, Forestry Bureau, Health and Epidemic Prevention Department

/N	Categories	Subproject Names	Stakeholders	
			Affected Groups	Relevant Departments and Experts
		Pipeline network extension project in township of Leping City	Residents along the pipeline network (Gaojia Township and Shiligang Township)	The People's Government of Luci Township, Branch Committee of Hongyan Township
.3	New construction, renovation and extension project of water plant in rural area	New construction of water plant in Huangtong Township of Jinxi County	Residents around the water plant (Huangtong Township)	Government of Jinxi County, Forestry Bureau, State Environmental Protection Administration of China, Highway Bureau, Bureau of Municipal and Rural Construction, Health and Epidemic Prevention Department
		Renovation and extension project of water plant in township of Leping city	Residents around the water plant (Lilin Township)	Government of Leping City, State Environmental Protection Administration of China, Planning Bureau, Bureau of Municipal and Rural Construction, Bureau of Land and Resources, Health and Epidemic Prevention Department
		New wastewater pipeline network and wastewater treatment plant project in Zhajin Township of Xiushui County	Residents around the water plant site and wastewater pipeline network (Putian village), and ancestral hall in Putian Village	Government of Xiushui County, Water-control Bureau of Xiushui County, State Environmental Protection Administration of China, Agricultural Bureau, Roads and Traffic Authority, Bureau of Land and Resources, Forestry Bureau, Health and Epidemic Prevention Department, Putian Village Committee of Zhajin Township

## **10.4 Procedures and Contents**

The public consultation is divided into two rounds: The first round is in the project preparation stage before the finalization of the EIA outline, and the second round is after the completion of the first draft of EIA report. The purposes of the first round of public consultation and information release are to understand the awareness and understanding of the stakeholders and public about the project, as well as their attitudes toward the project and concerns about the environmental and social impacts. The purposes of the second round of public consultation and information release are to inform the stakeholders of the potential environmental impacts of this project and the measures to be taken to mitigate these impacts, to understand the public acceptance and to inform the public of the complaint channels of environmental issues related to this project.

We shall submit the relevant materials to the affected groups and individuals prior to the public consultation and information release activities. Its form and language shall facilitate the understanding of these groups and individuals. The EIA unit will make a good record of public consultation which shall indicate: the consultation method (e.g. survey), the date and place of the consultation meeting, the list of the participants and their subordinate units and contact addresses, the public comments and feedback, and the summary of the public consultation.

## **10.5 Visit and Issue the Consultation Table of Public Participation**

During the assessment site survey and consultation period, we will adopt the forms of inquiries, visits, and public participation in forums and so on to listen to the attitudes toward the new construction of project and opinions on the resettlement of the local people and the relevant government functional departments involved in this project. Visit relevant departments, and listen to the comments of the relevant departments of People's Government, Residents (Village) Committee and etc. within the area of the project. The owner units shall widely issue the Public Participation Questionnaire to the units and villagers involved in the area to reflect the attitudes and opinions of the consulted units and the villagers on project construction.

Methods of feedback and handling: collect and collate (summarize) the contents of public consultation and information release questionnaire, and give reply and inform the relevant stakeholders on the advice that needs to be answered. Summarize the process and

contents of public consultation and information release and put forward corresponding suggestions.

From the survey results, we can see that the public response to this project is good, the project construction has been endorsed and supported by the overwhelming majority of the local people, and no public objection is raised. The public believe that the construction of this project is not only conducive to the social and economic development, but can also improve the water supply guarantee rate, pipeline network coverage rate, and water quality qualified rate in urban and rural areas, and it is in line with the aspirations of the general public. The treatment and disposal of the noise of project construction and machinery, construction dust, odor, sludge of wastewater plant, and the impact of effluent from wastewater treatment plant on the receiving water are the major environmental issues of public concerns. A summary of the two rounds of public participation in the survey is shown in Table 10.4-1 and Table 10.4-2. Both Tables have summarized the names of all subprojects, the public participation time, the methods, the organizational units, the participants, the major concerns, and the feedback of EIA on the issues of public concerns and so on.

**Table 10.5-1 The First Round of the Activity Process of Public Participation and Information Release**

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
Yongxin County	November, 2016	Urban area of Yongxin County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in urban area of Yongxin County	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits and questionnaires	(1) Dust pollution, noise impact, ecological damage and other environmental problems during the construction period. (2) Sludge disposal, noise pollution and other environmental problems during the operation period. (3) Strengthen the protection of ecological environment, and implement various prevention and control measures for pollution during the project construction.	(1) Shorten the construction period as far as possible, reasonably arrange the construction time, and carry out construction in a civilized manner, so as to avoid the noise impact. Require the owners to write the measures for noise reduction and dust reduction into the project bid, and supervise and strictly implement such measures. (2) We shall have a detailed arrangement for the drying, collection, clean time and route of the sludge during the operation period, and strictly implement such arrangement. Adopt the sound insulation and noise reduction measures for the noise-producing equipment in water plant and pumping house, and the specific requirements have been put forward in ESMP. (3) In the process of project implementation, and especially during the construction period, we shall strictly follow the ecological impact mitigation measures, and the specific plans have been made in EMP.
	November, 2016	Villagers of the third group in Hengxi Village, Yongxin County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Villagers of the third group in Hengxi Village	Introduce the project overview, and the possible environmental impacts caused by the project construction period and operation period	Visits	They made it clear that they did not want the original water pipelines to be laid through the fields in their village as they would affect farming, and they required the pipelines to be laid along the river as much as possible	They have made feedback to the design unit that they will take the avoidance measures for farmland in the design phase, and the pipeline construction will be carried out along the river

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
	November, 2016	Government of Yongxin County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Water-control Bureau of Yongxin County, State Environmental Protection Administration of China, Agricultural Bureau, Roads and Traffic Authority, Bureau of Land and Resources, Forestry Bureau	All departments shall put forward the project notes according to their relevant responsibilities, and discuss the possible environmental impacts during the construction and operation period of the project	Forums	(1) Whether the project scope involves the old and famous trees. If so, we shall do a good job in the protection of old and famous trees during the construction period. (2) In respect of woodland, it is necessary for us to conform to the relevant local planning, and we must go through the formalities concerning the woodland and forest in accordance with law. (3) During the project construction, we shall guarantee that there is no damage of highway facilities and no occupation of highway land.	(1) The protection measures for old trees are as follows: Prepare a number for each tree and implement the listing management, indicate the name, diameter, age, protection precautions and etc. of each tree, and equip with special tools. Set up tree archives. Prohibit the fire and gas operations around the old trees, and equip with adequate fire-fighting equipment. Strengthen the protection awareness of the construction workers. (2) The expropriation of collective woodland is involved in Yongxin county of this project, and the relevant formalities have been made according to regulations by the project office. (3) During the preparation period of the project, the design unit should propose the construction plans for the pipeline areas which involved in the highway facilities. The construction can be started after obtaining the permission from the highway department. During the construction of this project, we will strictly implement the management requirements of the highway department, to ensure no damage of highway facilities and no occupation of highway land.
	November, 2016	Wenzhu township of Yongxin County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in Wenzhu township of Yongxin County	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits and questionnaires	Do a good job in the construction traffic organization design before the construction to ensure the smooth and safety of the traffic	The project construction is divided into several sections, and we shall complete the excavation and backfill as soon as possible. Set up a billboard at the construction site to indicate the project content and construction time. Seek for the public understanding of the inconvenience caused by the construction, and inform the public with the contact person, complaint hotline and so on. The pipeline construction shall avoid the traffic peaks to reduce traffic jams and decline the impacts on resident trip. Strengthen the construction management and the environmental protection training of construction workers

Jiangxi Integrated Rural and Urban Water Supply and Wastewater Management Project

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
Jinxi County	November, 2016	Urban area of Jinxi County and Huangtong Township	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in urban area of Jinxi County and Huangtong Township	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits and questionnaires	(1) It is suggested that the tap water source with high quality should cover all the jurisdiction of Huangtong township. (2) Do not damage the vegetation	(1) The aspirations of local residents have been reflected to the owners. (2) After the construction of temporary land, we must promptly replant the street trees, and select appropriate local species to compensate for planting and restore greening.
	November, 2016	Government of Jinxi County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Government of Jinxi County, Forestry Bureau, State Environmental Protection Administration of China, Highway Bureau, Bureau of Municipal and Rural Construction	All departments shall put forward the project notes according to their relevant responsibilities, and discuss the possible environmental impacts during the construction and operation period of the project	Forums	(1) Strengthen the detection of surface water pollution. (2) Avoid the surface water pollution, and reduce the vegetation damage as far as possible, so as to avoid affecting the life of surrounding residents.	(1) The local water company has developed a regular detection system, and hired a qualified unit for regular detection on surface water source, finished water and tap water. (2) In the process of project implementation, we shall strictly follow the water environment and ecological environment impact mitigation measures, and the specific plans have been developed in ESMP.

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
Nanfeng county	November, 2016	Urban area of Nanfeng County, Laixi Township and Shishan Township	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in urban area of Nanfeng County, Laixi Township and Shishan Township	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits and questionnaires	(1) Atmosphere, noise and other environmental impacts during the construction period. (2) Surface water pollution, sludge disposal and other environmental problems during the operation period.	(1) Shorten the construction period as far as possible, carry out construction in a civilized manner, and avoid the construction at nighttime. And prepare sprinklers on the construction site and other facilities Require the owners to write the measures for noise reduction and dust reduction into the project bid, and supervise and strictly implement such measures. The specific plans have been developed in ESMP. (2) We shall have a detailed arrangement for the drying, collection, clean time and route of the sludge during the operation period, and strictly implement such arrangement. The mitigation measures for surface water environment have been cleared, and the specific requirements have been put forward in ESMP.
	November, 2016	Government of Nanfeng County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Forestry Bureau of Nanfeng County, State Environmental Protection Administration of China, Highway Bureau, Bureau of Municipal and Rural Construction	All departments shall put forward the project notes according to their relevant responsibilities, and discuss the possible environmental impacts during the construction and operation period of the project	Forums	(1) Take protection measures for old trees in the process of construction. (2) Project construction shall in line with the overall planning of the county. (3) Take relevant protection measures for road-crossing areas	(1) The protection measures for old trees are as follows: Prepare a number for each tree and implement the listing management, indicate the name, diameter, age, protection precautions and etc. of each tree, and equip with special tools. Set up tree archives. Prohibit the fire and gas operations around the old trees, and equip with adequate fire-fighting equipment. Strengthen the protection awareness of the construction workers. (2) The implementation of this project is in line with the overall plan of local city. (3) We will adopt the pipe jacking method and the crossing plan that entangling the steel pipe with the reinforced concrete pipe, and abide by the Technical Specification for Pipe Jacking of Water Supply and Sewerage Engineering (CECS246-2008), so as to ensure that there is no road hump and collapse, as well as to ensure the traffic safety.

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
	April, 2017	Government in Qiawan Township of Nanfeng County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Government of Qiawan Township of Nanfeng County	Describe the project overview, as well as the possible environmental impacts during the construction and operation period of the project, and seek for opinions	Interviews	(1) Pay attention to watering and dust reduction during the construction. (2) The construction near the old trees is strongly prohibited. (3) Do a good job of the corresponding safety management plan. (4) Inform the construction in advance	(1) Prepare sprinklers and other facilities on the construction site. Require the owners to write the measures for noise reduction and dust reduction into the project bid, and supervise and strictly implement such measures. The specific plans have been developed in ESMP. (2) The protection measures for old trees are as follows: Prohibit the construction nearby old trees. Prohibit the fire and gas operations around the old trees, and equip with adequate fire-fighting equipment. Strengthen the protection awareness of the construction workers. (3) ECOP has been developed. (4) Inform the relevant management department before the construction, and start the construction after obtaining the consent.

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
	April, 2017	Nanfeng Kuangyuan Energy Co., Ltd.	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Nanfeng Kuangyuan Energy Co., Ltd.	Describe the project overview, as well as the possible environmental impacts during the construction and operation period of the project, and seek for opinions from the management departments	Visits	<p>(1) Carry out the construction plans after obtaining the consent of the company, and we shall ensure that there is no adverse effect on gas pipeline during the construction.</p> <p>(2) Reduce the driving of the large-scale vehicles on the gas pipeline, and strictly control the width of the construction belt, as well as reduce the cross-laying of the pipelines.</p> <p>(3) Do a good job of the corresponding safety management plan.</p> <p>(4) Carry out the vegetation restoration around the pipeline after the construction.</p>	<p>(1) The construction plan can be carried out after obtaining the consent from the company. Develop the ECOP to ensure that there is no adverse effect on gas pipeline in the process of construction</p> <p>(2) Prohibit the mechanical excavation, blasting, lifting and hoisting and other operations near the gas pipeline. Eliminate the brutal construction. At the same time, prohibit the opening of temporary roads above the gas pipeline facilities, as well as the stay and walking of load-carrying vehicles, bulldozers and so on. Strictly control the width of the construction belt, and reduce the cross-laying of the pipelines.</p> <p>(3) Safety management plans and emergency measures shall be made in advance during the construction, and the repair equipment for emergency shall be prepared. Once the damage of gas pipeline and other accidents occur, we shall immediately report such accidents to the gas pipeline unit for the emergent repair.</p> <p>(4) Vegetation restoration shall be carried out in a timely manner after the construction activities</p>

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
	April, 2017	Central Primary School in Laixi Township of Nanfeng County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Management Department of Central Primary School in Laixi Township of Nanfeng County	Describe the overview and scope of the project, as well as the possible environmental impacts during the construction and operation period of the project, and seek for opinions from the management departments	Visits	(1) The construction time shall avoid the time for going to school and leaving school, and the transportation vehicles shall be prohibited to whistle during the construction. (2) Strengthen the measures for watering and dust reduction during the construction. (3) We shall inform the residents before the construction, and promptly do a good job in restoration after the construction	(1) Reasonably arrange the construction time, and carry out construction in a civilized manner, so as to avoid the noise impact on students' classes, attending school and leaving school. (2) Require the owners to write the measures for noise reduction and dust reduction into the project bid, and supervise and strictly implement such measures (3) Inform the management departments of the school prior to the construction, and promptly carry out the vegetation restoration in the affected areas after the construction
Leping City	November, 2016	Urban area of Leping City, Lilin Township and Hougang Township	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in urban area of Leping County, Lilin Township and Hougang Township	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits and questionnaires	(1) Surface water pollution, sludge disposal and other environmental problems during the operation period. (2) The existing water quality is not clean in Lilin township, and it shall meet the water quality of water supply source.	(1) We shall have a detailed arrangement for the drying, collection, clean time and route of the sludge during the operation period, and strictly implement such arrangement. The mitigation measures for surface water environment have been cleared, and the specific requirements have been put forward in ESMP. (2) According to the Water Resource Demonstration Report, water quality baseline of Lilin water plant source meets the waterbody standards of class III.

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
	April, 2017	Government of Leping City	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	State Environmental Protection Administration of China of Leping city, Planning Bureau, Highway Sub-bureau, Bureau of Municipal and Rural Construction, Bureau of Land and Resources	All departments shall put forward the project notes according to their relevant responsibilities, and discuss the possible environmental impacts during the construction and operation period of the project	Forums	(1) Avoid the water and soil loss, as well as the disturbance of residents during the construction. (2) Strengthen the project quality supervision, and pay great attention to the construction of environmental safety and water quality safety, and do not destroy the ecology.	(1) The owners have entrusted the relevant unit to develop a soil and water conservation report and will strictly implement such report, so as to reduce the water and soil loss to a minimum degree. (2) ESMP has identified the project construction period and the environmental management institutions during the operation period. It also has clearly defined the implementation and management of environmental protection measures, as well as the implementation and supervision of environmental management plans.
	April, 2017	Luci Township of Leping City, Hongyan Township	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	The People's Government of Luci Township, Branch Committee of Hongyan Township	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits and questionnaires	(1) Communicate with the public as much as possible, and satisfy their aspirations.	(1) The project has developed a public complaint and feedback mechanism. Upon receiving the public complaints, we will immediately organize visits and surveys with design department and other relevant departments, and will carry out rectifications in accordance with the actual conditions. The rectification plans will be publicized to solve the environmental protection disputes. (2) The ESMP has clearly required that, after the construction of temporary land, we must promptly replant the street trees, and select appropriate local species to compensate for planting and restore greening.

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
	April, 2017	Leping China Resource Gas Co., Ltd., Jiangxi Provincial Natural Gas Co., Ltd.	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Leping China Resource Gas Co., Ltd., Jiangxi Provincial Natural Gas Co., Ltd.	Describe the overview and scope of the project, and seek for opinions from the management departments	Visits	Inform the gas company before the construction, and the distance between the construction scope and gas pipeline shall be greater than 50 cm. The pipeline of the gas company shall be deeply buried about 1.2 m, and pipeline shall be ensured not to be damaged	We will strictly follow the regulations of gas company during the project construction period. The main pipelines should go through under the crossed pipelines. Temporary measures should be taken during the construction (such as increase the distribution of piles and beams or local undercut protections and so on), so as to protect the pipelines above and ensure the normal operations during the construction and the safety after the completion of the construction.
Xiushui County	November, 2016	Xiushui County, Zhengcun Township and urban area of Zhajin Township	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in urban area of Xiushui County, Zhengcun Village and urban area of Zhajin Township	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits and questionnaires	(1) Odor problems of wastewater treatment plants during the operation period. (2) Pay attention to soil and water conservation to guarantee the water quality of the water source.	(1) This project adopts an integrated process, and the prediction results show that the odor gas has a relatively small impact on the environment. The EIA has clearly required the operation units to mitigate the atmospheric environmental impacts caused by odor gas by measures of strengthening plant greening and so on. (2) The owners have entrusted the relevant unit to develop a soil and water conservation report and will strictly implement such report, so as to reduce the water and soil loss to a minimum degree. According to the Water Resource Demonstration Report, all the water source quality of this project meets the national standards.

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
	April, 2017	Highway Administration Bureau of Xiushui County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Highway Administration Bureau of Xiushui County	All departments shall put forward the project notes according to their relevant responsibilities, and discuss the possible environmental impacts during the construction and operation period of the project	Forums	The existing highway facilities shall not be damaged during the construction period	During the implementation of the construction, we will strictly implement the management requirements of highway department. We will adopt the pipe jacking method and the crossing plan that entangling the steel pipe with the reinforced concrete pipe, and abide by the Technical Specification for Pipe Jacking of Water Supply and Sewerage Engineering (CECS246-2008), so as to ensure that there is no road hump and collapse, as well as to ensure the traffic safety.
	April, 2017	Dongjin Power Generation Co., Ltd. in Jiangxi Province	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Jiangxi Dongjin Power Generation Co., Ltd.	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits and questionnaires	Strengthen the waterbody protection during the construction	The ESMP has clearly put forward the control measures for water pollution during the construction period
	April, 2017	Putian Village of Zhajin Township, and ancestral hall in Putian Village	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Village head and villagers of Putian Village in Zhajin Township, Xiushui County	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits	(1) Implement the land expropriation as soon as possible. (2) Restore the surrounding environment as soon as possible after the construction. (3) Strengthen watering and dust reduction during the construction. (4) Avoid the construction at nighttime as far as possible	(1) We have told owners that we will carry out land expropriation as soon as possible. (2) Promptly carry out the ecological restoration on the affected areas after the construction activities. (3) Strictly implement the protection measures during the construction. Take regular watering in the process with dust-producing, and reduce atmospheric environmental impacts by setting up fences and other measures at the construction site. (4) Prohibit construction at nighttime

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
Linchuan District	November, 2016	Urban area of Linchuan District, Shangdundu Township and the surrounding Villages	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Villages and residents around the urban area of Linchuan District and Shangdundu township and the surrounding Villages	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits and questionnaires	Minimize the damage on the ecological environment such as atmosphere, soil, vegetation and so on during the construction, and try to make life easier for the ordinary people as far as possible	Shorten the construction period as far as possible, carry out construction in a civilized manner, and avoid the construction at nighttime. And prepare sprinklers and other facilities at the construction site. Require the owners to write the measures for noise reduction and dust reduction into the project bid, and supervise and strictly implement such measures. The specific plans have been developed in ESMP.
	April, 2017	Government of Linchuan District	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	People's Government of Shangdundu Township in Linchuan District	All departments shall put forward the project notes according to their relevant responsibilities, and discuss the possible environmental impacts during the construction and operation period of the project	Forums	Strengthen the supervision and improvement on water quality, and do a good job in ecological protection	The EIA of the project has put forward corresponding environmental protection measures for different subprojects, including strengthening the environmental education of construction workers, improving the environmental protection awareness of the construction workers, and not littering or dumping waste and wastewater, carrying out construction in the normal water period and withered water period as much as possible to reduce the impacts on the river water quality. Implementing the soil and water conservation measures according to the corresponding plans, and doing a good job in the ecological bank and revetment protection.

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
Dongxiang District	November, 2016	Urban area of Dongxiang District	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in urban area of Dongxiang District	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Visits and questionnaires	Protect the green vegetation	The ESMP has clearly required that, after the construction of temporary land, we must promptly replant the street trees, and select appropriate local species to compensate for planting and restore greening.
	April, 2017	Government of Dongxiang District	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Bureau of Municipal and Rural Construction, Bureau of Land and Resources, Planning Bureau, and State Environmental Protection Administration of China of Dongxiang District	All departments shall put forward the project notes according to their relevant responsibilities, and discuss the possible environmental impacts during the construction and operation period of the project	Forums	(1) Timely restore everything during the project construction to ensure that there is no effect on traffic. (2) Do not affect the agricultural production of the public.	(1) The ESMP has explicitly proposed to shorten the construction period as far as possible. We shall negotiate with the local traffic management department to develop a temporary traffic route before the construction, and inform the residents within the construction affected areas in advance. Set up the nameplates on the construction site and arrange a special people to disperse the traffic. (2) All the land expropriation formalities of the subprojects involved in land expropriation of this project have been completed, and the compensation measures have been implemented.

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
	April, 2017	Liwen High Speed of Dongxiang District in Jiangxi Province	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Liwen High Speed of Dongxiang District in Jiangxi Province	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Interviews	(1) Send the notice of construction in advance. (2) Carry out the restoration after the construction. Strictly control the width of the construction area, and comply with the relevant national standards.	(1) Before the project construction, the design unit shall propose the construction plans for the pipeline areas which involved in the highway facilities. And the construction can be carried out after obtaining the permission of Liwen High Speed of Dongxiang District (2) During the construction of this project, we will strictly implement the management requirements of the highway department.
	April, 2017	Geracomium in Xiaohuang Township of Dongxiang District	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Geracomium in Xiaohuang township of Dongxiang District	Describe the project overview, and the possible environmental impacts during the construction and operation period of the project	Interviews	(1) Pay attention to the control of noise during the construction. (2) Do a good job in watering and dust reduction. (3) Do a good job in vegetation restoration after the construction	(1) This report has proposed the following measures for construction noise: Prohibit construction at noon or at nighttime. We shall set up fences at the construction site and a temporary noise barrier if necessary. We shall put forward strict requirements on construction intensity, operators of machinery and vehicles and other management aspects. (2) Shorten the construction period as far as possible, carry out construction in a civilized manner, and avoid the construction at nighttime. Prepare the sprinklers and other facilities at the construction site. Require the owners to write the measures for noise reduction and dust reduction into the project bid, and supervise and strictly implement such measures. (3) Vegetation restoration shall be carried out in a timely manner after the construction.

**Table 10.5-2 The Second Round of the Activity Process of Public Participation and Information Release**

Jiangxi Integrated Rural and Urban Water Supply and Wastewater Management Project

County and City	Date	Sites	Organizers	Participants	Contents	Methods	Public Problems or Opinions	Measures and Results on the Issues of Concern
Yongxin County	September, 2017	Urban area of Yongxin County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in urban area of Yongxin County	Carry out public consultation on the main contents and conclusions of the first draft of EIA, so as to expect to gain the understandings and supports on the project construction and mitigation measures taken of the public	Visits and questionnaires	The public support the project construction, and endorse the proposed environmental protection measures	The project will strictly implement the various environmental protection measures in the project environmental management plans
	September, 2017	The third group in Hengxi Village of Yongxin County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	The third group in Hengxi Village of Yongxin County		Visits	(1) The public supports the project construction, and endorses the proposed environmental protection measures. (2) Endorse the measures of avoiding farmland and laying along the river of pipeline construction proposed in the design phase.	The project will strictly implement various environmental protection measures in the project environmental management plan
	September, 2017	Government of Yongxin County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	State Environmental Protection Administration of China of Yongxin County		Interviews	Support the project construction, and endorse the proposed environmental protection measures. And hope to strengthen the environmental protection during the project construction.	The project will strictly implement the various environmental protection measures in the project environmental management plans

	September, 2017	Health and Epidemic Prevention Department of Yongxin County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Health and Epidemic Prevention Department of Yongxin County	Consult that whether the project location is in the schistosomiasis area	Interviews	It does not belong to the schistosomiasis area	/
Jinxi County	September, 2017	Zuofang Township of Jinxi County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in Zuofang Township of Jinxi County	Carry out public consultation on the main contents and conclusions of the first draft of EIA, so as to expect to gain the understandings and supports on the project construction and mitigation measures taken of the public	Visits and questionnaires	Support the project construction. The environmental protection of water sources must be strengthened	The project will strictly implement the various environmental protection measures in the project environmental management plans. In the ESMP, it has explicitly required that all the relevant subprojects shall divide the water source location into the first-level protection area and the second-level protection area according to regulations, and strictly implement the relevant protection requirements
	September, 2017	Health and Epidemic Prevention Department of Jinxi County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Health and Epidemic Prevention Department of Jinxi County	Consult that whether the project location is in the schistosomiasis area	Interviews	It does not belong to the schistosomiasis area	/

Nanfeng County	September, 2017	The People's Government of Laixi Township, and the People's Government of Shishan Township,	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	The People's Government of Laixi township, and the relevant personnel of the People's Government of Shishan Township	Carry out public consultation on the main contents and conclusions of the first draft of EIA, so as to expect to gain the understandings and supports on the project construction and mitigation measures taken of the public	Questionnaires	Support the project construction, and endorse the proposed environmental protection measures, as well as emphasize the vegetation protection during the construction	The project will strictly implement the various environmental protection measures in the project environmental management plans. After the construction of temporary land, we must promptly replant the street trees, and select appropriate local species to compensate for planting and restore greening
	September, 2017	Nanfeng Branch of China Unicom	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Nanfeng Branch of China Unicom	Carry out public consultation on the main contents and conclusions of the first draft of EIA, so as to expect to gain the understandings and supports on the project construction and mitigation measures taken of the public	Interviews	(1) Support the project construction, and endorse the proposed environmental protection measures. (2) Set up the warning signs in front of or behind the construction area. (3) Pay attention to the vegetation restoration and the restoration of surrounding environment after the construction. (4) Make a notice of the construction in advance	(1) The project will strictly implement the various environmental protection measures in the project environmental management plans. (2) Set up the warning signs in front of or behind the construction area during the construction. (3) Promptly carry out vegetation restoration on the construction affected areas after the completion of the construction activities. (4) The construction plans can be carried out after obtaining the consent from the company
	September, 2017	Health and Epidemic Prevention Department of Nanfeng County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Health and Epidemic Prevention Department of Nanfeng County	Consult that whether the project location is in the schistosomiasis area	Interviews	It does not belong to the schistosomiasis area	/

Leping City	September, 2017	Urban area of Leping City, and Jiedu Township	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in urban area of Leping City, and Jiedu Township	Carry out public consultation on the main contents and conclusions of the first draft of EIA, so as to expect to gain the understandings and supports on the project construction and mitigation measures taken of the public	Visits and questionnaires	Support the project construction, and endorse the proposed environmental protection measures	The project will strictly implement the various environmental protection measures in the project environmental management plans
	September, 2017	Qimingxing Experimental Kindergarten in Leping City	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Management department of Qimingxing Experimental Kindergarten in Leping City		Visits	(1) Support the project construction, and endorse the proposed environmental protection measures. (2) Noise shall be controlled during the construction period to avoid affecting the students in class. (3) Do a good job in watering and dust reduction, as well as enclosure during the construction. (4) Do a good job in restoration of the surrounding environment after the completion of the construction	(1) The project will strictly implement the various environmental protection measures in the project environmental management plans. (2) The following protection measures have been put forward for kindergartens, schools and other sensitive points: Prohibit the construction during the class time, and set up fences at the construction site, as well as a temporary sound barrier. (3) Carry out watering and dust reduction in a timely manner to mitigate the impacts of construction dust. (4) Promptly carry out restoration on the affected areas after the construction.
	September, 2017	Gaojia township of Leping City and Shiligang Township	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Guanzhuang Village Committee of Gaojia Township, and Jiaoyuan Branch Village Committee of Shiligang Township		Visits and questionnaires	(1) Support the project construction, and endorse the proposed environmental protection measures. (2) It is suggested that the owner unit and the construction unit shall well prepare the relevant emergency plans	The project will strictly implement the various environmental protection measures in the project environmental management plans

	September, 2017	Troop Security Department 96712 of Peoples Liberation Army	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Troop Security Department 96712 of Peoples Liberation Army		Visits	<p>(1) Support the project construction, and endorse the proposed environmental protection measures of the project.</p> <p>(2) The construction plans shall be carried out after obtaining the consent.</p> <p>(3) We shall strictly comply with the national standards for the construction. Do a good job in safety management plans to ensure that there is no adverse effect on the optical fiber cable.</p> <p>(4) Promptly carry out the restoration after the construction</p>	<p>(1) The project will strictly implement the various environmental protection measures in the project environmental management plans.</p> <p>(2) The detailed construction plans shall be developed prior to the construction activities, and they can be carried out after obtaining the consent from the management department.</p> <p>(3) We shall strictly abide by the relevant regulations and standards during the construction process. The corresponding protection measures shall be taken during the construction (such as increase the distribution of piles and beams or local undercut protections and so on), so as to protect the above pipelines and to ensure the normal operations during the construction period and the safety after the completion of the construction.</p> <p>(4) Promptly carry out restoration after the construction</p>
	September, 2017	Health and Epidemic Prevention Department of Leping City	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Health and Epidemic Prevention Department of Leping City	Consult that whether the project location is in the schistosomiasis area	Interviews	It does not belong to the schistosomiasis area	/

Xiushui County	September, 2017	Yugang Township, Gangkou Township and Shankou Township	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in Yugang Township, Gangkou Township and Shankou Township	Carry out public consultation on the main contents and conclusions of the first draft of EIA, so as to expect to gain the understandings and supports on the project construction and mitigation measures taken of the public	Questionnaires	(1) Support the project construction, and endorse the proposed environmental protection measures of the project. (2) It is suggested to speed up the construction and complete it as early as possible	(1) The project will strictly implement the various environmental protection measures in the project environmental management plans. (2) Strive for the early start of the construction. Carry out the construction strictly in accordance with the design requirements and construction organizations, and do a good job in pollution prevention and control measures. Strive for the one-time construction instead of the repetitive construction. Complete the construction as early as possible and put it into use at an early date
	September, 2017	Urban area of Zhajin Township	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in urban area of Zhajin Township		Visits	Support the project construction, and endorse the proposed environmental protection measures of the project	The project will strictly implement the various environmental protection measures in the project environmental management plans
	September, 2017	Putian Village of Zhajin Township and ancestral hall in Putian Village	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Village head and villagers of Putian Village in Zhajin Township, Xiushui County		Visits	(1) Support the project construction, and endorse the proposed environmental protection measures of the project. (2) Avoid the construction impacts on the normal worship activities in the ancestral hall in Putian Village	(1) The project will strictly implement the various environmental protection measures in the project environmental management plans. (2) During the construction, we shall set up fences at the construction site, and carry out watering to decrease the construction dust in a regularly manner. In order to avoid the impacts on the normal worship activities in the ancestral hall in Putian Village, we shall seek for opinions of the villagers in advance, and the construction shall be continued only after obtaining the consent

	September, 2017	Health and Epidemic Prevention Department of Xiushui County	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Health and Epidemic Prevention Department of Xiushui County	Consult that whether the project location is in the schistosomiasis area	Interviews	It does not belong to the schistosomiasis area	/
Linchuan District	September, 2017	Urban area of Linchuan District, Shangdudu Township and the surrounding villages	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in urban area of Linchuan District, Shangdudu Township and the surrounding villages	Carry out public consultation on the main contents and conclusions of the first draft of EIA, so as to expect to gain the understandings and supports on the project construction and mitigation	Visits and questionnaires	Support the project construction, and endorse the proposed environmental protection measures of the project.	The project will strictly implement the various environmental protection measures in the project environmental management plans.

