SFG2444 V3

The World Bank Financing

Jishui Water Environment Management Project

Environmental Assessment Report

CERI eco Technology Co., Ltd.

August, 2016. Nanchang

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1 Overview

1.1 Project Introduction

Project Name	The World Bank-Financed Jishui Water Environment Management Project				
Project Implementing Agency	Leading Group Office of the World Bank-Financed Jishui Water Environment Management Project				
Legal Representative	/		Contacts	Li Zhiqiang	
Tel	8689515	Fax	/	Zip Code	331600
Construction Site	South urban district and old urban district of Jishui county				
Project Examination and Approval Department	/		Registered Number of Approval	/	
Construction Type	New ■ Improvement or expansion □ Technological renovation □		Industry Category and Code	Pipeline engineering construction E4852	
Floor Area (m^2)	/		Green Area (m^2)	/	
Total Investment (10,000 yuan)	17,458.36	Environmental Protection Investment in the Total (10,000 yuan)	110.4	Ratio of the Environmental Protection Investment to the Total Investment	0.63%
EIA Cost (10,000 yuan)	/	Expected commissioning date	December, 2022		

1.2 Project Background

For the sake of reducing pollutants which enter into Poyang Lake basin through Gan River and improving the water quality management of Jishui county, the Leading Group

Office of the World Bank-Financed Jishui Water Environment Management Project intends to use the world bank loan to launch the Jishui water environment management project.

At present, urban domestic pollutants are major pollution sources of Jishui county. Among them, emissions of industrial pollution sources in Jishui county mainly concentrate on industrial park which is in the northwest of the central urban area. Industrial park of Jishui is planning to implement the sewage treatment plant in the park and the supporting pipe networks engineering. West district is just at the beginning of development, and Biyuehu Lake district has not been developed yet. Thus the project mainly solves the sewage collection and treatment of south urban district and old urban district. Jishui is a large county with large population (the total population of Jishui is around 540,000), emissions of agricultural pollution sources are decentralized and there are not many agricultural pollution sources within the scope of Jishui county. At the same time, the county is popularizing the soil testing and fertilizer recommendation, as well as the use of organic fertilize. Therefore, the management of agricultural sources pollutants is not included in the project.

The drainage pipelines reconstruction of south urban district and old urban district is the major content of the project construction. Through the project implementation, a relatively sound urban drainage system will be established. The drainage system will guarantee the ecological safety of urban water environment, improve the reconstruction of urban rainfall-sewage separation and sewage collection and treatment rate. Moreover, the contamination to Poyang Lake from the source will be reduced, and the urbanization of sustainable development will be realized.

Pursuant to relevant provisions in *China's Environmental Protection Law*, *Regulations for Environmental Protection*, *Circular on Strengthening Administration of Environmental Impact Assessment for Development Projects Financed by International Financial Organizations* and World Bank Safeguard Policies, this project should have environmental impact assessments. CERI eco Technology Co., Ltd. was commissioned by the project implementing agency to undertake environmental impact assessment (EIA) for World

Bank-Financed Jishui County Water Environment Management Project.

After accepting the commission, the environmental impact assessment unit carried out site investigations, collected necessary data, and conducted analysis and research of these data. Pursuant to relevant provisions in China's environmental regulations and technical manuals combined with features of project location, EIA for the project was prepared by the unit. Now EIA was submitted to World Bank and Environmental Protection Bureau of Jishui County for approval.

1.3 Objectives of Environmental Impact Assessment (EIA)

EIA will make comments on positive environmental effects induced by the project implementation, will identify, screen and forecast analysis possible negative environmental effects. Moreover, EIA will put forward targeted and effective mitigation measures and environmental management plan (EMP) for major inevitable negative environmental effects. Furthermore, EIA will offer foundations to not only the World Bank's independent assessments of the project, but also the decision-making and administrating of the government integrative management department and the environmental management department.