	September, 2017	Government-related management department in Linchuan District	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	State Environmental Protection Administration of China, Highway Sub-bureau, Bureau of Municipal and Rural Construction, Sub-bureau of Land and Resources, Planning Sub-bureau and Water-control Bureau of Linchuan District	measures taken of the public	Interviews	(1) Support the project construction, and endorse the proposed environmental protection measures of the project. (2) Provide local people with job opportunities	(1) The project will strictly implement the various environmental protection measures in the project environmental management plans. (2) Arrange the job opportunities for local people as much as possible under the conditions of meeting the requirements
	September, 2017	Health and Epidemic Prevention Department of Linchuan District	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Health and Epidemic Prevention Department of Linchuan District	Consult that whether the project location is in the schistosomiasis area	Interviews	It does not belong to the schistosomiasis area	/

Dongxiang District	September, 2017	Xiaogang Township and Dongxiang District	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Residents in Xiaogang Township and Linchuan District	Carry out public consultation on the main contents and conclusions of the first draft of EIA, so as to expect to gain the understandings and supports on the project construction and mitigation measures taken of the public	Questionnaires	(1) Support the project construction, and endorse the proposed environmental protection measures of the project. (2) Occupy the arable land as little as possible.	(1) The project will strictly implement the various environmental protection measures in the project environmental management plans. (2) The design plan of this project has obtained the optimal one after the comprehensive comparison and selection from the amount of arable land occupation and other aspects.
	September, 2017	Fuzhou Station of Chinese Petroleum Project of Natural Gas Transmission from West to East China	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Fuzhou Station of Chinese Petroleum Project of Natural Gas Transmission from West to East China		Interviews	(1) Support the project construction, and endorse the proposed environmental protection measures of the project. (2) Make a notice of the construction in advance	(1) The project will strictly implement the various environmental protection measures in the project environmental management plans. (2) Before the project construction, the design unit shall put forward the construction plans and protection measures for the pipeline sections involved in the project of natural gas transmission from West to East China, and carry out the construction activities after obtaining the permission of Fuzhou Station of the project of natural gas transmission from West to East China
	September, 2017	DongXiang Railway Station of the Shanghai-Kunming Railway	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	DongXiang Railway Station of the Shanghai-Kunming Railway		Interviews	(1) Support the project construction, and endorse the proposed environmental protection measures of the project. (2) Make a notice of the construction in advance	(1) The project will strictly implement the various environmental protection measures in the project environmental management plans. (2) Inform the relevant management departments before the construction which can be carried out after obtaining the consent

	September, 2017	Health and Epidemic Prevention Department of Dongxiang District	Jiangxi Province Water Resources Investment Group, Nuclear Industry Geological Bureau of Jiangxi Province	Health and Epidemic Prevention Department of Dongxiang District	Consult that whether the project location is in the schistosomiasis area	Interviews	It does not belong to the schistosomiasis area	/
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## 10.6 Statistics of Public Participation and Questionnaire

### (1) General information of the public

In order to fully reflect the opinions of the residents in the areas which involved in this project, and make the respondents more representative and truly reflect the opinions of the public, we have carried out the on-site survey of the public opinions. The public representatives accepted the survey include the local farmers, workers and staff of the surrounding companies. A total of 150 questionnaires were issued for individuals and 40 questionnaires were issued for units, and 188 valid forms were taken back. The composition of the investigators is shown in Table 10.6-1.



**The On-site Filling of the Public Participation in Questionnaire**

Table 10.6-1 General Statistics of Public Participation Personnel

Project	Category	Number of People	Proportion (%)
Age	Under 30	17	11
	31-40	32	22
	41-50	40	27

Project	Category	Number of People	Proportion (%)
	51-60	34	23
	Over 60	24	16
Occupation	Farmers	96	65
	Office workers	38	26
	Unknown	15	10
Degree of Education	Primary School	40	27
	Middle School	53	36
	High School / Specialized Secondary School	15	10
	Specialty and above Undergraduate	22	15
Respondents of Unit Groups	Xiushui Branch of Highway Administration Bureau in Jiujiang City, Jiangxi Dongjin Power Generation Co., Ltd., Water-control and Electric Power Bureau of Xiushui County, Linchuan Branch of Highway Bureau in Fuzhou City, Bureau of Municipal and Rural Construction in Linchuan District of Fuzhou City, Linchuan Branch of Bureau of Land and Resources in Fuzhou City, Linchuan Branch of Urban Planning Bureau, Water-control Bureau of Nanfeng County and Bureau of Municipal and Rural Construction of Nanfeng County, The People's Government of Hongyan Township in Leping City, Jiaoyuan Branch Village Committee of Shiligang Township in Leping City, State Environmental Protection Administration of China of Leping City, Leping Water Affairs Bureau, Leping Planning Bureau, Leping Branch of Highway Administration Bureau in Jingdezhen City, Bureau of Municipal and Rural Construction of Leping City, Bureau of Municipal and Rural Construction of Leping City, Bureau of Land and Resources of Leping City, Bureau of Land and Resources of Jinxi County, Bureau of Municipal and Rural Construction of Jinxi County, State Environmental Protection Administration of China of Jinxi County, Water-control Bureau of Jinxi County, State Environmental Protection Administration of China of Yongxin County, Yongxin Branch of Highway Bureau in Jian City, Bureau of Land and Resources of Yongxin County, Forestry Bureau of Yongxin County, Water-control Bureau in Dongxiang District of Fuzhou City, Bureau of Municipal and Rural Construction in Dongxiang District of Fuzhou City, Bureau of Land and Resources in Dongxiang District of Fuzhou City, Planning Bureau in Dongxiang District of Fuzhou City, Dongxiang Branch of Highway Bureau in Fuzhou City, Environmental Protection Committee of Dongxiang County, State Environmental Protection Administration of China in Dongxiang District of Fuzhou City		

(2) Statistics of survey contents

In order to make the public be aware of the project, we firstly introduced the

project conditions and the impacts of the project on the environment to the respondents in this survey, and then we listened to the public opinions and issued the questionnaires. The general survey results of the public participation are shown in Table 10.5-2.

Table 10.6-2 Summary of Public Opinions (Individual)

SN	Main Survey Contents	Opinions	Number of People	Proportion (%)
1	Do you know that this project is being built in local areas?	Yes	93	62
		No	56	38
2	Whether your residence place is in the service scope of this project?	Yes	144	97
		No	5	3
3	Do you think the implementation of this project is beneficial to local water supply and wastewater treatment?	Positive effect	106	71
		Negative effect	6	4
		No effect	35	23
4	Are you satisfied with the current baseline of water supply and wastewater treatment in the residential areas	Satisfied	37	25
		Generally satisfied	74	50
		Unsatisfied	36	24
5	What do you think are the major environmental issues in this region at present (multiple choices)?	Atmosphere	60	40
		Water pollution	96	64
		Noise impact	56	38
		Ecological damage	57	38
6	What are the environmental issues that caught most of your attention during the construction of this project (multiple choices)?	Dust	72	48
		Surface water pollution	81	54
		Noise	68	46
		Ecological damage	56	38
		Other	7	5
7	What are the environmental issues that caught most of your attention during the operation of this project (multiple choices)?	Stench	68	46
		Surface water pollution	83	56
		Noise	47	32
		Sludge	66	44
		Other	7	5
8	Do you believe that this project can improve the life quality of local residents?	Yes	116	78
		No	1	1
		Unknown	31	21
9	What is the effect on the development of local economy after the implementation of the project?	Promotion	109	73
		No promotion	2	1
		Unknown	37	25
10	What is your overall attitude toward this project	Support	119	80
		Oppose	0	0

SN	Main Survey Contents	Opinions	Number of People	Proportion (%)
		Not matter	29	19

Table 10.6-3 Summary of Public Opinions (Group)

SN	Main Survey Contents	Opinions	Number of People	Proportion (%)
1	Do you know the project?	Yes	39	98
		No	1	3
2	Whether the project construction is conducive to the development of local areas?	Positive effect	39	98
		Negative effect	0	0
		No effect	1	3
3	What is the environment quality in this area at present?	Good	24	60
		Moderate	16	40
		Bad	0	0
4	What do you think are the main environmental issues in the project location at present (multiple choices)?	Atmospheric pollution	13	33
		Water pollution	26	65
		Noise pollution	10	25
		Ecological damage	16	40
5	What are the environmental issues that caught most of your attention during the construction of this project (multiple choices)?	Dust	8	20
		Surface water pollution	27	68
		Noise	11	28
		Ecological damage	22	55
		Other	2	5
6	What are the environmental issues that caught most of your attention during the operation of this project (multiple choices)?	Stench	11	28
		Surface water pollution	28	70
		Noise	5	13
		Sludge	20	50
		Other	4	10
7	What is the effect on the improvement of local life standards and the development of local economy after the implementation of the project?	Promotion	40	100
		No promotion	0	0
		Unknown	0	0
8	What is your overall attitude toward this project	Support	40	100
		Oppose	0	0
		Not matter	0	0

It can be seen that all the units support this project. All of them believe that this project is in line with the local planning and conducive to the development of regional economy, and they all agree with the construction of this project.

## 10.7 Information Disclosure

According to the Interim Measures for Public Participation in Environmental Impact Assessment, Measures for the Disclosure of Environmental Information (for Trial Implementation), World Bank OP/BP 4.01 Environmental Assessment and the BP17.50 Information Disclosure, this project has carried out the information disclosure of environmental assessment through Internet, posting bulletins and other methods. The first disclosure time is before the finalization of the EIA outline, and it is mainly to release the relevant information of this project. The second disclosure time is after the completion of the first draft of EIA report, and the full text of EIA report and EMP will be put in the convenient sites for public access. These sites include the provincial project offices, subproject offices of all counties and cities, and all relevant Residents (Village) Committees and so on. At the same time, post the proclamations on the bulletin board in local villages. There is no feedback opinion during the two rounds of disclosure.

The information disclosure situations of this project are shown in Table 10.6-1.

**Table 10.7-1 Time, Site and Method for Information Disclosure**

Round	Time	Form	Site	Titles and Main Contents of the Disclosure Documents
The First Round	November, 2016	Post proclamations	Bulletin boards of urban area of Yongxin County, Shiqiao Township, Caifeng Township, Lianzhou Township, Huaizhong Township, Gaoqiaolou Township and other Village Committees (Sub-district Offices). Bulletin boards of urban area of Jinxi County, Zuofang Township, Shuangtang Township, Heshi Township and other Village Committees (Sub-district Offices). Bulletin boards of urban area of Linchuan District, Wenquan Township, Liancheng Township, and Chonggang Township Village Committees (Sub-district Offices). Bulletin boards of urban area of Dongxiang District, Dengjia Township, Gangshangji Township, Huxu Township, Bogan Township, Xushangqiao Township, Xiaohuang Township and Xiaogang Township Village Committees (Sub-district Offices). Bulletin boards of urban area of Nanfeng County, Shishan Township, Qiawan Township, and Laixi Township Village Committees	1. Title of the disclosure documents: The First Disclosure of EIA of Urban-rural Water Supply Integration and Rural Wastewater Treatment Project in Jiangxi Province Loaned by the World Bank 2. Main contents of the disclosure: ① Overview of the construction project. ② Working procedures and main contents of the assessment. ③ Methods and deadlines for public access of environmental and social impact reports. ④ Start date and expiration date for public opinions. ⑤ Contact information, including mailing addresses of construction units and EIA agencies, postcode, contact telephone, fax number, contact person, e-mail and so on.

			(Sub-district Offices). Bulletin boards of urban area of Leping City, Jiedu Township, Legang Township and Hougang Township Village Committees (Sub-district Offices).	
The Second Round	September, 2017	Post proclamations	Bulletin boards of urban area of Yongxin County, Shiqiao Township, Caifeng Township, Lianzhou Township, Huaizhong Township, Gaoqiaolou Township and other Village Committees (Sub-district Offices). Bulletin boards of urban area of Jinxi County, Zuofang Township, Shuangtang Township, Heshi Township and other Village Committees (Sub-district Offices). Bulletin boards of urban area of Linchuan District, Wenquan Township, Liancheng Township, and Chonggang Township Village Committees (Sub-district Offices). Bulletin boards of urban area of Dongxiang District, Dengjia Township, Gangshangji Township, Huxu Township, Bogan Township, Xushangqiao Township, Xiaohuang Township and Xiaogang Township Village Committees (Sub-district Offices). Bulletin boards of urban area of Nanfeng County, Shishan Township, Qiawan Township, and Laixi Township Village Committees (Sub-district Offices). Bulletin boards of urban area of Leping City, Jiedu Township, Legang Township and Hougang Township Village Committees (Sub-district Offices). Fuzhou Station of Chinese Petroleum Project of Natural Gas Transmission from West to East China. Dongxiang Station of Liwen High Speed in Dongxiang District.	<p>1. Title of the disclosure documents: The Second Information Disclosure of EIA Public Participation of Urban-rural Water Supply Integration and Rural Wastewater Treatment Project in Jiangxi Province Loaned by the World Bank</p> <p>2. Main contents of the disclosure: ① Brief description of the construction project. ② Overview of the possible impacts of the construction project on the environment. ③ Main points of countermeasures and measures for the prevention or mitigation of the adverse environmental impacts. ④ Main conclusions of the EIA. ⑤ Methods and deadlines for public access. ⑥ Scope and matters of public opinions. ⑦The specific form for seeking for the public opinions. ⑧Contact information. ⑨ Disclosure of the full text of EIA report and EMP.</p>



Figure 10.7-1 On-site Disclosure of Project Information

## 10.8 Public Participation in Social Resettlement

### 10.8.1 Activities of public participation and social consultation

Since the preparation of the World Bank project in 2016, the program management offices of Jiangxi Provinces and the program management offices of each County (City / District) have coordinated with the relevant functional departments at all levels to organize and develop a series of investigations on

information disclosure and public opinions. Meanwhile, during the preparation stage of the project, the feasibility study preparation unit, the resettlement plan preparation unit, the social assessment report preparation unit and the environmental management plan preparation unit and other units have carried out the activities of the project information disclosure and notification, as well as the sufficient informed consultation and public participation for relevant information of the project.

**(1) Notification and disclosure of relevant information of the project**

1) From the pre-identification stage of the project in 2016, the program management offices of seven Counties (Cities / Districts) had worked with the project declaration township, Community Committee / Village Committee to carry out the information disclosure and propaganda of the project construction contents and the village selection standards, as well as a survey on the village selection willingness by holding the Villager / Resident Congress, Party Congress, and Head of Household Congress, and the project information disclosure of community / village group, project notice, issuance of brochure, hanging the brochure banner, and outdoor wall slogan and other ways

2) Starting from June, 2016, when the feasibility study preparation unit conducting the on-site survey, the program management office started to communicate with the residents about the project construction contents in the project area, inform the ordinary people about the project situation and listen to their attitudes and opinions on the project construction.

3) From December, 2016 to May, 2017, the resettlement plan preparation unit visited the units, townships, villages and etc. which involved in the land expropriation for resettlement and temporary land occupation, to understand the impacts of the project on the affected people, and carried out the social and economic sampling survey, and informed the residents about the project construction contents, land expropriation policies and restoration measures. The negotiation results had been written into the resettlement plan and the resettlement information manual.

4) From December, 2016 to May, 2017, the social assessment preparation unit carried out the on-site survey in the project areas of seven Counties (Cities / Districts),

and visited the communities involved in the project and villages or communities involved in the pipeline network extension. They got a detailed understanding of the production and living conditions of the affected households within the scope of the project service coverage by means of questionnaires, individual in-depth interviews and conducting interviews and seminars. And specifically consulted the main concerns on the project of the project area people, as well as their opinions and suggestions on the project implementation, and a true record and feedback had been made.

From 2016 to now, the program management office of Jiangxi Province and the program management offices of seven Counties (Cities / Districts) have respectively released the latest developments on this project on the website at different time points.

### **(2) On-site survey**

The social assessment group has carried out the on-site survey on the new and the existing water plants, water intake sources, site selection of pumping house, and the townships and villages involved in the designed pipeline network, as well as the wastewater treatment project in Xiushui County, so as to get a more realistic and objective understanding of the project site selection and pipeline network trend in each project area, the social and economic living conditions of urban and rural residents and the affected people in the project benefited areas, as well as their payment ability and willingness to pay, major concerns, aspirations and so on. At the same time, the social assessment group has also carried out survey on the willingness of resettlement compensation and publicized the compensation and resettlement policies, as well as the agreed preliminary plan for the resettlement.

### **(3) Focus group interview**

In order to more comprehensively understand the requirements and opinions of the affected people (including the project benefiting urban and rural residents, women, poverty and other disadvantaged groups) in the project area, the social assessment group adopted the method of focus group interview in the on-site survey, focusing on the relatively centralized issues of the project beneficiaries such as the willingness to pay and payment ability, water use situation and dilemma, domestic wastewater

disposal and other issues. A total of 41 resident focus interviews have been carried out in different townships and villages of seven Counties (Cities / Districts) with participants of 574, including 164 women, accounting for 28.6%, 82 of disadvantaged groups, accounting for 14.3%, 123 of elderly people, accounting for 21.4%, and 205 of village committee and villager representatives, accounting for 35.7%.

#### **(4) Interviews with key information providers**

The social assessment group has respectively interviewed with key information providers from County (City / District), Township and Village / Community levels so as to better understand the attitudes of the stakeholders toward the project, and to provide better suggestions for project design and implementation. At the County (City / District) level, the social assessment group mainly interviewed with heads from Bureau of Land and Resources, Water Affairs Bureau, Bureau of Municipal and Rural Construction, Women's Federation, Poverty Alleviation Office, National Bureau of Religious Affairs, Civil Affairs Bureau, Poverty Alleviation Office, Township Government, Water Supply Company, Wastewater Disposal Company and other agencies of seven counties (cities / districts). At the Community and Village level, the social assessment group mainly interviewed with the Community Committees / Village Committees, villager representatives and other people involved in the project of seven Counties (Cities / Districts). The social assessment group interviewed with 184 key information providers in succession, including 31 in Xiushui County, accounting for 16.8%, 23 in Nanfeng County, accounting for 12.5%, 30 in Yongxin County, accounting for 16.3%, 20 in Linchuan District, accounting for 10.9%, 26 in Jinxi County, accounting for 14.1%, 32 in Dongxiang District, accounting for 17.4%, and 22 in Leping City, accounting for 12.0%.

#### **(5) Questionnaire**

After holding the forums with relevant agencies in the project area, the social assessment group immediately conducted the social assessment questionnaires and personal interviews with village groups, schools, hospitals, and shops along the street which affected by the project. The social assessment group completed 340 Questionnaires for Participants of Project Beneficiaries in seven Counties (Cities /

Districts). And after inspection and screening, there were 323 valid questionnaires, and the effective rate was 95.0%. Among which, 38 were from Xiushui County, 43 were from Nanfeng County, 51 were from Yongxin County, 72 were from Jinxi County, 55 were from Dongxiang District, 53 were from Leping City and 11 were from Linchuan District.

**Table 10.8-1 Public Participation in the Project**

Participation Type	Date	Site	Participation Contents	Participants
Notification and Disclosure of Relevant Information of the Project	2016	Relevant affected villages	Information disclosure Survey on village selection willingness	Program management offices of each County and City, relevant Townships, Communities / Villages and villagers
	June, 2016	Relevant affected villages	Carried out the project information disclosure and listened to their attitudes and opinions on project during the on-site survey	Program management offices, owner units, relevant Districts, village heads, villagers and feasibility study preparation units
	2016	Relevant websites	The latest developments of the project	Program management offices of each County and City, ordinary people in the project area
On-site Survey	December 23, 2016 to January, 16 March, 2017 to May 29	Relevant affected villages	Conducted the social and economic sampling survey	Villages affected by the project, program management offices, owner units, resettlement plan preparation units
	December 23, 2016 to January, 16 March, 2017 to May 29	Relevant affected villages	Try to understand the opinions and suggestions on the project implementation of residents within the project area by means of the on-site surveys, questionnaires, interviews and etc.	Villages affected by the project, program management offices, owner units, social assessment preparation units
	December 23, 2016 to January, 16 March, 2017 to May 29	Proposed project site	Conducted the on-site survey on the proposed project site, visited and exchanged with the community residents, communicated and negotiated on the preparations for the project and put forward the suggestions on the project optimization	Social assessment units
Questionnaire	December 23, 2016 to January, 16 March, 2017 to May 29	Relevant communities / villages and resident homes in the project area	A total of 340 questionnaires were issued, and 323 valid questionnaires were returned. The effective recovery rate was 95%, and among which, men accounted for 54.8%, and women accounted for 45.2%.	Villagers from the project implementation village, social assessment units

Participation Type	Date	Site	Participation Contents	Participants
Focus Group Interview	December 23, 2016 to January, 16 March, 2017 to May 29	Relevant communities / villages in the project area	Conducted 41 residential focus group interviews with 574 participants, including 164 women, 82 disadvantaged groups, 123 elderly people and 205 village committee members and villager representatives.	Affected residents in the project area, social assessment units
Interview with Key Information Provider	December 23, 2016 to January, 16 March, 2017 to May 29	Relevant agencies, communities / villages	Carried out 184 times of interviews for key information providers with heads of relevant agencies from seven counties and cities	Heads of relevant government departments, social assessment preparation units

## 10.8.2 Major findings of public participation

### 10.8.2.1 Urban and rural water supply integration project

(1) The level of awareness of the cadres and the masses on the project in the project area

After the previous participation and the household survey and propaganda of the program management offices, owners of various project areas, feasibility study preparation units, social assessment units, EIA units and etc., there are 84.5% of the respondents in the project areas have “heard” this project, indicating that the awareness on this project of the residents within the project areas has increased. The major way for the respondents hearing this project is by the notification of the Community Committee / Village Committee, accounting for 48.8%, and then by being informed by others, accounting for 18.6%.

During the on-site survey and interviews, the social assessment group found that the relevant government functional departments or the grassroots government departments have increased their awareness on the project construction contents. But in terms of villagers, village heads and the village directors within the project areas, there is even a certain degree of need for them to strengthen their awareness. This requires a further increase in project propaganda and active public participation.

(2) Daily water use is mainly based on the well water and tap water. The satisfaction rate of tap water is quite low

For the water sources of daily water use in the urban and rural area within the project area, 66.6% of the respondents use well water (well-killing, open well and so on), 23.5% of the respondents use the tap water, 5.3% of the respondents use the river water, and 1.90% of the respondents use the bottled water, and 2.8% of others.

Among the population of using tap water, only 27.9% are satisfied with the baseline of tap water (with 6.4% are very satisfied and 21.5% are relatively satisfied), while 31.5% are dissatisfied and quite dissatisfied with baseline of tap water use. And 33.5% are relatively satisfied with 7.1% unknown. During the reasons for dissatisfaction, poor water quality accounting for 51.9%, unstable water amount accounting for 5.8%, unknown reasons accounting for 5.8%, and other reasons accounting for 4.3%.

(3) Residents in the project areas have shown great supports for the project, and the self-provided water source will gradually replace the tap water

From the perspective of urban and rural water supply integration project, 86.7% of the respondents have shown supports for the implementation of this project. In particular, in respect to the villages / communities with no access to tap water, and some villages (only a few individual groups in the village have access to tap water) that the tap water pipeline is not fully connected, the villagers there still mainly use wells, mountain springs, lakes or rivers for daily life. During the on-site survey and interviews, the villagers in some villages all said that, because the domestic wastewater in the village was directly discharged into rivers / ponds / lakes without treatment, or flow into the soil to penetrate into the shallow groundwater body, the shallow groundwater body used in daily life is polluted, the well water and river water cannot be used, and the drinking water safety is threatened. They hope that the urban and rural water supply integration project can be implemented as soon as possible and tap water can be used as early as possible.

If use tap water, 78.9% of the respondents said that they would gradually stop using well water or other water sources within five years after the project was put into operation. And 30.9% of the respondents made it clear that they would be as early as possible to stop using well water or other water sources within one to two years after

the water supply of tap water. The respondents who will stop using the well water or other water sources after five years and above of the water supply of tap water reaching a maximum of 91.9%. At the same time, some respondents said that due to the payment for tap water, and considering the daily expenditure saving, the self-provided water source would be retained as a supplement and temporary alternative to daily water supply (when there is insufficient tap water supply).

If the communities / villages have been connected with tap water after the implementation of the project, the main uses of tap water for residents are as follows: ①drinking water and cooking accounting for 54.1%, ②daily washing accounting for 19.4%, ③sanitary purposes accounting for 15.3%, ④livestock and poultry water use accounting for 6.8%, ⑤other purposes accounting for 4.4%.

#### (4) Requirements for the participation of project construction

The residents' participation in the pre-construction and post-operation maintenance of the project in the project areas is one of the main forms of public participation in the project implementation. It is not only a good time to enhance the villagers' awareness of self-discipline, environmental awareness and responsibility consciousness, but also a good opportunity to increase the villagers' personal income and improve the family's economic situation.

According to the statistical results of the 323 questionnaires, if the project in each County (City / District) can provide some employment opportunities and jobs during the project construction and maintenance process, such as working on the project construction site, transporting raw materials, providing pipeline maintenance and repair during the operation period, cleaning the plant and so on, 73.2% of the respondents clearly expressed their willingness to participate in related work, and those who are reluctant to participate accounted for only 13.2%. From the interview results, in terms of the reasons that the respondents are reluctant to participate in the related work, because some respondents already have a stable work with substantial income, and the other part believe that they are too old to do the corresponding work. Another 13.2% of the respondents were not aware of their attitudes, saying that it was necessary to look at the specific circumstances to make decisions.

#### 10.7.2.2 Rural wastewater treatment project

According to the full communications and consultations between the program management office in Jiangxi Province and the program office in each County (City / District) and the project owners, the wastewater treatment project in urban-rural water supply integration and rural wastewater treatment project in Jiangxi Province loaned by the World Bank has been confirmed. There is only one rural wastewater treatment project in Zhanjin Township of Xiushui County is involved in.

(1) The residents in the project areas are more enthusiastic in participating in the project construction, and they have a clear sense of responsibility

According to the survey results, 92.1% of respondents said that after the completion of wastewater treatment project, the surrounding villagers shall be responsible for taking part in the daily operation and maintenance of the wastewater system. If a certain reward is provided, 86.8% of the respondents are willing to participate in the operation and maintenance of the wastewater treatment system. When they are asked about the “operation and maintenance mode of the wastewater treatment system after the completion of the construction”, 65.8% of the respondents believe that the village shall be responsible for the maintenance, while 34.2% of respondents think that the government shall hire a professional company to maintain it. The respondents who choose the former mainly think that people in this village know more about the conditions of their own village, and they are more interested in the village affairs. In addition, if there is a failure in pipeline network, they can quickly come back for repairs as the distance is relatively close. However, another part who choose the latter are mainly concerned with their ignorance of the professional knowledge and skills of operation and maintenance of the project. And they are afraid that they will not do a good job in this field due to the shortage of professional knowledge and skills, as well as the lack of professional expertise. Therefore, they think that a professional company shall be hired for the management of operations.

(2) After the implementation of the project, the residents in the project area have a high willingness to change their living habits and their potential environmental protection awareness has been enhanced

When the residents in the project areas were consulted about whether they would like to change their living habits after the implementation of this project, the proportion of those who chose to be very willing to change their own habits was as high as 89.5%, and the proportion of willing to change was 7.9%. And the total proportion of very willing and willing reached 97.4%. The proportion of those who chose not to be willing to change was just 2.6%.

If the residents in the project area are willing to change their living habits, they may give priority to changes in the following four aspects: ①pay attention to taking a bath accounting for 28.9%, ②use water closets changing from dry closets accounting for 63.2%, ③minimize the use of chemical cleaning agents in daily life accounting for 2.6%, ④do not throw debris and waste into the channels and pipelines accounting for 5.3%.

## 11.Environmental and Social Management Plan

The environmental and social management plan (ESMP) in this chapter aims to predict the potential impacts of the proposed project on the social and natural environment based on Environmental Impact Assessment (EIA), and proposes measures taken to avoid, mitigate or retard adverse environmental impacts so as to reduce the potential negative environmental impacts to an acceptably low level. The main contents include: the organization needed to implement ESMP, major environmental problems during project implementation and operation, environmental impacts and mitigation measures at each stage of the project, monitoring plan and reporting system, training plan, budget and public appeal mechanism, etc.

Focusing on the characteristics of the project, two attachments have been compiled for the *Plan*, including:

(1) Implementation procedure of environmental protection: focusing on the common environmental impact of plumbing pipe network construction and other civil works (water and wastewater treatment plants) of the project during construction and operational periods, general solutions and alleviation measures are established which will be considered as environmental management requirements and included into tender documents and relevant civil contracts for the future implementation of the project;

(2) Management plan of physical cultural resources: according to requirements of physical cultural resources policy (OP4.11) of the World Bank, specific actions and protective measures are established for local physical cultural resources (include 6 ancient trees and 1 ancestral temple) which may be affected directly/indirectly during construction and operation of the project. They will also be adopted by relevant sub-category projects in the future.

### 11.1 The Environmental Management Organization and Its Duties

#### 11.1.1 Environmental Management System

As the Owning Company of China Jiangxi Integrated Rural and Urban Water Supply and Wastewater Management Project financed by the World Bank, the Water Department of Jiangxi Province has established a leading group (provincial project leading group or PLG for short) for the

World Bank-financed Integrated Rural and Urban Water Supply and Wastewater Management Project. The PLG mainly takes charge of organizing, leading and coordinating the construction of urban and rural water supply and wastewater management project, researching and deploying project financing and implementation as well as deciding, planning, guiding and coordinating relevant issues during project preparation and implementation. The office under the PLG, mainly takes charge of the day-to-day coordination and implementation of the project, organizing and holding regular meetings regularly as well as supervising and urging project preparation and implementation.

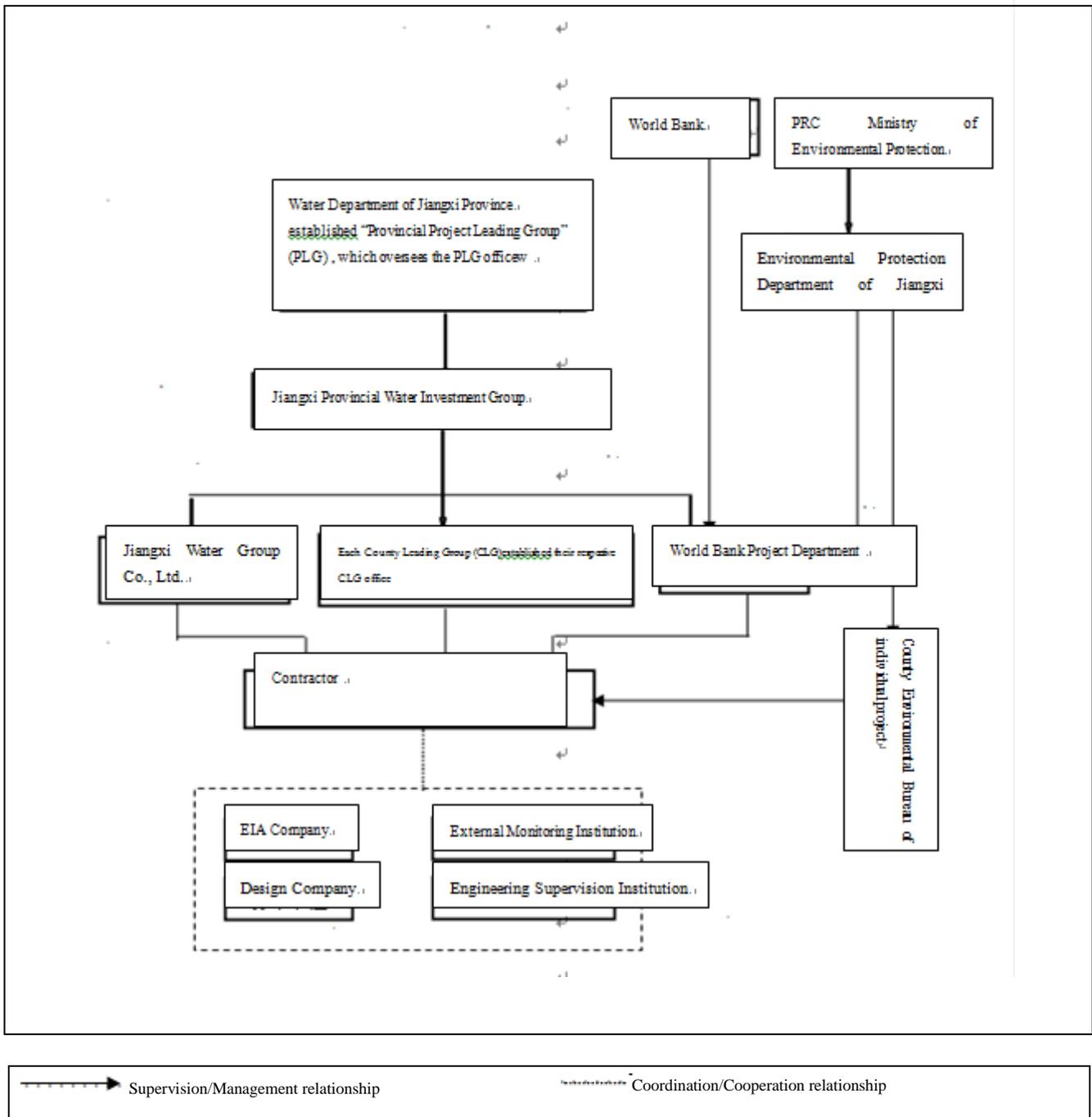
During the project construction stage, Water Department of Jiangxi Province entrusted Jiangxi Provincial Water Investment Group to establish “PMO of World Bank-Financed Jiangxi Integrated Rural and Urban Water Supply and Wastewater Management Project” (provincial project department or PPO for short). As the legal institution of project construction, it mainly takes charge of project differentiation, preparation, pre-assessment, assessment, negotiation and implementation. The project department is under the supervision of the PLG and its office.

Each project county (city) establishes its own county (city) leading group and office to lead and coordinate the World Bank projects in areas under its jurisdiction. They are required to coordinate the construction of local integrated urban and rural water supply and wastewater management projects, and to solve relevant issues such as land requisition, relocation, immigration and environmental protection during project implementation which need to be dealt with at the governmental level.

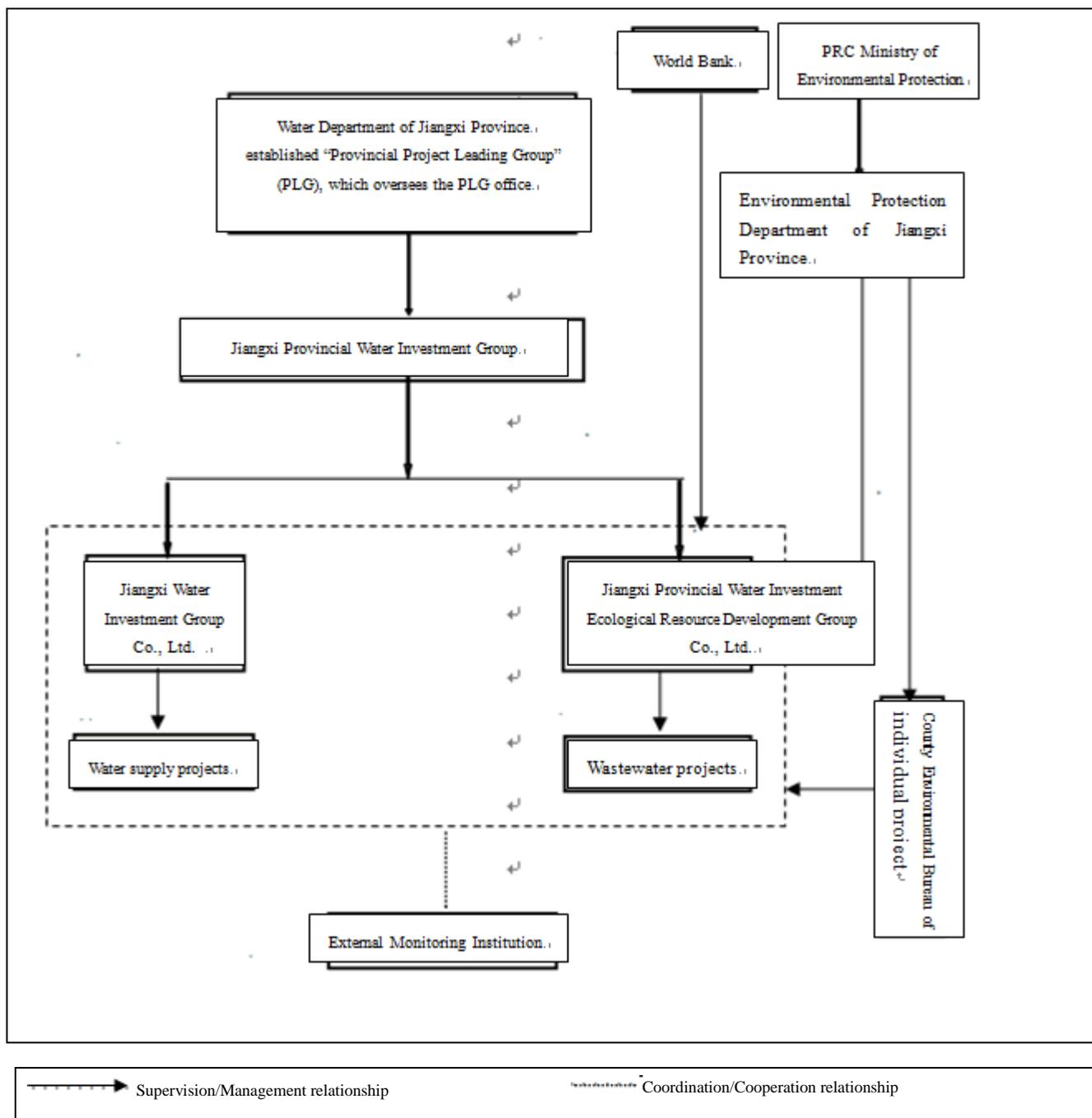
During the project operational stage, Water Investment & Water Affairs Group undertakes operational management responsibilities of water supply sub-item under the project and the Water Investment Ecological Environment Company undertakes sewage sub-item.

As the environmental management of construction and operational periods vary greatly and have different time limits (temporal or long-term), the contractor and operation provider shall establish institutions based on the different stages and practice the model of staged responsibilities. After completing construction, the corresponding management institution should be annulled immediately and the management institution of operational period shall commence operation. A certain overlapping period is allowed based on the specific situation. Refer to Figure 11-1 and 11-2

for environmental management institutions of construction and operational periods.



**Figure 11-1 Environmental Protection Management System during construction**



**Figure11-2 Environmental Protection Management System during operation**

**11.1.2 Capabilities and Responsibilities of Environmental Management Institutions**

As environmental management varies greatly during construction and operation, different departments are responsible for the implementation of the environmental and social management plan. To ensure the seamless implementation of the project environmental and social management plan, several full- and part-time environmental management personnel have been assigned to the project owner, provincial PMO, contractor, construction supervision institution and operation

provider. Refer to Table 11.1-1 for environmental management responsibilities and personnel allocation of each project management institution at different stages of project implementation.

**Table 11.1-1 Environmental Management Responsibilities of Relevant Institutions**

<b>Phase</b>	<b>Related project party</b>	<b>Main environmental management responsibilities</b>	<b>Personnel allocation</b>
Design and preparation	Water Department of Jiangxi Province (oversees PLG)	Owning company organizes and coordinates the construction of the World Bank-financed project	1
	Jiangxi Provincial Water Investment Group	Undertakes responsibilities such as project selection and arrangement of supporting funds.	1
	Provincial project department	<ol style="list-style-type: none"> <li>1. Takes charge of environmental protection management during project design and preparation stages.</li> <li>2. Takes charge of coordinating and implementing environmental management issues with relevant environmental departments of the government.</li> <li>3. Invites consultation institutions such as design and environmental impact assessment companies.</li> </ol>	1
	Design company	<ol style="list-style-type: none"> <li>1. Includes environmental protection measures into design plan and budget.</li> <li>2. Includes alleviation measures in environmental and social management plan into technical specification of tender documents.</li> </ol>	3
	Environmental impact assessment company	<ol style="list-style-type: none"> <li>1. Provides technical support for environmental protection of engineering design.</li> <li>2. Compiles project environmental impact assessment documents.</li> <li>3. Establishes environmental and social management plan.</li> </ol>	5
Construction phase	Provincial project department	<ol style="list-style-type: none"> <li>1. Takes charge of environmental protection management. Implement environmental protection funds during project construction phase.</li> <li>2. Manages and supervises environmental protection during construction phase. Investigates and resolves disturbances caused towards residents and pollution issues during construction.</li> <li>3. Takes charge of coordinating and implementing environmental management issues with relevant environmental protection departments of the government.</li> <li>4. Tracks implementation of environmental and social management plan and send regular reports to relevant departments and the World Bank.</li> <li>5. Handles public complaints.</li> </ol>	1

Phase	Related project party	Main environmental management responsibilities	Personnel allocation
	Integrated urban and rural water supply project department of Yongxin County	<ol style="list-style-type: none"> <li>1. Manages and supervises environmental protection of sub-project projects of Yongxin County. Investigates and resolves disturbances caused towards residents and pollution issues during construction.</li> <li>2. Takes charge of coordinating and implementing environmental management issues with local relevant environmental protection departments.</li> <li>3. Tracks implementation of environmental and social management plan of Yongxin County and reports to provincial project department regularly.</li> <li>4. Handles public complaints.</li> </ol>	1
	Integrated urban and rural water supply project department of Linchuan County	<ol style="list-style-type: none"> <li>1. Manages and supervises environmental protection of sub-project project of Linchuan County. Investigates and resolves disturbances caused towards residents and pollution issues during construction.</li> <li>2. Takes charge of coordinating and implementing environmental management issues with local relevant environmental protection departments.</li> <li>3. Tracks implementation of environmental and social management plan of Linchuan County and reports to provincial project department regularly.</li> <li>4. Handles public complaints.</li> </ol>	1
	Integrated urban and rural water supply project department of Jinxi County	<ol style="list-style-type: none"> <li>1. Manages and supervises environmental protection of sub-project of Jinxi County. Investigates and resolves disturbances caused towards residents and pollution issues during construction.</li> <li>2. Takes charge of coordinating and implementing environmental management issues with local relevant environmental protection departments.</li> <li>3. Tracks implementation of environmental and social management plan of Jinxi County and reports to provincial project department regularly.</li> <li>4. Handles public complaints.</li> </ol>	1
	Integrated urban and rural water supply project department of Leping County	<ol style="list-style-type: none"> <li>1. Manages and supervises environmental protection of sub-project of Leping County. Investigates and resolves disturbances caused towards residents and pollution issues during construction,</li> <li>2. Takes charge of coordinating and implementing environmental management issues with local relevant environmental protection departments.</li> <li>3. Tracks implementation of environmental and social management plan of Leping County and report to provincial project department regularly.</li> <li>4. Handles public complaints.</li> </ol>	1

Phase	Related project party	Main environmental management responsibilities	Personnel allocation
	Integrated urban and rural water supply project department of Nanfeng County	<ol style="list-style-type: none"> <li>1. Manages and supervises environmental protection of sub-project of Nanfeng County. Investigates and resolves disturbances caused towards residents and pollution issues during construction,</li> <li>2. Takes charge of coordinating and implementing environmental management issues with local relevant environmental protection departments.</li> <li>3. Tracks implementation of environmental and social management plan of Nanfeng County and reports to provincial project department regularly.</li> <li>4. Handles public complaints.</li> </ol>	1
	Integrated urban and rural water supply project department of Dongxiang County	<ol style="list-style-type: none"> <li>1. Manages and supervises environmental protection of sub-project of Dongxiang County. Investigates and resolves disturbances caused towards residents and pollution issues during construction.</li> <li>2. Takes charge of coordinating and implementing environmental management issues with local relevant environmental protection departments.</li> <li>3. Tracks implementation of environmental and social management plan of Dongxiang County and reports to provincial project department regularly.</li> <li>4. Handles public complaints.</li> </ol>	1
	Integrated urban and rural water supply project department of Xiushui County	<ol style="list-style-type: none"> <li>1. Manages and supervises environmental protection of sub-project of Xiushui County. Investigates and resolves disturbances caused towards residents and pollution issues during construction.</li> <li>2. Takes charge of coordinating and implementing environmental management issues with local relevant environmental protection departments.</li> <li>3. Tracks implementation of environmental and social management plan of Xiushui County and reports to provincial project department regularly.</li> <li>4. Handles public complaints.</li> </ol>	1
	Contractor	<ol style="list-style-type: none"> <li>1. Launches and implements environmental protection measures and various works during construction phase, as per tender documents, contract and the environmental and social management plan.</li> <li>2. Accepts guidance and supervision of environmental management personnel of the project department, construction supervision engineer and relevant functional departments of the government.</li> <li>3. Accepts technical support provided by environmental protection consultation institution.</li> <li>4. Takes safety preventive measures, for eg. Setting up information signs on construction site and enclosing construction site with a boundary. Establishes communication channels with the public to guarantee construction safety.</li> <li>5. Implements environmental and social management plan.</li> </ol>	Each engineering contractor to arrange at least 1 environmental management person

Phase	Related project party	Main environmental management responsibilities	Personnel allocation
	Construction supervision	<ol style="list-style-type: none"> <li>Supervises contractor to implement environmental and social management plan. Carries out environmental alleviation measures in the contract.</li> <li>Supervises contractor's implementation on site.</li> <li>Cooperates with owner in environmental management.</li> <li>Records implementation of environmental and social management plan. Compile reports and report to owner regularly.</li> </ol>	Each construction supervision to arrange at least 1 environmental management person
	External monitoring company	<ol style="list-style-type: none"> <li>Completes environmental monitoring of engineering construction phase based on project owner's delegation and environmental monitoring plan proposed in the assessment.</li> <li>Supervises implementation of environmental management measures and report to owner regularly.</li> </ol>	To be determined based on scope of entrusted task
	County Environmental Protection Bureau	<ol style="list-style-type: none"> <li>Supervises and inspect implementation of environmental protection measures on construction site.</li> <li>Arranges contingency measures in the event of abnormalities during construction.</li> <li>Coordinates and handles public complaints.</li> </ol>	1
	Technical aid/consultation advisor	<ol style="list-style-type: none"> <li>Provides technical support for engineering construction phase based on project owner's delegation and achievements of the environmental impact and environmental protection design.</li> <li>Provides contractor with technical guidance of environmental protection and provides environmental protection trainings during construction phase.</li> </ol>	Not limited
Operation al phase	Jiangxi Water Group Co., Ltd.	<ol style="list-style-type: none"> <li>Takes charge of post-operational environmental protection management of water supply projects. Implements alleviation measures and monitoring of environmental and social management plan during operational phase.</li> <li>Takes charge of contacting relevant governmental departments. Coordinates and implements environmental management issues.</li> <li>Contingency handling of environmental accidents.</li> <li>Provides staff with training regularly to improve their capabilities, while encouraging active exchange of technical knowledge and expertise for the further improvement of environmental management.</li> </ol>	1

Phase	Related project party	Main environmental management responsibilities	Personnel allocation
	Jiangxi Province Water Investment Ecological Resource Development Group Co., Ltd.	<ol style="list-style-type: none"> <li>1. Takes charge of post-operational environmental protection management of wastewater projects. Implements alleviation measures and monitoring of environmental and social management plan during operational phase.</li> <li>2. Takes charge of contacting relevant governmental departments. Coordinates and implements environmental management issues.</li> <li>3. Contingency handling of environmental accidents.</li> <li>4. Provides staff with training regularly to improve their capabilities, while encouraging active exchange of technical knowledge and expertise for the further improvement of environmental management.</li> </ol>	1
	External monitoring company	<ol style="list-style-type: none"> <li>1. Completes environmental monitoring of engineering operational phase based on project owner's delegation and environmental monitoring plan of operational phases proposed in the assessment.</li> <li>2. Supervises operation of environmental management situation and submits regular reports to owner.</li> </ol>	To be determined based on scope of entrusted task
	County Environmental Protection Bureau	<ol style="list-style-type: none"> <li>1. Manages and supervises environmental protection to meet standard requirements during operational phase.</li> <li>2. Conducts daily supervision and inspection of operation of completed environmental protection facility.</li> </ol>	1

### 11.1.3 Environmental Management Training

To ensure seamless and effective project implementation, it is necessary to provide environmental management and supervision personnel from the owning company, supervision company and contractor with training on environmental protection knowledge and skills as well as training on various environmental management measures in EIA and ESMP. This will ensure that they fully comprehend and are well-acquainted with engineering environmental protection and have acquired the competency for project environmental management and supervision. Hence providing personnel and technical assurance to the implementation of various environmental protection measures in ESMP.

Trainees include the personnel of the Owner, the Supervisor and the Contractor who engage in environmental management and supervision of the project.

Each construction contractor and supervision company will ensure that their employees will receive functional trainings relating to environment and laws and regulations as required in the

environmental and social management plan.

Training content involves environmental protection laws and regulations, environmental protection technology, ESMP environmental management measures, environmental monitoring technology, etc.

During the early stage of construction, the owning company shall organize environmental awareness training for staff from relevant departments. During construction, it shall organize personnel assigned to significant posts (including management personnel on construction site from owning company, engineering supervision company and contractor, as well as contractor project manager and on-site environmental protection leader) to take part in training on environmental management knowledge. It shall also organize relevant personnel who participate directly in water management and the contractor to take part in training on environmental management skills. During the operational phase, it shall organize management personnel from each water plant and wastewater treatment plant to receive special training on operational phase-environmental management. Refer to Appendix ESMP for specific training schedule.

## **11.2 Environmental Social Impact and Mitigation Measures**

The main components of the project includes improvement of urban water supply facilities, upgrading of rural drinking water safety and construction of new rural sewage treatment facilities. This chapter summarizes all the main environmental and social impacts involved in this project and the corresponding mitigation measures/action plans. It forms the environmental and social management plan for the integration of urban and rural water supply and sewage treatment projects in Jiangxi City. It also sets a clear budget of all measures and the institution for implementation and supervision. The major environmental impacts and mitigation measures during the design phase, construction phase and operational phase are shown in Table 4-1 to Table 4-8. The Environmental Implementation Regulations have been formulated as an annex to the environmental and social management plan in response to common measures and mitigation measures.

Environmental impacts and mitigation measures during the design stage are summarized in 11.2-1. Table 11.2-2 to 11.2-8 show the environmental impacts and mitigation measures during the construction phase and operational phase. Table 11.2-9 displays the social impacts and mitigation measures. There are 6 sub-projects in this main project which relies on existing reservoirs as water

sources. This involves 10 dams and hence, the project has completed the *Dam Safety Assessment Report*. Before the project is put into operation, all dam measures should have been rectified. The action plan and rectification plan of this project are summarized in Table 11.2-10.

Mitigation measures will be incorporated into detailed design, bidding documents, construction contracts and project management manuals. They are to be implemented by design units, contractors and implementing agencies under the supervision of PMO, the local environmental protection department and the environmental experts in this project team. The effectiveness of these measures will be assessed on the basis of environmental inspection and monitoring results to determine whether these measures are to be continued or improved/adjusted.

**Table 11.2-1 List of Environmental Impact and Mitigation Measures During Design Phase**

County	Sub-project name	Environmental focal point	Potential Impact	Mitigation/prevention measures	Implementing agency	Supervisory body
Yongxin County	Modification of tap water pipeline network in urban area	River He	The original design scheme adopts a large excavation plan to pass through River He, which has a large influence on it.	A directional transfer construction scheme with less environmental impact, about 350 meters long, shall be adopted.	Feasibility study unit	Provincial PMO
	Yongxin County water plant construction project	Hengxi Village 3rd batch	Pipeline construction temporarily occupies farmland, affecting farming	For the sakes of farmland, pipeline construction to be laid along the bank		
	Consolidation and improvement of Rural drinking water safety	Ancient trees	The ancient trees of Yongxin Shiqiao Town need to be transplanted in the original design scheme.	Avoidance measures are adopted in the design and the pipeline is increased by 85 m.		
Nanfeng County	Extension of town pipe network	Underground infrastructure(cables and gas pipelines)	The pipeline from Shishan town to Luoxi Village is routed through the Fu-Gan optical cable. The gas pipeline is laid on the side of the optical cable, while the present optical cable and the gas pipeline are in the road green belt. There may be problems with gas pipe network and optical cable breakage during construction.	This design is designed to reduce the influence of the water supply pipeline on the current pipeline. The pipe length is about 550 meters in the non-motorized driveway, which is 10 meters away from the green belt. Road damage and recovery works are increased.	Feasibility study unit	Provincial PMO
		Public housing	The original design scheme needs to pass through public housing and has a disturbing influence on it.	In order to avoid public housing, a bypass is planned and the pipeline is increased by 125m.		
		Laixi Primary School	The original scheme pipeline construction affects the students, with a larger construction area and higher noise level.	The optimized design pipeline route shall be reasonable for Laixi Primary School. Pipeline shall be laid across the school road, increasing by about 100m.		
Dongxiang District	Construction of urban water plant	Technical School in Dongxing District, Xiao Huang's Nursing Home	The original plan pipeline construction affects the surrounding residents, with a larger construction area and higher noise level.	The optimized design pipeline route shall be reasonable for the technical school and the nursing house. Pipeline shall be increased by 353m.	Feasibility study unit	Provincial PMO
	Extension of County city pipe network	Ancient trees	In the design scheme, it is necessary to transplant the ancient trees in the growth area of the ancient trees in Yong Shan Town.	To avoid the ancient trees, a bypass is planned and the line is increased by 160m.		
Leping City	Construction and modification of urban water plant	Leping 307, Provincial Highway	The original design scheme passes through the provincial road of 307. The impact range of water and soil erosion in the road construction is large, affecting the travel of the surrounding residents.	The optimum design scheme shall adopt pipe jacking construction. To reduce the influence of noise, the mechanical equipment with strong process performance and low noise levels shall be chosen.	Feasibility study unit	Provincial PMO
	Extension of town pipe network	Pancun Ancestral Hall	The original design scheme needs to go through Pancun Ancestral Hall	In order to avoid Pancun Ancestral Hall, water distribution pipe line is increased by 245m with a bypass.		
Xiushui County	Construction and modification of urban pipe network	Ma'ao No. 2 Primary School	The original scheme pipeline construction affects the students, with a larger construction area and higher noise level.	The optimized design pipeline route is reasonable for Ma'ao No 2 Primary School. Pipeline length is increased by about 63m.	Feasibility study unit	Provincial PMO
	Construction and modification of town pipe network	Donjin River.	The original design scheme has a potential impact on river flooding and environment.	The pipeline is laid along the current bridge across the river, crossing the Dongjin River to reduce the impact on the river.		
	Construction of new sewage pipe network and sewage treatment plant	Ancestral Hall	The original design scheme is close to the Ancestral Hall (about 30m). Construction noise and the odor generated by operation may affect the worship of the surrounding residents.	The optimization scheme is designed to set up acoustic barriers on one side of the Ancestral Hall to reduce the influence of construction noise. The sewage treatment process design adopts the integrated sewage treatment technology, which has less environmental impact.		