1.4 Basis for EIA Preparation

1.4.1 China's Laws, Rules and Regulations of Environmental Protection

(1) *Environmental Protection Law of the People's Republic of China* (April, 2014);

(2) *Environmental Impact Assessment Law of the People's Republic of China* (September, 2003);

(3) *Law of the People's Republic of China on Water Pollution Prevention and Control* (June, 2008);

(4) *Law of the People's Republic of China on Atmospheric Pollution Prevention and*

Control (August, 2015);

(5) *Law of the People's Republic of China on Prevention and Control of Ambient Noise Pollution* (March, 1997);

(6) *Law of the People's Republic of China on Prevention and Control of Environmental Pollution Caused by Solid Waste* (June, 2013);

(7) *Law of the People's Republic of China on Land Administration* (August, 2004);

(8) *Law of the People's Republic of China on the Protection of Wildlife* (August, 2004);

(9) *Law of the People's Republic of China on the Protection of Cultural Relics (Revision)* (June, 2015);

(10) *Water Law of the People's Republic of China* (August, 2002);

(11) *Law of the People's Republic of China on Flood Control (Amendment)* (April, 2015);

(12) *Law of the People's Republic of China on Water and Soil Conservation* (December, 2010);

(13) *Law of the People's Republic of China on Urban and Rural Planning* (October, 2007);

(14) *Regulation on the Implementation of the Water and Soil Conservation Law of the People's Republic of China* (August, 1993);

(15) *Regulations of the People's Republic of China on Nature Reserves* (October 9, 1994);

(16) *Regulations on Scenic and Historic Areas* (State Council Decree No.474, September 19, 1994);

(17) *Measures for the Administration of National Wetland Park (For Trial*

Implementation) (Lin Shi Fa [2010] No.1, February 21, 2010);

(18) *Provisions on Administration of Wetland Protection* (State Forestry Administration Decree No.32, March 28, 2013);

(19) *Regulations on Basic Farmland Protection* (State Council Decree No.257, December, 1998);

(20) *Regulations of the People's Republic of China on River Channel Administration* (State Council Decree No.3, March, 1988);

(21) *National Ecological Environment Protection Program* (Guo Fa [2000] No.38, November, 2000);

(22) *Regulations on Administration of Environmental Protection in Construction Projects* (State Council Decree No.253, November 29, 1998);

(23) *Administration of Environmental Impact Assessment of Construction Projects by Means of Classification Catalogue* (April, 2015);

(24) *Interim Procedures of Public Participation in Environmental Impact Assessment* (State Environmental Protection Administration Huan Fa [2006] No.28, March 18, 2006);

(25) *Decision of State Council on Implementing Scientific Outlook on Development and Strengthening Environmental Protection* (Guo Fa [2005] No.39);

(26) *Opinions on Enhancing Supervisions of Resource Development and Ecological Environmental Protection* (State Environmental Protection Administration Huan Fa [2004] No.24);

(27) *Guiding Catalogue on Industrial Restructuring (2011 Version)* (2013 Revision);

(28) *Circular on Strengthening Administration of Environmental Impact Assessment for Development Projects Financed by International Financial Organizations* (June, 1993).

1.4.2 Relevant Local Environment Protection Regulations

(1) *Regulations of Jiangxi Province on Environmental Protection in Development Projects* (Amendment) September 17, 2010);

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

(3) *Methods of Jiangxi Province for Prevention and Control of Pollution to Domestic Drinking Water Sources* (August 1, 2006);

(4) *Jiangxi Province Surface Water (Environment) Function Zoning (the Approved)* (Order No.35 [2007] of People's Government of Jiangxi Province) (June 29, 2007);

(5) *Regulations on Environmental Protection of Poyang Lake Ecological Economic Zone* (May 1, 2012);

(6) *Methods of Jiangxi Province for Land Acquisition Administration* (December 22, 2001).

1.4.3 Technical Guidelines and Specifications on EIA

(1) *Technical Guidelines on EIA: General Principles* (HJ2.1-2011);

(2) *Technical Guidelines on EIA: Atmospheric Environment* (HJ2.2-2008);

(3) *Technical Guidelines on EIA: Surface Water Environment* (HJ/T2.3-93);

(4) *Technical Guidelines on EIA: Groundwater Environment* (HJ610-2016);

(5) *Technical Guidelines on EIA: Acoustic Environment* (HJ2.4-2009);

(6) *Technical Guidelines on EIA: Ecological Impacts* (HJ19-2011);

(7) *Technical Guidelines on Assessment of Environmental Risks of Development Projects* (HJ/T 169-2004);

(8) *Technical Specifications for Ecosystem Status Evaluation* (HJ/T 192-2006);

(9) *Technical Specifications For Recognizing Environmental Noise Function* (GB/T15190-2014).