**Table 11.2-2 List of Environmental Impact and Mitigation Measures for Sub-projects in Yongxin County**

Project Name	Time interval	Activities	Environmental sensitive point	Potential Impact	Mitigation/prevention measures	Implementing agency	Supervisory body	Budget (10,000 yuan,)
Sub-project in Yongxin County	Construction phase	Civil construction, construction materials and earthwork transportation, construction access road, etc.	Jiangdongbian, Longyuankou, Ma Pi, Wangshe Village, E Village, Xiquan Mountain, Shangyao and other Villages along the line	Dust, wastewater and noise generated from construction machinery and transport vehicles, construction waste, etc.	According to Annex 1 of the Environmental Management Plan, the urban and rural water supply integration in Jiangxi Province and the environmental protection implementation regulations of the rural sewage treatment project shall be implemented.	Project Contractor, Construction Supervision	CPMO, County-level Environmental Protection Bureau	Included in project costs
		Extension of pipe network in Shiqiao Town	Ancient trees	The pipeline route of the project is about 15m away from the ancient trees, which is mainly influenced by construction dust.	Construction activities shall be carried out strictly in accordance with the requirements of Annex 2 of the Environmental Social Management Plan.	Project Contractor, Construction Supervision	Local forestry department	Included in project costs
		Extension of County-town Pipeline Network in Yongxin County	G319, S228	The distance pipes of G319 and S228 are 20m and 15m respectively, which is parallel to the pipeline but do not cross it. The main influence is the possible settlement of the road surface during and after construction.	The highway management department requires the design unit to propose the construction scheme for the pipeline section concerned with the highway facilities during project preparation. The design unit shall inform the highway department before the construction and construction can only be initiated with permission from the highway department. The project implementation process shall strictly adhere to the requirements of highway management, to ensure no damage to the highway facilities, no occupation of highway land, strict control of the width of operational belt and compliance with relevant national operation specifications. The affected area shall be restored immediately after construction.	Project Contractor, Construction Supervision	Local traffic management department	Included in project costs
		Digging and disposing soil	/	The area of disturbance disturbance and damage is 86.69 hm <sup>2</sup> . Corresponding maximum amount of water and soil erosion caused is 44532t and the new amount of water and soil erosion is 44302t.	(1) Control area of tap water plant Engineering measures: site leveling 2.78hm <sup>2</sup> , topsoil backfilling 9,700m <sup>3</sup> , arch-shaped framework slope protection of 1.78hm <sup>2</sup> , intercepting ditch of 442m, flood discharge channel is 467m, drain ditch is 680 m, rain pipe is 1760m, and rainwater well is 26. Plant measures: gardening 1.47hm <sup>2</sup> , parking lot afforested for 200m <sup>2</sup> . Temporary measures: topsoil stripping removed to 9,700m <sup>3</sup> , soil-filled straw bag retaining wall is 210m, tarpaulin covers 7000 m <sup>2</sup> , drain ditch is 220m, 2 sand basins, 1 car washing tank and removes concrete floor for 450m <sup>3</sup> . (2) Control area of pipeline works and ancillary facilities Engineering measures: 28.63hm <sup>2</sup> of site leveling, 85,900m <sup>2</sup> of topsoil backfilling and 8.90hm <sup>2</sup> of restoring cultivation. Plant measures: 13.00hm <sup>2</sup> of Green Belt Recovery, 1.65hm <sup>2</sup> of forestation and grass planting and 5.08hm <sup>2</sup> of sowing grass; Temporary measures: 85,900m <sup>3</sup> of topsoil stripping, 2,500m of soil-filled straw bag retaining wall, 5,000m <sup>2</sup> of tarpaulin covers and 100 m color steel plate.	Project Contractor, Construction Supervision	County-level CPMO, Local Water Conservancy Bureau	Included in water and soil conservation works
	Operational	Expansion of urban	Longyuankou Reservoir	The water source protection zone has not been divided and it is difficult to	1. Set up primary and secondary protection zones, where the range of the first-level protection zone is from the	local Water Conservancy	Local Environmental Protection Bureau; Water	Government

Project Name	Time interval	Activities	Environmental sensitive point	Potential Impact	Mitigation/prevention measures	Implementing agency	Supervisory body	Budget (10,000 yuan,)
	phase	water plant		guarantee the water quality of the reservoir for a prolong period	water intake point to the water area of 1 km to the downstream 100m from the water intake point and the land area extending 100m from the water intake point side to the back surface of the water intake point. The second-level protection zone is to start from land area of 100m from the side of the water area and the water intake point of 3000m the upper bound of the primary protection zone.	Bureau	Conservancy Bureau	budget
					Installing on-line water quality monitoring system.	Water plant operational unit,	local Water Conservancy Bureau	included in the operation cost of the water plant
				During low-water level years, the power generation capacity of the Longyuankou Reservoir will be reduced by 1130,000 kilowatt hour.	It is recommended to sign the agreement with Longyuankou Hydropower Station to generate electricity on the premise of meeting the urban water supply and irrigation water. The corresponding compensation for Longyukou Hydropower Station is carried out by 07 yuan/m <sup>3</sup> , and relevant compensation measures have been included in the social evaluation report.	Water plant operational unit	Local Environmental Protection BureauWater Conservancy Bureau	Included in the operating expenses of the water plant
		Tap water plant	/	Tap Water plant backwashes waste water, sludge discharge waste water etc.	The backwashed waste water in tap water plant is lifted to the water distribution well after being lifted by the reuse water tank. The sludge discharged from the sedimentation tank is returned to the dewatering machine room for reuse after being concentrated by the sludge concentration tank. The remaining part enters the dewatering machine room to be dehydrated. The filtrate generated by the sedimentation process reaches the municipal sewage standard and can be reused for irrigation and road irrigation in the plant area. The domestic sewage of the pressurized pumping station shall be discharged into the municipal pipe network after being treated by the septic tank.	Water Plant Operational and Maintenance Unit	Municipal Environmental Protection Bureau	Included in the operating expenses of the water plant
		Running water plant	Authoritative staff	Chlorine gas leakage may occur in the chlorine-intensive room	(1) to establish safe operation procedures, the staff must be specially trained to operate strictly according to the operation procedures, and the education management shall be strengthened to avoid the leakage of chlorine gas caused by operation mistakes. (2) to strengthen liquid chlorine storage and transport management (3) to strengthen the maintenance and management of equipments (4) to ensure being equipped with necessary protective equipments (5) to formulate contingency plan; to handle in the remote plan, if necessary, to promptly alarm and timely cooperate to deal with the accident. (6) green tree species near the water plant shall be the select with strong resistance to chlorine gas, such as yew, hemlock, jujube, Holly, etc.	Water Plant Operational and Maintenance Unit	Local Environmental Protection BureauEnvironmental Protection Bureau	Included in the operating expenses of the water plant

Project Name	Time interval	Activities	Environmental sensitive point	Potential Impact	Mitigation/prevention measures	Implementing agency	Supervisory body	Budget (10,000 yuan,)
		Running water plant	/	Sludge and domestic garbage	<p>1, according to the specification of design construction, the pipeline maintenance and accident emergency work shall be properly done; pipeline maintenance workers shall receive special training; important node along the pipeline shall be set up with clear identification in order to avoid other units damage in pipeline construction.</p> <p>2. When crossing major river channels and highways, the materials shall be used to enhance the ability of anti-risk; the pipe shall be set up at a certain distance to set the cut-off valve and the bypass pipe.</p> <p>3, to establish and improve the engineering water inlet water pollution emergency plan, once finding upstream pollution incident, the water intake and related measures shall be taken in time, according to the pollution disposal situation, real time optimization of diversion scheme, to ensure the safety of water diversion water as much as possible.</p>	Water Plant Operational and Maintenance Unit	Local Water Conservancy Bureau Environmental Protection Bureau	Included in the operating expenses of the water plant

Table 11.2-3 List of Environmental Impact and Mitigation Measures for Sub-projects in Jinxi County

Project Name	Time interval	Activities	Environmental sensitive point	Potential Impact	Mitigation/prevention measures	Implementing agency	supervisory body	Budget (10,000 yuan,)
Sub-project in Jinxi County	Construction phase	Civil construction, construction materials and earthwork transportation, construction road, etc.	Yu Fang Village, Shanchengxiang Village, Xia Jimiao, Tianxiantou, Wangjiadun, Li Jia-bian, Zhuqiao Village, Maotaofeng, Yinshan Village and other Villages along the line	Dust, wastewater and noise generated from construction machinery and transport vehicles, construction waste etc.	According to Annex 1 of the Environmental Management Plan, the urban and rural water supply integration in Jiangxi Province and the environmental protection implementation regulations of the rural sewage treatment project shall be implemented.	Project Contractor, Construction Supervision	PMO local Environmental Protection BureauEnvironmental Protection Bureau	Included in project costs
	Operational phase	Construction of Huangtong town Water Plant	Gao Fanghe River	It belongs to the new water source area, which is not divided into the water source protection area. It is difficult to guarantee the water quality of the reservoir for a prolong period	1. Set the first-grade and second-grade protection zones. The first-grade protection zones is from the water intake point to the water area of 1 km to the downstream 100m from the water intake point and the land area extending 100m from the water intake point side to the back surface of the water intake point. The second-grade protection zone is in the upper bound of the primary protection zone, A land area of 100m from the surface of the water area and the water intake point of 3000m, and 100m extensive from the upstream face of water to the back surface of the water surface. 2. Strengthen water conservation and environmental protection publicity. Install online water quality monitoring system	local Water Conservancy Bureau	Local Environmental Protection BureauWater Conservancy Bureau	Government budget t;
					Install online water quality monitoring system	Water plant operational unit	local Water Conservancy Bureau	included in the operation cost of the water plant
					Without other important water users It will have less impact on other users.	Water intaking shall strictly adhere to the approved scale.	Water plant operational unit	Local Environmental Protection BureauWater Conservancy Bureau
	Operational phase	Operation of tap water plant	/	Tap water plant backwashes waste water, sludge discharge waste water etc.	The backwashed waste water in tap water plant is lifted to the water distribution well after being lifted by the reuse water tank. -The sludge discharged from the sedimentation tank is returned to the dewatering machine room for reuse after being concentrated by the sludge concentration tank, the remaining part enters the dewatering machine room to be dehydrated. The filtrate generated by the sedimentation process reaches the municipal sewage standard and can be reused for irrigation and road irrigation in the plant area. -The domestic sewage of the pressurized pumping station shall be discharged into the municipal pipe network after being treated by the septic tank.	Water Plant Operational and Maintenance Unit	Local Environmental Protection BureauEnvironmental Protection Bureau	Included in the operating expenses of the water plant
		Operation of tap water plant	/	Noise impact of various pump stations	_The noise reduction and noise reduction measures of damping cushion and sound insulation door and window shall be adopted for the dewatering machine room and the back washing room, and the sound absorption wall measures shall be added in addition to the above measures in pumping house ; --Strengthen the operation and maintenance of the	Water Plant Operational and Maintenance Unit	Local Environmental Protection BureauEnvironmental Protection Bureau	Included in the operating expenses of the water plant

					equipment. Strictly control the key noise sources (such as fan, water pump, etc.), propose noise control requirements to the equipment manufacturers, and choose low noise equipment as much as possible;			
		Runningtap water plant	/	Sludge and domestic garbage	The sludge water of the water purification plant is dehydrated to the water content less than 60% by drying. Thereafter, the sludge water shall be transported to the waste landfill site at regular intervals. --The staff's domestic garbage shall be collected and disposed of by the local sanitation department.	Water Plant Operational and Maintenance Unit	Municipal Environmental Protection Bureau	Included in the operating expenses of the water plant
		Running the water plant	Authoritative staff	Chlorine gas leakage may occur in the Chlorine-intensive room	(1) to establish safe operation procedures, the staff must be specially trained to operate strictly according to the operation procedures, and the education management shall be strengthened to avoid the leakage of chlorine gas caused by operation mistakes. (2) to strengthen liquid chlorine storage and transport management (3) to strengthen the maintenance and management of equipments (4) to ensure being equipped with necessary protective equipments (5) to formulate contingency plan; to handle in the remote plan, if necessary, to promptly alarm and timely cooperate to deal with the accident. (6) green tree species near the water plant shall be the select with strong resistance to chlorine gas, such as yew, hemlock, jujube, Holly, etc	Water Plant Operational and Maintenance Unit	Local Environmental Protection Bureau	Included in the operating expenses of engineering
		Running the water plant	/	Water quality pollution risk of water intake and pipeline	1, according to the specification of design construction, the pipeline maintenance and accident emergency work shall be properly done; pipeline maintenance workers shall receive special training; important node along the pipeline shall be set up with clear identification in order to avoid other units damage in pipeline construction. 2. When crossing major river channels and highways, the materials shall be used to enhance the ability of anti-risk; the pipe shall be set up at a certain distance to set the cut-off valve and the bypass pipe. 3, to establish and improve the engineering water inlet water pollution emergency plan, once finding upstream pollution incident, the water intake and related measures shall be taken in time, according to the pollution disposal situation, real time optimization of diversion scheme, to ensure the safety of water diversion water as much as possible.	Water Plant Operational and Maintenance Unit	Local water conservation bureau	Included in the operating expenses of engineering

Table 11.2-4 List of Environmental Impact and Mitigation Measures for Sub-projects in nanfeng County

Project Name	Time interval	Activities	Environmental sensitive point	Potential Impact	Mitigation/prevention measures	Implementing agency	Supervisory body	Budget (10,000 yuan,)
Sub-project in Nanfeng County	Construction phase	Civil construction, construction materials and earthwork transportation, construction access road, etc.	Shishan town, Xi Village, Dong Village, Shangkaokeng Village Xinjiabao Village, Pengjiabao Village, Zihe Village, Guanjiabao Village and other Villages along the line.	Dust, wastewater and noise generated from construction machinery and transport vehicles, construction waste etc.	According to Annex 2 of the Environmental Management Plan, the urban and rural water supply integration in Jiangxi Province and the environmental protection implementation regulations of the rural sewage treatment project shall be implemented.	Project Contractor, Construction Supervision	PMO local Environmental Protection Bureau	Included in project costs
		Extension of town pipe network in Nanfeng County	G206	G206 runs parallel to the construction pipeline, about 20m away from the pipeline. The main impact could be the possible settlement of the road surface during and after the construction.	The highway management department requires the design unit to propose the construction scheme for the pipeline section concerned with the highway facilities during project preparation. The design unit shall inform the highway department before the construction and the construction can only be initiated with permission from the highway department. The project implementation process shall strictly adhere to the requirements of highway management to ensure no damage to the highway facilities, no occupation of highway land, strict control of the width of operation belt and compliance with relevant national operation specifications. The affected area shall be restored immediately after construction.	Project Contractor, Construction Supervision	Local traffic management department	Included in project costs
		Extension of town pipe network in Nanfeng County	Gas pipeline	The project is extended to the pipeline construction of Shishan Town by the County water plant pipe network, which is 15m away from the gas pipeline in Shishan town. The project construction or inadequate supervision may affect the gas pipe network, causing leakage and breakage.	During construction, temporary measures shall be taken, such as adding piles, beam erection or local excavation protection etc., to protect the pipelines above and to ensure their normal operation during construction and their safety after construction. Within 5m on both sides of the pipeline, it is prohibited to plant trees, use fire, soil, stones or stack heavy objects and other corrosive materials. It is forbidden to use mechanical tools for excavation and mining, construction of buildings and other buildings behaviors threatening the pipeline security etc. Without the permission of the management unit, it is forbidden to construct, expand highway, bury underground cables, optical cables etc within five to fifty meters from the center line of the pipeline. Before construction, the gas company shall be informed and agree with the other party, the construction scope shall be more than 50 cm away from the gas pipeline, and the pipeline depth of gas company is about 1.2m. The pipeline shall not be damaged during construction. Prepare the risk contingency plan beforehand and equip the corresponding personnel and facilities	Project Contractor, Construction Supervision	Gas Company	Included in project costs
		Extension and Construction of Pipeline Network in Shishan town and County	Optical cable	The pipeline route of the project is about 15m away from the optical cable. Construction involves excavation, compaction, rolling etc, which may cause certain potential safety hazards and threats to the optical cable.	For the engineering section concerned with optical cable, detailed construction plan shall be formulated before construction. The construction plan shall be reported to the pipeline management department. Construction activities can be carried out only after the approval of the department. Construction shall be carried out strictly in accordance with the national standard operation. The optical cable installation shall be protected. During construction, warning signs shall be set before and after the construction section, corresponding safety management plan shall be made,	Project Contractor, Construction Supervision	Optical cable management department	Inclusion of project costs

Project Name	Time interval	Activities	Environmental sensitive point	Potential Impact	Mitigation/prevention measures	Implementing agency	Supervisory body	Budget (10,000 yuan,)
					cross-laying of pipeline lines shall be reduced; inflammable and explosive materials shall not be piled up beside the optical cable communication line. Construction waste, earthwork, construction materials and the like shall be prohibited from being piled up above the surface of the optical cable. Trunk pipeline shall be worn under the cross-line. During construction, temporary measures (such as adding piles, beam erection or local excavation protection etc.) shall be taken to protect the pipelines above and ensure their normal operation during construction and their safety after completion. It shall be restored in time after the construction is completed. Prepare the risk contingency plan beforehand and equip the corresponding personnel and facilities			
		Extension of the County town pipe network in the town of the Qia bay	Ancient tree	The project pipeline route is about 15m away from three ancient trees , with ages 1000 years, 280 years and unknown. They are considered national and tertiary protected ancient trees respectively. Mainly affected by construction dust.	Construction activities shall be carried out strictly in accordance with the requirements of Annex 2 of physical cultural resources management plan in the Environmental Social Management Plan.	Project Contractor, Construction Supervision	Local forestry department	Included in project costs
		Extension of water supply network in Laixi Town	Laixi Primary School	Project pipeline is 5m away from Laixi Primary School. Noise and dust impact during construction.	During the construction of the project, attention shall be paid to the control of noise level. Construction time shall be arranged in the non-teaching time as much as possible to avoid the influence on the classrooms. Watering will be done during construction to reducedust. Extra attention shall be paid to safety. The construction area shall set temporary noise barrier no less than 2m with higher noise reduction effect. After the construction, the environmental impact of the construction shall be promptly restored.	Project Contractor, Construction Supervision	Local traffic bureau, local police team	1

Table 11.2-5 Schedule of Environmental Impact and Mitigation Measures for Sub-projects in Leping County

Project Name	Period	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Control Measures	Implementing Agency	Supervisory Body	Budget (10,000 yuan)
Leping County sub-project	Construction phase	Civil construction, construction materials and earthwork transportation, construction access road, etc.	Nearby Villages including Bayu, Guankou and its new rural area, Chexi, Kuqian, Gujinshan and Liucha	Dust, wastewater and noise by machinery & vehicles, construction waste etc.	As required by Annex 2 of <i>Environmental Management Plan - China Jiangxi Provincial Integrated Rural and Urban Water Supply and Wastewater Management Project</i>	Project Contractor, Construction Supervisor	PMO local Environmental Protection Bureau Environmental Protection Bureau	Included in project costs
		Construction & modification of urban water plants	S307	With a distance of 15m, S307 runs parallel with the pipeline of the project. The main effect is the possible incurrance of earth subsidence during or after the construction.	The highway management department requires the design unit to propose the construction scheme for the pipeline section concerned with the highway facilities during project preparation. The design unit shall inform the highway department before the construction and the construction can only be initiated with permission from the highway department. The project implementation process shall strictly adhere to the requirements of highway management to ensure no damage to the highway facilities, no occupation of highway land, strict control of the width of operation belt and compliance with relevant national operation specifications. The affected area shall be restored immediately after construction.	Project Contractor, Construction Supervisor	Local traffic management department	Included in the project cost
		Construction & modification of urban water plants	Optical cable	The pipeline route of the project runs parallel to the optical cable and the distance is about 10m. The construction involves digging, punning and rolling soil, which may cause certain safety hazards and threats to the optical cable.	Optical cable protection requirements state that it is strictly prohibited to break ground within 5m, to excavate within 3m and to carry out engineering survey and construction within 50m. It is prohibited to pile up flammable and explosive materials alongside the optical cable communication line, or construction waste, earth work and construction materials on the ground above the cable. Prior permission of the management units is required and relevant precautionary measures shall be taken if there is any possible danger to the cable. Prepare the risk contingency plan beforehand and equip the corresponding personnel and facilities	Project Contractor, Construction Supervisor	Optical cable management department	Included in the project cost
		Extension of urban water supply pipeline network	Leping Qimingxing Experimental Kindergarden	The pipeline of the project is about 15m from Leping Qimingxing Experimental Kindergarden. It will be impacted by noise and dust during the construction.	During the construction of the project, attention shall be paid to the control of noise level. Construction time shall be arranged in the non-teaching time as much as possible to avoid the influence on the classrooms. Watering will be done during construction to reducedust. Extra attention shall be paid to safety. The construction area shall set temporary noise barrier no less than 2m with higher noise reduction effect. After the construction, the environmental impact of the construction shall be promptly restored.	Project Contractor, Construction Supervisor	Local bureau, traffic police brigade	1
Leping Sub-project	Construction phase	Extension of Hougang Town water plant pipeline network	Gas pipeline	The project is to pass through the gas pipeline in Hougang Town. The main trunk pipeline is planned to pass under the crossing pipeline. Improper construction or supervision may lead to adverse effects like leakage or breakage on the gas pipeline network.	It is necessary to take provisional measures during the construction, such as adding piles, setting up beams or excavating underground locally to protect the pipeline above, and to ensure normal operation and security after the construction. Within 5m along the two sides of the center pipeline, any possible dangerous act is strictly prohibited such as planting trees, setting fire, digging earth, quarrying stones, or piling up heavy stuff or corrosive substance, excavating by means of machinery equipment, building houses or any other structures and so on. It is prohibited to build or extend roads, burry cable or optical cable underground within 5 to 50m from the center pipeline without prior permission of relative management units. It is necessary to inform the gas company before the activity and obtain its permission, and make sure the distance between the construction scope and the gas pipeline is more than 50cm. As the gas pipeline is buried about 1.2m deep underground, it is important to make sure the pipeline is not damaged during the activity. Prepare the risk contingency plan beforehand and equip the corresponding	Project Contractor, Construction Supervisor	Gas pipeline management department	Included in the project cost

Project Name	Period	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Control Measures	Implementing Agency	Supervisory Body	Budget (10,000 yuan)
			Ancient trees	The ancient trees are about 10m away from the project pipeline route and may suffer from construction dust.	Construction activities shall be carried out in strict accordance with the requirements of Annex 2 of the Environmental Social Management Plan – Plan of Physical Cultural Resource Management.	Project Contractor, Construction Supervisor	Local forestry department	Included in the project cost
			Leping County Star Experimental Kindergarden	Star Experimental Kindergarden is about 10m from the project pipeline and may suffer from construction noise and dust.	During the construction of the project, attention shall be paid to the control of noise level. Construction time shall be arranged in the non-teaching time as much as possible to avoid the influence on the classrooms. Watering will be done during construction to reducedust. Extra attention shall be paid to safety. The construction area shall set temporary noise barrier no less than 2m with higher noise reduction effect. After the construction, the environmental impact of the construction shall be promptly restored.	Project Contractor, Construction Supervisor	Local traffic bureau, local traffic police brigade	1
		Extension of the existing pipeline network of Yongshan Water Plant	Ancient trees	The ancient trees are about 8m away from the project pipeline route and may suffer from construction dust.	Build a brick fence around the ancient trees during the construction. It is recommended that the radius of the fence be 50m more than that of the root of the tree and the fence be 50m above the ground for fear that the construction waste liquid might permeate into the root soil and result in hardened soil and bad air breathability, hence affecting the growth of the trees or impairing its roots directly. It is prohibited to operate with fire or gas around the trees, and it is necessary to keep clean around the trees, without clutter but sufficient fire extinguishers. Layered backfill with planting soil is suggested to ensure that the soil used caters to the growth of the trees. It is also necessary to improve the constructors' protection awareness.	Project Contractor, Construction Supervisor	Local forestry department	Included in the project cost
Leping Sub-project	Construction phase	Digging and disposing soil	/	The area of disturbance disturbance and damage is 46.14hm <sup>2</sup> . After balancing allocation of earthwork and stonework, it needs to borrow 67,700m <sup>3</sup> and dispose 72,300m <sup>3</sup> . The possible total water and soil erosion is 3515t and newly increased water and soil erosion 3321t.	<p>(1) Control Area of Water Treatment Plant Engineering measures: site formation 2.68m<sup>2</sup>, topsoil backfill 7700m<sup>3</sup>, drainage ditch 2,340m; Plant measures: landscaping 2.57hm<sup>2</sup>, sowing grass seeds 886m<sup>2</sup>, parking lot greening 208m<sup>2</sup>, and planting 46 trees; Temporary measures: topsoil stripping 7700m<sup>3</sup>, soil- or straw-filled bag retaining wall 202m, tarpaulin covering area 2,566m<sup>2</sup>, drain ditch 1,286m, sand basin 4, car washing tank 1.</p> <p>(2) Control Area of Pipeline Project Engineering measures: site formation 8.70hm<sup>2</sup>, topsoil backfill 2600m<sup>3</sup>, second ploughing 15.02hm<sup>2</sup>; Plant measures: Green belt restoration 7.84hm<sup>2</sup>, forest planting and grass seeding 0.86hm<sup>2</sup>; Temporary measures: topsoil stripping 2600m<sup>3</sup>, soil- or straw-filled bag retaining wall 5,400m, tarpaulin covering 38,880m<sup>2</sup>, color steel plate 5,400m, and sand basin 41.</p> <p>(3) Control Area of Crossing Project Engineering measures: second ploughing 0.18hm<sup>2</sup>; Temporary measures: color steel plate 678m, drainage ditch 650m, and sand basin 46.</p>	Contractor, Construction Supervisor	PMO, local Environmental Protection Bureau, local Water Conservancy Bureau	Included in the project cost of water and soil conservation
	Operational phase	Construction & modification of urban water plants	Communist reservoir	It belongs to the newly added water source area and water source conservation area has yet to be divided. Hence it is difficult to guarantee the water quality of the reservoir for a prolong period.	1. Set primary and secondary conservation areas. The primary conservation area covers the water area from 1km upstream of the water intake point to 100m downstream, the beach area at one side of the water intake point and the land area of 100m from the angle of the head-on dam to the inverse side. The secondary conservation area is 3,000m upstream of the upper bound of the primary conservation area, the beach area at one side of the water intake point	Water plant operational unit, local Water Conservancy Bureau	Local Water Conservancy Bureau, Environmental Protection Bureau	The water source protection area shall be included in the water

Project Name	Period	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Control Measures	Implementing Agency	Supervisory Body	Budget (10,000 yuan)
					and the land area of 100m from the angle of the head-on dam to the inverse side. 2. Install online monitoring system of water quantity and quality.			conservancy department; The online monitoring system shall be included in the operation cost of the water plant
				The power generation capacity of the Yongshan, Gutian and Guxi hydropower stations at the downstream of the dam site of the reservoir is reduced by 260,000 kwh respectively.	1. It is recommended to enter into agreement with Yongshan, Gutian and Guxi Hydropower Station to generate electricity on the premise of meeting the urban water supply and irrigation water, and compensate Yongshan, Gutian and Guxi hydropower station by 0.07 yuan/m <sup>3</sup> . Relevant compensation measures have been included in the social evaluation report;	Water plant operational unit	Local Water Conservancy Bureau	Included in the operational cost of the water plant
			/	Backwashed wastewater and sludge-discharged wastewater of tap water plant filter tank	-The backwashed waste water in tap water plant is lifted to the water distribution well after being lifted by the reuse water tank. -The sludge discharged from the sedimentation tank is returned to the dewatering machine room for reuse after being concentrated by the sludge concentration tank, the remaining part enters the dewatering machine room to be dehydrated. The filtrate generated by the sedimentation process reaches the municipal sewage standard and can be reused for irrigation and road irrigation in the plant area. -The domestic sewage of the pressurized pumping station shall be discharged into the municipal pipe network after being treated by the septic tank.	Water plant operational unit	Environmental Protection Bureau Local Environmental Protection Bureau	Included in the operating expense of the water plant
			/	Noise impact of various pump stations	-The noise reduction and noise reduction measures of damping cushion and sound insulation door and window shall be adopted for the dewatering machine room and the backwashing room. Sound absorption wall measures shall be added in addition to the above measures in pumping stations. -Strengthen the operation and maintenance of the equipment. Strict control of key noise sources (such as fan, water pump etc.). Propose noise control requirements to the equipment manufacturers and choose low noise equipment as much as possible.	Water plant operational unit	Environmental Protection Bureau Local Environmental Protection Bureau	Included in the operating expense of the water plant
			/	Sludge and domestic garbage	---The sludge water of the water treatment plant is transported to the refuse landfill at regular intervals for disposal after being dehydrated to the water content less than 60%. ---Staff's domestic garbage is collected together by local sanitation unit for unified disposal.	Water plant operational unit	Local Environmental Protection Bureau Environmental Protection Bureau	Included in the operating expense of the water plant
			Authoritative staff	Chlorine gas leakage may occur in the chlorine-intensive room	(1) to establish safe operation procedures, the staff must be specially trained to operate strictly according to the operation procedures, and the education management shall be strengthened to avoid the leakage of chlorine gas caused by operation mistakes. (2) to strengthen liquid chlorine storage and transport management (3) to strengthen the maintenance and management of equipments (4) to ensure being equipped with necessary protective equipments (5) to formulate contingency plan; to handle in the remote plan, if necessary, to promptly alarm and timely cooperate to deal with the accident.	Water plant operational unit	Local Environmental Protection Bureau	Included in the operating expense of engineering

Project Name	Period	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Control Measures	Implementing Agency	Supervisory Body	Budget (10,000 yuan)
					(6) green tree species near the water plant shall be the select with strong resistance to chlorine gas, such as yew, hemlock, jujube, Holly, etc			
			/	Water quality pollution risk of water intake and pipeline	<p>1, according to the specification of design construction, the pipeline maintenance and accident emergency work shall be properly done; pipeline maintenance workers shall receive special training; important node along the pipeline shall be set up with clear identification in order to avoid other units damage in pipeline construction.</p> <p>2. When crossing major river channels and highways, the materials shall be used to enhance the ability of anti-risk; the pipe shall be set up at a certain distance to set the cut-off valve and the bypass pipe.</p> <p>3, to establish and improve the engineering water inlet water pollution emergency plan, once finding upstream pollution incident, the water intake and related measures shall be taken in time, according to the pollution disposal situation, real time optimization of diversion scheme, to ensure the safety of water diversion water as much as possible.</p>	Water plant operational unit	Local Environmental Protection Bureau	Included in the operating expense of engineering
		Rural water supply pipe network transformation and extension works	Happiness Reservoir, Coqing Reservoir and Red Orient Reservoir	The current water source areas shall be not divided as required by Water Conservation Bureau project, so the water quality is not so good in the long-term	set up the first class and second class water conservation areas, the former including the range distance between 1km upstream level and 100m downstream level beaches and shallow and extended 100 m bank; the latter including the range from the upper reaches of the former 3000m water and shallow and extended 100m bank	local water conservation bureau	local water conservation bureau and local Environmental Protection Bureau	Government Budget
					install online water quality monitoring system	Water plant operational unit	local water conservation bureau and local Environmental Protection Bureau	The water included in the operation cost of the water plant

Table 11.2-6 Schedule of Environmental Impact and Mitigation Measures for Sub-projects in Xiushui County

Project Name	Period	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Control Measures	Implementing Agency	Supervisory Body	Budget (10,000 yuan)
Water supply sub-project of Xiushui County	Construction phase	Civil construction, construction materials and earthwork transportation, construction access road, etc.	Nearby Villages like Longbei, Bailuoqiu, Zoujiawan, Youjiacha, Zhishanyuan, Duanshang Primary School, Baitu, Chenjiazui, Songshanxia, Shangwuping, Xiawuping, Kengkoupushang, etc.	Dust, wastewater and noise by machinery & vehicles, construction waste etc.	As required by Annex 1 of Environmental Management Plan - China Jiangxi Provincial Integrated Rural and Urban Water Supply and Wastewater Management Project	Project Contractor, Construction Supervisor	Local Environmental Protection Bureau	Included in project costs
		Expansion of urban water plant in Xiushui County	Provincial Highway S304	15m away from S304 provincial road in a parallel direction Subsidence of the road surface during and after the construction, and the road hump caused by underdigging top pipe.	During the preparation period, the design institute shall put forward a construction plan based on the involved pipeline sections, and permissions shall be obtained from related highway units before the work starts. The management requirements of related highway units shall be adhered to strictly during the implementation process without impairment to the highway facilities or occupation of highway land. The breadth of working area shall be controlled strictly according to relative national working standards. Restoration work shall be done without delay in the affect area after the work is finished. For road sections crossing roads and railways, relevant protective measures shall be taken during the construction period, and strictly comply with the <i>Technical Specification for Top Pipe of Water Supply and Drainage Works (CECS246-2008)</i>	Project Contractor, Construction Supervisor	Local road management department	Included in the project cost
		Construction of the original water pipeline	Ma'ao Town Duanshang Primary School	Construction pipeline south section 20m from Duanshang Primary School, impacted by construction noise and dust	1. Construction work shall be arranged during non-teaching time as much as possible so as not to disturb the classrooms. 2. Set temporary sound barrier of at least 2m on the construction area near the Primary School to reduce noise efficiently.	Project Contractor, Construction Supervisor	Local Environmental Protection Bureau	1
		Digging and disposing soil		The area of the original earth's surface and the conservation facilities of water and soil disturbed and damaged by the sub-project is 40.09hm <sup>2</sup> . The gross earthwork and stonework of the project is 410,800m <sup>3</sup> , among which digging is 205,400m <sup>3</sup> and filling 205,400m <sup>3</sup> . After balancing allocation, there is no borrowing or disposing earthwork and stonework.	(1) Control Area of Plant Area Engineering measures: site formation 0.28hm <sup>2</sup> , top soil backfilling 7,700m <sup>3</sup> , drainage ditches 2,340m; Plant measures: Landscaping 0.28hm <sup>2</sup> , grass seeding 886m <sup>2</sup> , parking lot greening 208m <sup>2</sup> , and planting trees 46; Temporary measures: top soil stripping 7,700m <sup>3</sup> , soil- or straw-filled bag retaining wall 202m, tarpaulin covering 2,566m <sup>2</sup> , drainage ditch 1,286m, sand basin 4, car washing tank 1. (2) Control Area of Pipeline Works Engineering measures: site formation 8.70hm <sup>2</sup> , top soil backfilling 2,600m <sup>3</sup> , second ploughing 15.02hm <sup>2</sup> ; Plant measures: Green Belt Restoration 7.84hm <sup>2</sup> , forest planting and grass seeding 0.86hm <sup>2</sup> ; Temporary measures: top soil stripping 2,600m <sup>3</sup> , soil- or straw-filled bag retaining wall 5,400m, tarpaulin covering 38,880 m <sup>2</sup> , color steel plate 5,400m, and sand basin 41. (3) Control Area of Crossing Project Engineering measures: Second ploughing 0.18hm <sup>2</sup> ; Temporary measures: Color steel plate 678m, drainage ditch 650m and sand basins 16. Water and soil conservation monitoring: the monitoring content includes disturbance of land condition, soil erosion and water and soil	Contractor, Construction Supervisor	local environmental protection bureau, local Water Conservancy Bureau	Included in the cost of water and soil conservation works

Project Name	Period	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Control Measures	Implementing Agency	Supervisory Body	Budget (10,000 yuan)
					conservation measures. The water and soil conservation monitoring period starts from the construction preparation period to the end of the design level year, i.e. from January 2018 to December 2019, for totally 24 months. The monitoring scope is the project construction area and the direct impact area, with a total area of 66.51 hm <sup>2</sup> . The monitoring method is combing locating observation and investigation. Evaluate the result according to the characteristics of engineering construction and the condition of soil erosion. The project set 3 observation sample plots and 5 investigation sample plots in total.			
	Operational phase	Expansion of urban water plant in Xiushui County	Dongjin Reservoir	Annual water intake of the project accounts for 3.51% ~ 8.43% of the power generation of Dongjin Reservoir in a typical year. which will occupy the power generation water of Dongjin Reservoir;	It is recommended to enter into an agreement with Jiangxi Dongjin Power Generation Co., Ltd., to generate electricity under the premise of meeting the urban water supply and irrigation, and compensate Dongjin Power Generation Co., Ltd. by 0.07 yuan/m <sup>3</sup> . Relevant compensation measures have been included in the social evaluation report.	Water plant operational unit	Local Water Conservancy Bureau	Included in operational cost of the water plant
Uncertainty of long-term guarantee of reservoir water quality				Install on-line water quality and quantity monitoring system	Water plant operational unit	Local Water Conservancy Bureau	Included in the operating expense of the water plant	
/			Backwashed wastewater and sludge-discharged wastewater of tap water plant filter tank	-The backwashed waste water in tap water plant is lifted to the water distribution well after being lifted by the reuse water tank. -The sludge discharged from the sedimentation tank is returned to the dewatering machine room for reuse after being concentrated by the sludge concentration tank, the remaining part enters the dewatering machine room to be dehydrated. The filtrate generated by the sedimentation process reaches the municipal sewage standard and can be reused for irrigation and road irrigation in the plant area. ---Domestic sewage from both the water plant and the booster pumping station is discharged into the municipal pipeline network after being treated by the septic tank.	Water plant operational unit	Local Environmental Protection Bureau	Included in the operating expenses of the water plant	
/			Noise impact of various pump stations	-The noise reduction and noise reduction measures of damping cushion and sound insulation door and window shall be adopted for the dewatering machine room and the backwashing room. Sound absorption wall measures shall be added in addition to the above measures in pumping stations. -Strengthen the operation and maintenance of the equipment. Strict control of key noise sources (such as fan, water pump etc.). Propose noise control requirements to the equipment manufacturers and choose low noise equipment as much as possible.	Water plant operational unit	Local Environmental Protection Bureau	Included in the operating expense of the water plant	
/			Sludge and domestic garbage	---The sludge water of the water treatment plant is transported to the refuse landfill of Shizi Town, Jiujiang County at regular intervals for disposal after being dehydrated to the water content less than 60%. ---Staff's domestic garbage is collected together by local sanitation unit for unified disposal.	Water plant operational unit	Local Environmental Protection Bureau	Included in the operating expense of the water plant	
Sewage treatment sub-project of Xiushui County	Construction phase	Civil construction, construction materials and earthwork transportation, construction access road, etc.	Group 6, 13, 5 and 10 of Putian Village. Authoritative staff	Dust, wastewater and noise by machinery & vehicles, construction waste etc.	(1) to establish safe operation procedures, the staff must be specially trained to operate strictly according to the operation procedures, and the education management shall be strengthened to avoid the leakage of chlorine gas caused by operation mistakes. (2) to strengthen liquid chlorine storage and transport management (3) to strengthen the maintenance and management of equipments (4) to ensure being equipped with necessary protective equipments (5) to formulate contingency plan; to handle in the remote plan, if necessary, to promptly alarm and timely	Water plant operational unit	Local Environmental Protection Bureau	Included in the operational expense of the engineering

Project Name	Period	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Control Measures	Implementing Agency	Supervisory Body	Budget (10,000 yuan)
					cooperate to deal with the accident. (6) green tree species near the water plant shall be the select with strong resistance to chlorine gas, such as yew, hemlock, jujube, Holly, etc			
		Digging and disposing soil /		Water quality pollution risk of water intake and pipeline	1, according to the specification of design construction, the pipeline maintenance and accident emergency work shall be properly done; pipeline maintenance workers shall receive special training; important node along the pipeline shall be set up with clear identification in order to avoid other units damage in pipeline construction. 2. When crossing major river channels and highways, the materials shall be used to enhance the ability of anti-risk; the pipe shall be set up at a certain distance to set the cut-off valve and the bypass pipe. 3, to establish and improve the engineering water inlet water pollution emergency plan, once finding upstream pollution incident, the water intake and related measures shall be taken in time, according to the pollution disposal situation, real time optimization of diversion scheme, to ensure the safety of water diversion water as much as possible.	Water plant operational unit	Local water conservation Environmental Protection Bureau	Included in the operational expense of the engineering
		New construction and renovation works of Xiushui County and township network /		All water plants in Xiushui County are not subject to environmental assessment and acceptance procedures	All water plant operation agencies (water companies) shall go to the local Environmental Protection Bureau as soon as possible to supplement relevant procedures to ensure environmental protection measures and environmental management methods meeting the requirements of local environmental protection authorities	Xiushui County Water Plant	Local Environmental Protection Bureau	/
	Operational phase	Construction of new sewage pipe network and sewage treatment plant in Zhajin Town /	Influence on Zhajin River	20m,15m,20m,15m respectively away from the pipelineSewage discharge of the sewage treatment plant will affect Zhanjin river.	1. Improve the construction of sewage collection pipe network in the district. 2. Strengthen the operation management to ensure the sewage reaches relevant standards. 3. Establish accident prevention and emergency measures.	Operational unit of sewage treatment plant	Local Environmental Protection Bureau	Included in the operating expense of the sewage treatment plant
			/	the total amount of dug earth stone generated during wastewater treatment will affect the atmospheric environment	In order to minimize the influence of odors, it is recommended to create a green isolation belt, such as planting trees, seeding grass etc., around the plant area to form a three-dimensional shelter forest system of grass, shrub and arbor. The interspace between buildings in the plant area shall be planned accordingly, especially around the areas that will generate odors. Make sure that the green area of the plant area is not less than 30%.	Operational unit of sewage treatment plant	PMO, Municipal Environmental Protection Bureau	Included in the operating expense of the sewage treatment plant
			/	30m away from Ancestral Hall Noise generated by lifting pump and treatment facilities of the sewage treatment project	Prioritize the use of advanced low-noise equipment such as submersible pump. Try to place the water pump inside the room and isolate noise by utilizing buildings. Further optimize the plane layout of the plant during the stage of construction drawing design.Equipment with high noise level shall be kept far away from the residential areas. Enforce the maintenance of water pump, check the electrical machinery as well as the concentricity of pump spindle regularly, and ensure good lubrication of the bearings. Reducing the wear of components in the pump. Properly arrange sound absorbing materials and vibration damping devices at the periphery of the inner wall of the pump room, the floor of the roof and the machine set, such as asbestos boards, shock absorbers, etc., which can effectively control and eliminate the propagation and reflection of noise.	Operational unit of sewage treatment plant	Local Environmental Protection Bureau	Included in the operating expense of the engineering
			Zhajin River	Effects of Effluent discharge on the water environment of the Zhajin River	(1) design considerations allowance, according to the maximum capacity of 0.5 times the reserved, accident situation of buffering capacity, with a considerable processing equipment (reflux pump, reflux pipe, valve and instrument, etc.), one thousand when the normal operation of equipment failure affect the processing	Operational unit of sewage treatment plant	Local Environmental Protection Bureau	Included in the operating expense of the sewage

Project Name	Period	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Control Measures	Implementing Agency	Supervisory Body	Budget (10,000 yuan)
					<p>system, startup system buffer and reflow equipment, will not be qualified to deal with water, until meet the emission standards.</p> <p>(2) take multiple sets of spare equipment for vulnerable equipment and ensure sufficient spare parts for maintenance and renovation.</p> <p>The electromechanical devices in the processing system shall be used in at least one way.</p> <p>(3) choose quality equipment.</p> <p>For all kinds of machinery, electrical appliances, instruments and other equipment in the facility, we must choose the products which have good quality, low failure rate, meet the design requirements, and are suitable for long-term operation and maintenance.</p> <p>(4) during operation, the operator must strictly follow the rules and regulations of the treatment facilities, check the equipment regularly, carry out maintenance in time, and reduce the failure rate of the equipment.</p> <p>(5) the electrical equipment shall be carried out according to the grounding protection procedure;</p> <p>And equipped with automatic tripping circuit, main equipment operation by using the computer data monitoring, timely report to the police, and to record the scene, nature and the accident of time, etc., in order to organize workers to timely make emergency repair.</p> <p>All electrical equipment installation protection must meet the electrical equipment related safety regulations.</p> <p>(6) take the power supply of dual-circuit power supply to ensure the normal operation of power supply facilities and lines</p> <p>(7) formulate management measures for the operation of sewage treatment plants, and deal with the risks of power failure and emergent wastewater discharge.</p>			treatment plant
			Authoritative staff of the sewage treatment plant	Health risks to the staff in the state of accident, including gas, pathogens, etc.	<p>(1) strengthen safety education for operators and management personnel, establish safe operation procedures and management systems, carry out strict implementation after operation, and check frequently.</p> <p>(2) the design of the buildings shall taken into account the sanitary requirements of water supply, drainage, heating and ventilation, lighting and lighting, and air conditioning facilities in the place where the staff works for a long time.</p> <p>For some sealing structures, poor ventilation conditions, mechanical ventilation is adopted.</p> <p>(3) the factory shall be equipped with life jackets, life belts, safety belts, safety caps and other labor protective equipment.</p> <p>To the operation of the under well pipeline inspection or homework workers must wear necessary protective equipment, such as safety clothing gas mask, supply air masks, gas detection instruments, test, etc., in case of poisoning, and at least two people are present.</p> <p>(4) the edge of the ikebana walkway is provided with a support column and lighting facilities to ensure pedestrian safety.</p> <p>(5) the installation and protection of all electrical equipment shall meet the safety requirements of electrical equipment and ensure the grounding protection of high-voltage equipment.</p> <p>(6) dangerous parts of mechanical equipment, such as transmission belts, gears, grinding wheels, etc. must be installed.</p> <p>(7) to strengthen the management of safety work, set up post responsibility system, the factory all of the danger area set up warning sign in eye-catching place, more than 1.2 m above the platform of a guardrail, on May gather the poisonous and harmful gas, are due and ventilation equipment, set up safety labor</p>	Operational unit of sewage treatment plant		Equipments included in the expense of the engineering and maintenance and management included in the operational expense

Project Name	Period	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Control Measures	Implementing Agency	Supervisory Body	Budget (10,000 yuan)
					<p>protection agencies, is responsible for the security of safe production and labor protection.</p> <p>(8) based on the actual needs of each section and easy to use, set up the production health room, toilet, bathroom, wardrobe, etc.), conditions of section and open operation, besides strengthening ventilation set shade, shall also be a lounge.</p> <p>The factory has a central bathroom.</p> <p>(9) all workers who have direct contact with sewage, sludge and household waste shall check their bodies regularly and regularly inject relevant vaccines (such as hepatitis a, hepatitis b, etc.).</p>			

**Table 11.2-7 List of Environmental Impact and Mitigation Measures for Sub-projects in Linchuan District**

Project Name	Period of Time	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Prevention Measures	Implement Mechanism	Supervision Mechanism	Budget (10,000 yuan,)
Sub-project of Linchuan County	Construction Period	Civil construction, construction materials and earthwork transportation, construction access road, etc.	Wuhu Yan, Wenquan Town, Zhou Jia Village, Yang Jia Village, Zhu Jia Village, Liangxian Primary School, Dongliang Jia Village and other Villages along the line	Construction dust, construction waste water, noises generated from construction machinery and transport vehicles, construction wastes, etc.	The construction shall be implemented according to Annex 2 of the Environmental Management Plan of environmental protection implementation regulations of China Jiangxi Intergrated Rural and Urban Water Supply and Wastewater Management Project.	Project Contractor, Construction Supervision	PMO, Municipal Environmental Protection Bureau	Included in project costs
		Extension of Town Pipeline in Wenquan Town	Liangxian Primary School	Project pipeline is about 10m from Liangxian Primary School and the noise influence during construction period, and construction fugitive dust influence	During the construction of the project, attentions shall be taken to control the noise. The construction time shall be arranged in the non-teaching time as far as possible to avoid the influence on the teaching order. In the construction activities, it is necessary to pay attention to the water sprinkling and dust falling work. In the construction process, attention shall be paid to safety, and the construction area shall be provided with a temporary sound barrier of not less than 2 meters high with higher noise reduction effect; environmental restoration work shall be carried out timely on the affected area after construction.	Project Contractor, Construction Supervision	Local traffic bureau, local police team	1
		Take soil Discard soil	/	The area of disturbance and damage is 9.96hm <sup>2</sup> ; damage to the water and soil conservation facility area is 9.96hm <sup>2</sup> ; the total amount of water and soil erosion caused by the project may be 3515t, and the total amount of water and soil erosion is 3321t.	(1) Control area of water intake pump station Engineering measures: site leveling is 1487m <sup>2</sup> , and the topsoil is back-filled with 700m <sup>3</sup> , drain ditch is 408 meters; Plant measures: landscape greening 1487m <sup>2</sup> , planting of 96 trees, ; Temporary measures: topsoil stripping 700m <sup>3</sup> , the concrete floor is removed for 500m <sup>2</sup> , build 64m of the soil-filled straw bag retaining wall, 233m <sup>2</sup> of the covered tarpaulin, 125 meters of the drain ditch and 2 of the sand basin. (2) Water purification plant control area Engineering measures: site leveling 2.68hm <sup>2</sup> , and the topsoil is back-filled with 7700m <sup>3</sup> , drainage ditches 2340 meters; Plant measures: 2.57hm <sup>2</sup> of garden greening, 886m <sup>2</sup> of sowing grass seeds, 208m <sup>2</sup> of greening in parking lot, and planting 46 trees; Temporary measures: 7700 m <sup>3</sup> of topsoil stripping, 202 meters of soil-filled straw bag retaining wall, 2566m <sup>2</sup> of tarpaulin covering, 1286 meters of drain ditch, 4 sand basins and 1 car washing tank. (3) Control area of pipeline project Engineering measures: 8.70hm <sup>2</sup> of site leveling, and the topsoil is backfilled with 2600 m <sup>3</sup> , 15.02hm <sup>2</sup> of re-cultivation; Plant measures: 7.84hm <sup>2</sup> of Green Belt Recovery .0.86hm <sup>2</sup> of forrestation and grass planting Temporary measures: topsoil stripping 2600m <sup>3</sup> , 5400 meters of soil-filled straw bag retaining wall, 38880 m <sup>2</sup> of tarpaulin covering, 5400 meters of color steel plate, and 41 sand basins. (4) Control Area of Crossing Engineering Engineering measures: Re-cultivation 0.18hm <sup>2</sup> ; Temporary measures: 678 meters of color steel plate, 650 meters of drain ditch, and 46 sand basins.	Contractor, Construction Supervision	Project Dept. and local environmental protection Bureau, Local Water Conservancy Bureau	Cost to be included in water and soil conservation works
Sub-project	Operating	New Project of	Chongren River	It belongs to the new water source	1. Strengthen water-saving and environmental protection publicity;	local Water	Local	Government

Project Name	Period of Time	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Prevention Measures	Implement Mechanism	Supervision Mechanism	Budget (10,000 yuan,)
project of Linchuan County	Period	Second Water Plant in Linchuan District		area, and has not divided the water source protection zone, and is difficult to guarantee the water quality of the reservoir for a long time;	2. Setting the primary and secondary protection zones, where the range of the first-level protection zone is 1 km upstream to 100 meters downstream from the water area and one side of water intake point to the land area 100m extended from the land surface of embankment angle to the back surface; and the second-level protection zone is 3000 meters upstream of one side of the back surface of the water area and water intake point and land surface extended 100 meters from the land surface of embankment angle to the back surface.	Conservancy Bureau	Environmental Protection Bureau ; Water Conservancy Bureau	budget
					Installing on-line water quality monitoring system;	Water plant operating unit	Local Water Conservancy Bureau	Included in the operating expenses of the water plant
			/	The water plant filter backwash wastewater, sludge discharge wastewater etc.	- the flushing wastewater of the water plant has been upgraded to the back of the water distribution well after the recovery of the water tank; - tank mud wastewater after concentrated sludge concentration pool that the supernatant fluid recycling recycling pool, the rest into the dewatering machine room, the filtrate after precipitation treatment to city miscellaneous water standard back to factory green land irrigation, flushing roads. -- water plant, pressure pumping station staff life sewage treatment of sewage treatment back into the municipal network.	Water plant operating unit	Local Water Conservancy Bureau	/
			Huangshi Village	The noise effects of various pumping stations	-- to reduce noise, noise reduction and noise reduction measures for the dewatering machine room and the anti-flushing room, and increase the sound absorption wall measures in addition to the above measures; -- strengthen equipment operation and maintenance. Strictly control key noise sources (such as fan, water pump, etc.), make noise control requirements to equipment manufacturers, and select low-noise equipment as far as possible;			
			/	Sludge, household waste	-- the sludge water from the water purification plant will be transported to the lion town landfill site in Jiujiang County on a regular basis after the drying rate is less than 60%. -- staff living waste is collected and disposed of by the local sanitation department.			
			Authoritative staff	Chlorine gas leakage may occur in the chlorine-intensive room	(1) to establish safe operation procedures, the staff must be specially trained to operate strictly according to the operation procedures, and the education management shall be strengthened to avoid the leakage of chlorine gas caused by operation mistakes. (2) to strengthen liquid chlorine storage and transport management (3) to strengthen the maintenance and management of equipments (4) to ensure being equipped with necessary protective equipments (5) to formulate contingency plan; to handle in the remote plan, if necessary, to promptly alarm and timely cooperate to deal with the accident. (6) green tree species near the water plant shall be the select with strong resistance to chlorine gas, such as yew, hemlock, jujube, Holly, etc			
			/	Water quality pollution risk of water	1, according to the specification of design construction, the pipeline			

Project Name	Period of Time	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Prevention Measures	Implement Mechanism	Supervision Mechanism	Budget (10,000 yuan,)
				intake and pipeline	<p>maintenance and accident emergency work shall be properly done; pipeline maintenance workers shall receive special training; important node along the pipeline shall be set up with clear identification in order to avoid other units damage in pipeline construction.</p> <p>2. When crossing major river channels and highways, the materials shall be used to enhance the ability of anti-risk; the pipe shall be set up at a certain distance to set the cut-off valve and the bypass pipe.</p> <p>3, to establish and improve the engineering water inlet water pollution emergency plan, once finding upstream pollution incident, the water intake and related measures shall be taken in time, according to the pollution disposal situation, real time optimization of diversion scheme, to ensure the safety of water diversion water as much as possible.</p>			

**Table 11.2-8 List of Environmental Impact and Mitigation Measures for Sub-project Works in Dongxiang District**

Project Name	Period of time	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Prevention Measures	Implement Mechanism	Supervision Mechanism	Budget (10,000 yuan,)
Water Supply Sub-project of Xiushui County	Construction Period	Civil construction, construction materials and earthwork transportation, construction access road, etc.	Shu Jia Source, Paishang New Village, Fenglin Village, Upper Xigang, Aijia Village, Cao Jia Village and other Villages along the line	Construction dust, construction waste water, noises generated from construction machinery and transport vehicles, construction wastes, etc.	The construction shall be implemented according to Annex 2 of the Environmental Management Plan of the environmental protection implementation regulations of China Jiangxi Provincial Integrated Rural and Urban Water Supply and Wastewater Management Project	Project Contractor, Construction Supervision	PMO, Municipal Environmental Protection Bureau	Included in project costs
		Construction process of new construction of water plant in Dongxiang District	West-East Gas Transmission Pipeline	Leakage and damage to the excavation of the gas pipe network may caused by the construction of civil works; forced construction with uncleared location of the pipeline may resulting in accidents such as rupture of the pipe network, etc.	The construction scheme shall be constructed after the approval of the Company, the construction scope shall be greater than 50 cm from the gas pipeline; the large-scale operation vehicle shall be reduced passing above the gas pipeline, the width of the operation belt shall be strictly controlled, the cross-laying of pipelines shall be reduced; the corresponding safety management plan shall be made; and the operation of mechanical excavation, blasting, hoisting and hoisting shall be prohibited at the vicinity of the gas pipeline, and emergency measures shall be established in advance; additional piles, beam erection or local excavation protection shall be added in the construction. After the construction, vegetation restoration work shall be carried out on the periphery of the pipeline.	Project Contractor, Construction Supervision	Fuzhou Station of CNPC West-East Gas Transmission	Inclusion of project costs
		Extension Construction of County Pipeline Network in Dongxiang County	G320, S210, S208,S213, G60, High-speed Rail	The settlement of the road surface during the construction process and in the completion of the construction, as well as the pavement uplift caused by the under-digging top pipe, etc.	During the preparation of the project, the design unit shall put forward the construction scheme for pipeline sections related to road facilities. Before the construction, the design unit shall inform them in advance that the construction can be started only after obtaining the permission of the highway department; in the implementation of the project, the management requirements of the highway departments shall be strictly enforced, so as to ensure that the road facilities are not damaged or the highway land is not occupied; strictly control the width of the operation scope, observe the relevant national operation specifications; and restore the affected area in time after the construction is completed. For sections crossing roads and railways, relevant protective measures shall be taken during the construction period and strictly complying with the Technical Specification for Pipe Jacking of Water Supply and Sewerage Engineering (CECS246-2008)	Project Contractor, Construction Supervision	Local road management department	Inclusion of project costs
		New Project of Water Plant in Dongxiang District, Extension Project of County Pipeline Network in Dongxiang District	10m,50m,15m,15m respectively away fromDongxing Technology School, Guangchang Primary School of Dongxiang District, Pogan High School, Xiaohuang Town Nursing Home	Influence of construction on air environment of school; influence of construction of noise to students' class	1. The construction activities shall be arranged in non-teaching time as much as possible, so as to avoid the influence on the teaching order; 2. The construction section near the school shall have a temporary sound barrier with a high noise reduction effect of not less than 2 meters, so as to reduce the influence of noise; 3. Special attention shall be paid to the control of construction period during the construction of the road section near Xiaohuang Nursing Home of Dongxiang District, so as to avoid the rest period at noon and night and so as to avoid the influence of construction noise on the senior citizens in the nursing home.	Project Contractor, Construction Supervision	PMO, Municipal Environmental Protection Bureau	4
		Take soil Discard soil	/	The area of disturbances and damage caused by sub-project construction in Dongxiang District is	1. Control area of water intake pump station Engineering measures: site leveling is 1487m <sup>2</sup> , and the topsoil is back-filled with 700m <sup>3</sup> , drain ditch is 408 meters; Plant measures: landscape greening 1487m <sup>2</sup> , planting of 96 trees, ;	Contractor, Construction Supervision	PMO local environmental protection Bureau, Local Water Conservancy	Cost to be included in water and soil