1.4.4 World Bank Safeguard Policies

In the process of this environmental impact assessment, we have analyzed the correlation between the project and World Bank Safeguard Polices, and the result is listed in Table 1-1.

Table 1-1 World Bank Safeguard Policies

World Bank Operational Policies and Procedures	Correlate or Not	Reasons that the project correlates with World Bank Operational Policy and Procedures
OP/BP4.01 Environmental Assessment	√	The project correlates with this policy. The water environment management project brings some positive environmental benefits. For example, it decreases contaminants that flows into surface water and improves local environment quality. However, the project also has some negative influences, such as common impacts on the construction and equipment noise impacts during the project operation period, etc.
OP/BP4.04 Natural Habitats	×	The project does not correlate with this policy. The project construction site is located in urban area, so it does not involve natural habitats.
OP/BP 4.36 Forestry	×	The project does not correlate with this policy. The project will not affect the health and the quality of the forestry, and will not affect benefits of masses who enjoy the ownership of forestry. Moreover, the project will have no impact on the dependence between masses and the forestry.
OP/BP 4.09 Management of Diseases and Pets	×	The project does not correlate with this policy. The project does not involve the purchase of pesticides and does not result in the increase of usage amount of pesticides.
OP/BP 4.11 Physical Cultural Resources	×	The project does not correlate with this policy. The project construction site is located in urban area, and according to the reconnaissance trip and site investigation, the project does not involve material cultural resources.
OP/BP 4.10	×	The project does not correlate with this policy. The project area

Ethnic Groups		does not involve indigenous people and it is not the minority area.
OP/BP 4.12 Involuntary Resettlement	√	The project correlates with this policy. The project construction will make temporary or permanent use of some lands.
OP/BP 4.37 Dam Safety	×	The project does not correlate with this policy. The project construction content does not involve the dam engineering and also does not depend on any existing or under-construction dams.
OP/BP 7.50 International Waters	×	The proposed project construction area is in Jishui County, Ji'an City, Jiangxi Province, China. The project does not involve international waters.
OP/BP 7.60 Disputed Regions	×	The project construction area isl located in Jiangxi Province. Thus disputed regions will not be involved.
BP17.50 Information Disclosure	√	Environmental impact assessment documents of this project has made public consultation and information disclosure.
IFC *Environmental, Health and Safety General Guidelines*	√	IFC *Environmental, Health and Safety General Guidelines* are applied to this project.
IFC *Environmental, Health and Safety Guidelines for Water and Sanitation*	√	IFC *Environmental, Health and Safety Guidelines for Water and Sanitation* are applied to this project.
IFC *Environmental, Health and Safety Guidelines for Waste Management Facilities*	√	IFC *Environmental, Health and Safety Guidelines for Waste Management Facilities* are applied to this project.

1.4.5 Relevant Documents

(1) Project Feasibility Study Reports;

(2) Project Resettlement Plan;

(3) Project Social Impact Assessment.

1.5 EIA Contents and Key Points

In accordance with requirements of domestic technical guidelines on EIA and World Bank safeguard policies, EIA mainly deals with following problems:

(1) Project's features and potential environmental problems;

(2) Major environmental protection targets (sensitive spots) of the project;

(3) Potential positive environmental benefits or negative environmental impacts induced by the project;

(4) Countermeasures to mitigate potential negative environmental impacts of the project;

(5) The analysis of alternatives;

(6) Environmental Management Plan (EMP).

1.6 Standards for EIA

IFC *Environmental, Health and Safety General Guidelines* (EHS) include standards and requirements of atmospheric emission, noise and acoustic environment quality, the management of waste water and wastes, and occupational health and safety.