Project Name	Period of time	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Prevention Measures	Implement Mechanism	Supervision Mechanism	Budget (10,000 yuan,)
				22.13hm <sup>2</sup> ; damage to the water and soil conservation facility area is 22.13hm <sup>2</sup> . In the absence of any water and soil conservation measures, the total amount of water and soil erosion that may be caused by the project is 3515t, and the total amount of newly increased water and soil erosion is 3321t.	<p>Temporary measures: strip 700 m<sup>3</sup> of topsoil, the concrete floor is removed for 500m<sup>2</sup>, build 64m of the soil-filled straw bag retaining wal, 233m<sup>2</sup> of the covered tarpaulin, 125 meters of the drain ditch and 2 of the sand basin.</p> <p>2. Control area of water purification plant Engineering measures: 2.68hm<sup>2</sup> of site leveling, and the topsoil is backfilled with 7700 m<sup>3</sup>, drainage ditches 2340m; Plant Measures: 2.57hm<sup>2</sup> of garden greening, 886m<sup>2</sup> of sowing grass seeds, 208m<sup>2</sup> of greening in parking lot, and planting 46 trees; Temporary measures: 7700 m<sup>3</sup> of topsoil stripping, 202 meters of soil-filled straw bag retaining wall, 2566m<sup>2</sup> of tarpaulin covering, 1286m of drain ditch, 4 sand basins and 1, car washing tank.</p> <p>3. Control area of pipeline engineering Engineering measures: 8.70hm<sup>2</sup> of site leveling , and the topsoil is backfilled with 2600 m<sup>3</sup>, 15.02hm<sup>2</sup> of re-cultivation; Plant measures: 7.84hm<sup>2</sup> of Green Belt Recovery .0.86hm<sup>2</sup> of forrestation and grass planting; Temporary measures: topsoil stripping 2600m<sup>3</sup>, 5400 meters of soil-filled straw bag retaining wall, 38880 m<sup>2</sup> of tarpaulin covering, 5400 meters of color steel plate, and 41 sand basins.</p> <p>4.Control Area of CrossingEngineering Engineering measures: Re-cultivation 0.18hm<sup>2</sup>; Temporary measures: 678 meters of color steel plate, 650 meters of drain ditch, and 46 sand basins.</p>		Bureau	conservation works
	Operating Period	New Project of Water Plant in Dongxiang District	Hefang Reservoir, Hengshan Reservoir	It belongs to the newly added water source area, has not divided the water source protection area, and it is difficult to guarantee the water quality of the reservoir for a long time.	Setting the primary and secondary protection zones, where the range of the first-level protection zone is 1 km upstream to 100 meters downstream from the water area and one side of water intake point to the land area 100m extended from the land surface of embankment angle to the back surface; and the second-level protection zone is 3000 meters upstream of one side of the back surface of the water area and water intake point and land surface extended 100 meters from the land surface of embankment angle to the back surface.	local Water Conservancy Bureau	Local Environmental Protection Bureau; Water Conservancy Bureau	Government budget
The water supply guarantee rate is 90%, which can meet the requirement of water supply guarantee rate of the water plant; the water quality status is in accordance with Class III water quality standard				Installation of online water quality monitoring system	Water plant operating unit	Local Water Conservancy Bureau	Included in the operating expenses of the water plant	
/			Filter tank back-washing waste water, sludge discharge waste water, etc. The back-washing waste water of the filter tank of the tap water plant is transport to the water distribution well for reuse after being lifted by the reuse water tank; The waste water of sludge discharged from the sedimentation tank is concentrated by the sludge concentration tank and the liquid supernatant after concentration is returned to the reuse water tank for reuse the remaining part enters the dewatering machine room to be dehydrated, and the filtrate generated by the sedimentation	Water plant operating unit	Municipal Environmental Protection Bureau	Included in the operating expenses of the water plant		

Project Name	Period of time	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Prevention Measures	Implement Mechanism	Supervision Mechanism	Budget (10,000 yuan,)
					process reaches the municipal sewage standard, and is reused for irrigation and road irrigation in the plant area. The domestic sewage of the staff of the pressurized pumping station shall be discharged into the municipal pipe network after being treated by the septic tank.			
			/	Noise impact of various pump houses	_The noise decrease and noise reduction measures of damping cushion and sound insulation door and window shall be adopted for the dewatering machine room and the back washing room, and the sound absorption wall measures shall be added in addition to the above measures; _Strengthen the operation and maintenance of the equipment. Strictly control the key noise sources (such as fan, water pump, etc.), propose noise control requirements to the equipment manufacturers, and choose low noise equipment as much as possible;	Water plant operating unit	Municipal Environmental Protection Bureau	Included in the operating expenses of the water plant
			/	Sludge and domestic garbage	-After the sludge water of the water purification plant is dehydrated to less than 60% of the water content by drying, the sludge water shall be transported to the domestic garbage landfill site in Yangyuanli of Dongxiang District on a regular basis. _The staff's domestic garbage shall be collected and disposed of by the local sanitation department.	Water plant operating unit	Municipal Environmental Protection Bureau	Included in the operating expenses of the water plant

Project Name	Period of Time	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Prevention Measures	Implement Mechanism	Supervision Mechanism	Budget (10,000 yuan,)
Sub-project of Linchuan County	Construction Period	Civil construction, construction materials and earthwork transportation, construction access road, etc.	Wuhu Yan, Wenquan Town, Zhou Jia Village, Yang Jia Village, Zhu Jia Village, Liangxian Primary School, Dongliang Jia Village and other Villages along the line	Construction dust, construction waste water, noises generated from construction machinery and transport vehicles, construction wastes, etc.	The construction shall be implemented according to Annex 2 of the Environmental Management Plan of environmental protection implementation regulations of China Jiangxi Intergrated Rural and Urban Water Supply and Wastewater Management Project.	Project Contractor, Construction Supervision	PMO, Municipal Environmental Protection Bureau	Included in project costs
		Extension of Town Pipeline in Wenquan Town	Liangxian Primary School	Project pipeline is about 10m from Liangxian Primary School and the noise influence during construction period, and construction fugitive dust influence	During the construction of the project, attentions shall be taken to control the noise. The construction time shall be arranged in the non-teaching time as far as possible to avoid the influence on the teaching order. In the construction activities, it is necessary to pay attention to the water sprinkling and dust falling work. In the construction process, attention shall be paid to safety, and the construction area shall be provided with a temporary sound barrier of not less than 2 meters high with higher noise reduction effect; environmental restoration work shall be carried out timely on the affected area after construction.	Project Contractor, Construction Supervision	Local traffic bureau, local police team	1
		Take soil Discard soil	/	The area of disturbance and damage is 9.96hm <sup>2</sup> ; damage to the water and soil conservation facility area is	(1) Control area of water intake pump station Engineering measures: site leveling is 1487m <sup>2</sup> , and the topsoil is back-filled with 700m <sup>3</sup> , drain ditch is 408 meters;	Contractor, Construction Supervision	Project Dept. and local environmental	Cost to be included in water and soil

Project Name	Period of Time	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Prevention Measures	Implement Mechanism	Supervision Mechanism	Budget (10,000 yuan,)
				9.96hm <sup>2</sup> ; the total amount of water and soil erosion caused by the project may be 3515t, and the total amount of water and soil erosion is 3321t.	<p>Plant measures: landscape greening 1487m<sup>2</sup>, planting of 96 trees, ;</p> <p>Temporary measures: topsoil stripping 700m<sup>3</sup>, the concrete floor is removed for 500m<sup>2</sup>, build 64m of the soil-filled straw bag retaining wall, 233m<sup>2</sup> of the covered tarpaulin, 125 meters of the drain ditch and 2 of the sand basin.</p> <p>(2) Water purification plant control area</p> <p>Engineering measures: site leveling 2.68hm<sup>2</sup>, and the topsoil is back-filled with 7700m<sup>3</sup>, drainage ditches 2340 meters;</p> <p>Plant measures: 2.57hm<sup>2</sup> of garden greening, 886m<sup>2</sup> of sowing grass seeds , 208m<sup>2</sup> of greening in parking lot, and planting 46 trees;</p> <p>Temporary measures: 7700 m<sup>3</sup>of topsoil stripping, 202 meters of soil-filled straw bag retaining wall, 2566m<sup>2</sup> of tarpaulin covering, 1286 meters of drain ditch, 4 sand basins and 1 car washing tank.</p> <p>(3) Control area of pipeline project</p> <p>Engineering measures: 8.70hm<sup>2</sup> of site leveling , and the topsoil is backfilled with 2600 m<sup>3</sup>, 15.02hm<sup>2</sup> of re-cultivation;</p> <p>Plant measures: 7.84hm<sup>2</sup> of Green Belt Recovery .0.86hm<sup>2</sup> of forrestation and grass planting</p> <p>Temporary measures: topsoil stripping 2600m<sup>3</sup>, 5400 meters of soil-filled straw bag retaining wall, 38880 m<sup>2</sup> of tarpaulin covering, 5400 meters of color steel plate, and 41 sand basins.</p> <p>(4) Control Area of Crossing Engineering</p> <p>Engineering measures: Re-cultivation 0.18hm<sup>2</sup>;</p> <p>Temporary measures: 678 meters of color steel plate, 650 meters of drain ditch, and 46 sand basins.</p>		protection Bureau, Local Water Conservancy Bureau	conservation works
Sub-project of Linchuan County	Operating Period	New Project of Second Water Plant in Linchuan District	Chongren River	It belongs to the new water source area, and has not divided the water source protection zone, and is difficult to guarantee the water quality of the reservoir for a long time;	<p>1. Strengthen water-saving and environmental protection publicity;</p> <p>2. Setting the primary and secondary protection zones, where the range of the first-level protection zone is 1 km upstream to 100 meters downstream from the water area and one side of water intake point to the land area 100m extended from the land surface of embankment angle to the back surface; and the second-level protection zone is 3000 meters upstream of one side of the back surface of the water area and water intake point and land surface extended 100 meters from the land surface of embankment angle to the back surface.</p>	local Water Conservancy Bureau	Local Environmental Protection Bureau ; Water Conservancy Bureau	Government budget
					Installing on-line water quality monitoring system;	Water plant operating unit	Local Water Conservancy Bureau	Included in the operating expenses of the water plant
			/	The water plant filter backwash wastewater, sludge discharge wastewater etc.	<p>- the flushing wastewater of the water plant has been upgraded to the back of the water distribution well after the recovery of the water tank;</p> <p>- tank mud wastewater after concentrated sludge concentration pool that the supernatant fluid recycling recycling pool, the rest into the dewatering machine room, the filtrate after precipitation treatment to city miscellaneous water standard back to factory green land irrigation, flushing roads.</p> <p>-- water plant, pressure pumping station staff life sewage treatment of sewage treatment back into the municipal network.</p>	Water plant operating unit	Local Water Conservancy Bureau	/
			Huangshi Village	The noise effects of various pumping stations	-- to reduce noise, noise reduction and noise reduction measures for the dewatering machine room and the anti-flushing room, and increase the			

Project Name	Period of Time	Activities	Environmental Sensitive Point	Potential Impact	Mitigation/Prevention Measures	Implement Mechanism	Supervision Mechanism	Budget (10,000 yuan,)
					sound absorption wall measures in addition to the above measures; -- strengthen equipment operation and maintenance. Strictly control key noise sources (such as fan, water pump, etc.), make noise control requirements to equipment manufacturers, and select low-noise equipment as far as possible;			
			<i>l</i>	Sludge, household waste	-- the sludge water from the water purification plant will be transported to the lion town landfill site in Jiujiang County on a regular basis after the drying rate is less than 60%. -- staff living waste is collected and disposed of by the local sanitation department.			
			Authoritative staff	Chlorine gas leakage may occur in the chlorine-intensive room	(1) to establish safe operation procedures, the staff must be specially trained to operate strictly according to the operation procedures, and the education management shall be strengthened to avoid the leakage of chlorine gas caused by operation mistakes. (2) to strengthen liquid chlorine storage and transport management (3) to strengthen the maintenance and management of equipments (4) to ensure being equipped with necessary protective equipments (5) to formulate contingency plan; to handle in the remote plan, if necessary, to promptly alarm and timely cooperate to deal with the accident. (6) green tree species near the water plant shall be the select with strong resistance to chlorine gas, such as yew, hemlock, jujube, Holly, etc			
			<i>l</i>	Water quality pollution risk of water intake and pipeline	1, according to the specification of design construction, the pipeline maintenance and accident emergency work shall be properly done; pipeline maintenance workers shall receive special training; important node along the pipeline shall be set up with clear identification in order to avoid other units damage in pipeline construction. 2. When crossing major river channels and highways, the materials shall be used to enhance the ability of anti-risk; the pipe shall be set up at a certain distance to set the cut-off valve and the bypass pipe. 3, to establish and improve the engineering water inlet water pollution emergency plan, once finding upstream pollution incident, the water intake and related measures shall be taken in time, according to the pollution disposal situation, real time optimization of diversion scheme, to ensure the safety of water diversion water as much as possible.			

**Table 11.2-9 Summary of Social Impact and Mitigation Measures**

<b>Risk</b>	<b>Measures or actions</b>	<b>Actors</b>	<b>Time</b>	<b>Funding</b>	<b>Monitoring indicators</b>
<b>1. Insufficient project awareness and participation</b>	a) Strengthen publicity on the Project to guide villagers to use tap water and treatment facilities voluntarily; b) Strengthen project information disclosure; c) Optimize the design of water supply and sewer pipelines in consultation with villagers; d) For any inevitable damage, conduct functional restoration or offer compensation properly; e) Set villagers with good water conservation and environmental awareness as examples.	PMOs, design agency, township governments, village committees, villagers	Preparation, construction, operation	Project budget, government finance	a) Project publicity materials, publicity frequency and sign-in form of participants; b) Time, location and participants of publicity; c) Grievances about interior decoration damage and handling; d) Number of villagers recognized
<b>2. LA risks</b>	a) Develop a detailed RAP; b) Pay special attention to the income restoration of vulnerable groups in the RAP.	PMOs, owner, RAP preparation agency, external M&E agency	Preparation, construction	Project budget	a) RAP
<b>3. Construction risks</b>	a) Lay pipelines along flat terrains, and avoid living areas where possible; b) Avoid the busy season of farming; c) Conduct publicity before construction, and carry out construction in segments; d) Take measures to control noise; e) Sprinkle access roads regularly to prevent flying dust; f) Set up non-horning signs in densely populated areas, and avoid overnight construction where possible; g) Strengthen the supervision over material sources to ensure construction quality, and establish a pipeline maintenance mechanism.	PMOs, contractor	Preparation, construction	Budget of the Environmental Management Plan	a) Pipeline routing and distance from living areas; b) Construction time and disbursement of compensation; c) Modes and frequency of publicity; d) Grievances about environmental pollution and handling; e) Inclusion of construction safety management in construction contracts, and safety awareness publicity and education; f) Number of signs and repaired public facilities; g) Material quality and maintenance mechanism
<b>4. Maintenance staff and training, and option comparison</b>	a) Appoint staff for system operation and maintenance, and offer professional training; b) Keep the staff stable and assign responsibilities clearly; c) Establish appeal and supervision mechanisms, and contact points above the village level; d) Conduct option comparison in consideration of operation and maintenance costs.	PMOs, owner, village committees, villagers	Preparation, construction, operation	Project budget, township and village finance	a) Time and scope of training; b) Stability of operation and maintenance staff; c) Establishment of appeal and supervision mechanisms, and contact points above the village level; d) Project design
<b>5. Ability to pay of vulnerable groups</b>	a) Develop preferential policies on water charges and wastewater treatment charges for poor population; b) Hold a public hearing when adjusting water and wastewater treatment rates.	Water supply companies, civil affairs bureaus	Operation	Government finance	a) Number of persons covered by preferential policies, and amount exempted; b) Time, location and participants of the public hearing
<b>6. Women's participation</b>	a) Not less than 40% of participants in public participation activities at the preparation stage should be women; b) Not less than 30% of members of village maintenance teams should be women; c) Compensation should be received after signature by a couple; d) Each project agency (PMOs, water supply companies, sewerage companies, etc.) should have at least two female members; e) Conduct project publicity at times and locations, and in forms suitable for women; f) Tailor publicity to women's cognition; g) Give publicity and training on water conservation and tap water use to women.	Design agency, contractor, PMOs, county / district agencies concerned, township governments, village committees, local women, poor people	Construction, operation	Project budget, government finance	a) Number of public participation activities, number of female participants, and minutes; b) Number and proportion of female members, feedback and suggestions; c) Signature of women; d) Number of female members in project agencies; e) Time, location and mode of publicity and training

<b>7. Job opportunities for vulnerable groups</b>	<ul style="list-style-type: none"> <li>a) Make unskilled jobs first available to women and other vulnerable groups.</li> <li>b) Ensure equal pay to equal work.</li> </ul>	PMOs, contractor, labor and social security bureau, village committees, local women	Construction	Contractor budget	<ul style="list-style-type: none"> <li>a) Number of vulnerable people doing unskilled jobs at the construction stage;</li> <li>b) Number of vulnerable people doing public welfare jobs at the operation stage</li> </ul>
<b>8. Women's employment in IAs</b>	<ul style="list-style-type: none"> <li>a) Recruit some female members for PMOs for the convenience of women-related work;</li> <li>b) Employ a certain number of female workers for water supply companies, such as meter readers and coordinators, running maintenance staff, toll collector, etc.</li> <li>c) Offer training for women's recruitment and employment.</li> </ul>	PMOs, contractor, labor and social security bureau, village committees, local women	Construction	Contractor budget	<ul style="list-style-type: none"> <li>a) Number of vulnerable people doing unskilled jobs at the construction stage;</li> <li>b) Number of vulnerable people doing public welfare jobs at the operation stage;</li> <li>c) Location, scope and frequency of female employees</li> </ul>
<b>9. Impact on power generation</b>	<ul style="list-style-type: none"> <li>a) Coordinate interests between water supply companies and hydropower stations, and offer rational compensation;</li> <li>b) Develop compensation measures based on practical conditions to make up losses arising from water supply.</li> </ul>	Owners, PMOs, water supply companies, power generation companies	Construction	Project budget, profit of water supply company	<ul style="list-style-type: none"> <li>a) Compensation measures between water supply companies and hydropower stations;</li> <li>b) Annual amount of compensation and payment</li> </ul>
<b>10. Social risks</b>	<ul style="list-style-type: none"> <li>a) Strengthen publicity and education on public health and AIDS prevention;</li> <li>b) Include education on public health and AIDS prevention in construction contracts for effective performance;</li> <li>c) Establish a physical checkup mechanism for construction staff (i.e., setting up temporary infirmaries and utilizing local medical resources);</li> <li>d) Conduct diversified publicity on AIDS prevention (brochure, poster, album, etc.);</li> <li>e) Conduct publicity on local social and cultural customs to reduce potential conflicts.</li> </ul>	Contractors, local agencies concerned, owners, enterprises, township governments, village committees	Construction	Project budget, budgets of local agencies concerned	<ul style="list-style-type: none"> <li>a) Provisions of construction contract, and implementation;</li> <li>b) Number of participants in training on public health and AIDS prevention;</li> <li>c) Number of health centers;</li> <li>d) Quantities of publicity materials on AIDS prevention at the construction stage;</li> <li>e) Quantities of publicity materials on local social and cultural customs at the construction stage</li> </ul>

**Table 11.2-10 Summary Table of the Dam Remediation Program**

S/N	Reservoir Name	Location (Township, River)	Total Storage Capacity (10,000 m <sup>3</sup> )	Reservoir Functions	Dam Type	Dam Height (m)	Construction Year	Last Time for Reinforcement	Last Time for Safety Identification	Identification Conclusion	Action Plan for Reinforcement and Improved Management	Estimated Costs (10,000 Yuan)	Operation Management Department
1	Dongjin reservoir in Xiushui county	Upstream of Xiuhe river in Xiushui county, northwest of Jiangxi Province	79500	It is mainly used for power generation, and it also has the flood prevention, irrigation, aquaculture and other comprehensive utilization functions	Reinforced concrete face rock-fill dam	85.5	1995	2012	2010	The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37	Keep observing during flood time.	0	Jiangxi Dongjin Power Generation Co., Ltd
2	Communist Reservoir in Leping City	Middle and upstream of Chexi, tributary of Lean river	14370	It is mainly used for water supply in urban area and irrigation, and it also has the flood prevention, power generation, aquaculture and other comprehensive utilization functions	Earth dam with inclined clay core	34.2	1959	2006	2001	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>(3) Due to the lack of supporting funds, part of the danger elimination and reinforcement project of the reservoir will not be completed according to the approval plan. Therefore, this project has not yet been completed and accepted. Although it does not affect normal and safe operation, we suggest to complete the project as soon as possible.</p> <p>(4) The road upstream of 1# dam is the debris road and is not hardened, and it is relatively simple. There are more weeds and shrubs on both sides, and vehicles are not easy to go on the dam in flood or rainseason, which is not conducive to flood prevention. It is recommended to harden and broaden the road. Weeds upstream and downstream of dam have a rapid speed of growth, and we suggest to regularly clear them.</p> <p>(3)Some rain stations, the tubing have been damaged, it's better to repair them</p>	<p>(1)Due to the lack of supporting funds, part of the danger elimination and reinforcement project of the reservoir will not be completed according to the approval plan. Therefore, this project has not yet been completed and accepted. Although it does not affect normal and safe operation, we suggest to complete the project as soon as possible.</p> <p>(2)The road upstream of 1# dam is the debris road and is not hardened, and it is relatively simple. There are more weeds and shrubs on both sides, and vehicles are not easy to go on the dam in flood or rainseason, which is not conducive to flood prevention. It is recommended to harden and broaden the road. Weeds upstream and downstream of dam have a rapid speed of growth, and we suggest to regularly clear them.</p> <p>(3)Some rain stations, the tubing have been damaged, it's better to repair them</p>	60	Leping Communist Reservoir Engineering Management Bureau

3	Dongfanghong reservoir in Leping City	Tributary of upstream of Lean river, Raohe	1381	It is mainly used for irrigation, and it also has the flood prevention, water supply, aquaculture and other comprehensive utilization functions	Earth dam with cement core	24.0	1969	2010	2005	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>(1) The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable.</p> <p>(2) We suggest that the piezometer tubes should be regularly monitored for reorganization and record keeping</p>	<p>(1) The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable.</p> <p>(2) We suggest that the piezometer tubes should be regularly monitored for reorganization and record keeping</p>	13	Leping Dongfanghong Reservoir Management Institute
4	Happiness reservoir in Leping City	Guanzhuang water tributary of middle of Lean river, Raohe	1267	It is mainly used for irrigation, and it also has the flood prevention, aquaculture and other comprehensive utilization functions	Earth dam with cement and clay core	22.8	1958	2010	2002	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>(1)The piezometer tubes should be regularly monitored for reorganization and record keeping.</p> <p>(2) The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable.</p>	<p>(1)The piezometer tubes should be regularly monitored for reorganization and record keeping.</p> <p>(2) The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable.</p>	13	Leping Happiness Reservoir Management Institute

5	Gongqiang reservoir in Leping City	Kengpan water of downstream of Lean river	1412	It is mainly used for irrigation, and it also has the flood prevention, aquaculture, travel and other comprehensive utilization functions	Homogeneous earth dam	16.0	1958	2012	2008	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>(1) The weeds in the downstream slope of the dam grow faster and are regularly cleared. The water level of downstream dam is higher than that of the drainage dikes. It is suggested to reduce the water level in the ponds and to inspect whether there is abnormal water seepage in the ponds during the flood season.</p> <p>(2) There is water resistance phenomenon in the inlet of spillway, and we suggest to remove.</p> <p>(3) It is suggested that the flood prevention contingency plan prepared by the reservoir management townships should be refined, specific and operable with the relevant charts.</p> <p>(4) We suggest to improve the relevant safety management system</p>	<p>(1) The weeds in the downstream slope of the dam grow faster and are regularly cleared. The water level of downstream dam is higher than that of the drainage dikes. It is suggested to reduce the water level in the ponds and to inspect whether there is abnormal water seepage in the ponds during the flood season.</p> <p>(2) There is water resistance phenomenon in the inlet of spillway, and we suggest to remove.</p> <p>(3) It is suggested that the flood prevention contingency plan prepared by the reservoir management townships should be refined, specific and operable with the relevant charts.</p> <p>(4) We suggest to improve the relevant safety management system</p>	33	Leping Town Qiaozhen Water Management Station
6	Gaofang reservoir in Jinxi county	Junction of Huangtong and Lufang in Jinxi county	6750	It is mainly used for water supply, with irrigation, flood prevention and power generation	Homogeneous earth dam	40.2	1959	2013	2002	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>We suggest to update and improve the flood prevention plan and relevant management system</p>	<p>We suggest to update and improve the flood prevention plan and relevant management system</p>	8	Jinxi County Gaofang Reservoir Management Bureau

7	Hefang reservoir in Dongxiang district	Hefang village of Dongjiaoxiaogang in Dongxiang district	1138	It is mainly used for water supply, and combined with irrigation, flood prevention and other comprehensive utilization functions	Earth dam with inclined clay core	16.7	1961	2009	2002	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable</p>	<p>The reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, making the plan more scientific and operable</p>	5	Dong Xiang District Hefang Reservoir Engineering Management Bureau
8	Hengshan reservoir in Dongxiang district	Hengshan village of Xiaohuang township in Dongxiang district	2879	It is mainly used for irrigation, and it also has the flood prevention, daily water supply, aquaculture, and other comprehensive utilization functions	Earth dam with cement core	25.2	1959	2010	2004	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>The mountain formed of the new construction of road on the right bank of the dam near the upper reaches of the bank is relatively steep, the rock mass is broken and the weathering is serious, forming a hidden danger. It is suggested that the contractor should take appropriate safety measures.</p>	<p>The mountain formed of the new construction of road on the right bank of the dam near the upper reaches of the bank is relatively steep, the rock mass is broken and the weathering is serious, forming a hidden danger. It is suggested that the contractor should take appropriate safety measures.</p>	20	Dongxiang District Hengshan Reservoir Engineering Management Bureau
9	Happniess Reservoir in Dongxiang district	Zhujiayuan of Xiaomin Town in Dongxiang district	4675	It is mainly used for urban industry, domestic water supply, agriculture irrigation, flood prevention and aquaculture	Earth dam with clay core	21.0	1958	2004	2000	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>Being flushed by wind and waves, the rocks piled up at the upstream of the reservoir are very messy, which should be smoothed out timely.</p>	<p>Being flushed by wind and waves, the rocks piled up at the upstream of the reservoir are very messy, which should be smoothed out timely.</p>	30	Dongxiang district Happniess Reservoir Engineering Management Bureau

10	Longyuankou reservoir in Yongxin county	Upstream of Longyuankou, and upstream of Hengxi village in Longyuankou township, Yongxin county	4560	It has irrigation, flood prevention, power generation and other comprehensive benefits	Fine stone concrete block stone hyperbolic arch dam	57.3	1992	2010	2007	<p>The main responsibility for the operation management of the reservoir dam is clear and well-defined, the rules and regulations are sound, various performance indicators of the reservoir have met the standard requirements, and the proposed operation and maintenance supervision plan, and the emergency plan can effectively maintain and guarantee the safe operation of the reservoir dam. In general, the reservoir dam meets the requirements of World Bank Safeguard Policy OP4.37</p> <p>(1) The mountain and rock body of dam left bank near the dam road bend and the right dam abutment roadside are relatively steep, broken and weathering is serious, forming a hidden danger. We suggest to take safety measures;</p> <p>(2) We suggest that the reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, and we should make the plan more scientific and operable</p>	<p>(1) The mountain and rock body of dam left bank near the dam road bend and the right dam abutment roadside are relatively steep, broken and weathering is serious, forming a hidden danger. We suggest to take safety measures;</p> <p>(2) We suggest that the reservoir management department should prepare the flood prevention plan according to requirements of <i>Guidelines for the Preparation of Emergency Response Plan for Reservoir Flood Prevention</i>, and we should make the plan more scientific and operable</p>	25	Yongxin County Longyuankou Reservoir Engineering Management Bureau
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## **11.3 Environmental Monitoring Plan**

### **11.3.1 Purpose of monitoring**

The environmental monitoring includes two phases of the project, construction period and operation period, the purpose of which is to provide comprehensive and timely information on the pollution dynamics of the proposed project, understand the environmental quality change degree, influence scope, and the environment quality dynamics of the operation period in the area where the project construction is located, and timely report the condition information to the competent department, to provide scientific basis for environmental management of the project.