Having compared domestic standards that are appropriate for this project with standards of World Bank's *Environmental, Health and Safety General Guidelines*, we finally determine assessment standards that are followed by this project. The following are specific contrastive analysis and results.

1.6.1 Environmental Quality Standards

1.6.1.1 Ambient Air

In accordance with EHS, the specified standard of national legislation should be applied

to ambient air quality. If there is no standard stipulated by national legislation, the project should implement the latest *WHO Air Quality Guidelines* or other international recognized reference standards. See Table 1-2. China has issued *Ambient Air Quality Standards* (GB3095-2012), and the project is located in the Category II of the Chinese ambient air function zone, so Category II Standard in *Ambient Air Quality Standards* (GB3095-2012) is applied. See Table 1-3.

Table 1-2 Ambient Air Quality Standards in EHS ($\mu g/m^3$)

Item	Average Cycle	Guideline Value	Standard
SO_2	24h	125 (the target value in stage I) 50 (the target value in stage II) 20 (the guideline value)	WHO *Global Air Quality Guidelines*
	10min	500 (the guideline value)	
NO_2	1a	40 (the guideline value)	
	1h	200 (the guideline value)	
PM_{10}	1a	70 (the target value in stage I) 50 (the target value in stage II) 30 (the target value in stage III) 20 (the guideline value)	
	24h	150 (the target value in stage I) 100 (the target value in stage II) 75 (the target value in stage III) 50 (the guideline value)	
$PM_{2.5}$	1a	35 (the target value in stage I)	

	24h	25 (the target value in stage II) 15 (the target value in stage III) 10 (the guideline value) 75 (the target value in stage I) 50 (the target value in stage II) 37.5 (the target value in stage III) 25 (the guideline value)	

Table 1-3 Ambient Air Quality Standards

(Unit: μg/m^3)

Item	Environmental Quality Standards (μg/m^3)			Source of Standard
	Hourly Average	Daily Average	Annual Average	
SO_2 (μg/m^3)	500	150	60	Category II Standard in *Ambient Air Quality Standards* (GB3095-2012)
NO_2 (μg/m^3)	200	80	40	
TSP (μg/m^3)	--	300	200	
PM_{10} (μg/m^3)	--	150	70	

As comparison shows, if the item is NO_2, the hourly average and the annual average value of Chinese national standards are in accordance with guideline values of EHS. If the item is PM_{10}, the hourly average and the annual average value of Chinese national standards are in accordance with the target value in Stage I of EHS. If the item is $PM_{2.5}$, the daily average value and the annual average value of Chinese national standards are in accordance with the target value in Stage I of EHS. If the item is SO_2, the daily average value of Chinese national standards is lower than the target value in Stage I of EHS.

According to EHS, the specified standard of national legislation should be applied to ambient air quality. Thus relevant standards in Table 1-3 are applied.

1.6.1.2 Water Environment

Involved water bodies of the project are Gan River (the Jishui section) and the En River. Through comparing, we ascertain that both water bodies are landscape water bodies. Category III Standard in Surface Water Environment Quality Standards (GB3838-2002) of Chinese national standards is applied. Specific standard values are presented in Table 1-4.

Table 1-4 Surface Water Environment Quality Standards

(Unit: mg/L, excluding pH)

Assessment Factor	Standard limits of *Surface Water Environment Quality Standards* (GB3838-2002)
	Category III Standard
pH	6-9
COD	≤20
BOD_5	≤4
TN	≤1.0
NH_3-N	≤1.0
TP	≤0.2 (Lake and Reservoir: 0.05)
Petroleum	≤0.05
Involved Water Bodies	En River and Gan River (the Jishui Section)

1.6.1.3 Acoustic Environment

Standard limits of Chinese national standards that correlate with acoustic environment quality and noise guidelines of EHS are presented in Table 1-5.