### **11.3.2 Environmental Monitoring Agency**

The environmental monitoring of the construction period and the operation period shall be borne by the project contractor or the operator to qualified agency, which shall be the national environmental quality monitoring certificating unit with full equipment and high technology that the environment monitoring task undertaken can be completed with few difficulties.

### **11.3.3 Implementation of monitoring**

According to the environmental impact prediction result, take the sensitive focus which may be more obvious as the monitoring point, to track the pollution situation during the construction period and operation period of the project on noise, air environment and surface water environment, which have greater impacts on the environment. The monitoring factors should be determined according to the engineering pollution characteristic factors. The monitoring and analysis method adopts the corresponding monitoring and analysis method of the project in the *Environmental Monitoring Technical Specification* promulgated by the State Environmental Protection Administration. And the evaluation standard of each sub-project shall be carried out according to the national standard for environmental assessment.

This project monitoring focuses on construction period and operation period. The key scope of project environmental monitoring includes the surrounding environment of 7 counties, (prefectures

and districts) in the project area. See Table 11.3-1 to Table 11.3-8 for the Project Monitoring Plan for Water Supply Project and Sewage Treatment Plant of the Project.

**Table 11.3-1 Environmental Monitoring Plan and Budget Details for the Sub-project of County Yongxin**

Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (Quantity)	Monitoring items	Monitoring frequency	Unit price (yuan)	Annual cost (Yuan/year)	Monitoring Institution
Urban water supply facilities construction project	Construction period	Noise	Sensitive points along the original water pipes: 1 monitoring point is set separately at the east side of the river, the Longyuan port and the Shang Qiaotou Village	LeqdB (A)	Once a quarter, 2 days/term, 2 times/day, once every day and night	300	3600	Units with monitoring qualifications
		Surface water	Each monitoring section shall be arranged at 500m from upstream and 500m from downstream of the Three Bay Bridge of Hehe River	PH, DO, total phosphorus NH3-N, COD, BOD <sub>2</sub> Petroleum	The construction influence period shall be detected once a day for 2 days	1000	6000	
		Construction Waste water	1 monitoring point shall be on the drainage port of the construction sedimentation tank	COD, BOD <sub>5</sub> , SS	3 terms/year, 1 day/term, 1 time./day	1000	3000	

Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (Quantity)	Monitoring items	Monitoring frequency	Unit price (yuan)	Annual cost (Yuan/year)	Monitoring Institution
	Operating Period	water and soil erosion	There are four observation sites and six sample sites	<p>(1)Disturbance surface area, t digging and filling amount, runoff amount, temporary piled up, the number of temporary protection measures and control effects of soil and water erosion area shall be monitored.</p> <p>(2) changes in soil erosion and erosion of water, and the effect of soil erosion on the prevention and control measures shall be monitored.</p> <p>(3) the quantity and quality of soil and water conservation control measures, the survival rate, retention rate, growth situation and coverage of forest grass measures, the stability, integrity and operation of the engineering measures shall be monitored.</p> <p>(4) soil and water conservation measures are being implemented</p> <p>(5) changes in topography, topography and water systems</p>	<p>Background check 1 time.</p> <p>During the construction and natural convalescence period during the rainy season (April ~ September), once every month, the non-rainy season shall be monitored once every three months.</p> <p>During the rainstorm period (the daily rainfall is greater than 50mm).</p> <p>Soil and water conservation years shall be monitored three to four times.</p> <p>Soil and water conservation measures being implemented shall be continuously monitored and monitored every 10 days.</p> <p>The changes in the topography, topography and water systems, and the damage to the downstream and surrounding areas shall be monitored at least once every six months.</p>	5000	200000	

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Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (Quantity)	Monitoring items	Monitoring frequency	Unit price (yuan)	Annual cost (Yuan/year)	Monitoring Institution
		Atmosphere	1 monitoring point shall be set on the boundary of the water plant	Cl <sub>2</sub>	4 terms./year, 1 day/term	600	2400	
		Surface water	The Longyuankou Reservoir has 3 monitoring points: 500m from upstream of the water intake, water intake and 1,000m from the downstream of the water intake;	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	3 terms/yearforlow flow period, high flow period ,and normal flow period : 1 Phase., 3 days/term, 1 time/day	2000	10000	Be included in routine monitoring of water plant
			The water inlet and the water outlet of the water plant are respectively provided with monitoring points;	Color, turbidity, smell and taste, gross visible matter, ph, total hardness (calculated as caco3), aluminum, iron, manganese, copper, zinc, anionic synthetic detergent, volatile phenol, sulfate, chloride, fluoride, cyanide, total soluble solids, arsenic, selenium, mercury, cadmium, chromium (hexavalent)), lead, nitrate nitrogen, chloroform, carbon tetrachloride, total number of colonies, total coliforms, heat-resistant coliforms, free residual chlorine, ammonia , oxygen consumption	According to the water plant management requirements	2000	20000	Be included in routine monitoring of water plant
County city water supply	Construction period	Surface water	Monitoring section shall be separately set for 500m from upstream and 500m	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	The construction influence period shall be detected for 2 days and once a day	1000	3000	Institutions with monitoring

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Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (Quantity)	Monitoring items	Monitoring frequency	Unit price (yuan)	Annual cost (Yuan/year)	Monitoring Institution
network extension project			from downstream of Tianxi Village of Rongjiang River					qualifications
		Noise	Monitoring points are arranged separately at the Guangming Village of Lianzhou Township, Longan Village of Fengxiang Town, Taishan Village of Gaolou Bridge Town, Quantang Village of Huaizhong Town and Qishan Village of Shiqiao Town	LeqdB (A)	Once a quarter, 1 day/term, 2 times/day, once every day and night	300	6000	

**Table 11.3-2 Environmental Monitoring Plan and Budget Details for the Sub-project of County Jinxi**

Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (Quantity)	Monitoring items	Monitoring frequency	Unit price (yuan/year)	Annual cost (yuan/year)	Monitoring Institutions
County city water supply network extension project	Construction period	Noise	Along the original water pipeline line: monitoring points are arranged separately at Shuangtang Town, Chonglu Town of He City, Zufang Town	LeqdB (A)	Once a quarter, 1 day/term, 2 times/day, once every day and night	300	3600	Institutions with monitoring qualifications
Huangtong Township Water Supply Project	Construction period	Noise	Along the original water pipeline: 1 monitoring point is set at Huangtong Town, Huangtong Township	LeqdB (A)	Once a quarter, 1 day/term, 2 times/day, once every day and night	300	1200	
		Construction wastewater	1 monitoring point shall be set at the drainage port of the construction sedimentation tank	COD, BOD <sub>5</sub> , SS	3 terms/year, 1 day/term, onceday	1000	3000	
	Operating Period	Atmosphere	Monitoring point shall be set at the expansion water plant and the boundary of water intake pump house	Cl <sub>2</sub>	Once a quarter, 1 day/term	600	2400	
		water and soil	Set six observations and eight sample	(1)Disturbance surface area, digging and filling amount, runoff amount emporary piled up, the number of temporary	Background value check once time. During the construction period and	5000	224000	

		erosion sites	<p>protection measures and control effects of soil and water erosion area shall be monitored.</p> <p>(2) changes in soil erosion and erosion of water, and the effect of soil erosion on the prevention and control measures shall be monitored.</p> <p>(3) the quantity and quality of soil and water conservation control measures, the survival rate, retention rate, growth situation and coverage of forest grass measures, the stability, integrity and operation of the engineering measures shall be monitored.</p> <p>(4) soil and water conservation measures are being implemented</p> <p>(5) changes in topography, topography and water systems</p>	<p>natural convalescence period during the rainy season (April ~ September), once every month, the non-rainy season shall be monitored once every three months.</p> <p>During the rainstorm period (the daily rainfall is greater than 50mm).</p> <p>Soil and water conservation years shall be monitored three to four times.</p> <p>Soil and water conservation measures being implemented shall be continuously monitored and monitored every 10 days.</p> <p>The changes in the topography, topography and water systems, and the damage to the downstream and surrounding areas shall be monitored at least once every six months.</p>			
		Surface water	<p>Three monitoring points: 500m from upstream of water intake, water intake and 1,000m from downstream of water intake</p> <p>Water temperature, pH, DO, permanganate index, total phosphorus, total nitrogen, NH3-N, COD, BOD5, copper, zinc, fluoride, selenium, arsenic, mercury, cadmium, chromium, lead, cyanide, volatile phenol, petroleum, anionic surfactant, sulfide, fecal coliforms,</p>	<p>3 terms/year, low flow period, high flow period, and normal flow period 3 days/term, once aday</p>	2000	30000	Be included in routine monitoring of water plant

**Table11.3-3 Environmental Monitoring Plan and Budget Details for the Sub-project of County Nanfeng**

Sub-project	Monitoring Period	Environmental elements	Monitoring point layout (quantity)	Monitoring items	Monitoring frequency	Unit price (Yuan/Period)	Annual cost (yuan/year)	Monitoring Institution
Extension project of tap water pipe network in County	Construction period	Surface water	Monitoring sections shall be separately set at 500m from upstream and 500m downstream of the Junfeng Bridge of Shishan County, 500m from the upstream, and 500m downstream of Jiulian Bridge in Laixi Township	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	The construction influence period shall be detected for 2 days and once a day	1000	6000	Institutions with monitoring qualifications
		Noise	Sensitive points along the pipe network: monitoring points are separately set up in the town of County Shishan, Changling Village of Qiawan County, Laixi Township Primary School.	LeqdB (A)	Once a quarter, 1 day/term, twice/day, once every day and night	300	3600	
		water and soil erosion	There are four observation sites and six sample sites	(1)Disturbance surface area, t digging and filling amount, runoff amount, temporary piled up in the area of pile soil, useless quantity layer stripping and temporary piled up, the number of temporary protection measures and control effects of soil and water erosion area of change (2) changes in soil erosion and erosion of water, and the effect of soil erosion on the prevention and control measures (3) the quantity and quality of soil and water conservation control measures, the survival rate, retention rate, growth situation and coverage of forest grass measures, the stability, integrity and operation of the engineering	Background value check once time; During the construction period and natural convalescence period during the rainy season (April ~ September), once every month, the non-rainy season will be monitored once every three months. During the rainstorm period (the daily rainfall is greater than 50mm). Soil and water conservation years shall be monitored three to four times. Soil and water conservation measures	5000	180000	

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				<p>measures</p> <p>(4) soil and water conservation measures being implemented</p> <p>(5) changes in topography, topography and water systems</p>	<p>being implemented shall be continuously monitored and monitored every 10 days.</p> <p>The changes in the topography, topography and water systems, and the damage to the downstream and surrounding areas shall be monitored at least once every six months.</p>			
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**Table11.3-4 Environmental Monitoring Plan and Budget Details for the Sub-project of County Leping**

Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (quantity)	Monitoring items	Monitoring frequency	Unit price (yuan/year)	Annual cost (Yuan/year)	Monitoring Institution
Expansion Project of Water Plant in LepingCity	Construction period	Surface water	Monitoring sections shall be set at 500m from upstream of the Gutian Bridge and 500m from downstream of the Gutian Bridge	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	The construction influence period shall be detected for 2 days and once a day	2000	4000	Institutions with monitoring qualifications
		Construction wastewater	The monitoring point shall be on the drainage port of the construction sedimentation tank	COD, BOD <sub>5</sub> , SS	3 terms/year, 1 day/term, once a day	1000	3000	
		Noise	Primary SchoolStar Experimental kindergarden, Huanggang Town	LeqdB (A)	Once a quarter, 1 day/term, twice/day, and once every day and night	300	6000	
		Water and soil erosion	There are four observation sites and six sample sites	(1)Disturbance surface area, t digging and filling amount, runoff amount, temporary piled up in the area of pile soil, useless quantity layer stripping and temporary piled up, the number of temporary protection measures and control effects of soil and water erosion area of change  (2) changes in soil erosion and erosion of water, and the effect of soil erosion on the prevention and control measures  (3) the quantity and quality of soil and water conservation control measures, the survival rate, retention rate, growth situation and	Background value check once time.  During the construction period and natural convalescence period during the rainy season (April ~ September), once every month, the non-rainy season will be monitored once every three months.  During the rainstorm period (the daily rainfall is greater than 50mm).  Soil and water conservation years shall be monitored three to four	5000	200000	

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Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (quantity)	Monitoring items	Monitoring frequency	Unit price (yuan/year)	Annual cost (Yuan/year)	Monitoring Institution
				coverage of forest grass measures, the stability, integrity and operation of the engineering measures  (4) soil and water conservation measures being implemented  (5) changes in topography, topography and water systems	times.  Soil and water conservation measures being implemented shall be continuously monitored and monitored every 10 days.  The changes in the topography, topography and water systems, and the damage to the downstream and surrounding areas shall be monitored at least once every six months.			
	Operating Period	Atmosphere	Monitoring point shall be set at the expansion water plant and the boundary of water intake pump house	Cl <sub>2</sub>	Once a quarter, 1 day/term	600	2400	
		Surface water	There are 3 monitoring points in the Communist Reservoir: 500m from upstream of the water intake, water intake and 1,000m from downstream of the water intake;	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	3 terms/year,for the low flow period ,high flow period, and normal flow period 3 days/term, once day	2000	10000	Be Included in routine monitoring of water plant
			The water inlet and the water outlet of the water plant are respectively provided with monitoring points;	Color, turbidity,smell and taste, gross visible matter, ph, total hardness (calculated as CaCO <sub>3</sub> ), aluminum, iron, manganese, copper, zinc, anionic synthetic detergent, volatile phenol, sulfate,	Fixed according water plant management requirements	2000	20000	Be Included in routine monitoring of water plant

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Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (quantity)	Monitoring items	Monitoring frequency	Unit price (yuan/year)	Annual cost (Yuan/year)	Monitoring Institution
				chloride, fluoride, cyanide, total soluble solids, arsenic, selenium, mercury, cadmium, chromium (hexavalent), lead, nitrate nitrogen, chloroform, carbon tetrachloride, total number of colonies, total coliforms, heat-resistant coliforms, free residual chlorine, ammonia nitrogen, oxygen consumption,				
County city water supply pipeline extension project	Construction period	Noise	Primary SchoolStar Experimental kindergarden, Huanggang Town, Handu Village of Legang Town, and Wankou Primary School of Hougang Villiage; and one monitoring point shall be set for the integrated pressurized pump station	LeqdB (A)	Once a quarter, 1 day/term, twice/day, and once every day and night	300	6000	Institutions with monitoring qualifications
Reconstruction and Extension Project of Rural Water Supply Network	Construction period	Noise	Each monitoring point is arranged at Chang Songgang Village of Yongshan Town, Zhongnao Village of Zhongbu Town, Cangxia Village of Shiligang Town, Mingkou Township, Longkou Village of Gaojia Town, and Wukou Town; and 1 monitoring point is set in the integrated pressurizing pump station.	LeqdB (A)	Once a quarter, 1 day/term, twice/day, once every day and night	300	7200	
Lilin Water Plant Extension Project	Construction period	Construction wastewater	The monitoring point shall be provided at the drainage port of the construction sedimentation tank	COD, BOD <sub>5</sub> , SS	3 terms/year, 1 day/term, once a day	1000	3000	
	Operating	Atmosphere	The monitoring point shall be set at	Cl <sub>2</sub>	Once a quarter, 1	600	2400	

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Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (quantity)	Monitoring items	Monitoring frequency	Unit price (yuan/year)	Annual cost (Yuan/year)	Monitoring Institution
	Period		the boundary of the water plant		day/term			
		Surface water	There are 3 monitoring points for the An Yin water: 500m from section upstream of the water intake, water intake and 1,000m from downstream of the water intake;	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	3 terms /year, for low flow period, high flow period, and normal flow period , 3 days/term, once a day	2000	10000	Be Included in routine monitoring of water plant
			The water inlet and the water outlet of the water plant are respectively provided with monitoring points;	Color, turbidity, odor and taste, gross visible matter, ph, total hardness (calculated as caco3), aluminum, iron, manganese, copper, zinc, anionic synthetic detergent, volatile phenol, sulfate, chloride, fluoride, cyanide, total soluble solids, arsenic, selenium, mercury, cadmium, chromium (hexavalent)), lead, nitrate nitrogen, chloroform, carbon tetrachloride, total number of colonies, total coliforms, heat-resistant coliforms, free residual chlorine, ammonia nitrogen, oxygen consumption,	Fixed according to water plant management requirements	2000	20000	Be Included in routine monitoring of water plant

**Table 11.3-5 Environmental Monitoring Plan and Budget Details for the Sub-project of Xiushui**

Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (quantity)	Monitoring items	Monitoring frequency	Unit price (yuan/year)	Annual cost (Yuan/year)	Monitoring Institution
Expansion Project of Water Plant in Xiushui County	Construction period	Noise	Along the original water pipeline: Zhishan Yuan Village and Shangwu Ping Village each set 1 monitoring point	LeqdB (A)	Once a quarter, 1 day/term, twice/day, once every day and night	300	2400	Institutions with monitoring qualifications
		Construction wastewater	The monitoring point shall be provided for the drainage port of the construction sedimentation tank	COD, BOD <sub>5</sub> , SS	3 terms/year, 1 day/term, once a day	1000	3000	
		Water and soil erosion	There are four observation sites and six sample sites	(1)Disturbance surface area, t digging and filling amount, runoff amount, temporary piled up in the area of pile soil, useless quantity layer stripping and temporary piled up, the number of temporary protection measures and control effects of soil and water erosion area of change  (2) changes in soil erosion and erosion of water, and the effect of soil erosion on the prevention and control measures  (3) the quantity and quality of soil and water conservation control measures, the survival rate, retention rate, growth situation and coverage of forest grass measures, the stability, integrity and operation of the engineering measures  (4) soil and water conservation measures being implemented  (5) changes in topography, topography and water systems	Background value check once time.  During the construction period and natural convalescence period during the rainy season (April ~ September), once every month, the non-rainy season will be monitored once every three months.  During the rainstorm period (the daily rainfall is greater than 50mm).  Soil and water conservation years shall be monitored three to four times.  Soil and water conservation measures being implemented shall be continuously monitored and	5000	120000	

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					monitored every 10 days.  The changes in the topography, topography and water systems, and the damage to the downstream and surrounding areas shall be monitored at least once every six months.			
	Operating Period	Atmosphere	The monitoring point shall be set at the boundary of the water plant	Cl <sub>2</sub>	Once a quarter, 1 day/term	600	2400	
		Surface water	There are 3 monitoring points in Dongjin Reservoir: section 500m from upstream of water intake, water intake, and 1,000m from downstream of water intake;	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	3 terms /year, for low flow period, high flow period, and normal flow period, 3 days/term, once a /day	2000	10000	Be Included in routine monitoring of water plant
			The water inlet and the water outlet of the water plant are respectively provided with monitoring points;	Color, turbidity, odor and taste, gross visible matter, ph, total hardness (calculated as CaCO <sub>3</sub> ), aluminum, iron, manganese, copper, zinc, anionic synthetic detergent, volatile phenol, sulfate, chloride, fluoride, cyanide, total soluble solids, arsenic, selenium, mercury, cadmium, chromium (hexavalent)), lead, nitrate nitrogen, chloroform, carbon tetrachloride, total number of colonies, total coliforms, heat-resistant coliforms, free residual chlorine, ammonia nitrogen, oxygen consumption,	Fixed according to the water plant management requirements	2000	20000	Be Included in routine monitoring of water plant
New Construction and Reconstruction Project of Township Network	Construction period	Surface water	Monitoring sections shall be arranged at 500m from upstream and 500m from downstream of Dongjin River Dongjin Bridge respectively.	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	The construction influence period shall be detected for 2 days and once a day	1000	2000	Institutions with monitoring qualifications
		Noise	Monitoring points are arranged at the ZhajinVillage Zhajin Town, Xiushui Village of Shankou Town, the Gangbei Village of the Gangkou Town, and the Xizhuang Village of Xigang Town.	LeqdB (A)	Once quarter, 1 day/term, twice/day, once every day and night	300	6000	

**Table 11.3-6 Environmental Monitoring Plan and Budget Details for the Sub-project of Linchuan District**

Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (Quantity)	Monitoring items	Monitoring frequency	Unit price (yuan/year)	Annual cost (Yuan/year)	Monitoring Institutions
New Project of Water Plant in Linchuan District	Construction period	Noise	Four monitoring points in each layout of water plant and water intake pump house	LeqdB (A)	Once a quarter, 1 day/term, twice/day, once every day and night	300	4800	Institutions with monitoring qualifications
		Construction wastewater	1 monitoring point	COD, BOD <sub>5</sub> , SS	Phase 3/year, 1 day/period, 1 time./day	2400	7200	
		Water and soil erosion	There are four observation sites and six sample sites	(1)Disturbance surface area, t digging and filling amount, runoff amount, temporary piled up in the area of pile soil, useless quantity layer stripping and temporary piled up, the number of temporary protection measures and control effects of soil and water erosion area of change (2) changes in soil erosion and erosion of water, and the effect of soil erosion on the prevention and control measures (3) the quantity and quality of soil and water conservation control measures, the survival rate, retention rate, growth situation and coverage of forest grass measures, the stability, integrity and operation of the engineering measures (4) soil and water conservation measures being implemented (5) changes in topography, topography and water	Background value check once time. During the construction period and natural convalescence period during the rainy season (April ~ September), once every month, the non-rainy season will be monitored once every three months. During the rainstorm period (the daily rainfall is greater than 50mm). Soil and water conservation years shall be monitored three to four times. Soil and water conservation measures being implemented shall be continuously monitored and monitored every 10 days. The changes in the topography, topography and water systems, and the damage to the downstream and	5000	200000	

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				systems	surrounding areas shall be monitored at least once every six months.			
	Operating Period	Atmosphere	The monitoring point shall be set at the boundary of the water plant	Cl <sub>2</sub>	Phase 1/quarter, 1 day/period	600	2400	
		Surface water	Three monitoring sections of Chongren River: section 500m from upstream of water intake, water intake and 1,000m from downstream of water intake;	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	Phase 3/year, for low flow period, high flow period, and normal flow period, 3 days/term, once a day	2000	10000	Be included in routine monitoring of water plant
			The water inlet and the water outlet of the water plant are respectively provided with monitoring points;	Color, turbidity, odor and taste, gross visible matter, ph, total hardness (calculated as CaCO <sub>3</sub> ), aluminum, iron, manganese, copper, zinc, anionic synthetic detergent, volatile phenol, sulfate, chloride, fluoride, cyanide, total soluble solids, arsenic, selenium, mercury, cadmium, chromium (hexavalent)), lead, nitrate nitrogen, chloroform, carbon tetrachloride, total number of colonies, total coliforms, heat-resistant coliforms, free residual chlorine, ammonia nitrogen, oxygen consumption,	Fixed according to the water plant management requirements	2000	20000	Be included in routine monitoring of water plant
		Noise	4 monitoring points shall be set at the boundary of the water plant and the boundary of the water pump house; 1 monitoring point shall be set in Huangshi Village	LeqdB (A)	4 terms/year, 1 day/term, twice/day, once every day and night	300	6000	Institutions with monitoring qualifications
Water Supply Pipeline Extension	Construction period	Surface water	Monitoring sections shall be set at 500m from upstream of and 500m from downstream of	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	The construction influence period shall be detected for 2 days and once a day	1000	2000	

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on Project in Linchuan District		Linchuan Bridge of Chongchuan River					
	Noise	The monitoring points are respectively set in the Lijia Village of Wenquan Town, Liancheng Town and Hujia Village in Chonggang Town.	LeqdB (A)	4 terms/year, 1 day/term, twice/day, once every day and night	300	2700	

**Table 11.3-7 Environmental Monitoring Plan and Budget Details for the Sub-project of Dongxiang District**

Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (Quantity)	Monitoring items	Monitoring frequency	Unit price (yuan/year)	Annual cost (Yuan/year)	Monitoring Institutions
New Project of Water Plant in Dongxiang District	Construction period	Noise	Along the original water pipeline: 1 monitoring point shall be set in the Village of Daping	LeqdB (A)	4 terms/year, 1 day/term, twice/day, once every day and night	300	1200	Institutions with monitoring qualifications
		Construction wastewater	The monitoring point shall be provided for the drainage port of the construction sedimentation tank	COD, BOD <sub>5</sub> , SS	3 terms/year, 1 day/term, once a /day	1000	3000	
		Water and soil erosion	There are four observation sites and six sample sites	(1)Disturbance surface area, t digging and filling amount, runoff amount, temporary piled up in the area of pile soil, useless quantity layer stripping and temporary piled up, the number of temporary protection measures and control effects of soil and water erosion area of change (2) changes in soil erosion and erosion of water, and the effect of soil erosion on the prevention and control measures (3) the quantity and quality of soil and water conservation control measures, the survival rate, retention rate, growth situation and coverage of forest grass measures, the stability, integrity and operation of the engineering measures (4) soil and water conservation	Background value check once time. During the construction period and natural convalescence period during the rainy season (April ~ September), once every month, the non-rainy season will be monitored once every three months. During the rainstorm period (the daily rainfall is greater than 50mm). Soil and water conservation years shall be monitored	5000	200000	

				measures being implemented  (5) changes in topography, topography and water systems	three to four times.  Soil and water conservation measures being implemented shall be continuously monitored and monitored every 10 days.  The changes in the topography, topography and water systems, and the damage to the downstream and surrounding areas shall be monitored at least once every six months.			
Operating Period	Atmosphere	The monitoring point shall be set at the boundary of the water plant	Cl <sub>2</sub>	Once a quarter, 1 day/term	600	2400		
	Surface water	Three monitoring sections are arranged in each of the Hefang Reservoir and Hengshan Reservoir: 500m from upstream of the water intake, water intakes and 1,000m from downstream of the water intake;	PH, DO, total phosphorus, NH <sub>3</sub> -N, COD, BOD <sub>5</sub> , petroleum class	3 terms/year, for low flow period, high low period, and normal flow period, 3 days/term, once a day	2000	10000	Be included in routine monitoring of water plant	
		The water inlet and the water outlet of the water plant are respectively provided with monitoring points;	Color, turbidity, odor and taste, gross visible matter, ph, total hardness (calculated as caco3), aluminum, iron, manganese, copper, zinc, anionic synthetic detergent, volatile phenol, sulfate, chloride, fluoride, cyanide,	Fixed according to the water plant management requirements	2000	20000	Be included in routine monitoring of water plant	

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				total soluble solids, arsenic, selenium, mercury, cadmium, chromium (hexavalent)), lead, nitrate nitrogen, chloroform, carbon tetrachloride, total number of colonies, total coliforms, heat-resistant coliforms, free residual chlorine, ammonia nitrogen, oxygen consumption,				
County city pipe network extension project	Construction period	Noise	Monitoring points shall be set at Xiaohuang Town and Pogan Middle School	LeqdB (A)	4 terms/year, 1 day/term, twice/day, once every day and night	300	2400	Institutions with monitoring qualifications

**Table 11.3-8 Environmental Monitoring Plan for Sewage Treatment Project**

Item (s)	Monitoring Period	Environmental elements	Monitoring point layout (quantity)	Monitoring items	Monitoring frequency	Unit price (yuan/year)	Annual cost (Yuan/year)	Monitoring Institutions
Construction of new sewage pipe network and sewage treatment plant in Mujin Town, Xiushui County	Construction period	Noise	4 monitoring points shall be set at the boundary of sewage treatment plant	LeqdB (A)	4 terms /year, 1 day/term, twice/day, once every day and night	300	4800	Institutions with monitoring qualifications
		Surface water	Monitoring sections are arranged at 500m from upstream of the Zhajin River and 500m from downstream of the Zhajin River	pH, DO, COD, BOD <sub>5</sub> , NH <sub>3</sub> -N, TP	The construction influence period shall be detected for 2 days and once a day	1000	3000	
		Construction wastewater	The monitoring point shall be provided for the drainage port of the construction sedimentation tank	COD, BOD <sub>5</sub> , SS	3 terms/year, 1 day/term, once/day	1000	3000	
		Water and soil erosion	There are four observation sites and six sample sites	(1)Disturbance surface area, t digging and filling amount, runoff amount, temporary piled up in the area of pile soil, useless quantity layer stripping and temporary piled up, the number of temporary protection measures and control effects of soil and water erosion area of change (2) changes in soil erosion and erosion of water, and the effect of soil erosion on the prevention and control measures (3) the quantity and quality of soil and water conservation control measures, the survival rate, retention rate, growth situation and coverage of forest grass	Background value check once time. During the construction period and natural convalescence period during the rainy season (April ~ September), once every month, the non-rainy season will be monitored once every three months. During the rainstorm period (the daily rainfall is greater than 50mm). Soil and water conservation years shall be monitored three to four times. Soil and water conservation	5000	400000	

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				measures, the stability, integrity and operation of the engineering measures  (4) soil and water conservation measures being implemented  (5) changes in topography, topography and water systems	measures being implemented shall be continuously monitored and monitored every 10 days.  The changes in the topography, topography and water systems, and the damage to the downstream and surrounding areas shall be monitored at least once every six months.			
Operating Period	Atmosphere	The monitoring point shall be set on the boundary of sewage treatment plant	H <sub>2</sub> S, NH <sub>3</sub>		Once quarter, 1 day/term	1500	6000	
	Surface water	Three monitoring sections are arranged in the Zhajin River: section 500m from upstream of the water outlet, water intake and 1,000m from downstream of the water outlet;	pH, DO, COD, BOD <sub>5</sub> , NH <sub>3</sub> -N, TP		3 terms /year,for low flow period, high flow period, and normal flow period , 3 days/term, once a day	2000	10000	Be included in routine monitoring of sewage treatment plant
		The water inlet and outlet of the sewage treatment plant shall be respectively provided with monitoring points	PH, chemical oxygen demand, BOD 5, ammonia nitrogen, suspended substance, animal and plant oil, petroleum, anionic surfactant, total nitrogen, total phosphorus, chroma, fecal coliforms, total mercury, alkyl mercury, total cadmium, total chromium, hexavalent chromium, total arsenic, total lead,		According to the sewage treatment plant management requirements	2000	10000	Be included in routine monitoring of sewage treatment plant
	Noise	4 monitoring points shall be set in the plant boundary of sewage treatment plant	LeqdB (A)		4 terms/year, 1 day/term, twice/day, once every day and night	300	4800	Institutions with monitoring qualifications

## **11.4 Environmental Management Training**

### **11.4.1 Objective**

The purpose of environmental management training is to ensure successful and effective implementation of environmental management, familiarize relevant personnel with the contents and procedures of environmental management, enhance the environmental management ability of environmental management personnel, and finally make sure that the environmental protection measures can be carried out effectively. The main targets of environmental capacity-building are environmental managers and environmental supervisors, and their training is one of the technical support components of the project. Training courses are also available for builders and their workers during project implementation. Prior to the construction of the project, all builders, operators and supervisors are required to participate in compulsory environmental, health and safety training.

### **11.4.2 Trainees**

Trainees include all staff of environmental management offices at provincial, municipal and county levels, project owners, all environmental supervisors, representatives of environmental monitoring agencies and major contractors.

### **11.4.3 Contents**

#### **11.4.3.1 Environmental managers and environmental supervising engineers**

The training will be organized by the PMO one year prior to the implementation of the project and carried out by environmental technologists, which will involve environmental management specialists and environmental supervising engineers in the PMO. The training contents are shown in the table below:

**Table 11.4-1 Training for Environmental Management Specialists and Environmental Supervising Engineers**

Item	Contents	Duration
Operational competence (for environmental management specialists and environmental supervisors)	Browse and identify the hotkeys of Word, Excel and PowerPoint Learn security policies of the World Bank Reinforcement learning, formulate environmental protection rules for builders. Each environmental protection rule compiled by technical advisers shall include monitoring descriptions in detail.	4d
Appraisal of compliance (for environmental management specialists and environmental supervisors)	Training related to the on-site monitoring process, including organization, communication, roles and duties, decision-making process, reporting and standard observation procedures.	1d
Response team (for environmental management specialists and environmental supervisors)	Identify hazardous materials on site Potential leak and spillover Environmental and personal impacts brought by leak and spillover Emergency response process (including priority response) Location and use of response facilities Communication and reporting facilities	1/2d
Emergency and medical aid (for environmental management specialists and environmental supervisors)	The process of looking for medical aid and other help (for example, long-distance telephone and medical consultation) in an emergency or normal state	1/2d
Hazardous materials and waste management,	Correct use of the storage process Correct use of processes, including fuel servicing, calculation of fuel consumption and effective use of equipment	1/2d

<p>including disposal of explosive wastes (for environmental management specialists and environmental supervisors)</p>	<p>Correct disposal of used storage tanks                  Stroage process of hazardous wastes                  Borrow land and slash management                  Non-hazardous wastes management                  Medical issues related to exposure into hazardous wastes                  Emergency response process</p>	
<p>Health and safety check and reporting process (for environmental management specialists and environmental supervisors)</p>	<p>Health and safety issues                  Health and safety requirements                  How to conduct health and safety checks                  Problem reporting and solving process</p>	<p>1d</p>
<p>Traffic safety (for environmental management specialists and environmental supervisors)</p>	<p>Traffic regulations                  Safe driving training                  Vehicle maintenance process                  Fuel serviceing process                  Emergency response process</p>	<p>1/2d</p>
<p>Water qualitt, air and noise monitoring and analysis (for environmental management specialists and environmental supervisors)</p>	<p>Use of equipment, including standards, testing, methods, sample transport, data quality control                  monitoring and reporting requirements</p>	<p>1/2d</p>

#### 11.4.3.2 Contractors and construction workers

The training will be organized by the PMO or the construction owners of subprojects on site prior to project construction, and will be carried out by environmental

technologists and environmental management specialists from companies. The specific training contents and durations are shown in the following table:

**Table 11.4-2 Training for Construction Workers**

Model	Contents	Duration
<p>Environmental commonsense of construction workers</p>	<p>Introduce environment-related impact factors and protection measures</p> <p>Introduction of environmentally-sensitive areas within construction areas and relevant issues, as well as adjacent areas</p> <p>Roles and duties of environmental management and design engineers, environmental supervisors and construction supervisors and reporting highlights of environmental issues</p> <p>Wastes management within construction camps and construction sites</p> <p>Pollution control measures within construction sites</p> <p>Cultural heritage</p> <p>Penalty for violation of laws and regulations</p>	<p>Half-day training in each site</p>
<p>General health and safety of construction workers</p>	<p>Including means of spreading and protection, prevent HIV/AIDS and STD</p> <p>Prohibition against alcoholic drinks and drugs</p> <p>The process of looking for medical aid and other help (for example, STD testing and consultation) in an emergency or normal state</p> <p>Health and safety commonsense, including some basic processes: traffic safety, electrical safety, explosion, fire, hazardous wastes management, etc</p> <p>Use of personal protective gear</p> <p>Penalty for violation of laws and regulations</p>	<p>Half-day training in each site</p>

11.4.3.3 Operators

The training will be organized by the PMO or the construction owners of subprojects on site prior to project construction, and will be carried out by environmental technologists and environmental management specialists from companies. The specific training contents and durations are shown in the following table:

**Table 11.4-3 Training for Environmental Managers of the Operators**

Stage	Contents	Duration
Environmental managers	Project management process of the World Bank Environmental information storage, disclosure, exchange and reporting system Environmental risk response Health and safety check and reporting process	1d
	Inspection on advanced technology and environmental management	Inspection on domestic civil engineering projects
Environmental managers	Use of equipment, including standards, testing, methods, sample transport, data quality control monitoring and reporting requirements Environmental risk response: potential leak and spillover Environmental and personal impacts brought by leak and spillover, emergency response process (including priority response), and location and use of response facilities	2d

#### 11.4.4 Personnel training plan

The funds of training on environmental management during the construction of the Integrated Urban and Rural Water Supply and Wastewater Management Project in Jiangxi of China will be included into the project budget, while the funds of training during the operation period will be included into operation and maintenance costs. The capacity-building and training plan is shown in the following table:

**Table 11.4-4 Training Plan for Environmental Protection Personnel of Various Subprojects**

Stage	Type	Number of People	Period	Costs (10,000RMB)
Construction period	Training for environmental management specialists	2	Prior to project construction	4
	Environmental management coordinators	14	Prior to project construction	14
	Environmental supervising engineers	8	Prior to project construction	8
	Construction workers	All workers of the contractor	Prior to commencement	20
	Subtotal			46
Operation period	Training for special environmental managers	14	Prior to operation	28
	Environmental risk response personnel	6	Prior to operation	6
	Skill training for environmental management personnel	Some	Prior to operation	20
	Subtotal			54
Total				100

## 11.5 Public Appeal and Feedback Mechanism for Environmental Management

### 11.5.1 Sustainable public engagement

During the environmental impact assessment of the Project, the residents' opinions shall be collected through the convening of the symposium and the distribution questionnaire. The public can submit their opinions through the

symposium or fill in the questionnaire issued by the evaluation unit, and the questionnaire can be obtained proactively by the residents; the opinions can be put forward in such a manner as letters, calls, fax, e-mail, etc.; and the opinions shall also be expressed through the Environmental Protection Bureau of each project county (city) and the Complaint Office.

In the construction period or operation period of the project, the public can make comments to the construction executing unit or construction unit in forms of letters, calls, faxes, e-mails, etc; the opinions may also be expressed through the Environmental Protection Bureau of each project county (prefecture) and the Complaint Office. Meanwhile, during the construction and operation of the project, each sub-project conducts a random return visit to each environment-sensitive target each year, and a public participation in-site survey will be held in the environment-sensitive target comparison and concentrated area once a year. According to the investigation results, the satisfaction level of the public is evaluated and the relevant opinions are analyzed, and the environmental mitigation measures are improved if necessary.

The environmental assessment unit, the construction executing unit, the construction unit and the operation unit shall organize the visit and investigation immediately in conjunction with relevant departments such as design department and other relevant departments after receiving the rectification notice of administrative departments or environmental protection complaints, and conduct rectification according to the actual conditions, and publicize the rectification scheme to solve the problem of environmental disputes.

### **11.5.2 Complaints and grievances channels**

#### **1. Establishment and composition of the institution**

In order to protect the legitimate rights of the affected persons better, a complaint mechanism will be established to provide a convenient, transparent, fair and effective way of complaint for the affected persons, therefore the sub-project department of

each County shall establish an environmental impact complaint handling leading group. The team leader shall be the relevant personnel taking charge of the sub-project, and the group members shall be from sub-project, construction unit, relevant County Environmental Protection Bureau, contractor, environmental assessment unit, etc. The complaint handling office of the environmental impact complaint acceptance leading group is set up under the sub-project of each County, and the daily complaints will be collected, collated, and summarized by the complaint handling office. Each sub-project contractor shall designate special personnel on site to record grievances and complaints received from the masses.

## 2. Complaint and Grievance Procedure

The complaint handling leading group and office will begin receiving complaints within one week after the commencement of the construction, and simultaneously open the complaint telephone and complaint letter box, and disclose relevant complaint and grievance ways on the construction site. Detailed complaint procedures are as follows:

Where the affected person considers his or her rights to be violated in any aspects involving environmental protection, a complaint in writing or orally to the complaint handling office or directly to the Contractor is allowed, and if it is an oral complaint, a detailed record shall be made and organized by the member of the complaint handling office or the Contractor, and the comments shall be submitted within two weeks.

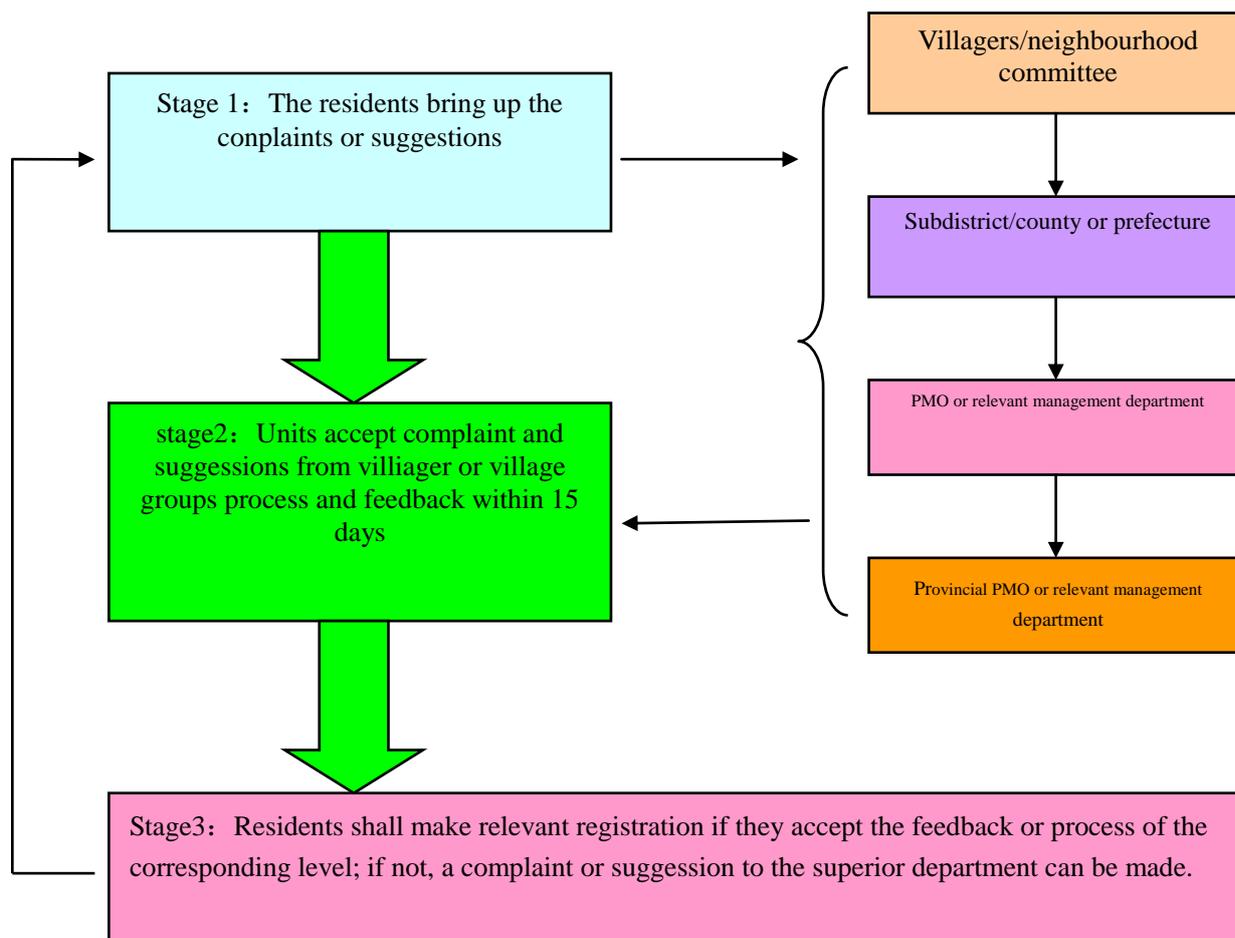
If the complainant is not satisfied with the opinion of the complained contractor or the acceptance office, he or she may lodge a complaint with the Environmental Protection Bureau of the relevant County or prefecture in written form within 1 month, and after receiving the treatment opinion, the relevant County or prefecture Environmental Protection Bureau shall give a treatment opinion within the prescribed time.

If the complainant is still not satisfied with the treatment opinions of the relevant

County or prefecture Environmental Protection Bureau, he may file a complaint to the environmental protection department at the superior level or the Jiangxi Provincial Environment Protection Department after receiving the treatment opinion, or directly prosecute to the local people's court according to the Civil Procedure Law of the People's Republic of China, and the case shall be adjudicated by the court.

Project department social migration and resettlement public complaint mechanism, during the process of preparation and implementation of projects, as direct stakeholders as well as direct participants, residents may be trapped into some unforeseen problems and related recommendations. In order to ensure the enthusiasm and breadth of the residents and community participation, the project has established a transparent and effective channel for complaints and advices as shown in figure 6-1.

The residents may lodge complaints or suggestions to the management of the community, subdistrict, project management office or related departments if they have complaints and suggestions. Community neighborhood committee/Villagers committee, subdistrict office/township, management office of County (prefecture, district) sub-project or leading group or provincial project management leading group shall set up special personnel or department to accept, process and feedback complaints from residents and residents groups and register the Report.



**Figure 11.5-1 Complaint and Grievance Handling Flow Chart**

### 11.5.3 Complaints and Grievance Responding Ways

#### 11.5.3.1 Content of the reply to the complaint

1. A brief description of the complaint's dissatisfaction;
2. Investigating fact and result;
3. Handling opinions and concrete basis;
4. The complainant has the right to appeal to and prosecute to the civil court at the upper level.

#### 11.5.3.2 Responding ways to complaints

The reply shall be submitted to the complaining party directly in the written material, and shall be submitted to the Project Department of Jiangxi Province.

### 11.6 Feedback mechanism

According to environmental monitoring reports and regulatory inspection,

environmental social management plans will make targeted adjustments to mitigation measures and further improve environmental management activities.

If there are significant deviations from the contents of the environmental social management plan during the inspection, or the changes in the project result in a significant adverse environmental impact, or a significant increase in the number of people influenced by the adverse environmental impacts, the PMO will immediately consult the environmental agencies and the World Bank to establish an environmental assessment team on an additional environmental assessment, and if necessary, an additional public consultation is also demanded. The revised environmental social management plan shall also inform the implementing agencies and contractors for the implementation in accordance with the revised version.

## **11.7 Information Management**

### **11.7.1 Information exchange**

Environmental management requires the necessary information exchange between different departments and different positions in each county (prefecture, district), owner, contractor and operator of the organization, and the organization shall also inform the outside (relevant party, social public, etc.) of relevant information.

Internal information exchange can be conducted in a variety of ways, such as meetings, internal briefings, etc., but there must be one formal meeting once a month, all of which should be documented and archived.

The external information exchange shall be conducted once every half year or every year, and the information exchange with the collaboration unit shall be formed in a summary and be filed.

### **11.7.2 Information Record**

In order to ensure the effective operation of the environmental management system, the Owner must organize a perfect recording system and keep records in the following aspects:

- (1) Legal and regulatory requirements;
- (2) licensing;
- (3) Environmental factors and related environmental impacts;
- (4) Training;
- (5) Check, verification and maintenance activities;
- (6) Monitoring data;
- (7) Problems in environmental management and environmental protection;
- (8) Effectiveness of corrective and preventive measures;
- (9) Information about relevant items;
- (10) Check ;
- (11) Review.

It is also necessary to control the above types of records, including the identification, collection, catalog, filing, storage, management, maintenance, inquiry, shelf life and disposal of records.

### **11.7.3 Reporting**

The Project Office of Jiangxi Province, PMO of each county project, contractor, environmental supervision unit and the project operation agency shall carry out daily supervision and inspection on the progress of the project, the implementation of environmental measures, the implementation of the training, the data and conclusions of environmental monitoring, etc, during the implementation of the project, all those information should be reported to the relevant departments timely. Specifically, the method comprises the following steps:

- (1) The project environmental supervision engineer shall record the implementation of the ESMP in detail monthly, and timely submit weekly report, monthly report to the project owner and county project office of the where the project

is located, the reports should include the implementation of environmental protection measures, the implementation of environmental monitoring and the monitoring data.

(2) The owner or operator shall record the progress of the project and the implementation of ESMP quarterly, and timely report the quarterly report to the project office in the county in which the project is located, and at the same time, copy the quarterly report to the county environmental protection bureau of the project.

(3) During the construction period, relevant county project construction units or contractors shall entrust local monitoring stations or qualified monitoring bodies to conduct environmental monitoring and submit the reports to the local environmental protection department.

(4) During the operation period of the project, each project operation and maintenance unit shall conduct environmental monitoring on the operation of the project according to the environmental assessment requirements, and the monitoring unit shall timely submit the monitoring report to the owner after completing the monitoring and commissioning task. The Owner shall submit the monitoring report to the local environmental protection department in time. The monitoring report mainly includes monitoring time, frequency, monitoring point position, monitoring item, method and monitoring data and statistical analysis.

(5) The PMO of each county shall timely submit the project progress report to the provincial PMO and copy the project progress report to the provincial environmental protection bureau at the same time.

(6) In the event of special irregularities in environmental protection happens, the supervision engineer and the PMO of each county (prefecture, district) will inform the local environmental protection administration department, and submit the event step-by-step if necessary.

(7) The ESMP performance report may include the following main contents for the EMP implementation report which should be submitted to the World Bank twice a year:

- a) Status of project progress;
- b) Implementation of Project Environmental Protection Measures
- c) Implementation of environmental monitoring and main monitoring results;
- d) Implementation of the training plan; continuous public participation: whether there is a public complaint; if a complaint occurs, the main content, solution and public satisfaction of the complaint are recorded;
- e) Existing problems and solutions;
- f) ESMP Execution Plan for the second half of the year.

#### 11.7.4 Document Management

In the implementation process of the *Environmental Social Management Plan*, the World Bank, Provincial Project Leading Group, Project Management Office, Project Leading Group, Project Management Office, the EIA Unit, Engineering Project Supervisor, and the construction unit shall manage the corresponding documents. For details, please refer to Table 11.7-1 below.

**Table 11.7-1 Requirements for Document Management of Agencies**

Operation period	Name of the institution	Document Management
Design period	EIA Unit	1. Prepare the contents of the <i>Environmental Social Management Plan</i> , and file the first draft, draft for review and approval documents.
Construction period	Construction Unit	1. Weekly record, file, and report the construction implementation details, to the engineering supervisor; 2. To complete and archive the construction site verification form and with the project supervisor before construction, and report it to the county project management; 3. When emergency and emergency situations happen, record and file the implementation of the construction, and report the situations to the engineering supervisor; 4. After receiving rectification notice, the rectification shall be completed within 3 working days (rectification demands coordination of management institutions shall be completed within 10 working days) and the documents shall be filed.

	Engineering Supervision Unit	<ol style="list-style-type: none"> <li>1. Record and file the construction situation of the construction unit weekly, and report the situation to the county project office;</li> <li>2. The construction site verification form shall be completed and filed together with the construction unit before construction, and shall be reported to the county project office;</li> <li>3. In case of emergency and emergency situations, the specific implementation plan of the construction unit shall be recorded, filed and reported to the county project office.</li> <li>4. The construction unit shall propose a rectification solution for environmental protection issues during construction activities and follow up the implementation, including issuance of rectification notification, rectification check list and filing of inspection documents.</li> </ol>
	PMO of each county	<ol style="list-style-type: none"> <li>1. To record, organize and archive the contents of the complaint during the construction process;</li> <li>2. Record and file the report of the engineering project supervisor quarterly, and submit the report to the provincial PMO (report forms) ;</li> <li>3. Check the site verification form reported by the construction unit and the engineering project supervisor, verifying the environment-sensitive issue and file the form and issues;</li> <li>4. Manage and archive the reported rectification notification.</li> </ol>
	Provincial Project Office	<ol style="list-style-type: none"> <li>1. To supervise and file the implementation of the <i>Environmental Social Management Plan and archive</i>;</li> <li>2. Record the report of each town project leading group and project management office every six months, and submit relevant reports and archives to the World Bank;</li> <li>3. Coordinate with other relevant departments to solve major environmental problems and record and archive the specific measures;</li> </ol>
	World Bank	<ol style="list-style-type: none"> <li>1. Record and file the reports of provincial project leading group and project management office every six months;</li> </ol>
Operation period	Provincial Project Office	<ol style="list-style-type: none"> <li>1. To supervise and file the implementation of the <i>Environmental Social Management Plan and archive</i>;</li> <li>2. Record, organize and archive the contents of the complaint during the operation of the project;</li> </ol>
	World Bank	<ol style="list-style-type: none"> <li>1. Record and file the reported condition of the provincial project leading group and project management office every six months</li> </ol>

## 11.8 Estimation of Environmental Investment

Environmental investment proposed in this EMSP for the stage of design, construction and operation of “Jiangxi Integrated Rural and Urban Water Supply and Wastewater Treatment Project” (hereinafter referred to as “this Project”) includes 1) environmental protection measures; 2) environment monitoring; 3) environment management training; 4) water and soil conservation; 5) cost of external monitoring; as well as 6) cost of environmental assessment and acceptance. The specific

investment on environmental protection in this Project is RMB 1086.22(in RMB 10,000), tthe details are as shown in table below:

**Table 11.8 List of Estimation for Project Environmental Investment**

<b>Item</b>	<b>Estimated Investment (in RMB 10,000)</b>
1 Design stage	116
1.1 Assessment on environmental impact	116
2 Construction stage	813.7
2.1 Environmental protection measures	14
2.2 Soil and water conservation measures and monitoring	272.8
2.2.1 Soil and water conservation measures (included in engineering cost)	0
2.2.2 Soil and water conservation and monitoring	272.8
2.3 Environmental monitoring	51.9
2.4 Implementation of dam safety operation plan	177
2.5 External environment monitoring plan	240
2.6 Personnel training in construction period	58
3 Operation stage	136.52
3.1 Completion acceptance of environmental protection	80
3.2 Environmental monitoring (excluding the routine monitoring cost of water plant and sewage treatment plant)	44.52
3.3 Personnel training in operation period	12
<b>Total</b>	<b>1086.22</b>

## 12. Conclusions and Recommendations

Jiangxi Province Water Resources Investment Group applies for a total investment of USD 200 million from the World Bank under “Engineering Project of Jiangxi Urban and Rural Water Supply Integration and Rural Wastewater Treatment”. The estimated total investment for the project is RMB 2,429,054,000. The main construction sites are located in seven counties under Fuzhou, Ji’an, Jiujiang, Jingdezhen and other cities in Jiangxi, including Yongxin County in Ji’an, Jinxi, Linchuan, Nanfeng counties and Dongxiang District in Fuzhou, Xiushui County in Jiujiang and Leping City in Jingdezhen. The main construction content includes the improvement of urban water supply facilities, consolidation and upgrading of rural drinking water safety and the new construction of rural wastewater treatment facilities.

This project includes new construction and expansion of five urban waterworks, the renovation and new construction of six county’s water supply pipe networks, the extension of six county’s pipe networks, the renovation and extension of three rural water supply pipe networks, the new construction and expansion of two rural waterworks and the new construction of one rural wastewater treatment engineering. Construction and extension projects of water plant of two villages will be newly built. The project will newly add the water supply scale of 245,600 m<sup>3</sup>/d. Among which, the newly increased water supply scale in urban areas is 240,000 m<sup>3</sup>/d, and 5,600m<sup>3</sup>/d in rural areas. It will reduce 38929.5m<sup>3</sup>/d leakage loss of the pipeline network, and the total benefited population is 2946577. (According to the 2015 population statistics yearbook, there are discrepancies with the latest data). The implementation of this project will improve the water supply in the project area, effectively raise the tap water coverage in the whole county, improve the degree of the province’s urban and rural water supply integration, reduce the leakage rate of pipe network and decrease non-revenue water. After the implementation of Zhajin’s rural wastewater treatment project, Zhajin Town’s wastewater collection rate can reach 80%, with the wastewater pipe covering 2,800 households. The project provides a showcase for the town

wastewater treatment project and the wastewater collection and pipe network renovation in the town area, and provides a model of popularization for wastewater treatment in the rural area; can further improve the rural living conditions, promote the comprehensive, coordinated and sustainable development of the economic society and is conducive to the improvement of living quality of the local residents. This project conforms to the national industrial policy, and is in line with the national and local related plans.

The implementation of this project may involve a number of environmental protection targets, such as underground infrastructure (optical cable, gas line), traffic facility, physical cultural resources (ancestral temple and old trees), residential area, school, nursing home, etc.. In the feasibility research, the above environmental protection targets can be avoided through reasonable site selection. In environmental assessment, the design proposal is optimized by comparing the alternative proposals to mitigate the impact on environmental protection targets.

The project's implementation is expected to have an overall positive impact on the environment. In view of the project activity's type, location, sensitivity and scale, potential negative environmental impact is mainly in the construction stage, including dust, noise, wastewater, water and soil loss, traffic disturbance, construction waste disposal, etc.. In addition, there is also adverse impact during the operation period. The details are as follows:

(1) The adverse impact during the construction period mainly includes the impact of construction dust on ambient air quality, the impact of construction vehicle and machinery noise on the surrounding environment, the impact of construction domestic wastewater on surface water, water and soil loss caused by soil borrowing, soil discarding, earth excavation, earth filling and temporary stacking of earthwork at the construction of wastewater treatment plant and refuse landfill, the impact of water supply and drainage pipe laying on road traffic, the vegetation deterioration by the construction, etc..

(2) The adverse impact during the operation period mainly comes from Zhajin Town's wastewater treatment plant, including the impact of wastewater discharge on

surface water environment, the impact of sludge disposal, the impact of pump noise on the surrounding environment, etc..

The degree and range of adverse impact that may be caused by this project can be controlled within the allowable scope of the state's laws, regulations and standard specification by alternative proposals, the implementation of mitigation measures and Environmental and Social Management Plan, public participation in negotiation, involuntary resettlement, execution of Action Plan for Dam Safety and other ways.

In conclusion, it is feasible to execute this project after adopting the alternative proposals and mitigation measures proposed by this project, implementing Environmental and Social Management Plan, public negotiation, involuntary resettlement, Action Plan for Dam Safety and other measures.