Table 1-5 The Comparison of Acoustic Environment Quality Standards (dB(A))

Acoustic Environment Quality Standards (GB3096-2008)	Noise Guidelines of EHS

Execution Region	Function Zone	Day 6:00~22:00	Night 22:00~6:00	Acceptor	Day 7:00~22:00	Night 22:00~7:00
Residential, commercial, and industry combined areas	Category II	60	50	Residential; official; culture and education	55	45
Areas along both sides of transport corridors	Category 4a	70	55	Industry; commercial facilities	70	70

Project areas are located in old urban district and south urban district of Jishui county. Project areas include residential, commercial, and industry areas. Moreover, the sewage lift pumping station on the bridgehead of En River Bridge, the sewage lift pumping station on Wenshan Avenue and the sewage lift pumping station on En River North Avenue are along both sides of transport corridors. Through comparing, *Acoustic Environment Quality Standards* (GB3096-2008) is applied. Executive standards are presented in Table 1-6.

Table 1-6 Acoustic Environment Quality Standards of the Project (dB(A))

Item	Category	Executive area	*Acoustic Environment Quality Standards* (GB3096-2008)	
			Day	Night
Acoustic Environment	Category II	The region outside the Category 4a area	60	50
	Category 4a	The sewage lift pumping station on the bridgehead of En River Bridge. The sewage lift pumping station on Wenshan Avenue and the sewage lift pumping station on En River North Avenue	70	55

1.6.2 Emission Standards of Pollutants

1.6.2.1 Atmospheric Pollutants

The main atmospheric pollutant during construction period is construction fugitive dust, and monitoring concentration limits of fugitive emission of *Comprehensive Atmospheric*

Pollutant Emission Standards (GB16297-1996) are applied. Standards are presented in Table 1-7.

Table 1-7 Comprehensive Atmospheric Pollutant Emission Standards (Excerpt)

Pollutant	Monitoring Concentration Limits of Fugitive Emission	
Particle	Monitory Point	Concentration (mg/m^3)
	The highest concentration of external perimeter	1.0

1.6.2.2 Water Pollutants

Sewage that collected by this project pipelines will be discharged into and treated in the sewage treatment plant of Jishui county. Category B Standard in *Wastewater Quality Standards for Discharge to Municipal Sewers* (GJ343-2010) is applied when sewage is discharged into sewers. See Table 1-8. When the sewage treatment plant's effluent quality reaches the Category IB Standard in *Pollutant Discharge Standards for Urban Sewage Treatment Plants*, the effluent will be discharged into Gan River. Applied standards are presented in Table 1-9.

Table 1-8 Wastewater Quality Standards for Discharge to Municipal Sewers (unit: mg/L)

No.	Item	Category B	No.	Item	Category B
1	COD	500	9	Total Pb	1
2	BOD_5	350	10	Total Cr	1.5
3	SS	400	11	Total Ni	1
4	NH_3-N	45	12	Total Zn	5
5	pH	6.5~9.5	13	Total Cu	2
6	TN	70	14	Total Mn	5
7	TP	8	15	Total Fe	10
8	Total Cd	0.1	16	Total As	0.5

Table 1-9 Pollutant Discharge Standards for Urban Sewage Treatment Plants

(unit：mg/L)

No.	Item	Category IB Standard
1	COD	60
2	BOD_5	20
3	SS	20
4	NH_3-N	8 (15)
5	pH	6-9
6	TN	20
7	TP	1

Note: The number outside the parenthesis is the control index when the water temperature is higher than 12℃, and the number inside the parenthesis is the control index when the water temperature is lower than or equal to 12℃.

1.6.2.3 Noise

Emission Standard of Environment Noise for Boundary of Construction Site (GB12523-2011) is applied to the project construction noise. Specific standard values are presented in Table 1-10.

The Category 4a standard in *Emission Standard for Industrial Enterprises Noise at Boundary* (GB12348-2008) is applied to the sewage lift pumping station on the bridgehead of En River Bridge, the sewage lift pumping station on Wenshan Avenue and the sewage lift pumping station on En River North Avenue. the Category II standard in *Emission Standard for Industrial Enterprises Noise at Boundary* (GB12348-2008) is applied to the sewage lift pumping station on Xiaojiangkou. Specific standard values are presented in Table 1-11.

Table 1-10 Emission Standard of Environment Noise on the Construction Site Boundary

(unit：dB(A))

Item	The Emission Standard for Construction Site Noise
Day	70

Night	55

Table 1-11 Emission Standard for Industrial Enterprises Noise at Boundary

(unit：dB(A))

Category	Standard Limits	
	Day	Night
Category II	60	50
Category 4a	70	55

1.6.2.4 Solid Waste

Pollutant Control Standards for Storage and Disposal Sites of General Industrial Solid Waste (GB18599-2001) is applied to the treatment of solid wastes. *Standards for Pollution Control at Hazardous Waste Storage Site* (GB18597-2001), EHS and related safety policies of World Bank are applied to the laboratory hazardous waste of this project's monitoring points.

1.7 EIA Factors

The EIA adopts the matrix method to discern main environmental problems of this project. Specific standards are presented in Table 1-12.

Table 1-12 Environmental Impact Identification Matrix Table

Environmental Medium	Pollution Factor	Construction Period		Operation Period	
		Pipeline Network Engineering	Water Quality Detecting System	Pipeline Network Engineering	Water Quality Detecting System
Atmosphere	Particle	△	△	—	—
	Odor	—	—	—	—
Water	COD	—	—	●	—
	BOD_5	—	—	●	—

Environmental Medium	Pollution Factor	Construction Period		Operation Period	
		Pipeline Network Engineering	Water Quality Detecting System	Pipeline Network Engineering	Water Quality Detecting System
	SS	—	—	●	—
	NH_3-N	—	—	●	—
	TP	—	—	●	—
Noise	Noise	△	△	△	—
Solid Waste	Solid waste	△	△	—	△
Social Impact	Transit and municipal facilities	▲	—	●	—

Note: ▲ significant negative impacts, △ Common negative impacts; ● significant positive impacts, ○ significant positive impacts.

The above table indicates main environmental problems of this project:

1) During construction period: common negative impacts, such as construction fugitive dust, wastewater, noise and solid wastes. The social impact is the pipeline network engineering construction will interrupt transit and municipal facilities;

2) During operation period: major impacts on environment are positive. Negative impacts on environment, namely, noise induced by pump stations operation and laboratory hazardous wastes of water environment monitoring system rooms.

According to the environmental impact identification, EIA factors are presented in Table 1-13.

Table 1-13 EIA Factor

Medium	Current Situation Assessment Factor	Prediction-affected Factor
Atmosphere	SO_2, NO_2, PM_{10}, TSP	—
Surface	pH, COD, BOD_5, NH_3-N, SS	COD, BOD_5, NH_3-N, SS

Water		
Noise	The equivalent sound level Leq (A)	The equivalent sound level Leq (A)
Ecological Environment	Plant and animal resources	—
Solid Waste	—	Earth and stone

1.8 Environment Protection Targets

1.8.1 Acoustic and Atmospheric Environment Protection Targets

According to the site investigation of the project group, acoustic and atmospheric environment protection targets involved in all projects are presented in Table 1-14.

Table 1-14 Acoustic and Atmospheric Environment Protection Targets of the Project

Project	Influential Stage	Impact Factor	Sensitive Spot	Location	No. Of Households /People	Distance to the Project (m)
A) Common Environment Protection Targets						
Pipeline Network Engineering	Construction Period	Construction Fugitive Dust and Mechanical Noise during Construction	Shanshuihaocheng Court	The west of Wanli Avenue	1,000 households	18
			Yulongwan Court	The west of Wanli Avenue	1,800 households	155
			Xincheng No.1 Court	The east of Wanli Avenue	250 households	10
			Jiyang Community	The south of Tongshi Road	550 households	20
			Hanwenyuan Court	The east of Yongji Road	500 households	18
			City Garden Court	The west of Garden Road	420 households	13
			Time Commerce Court	The east of Wenming	150	117

Project	Influential Stage	Impact Factor	Sensitive Spot	Location	No. Of Households /People	Distance to the Project (m)
				North Road	households	
			Wenshui Court	The east of Wenming North Road	170 households	17
			Hanlinyuan Court	The west of Longhua Middle Avenue	40 households	23
			Tainchengyiping Court	The east of Longhua Middle Avenue	500 households	99
			Shiyang Court	The west of Longhua Middle Avenue	85 households	13
			Qinzhang Garden	The east of Longhua Middle Avenue	170 households	72
			Yangmingyuan Court	The south of Wenhua Road	80 households	13
			Longfuyuan Court	The North of Wenjiao Road	120 households	9
			Xinlongyuan Court	The south of Wenfeng East Avenue	70 households	58
			Binjiang International City	The east of Wenfeng North Avenue	800 households	17
			Bo'shi Court	The north of Water South Road	130 households	18
Pump Station	Operation Period	Equipment Noise	Shuinanbei Village	The west of the Sewage Lift Pumping Station on En River Bridge	20 households	30
			Wenshui Village	The northeast of the Sewage Lift Pumping Station on Xiaojiangkou	30 households	20
			The North Court of En River North Avenue	The north of the Sewage Lift Pumping Stations on En River North Avenue	35 households	130

Project	Influential Stage	Impact Factor	Sensitive Spot	Location	No. Of Households /People	Distance to the Project (m)
B) Significant Environment Protection Targets						
Pipeline Network Engineering	Construction Period	Construction Fugitive Dust and Mechanical Noise during Construction	Jishui Siyuan Experimental School	The east of Wanli Avenue	4,775 people	107
			Chengdong Primary School	The south of Wenhua East Road	300 people	124
			Jishui No.2 Middle School	The north of Wenhua East Road	3,300 people	99
			Jishui No.3 Middle School	The south of Wenhua East Road	3,650 people	170
			Wenfeng Primary School	The west of Wenfeng Middle Avenue	1,500 people	10
			Jishui Experimental Primary School	The south of Wenjiao Road	3,000 people	20
			Jishui No.4 Middle School	The southwest of Shuinan Road	1,555 people	48
			Jishui Middle School	The east of Wenshan Avenue	4,300 people	32
			Jishui Hospital of TCM	The north of Wenhua East Road	300 people	29
			Jishui Ai’min Hospital	The north of Wenshui Avenue	200 people	14
			Jishui Center Kindergarten	The east of Wenming South Road	200 people	17
			Jishui Maternal and Child Health Hospital	The south of Renwen Road	400 people	17
			Jishui No.3 Middle School	The west of Longhua Middle Avenue	3,650 people	14
			Jishui County People’s Hospital	The east of Wanli Avenue	500 people	186
			Jishui Chin-shih School	The north of Tongshi Road	4,157 people	10

Project	Influential Stage	Impact Factor	Sensitive Spot	Location	No. Of Households /People	Distance to the Project (m)
			Jinggangshan Economic and Trade School	The east of Longhua Middle Avenue	1,700 people	12
			Wenfeng Health Center	The west of Wenshan Avenue	20 people	10

1.8.2 Water Environment Protection Targets

Water environment protection targets of this project are presented in Table 1-15.

Table 1-15 Water Environment Protection Targets

No.	Protection Target	Water Quality Target	Function of Water Body
1	Gan River (the Jishui section)	Category Ⅲ	Landscape and recreation water bodies
3	En River	Category Ⅲ	Landscape and recreation water bodies

1.8.3 Ecological Environment Protection Targets

Ecological environment protection targets of this project are presented in Table 1-16.

Table 1-16 Ecological Environment Protection Targets

No.	Environment Factor	Protection Target	Overview of Protection Target
1	Ecological environment	Terrestrial plants	Plants damaged by project's permanent land occupation and temporary land occupation
		Wild animals	Wild animals within the scope of project influences

1.8.4 Social Environment Protection Targets

Social environment protection targets of this project are presented in Table 1-17.

Table 1-17 Ecological Environment Protection Targets

No.	Impact Factor	Protection Target
1	Infrastructure	Existing roads and buildings
2	Transportation and safety	travel and safety of residents, schools, hospitals along existing roads and businesses along the street during project construction
3	Municipal facility	Municipal service facilities, such as water supply and power supply

2 Project Description

2.1 Project Overview

2.1.1 Project Components

(1) Project name: World Bank-Financed Jishui Water Environment Management Project

(2) Project implementing agency: Leading Group Office of World Bank-financed Jiangxi Poyang Lake Basin and Key Towns Comprehensive Pollution Control and Ecological Security Improvement Project

(3) Construction site: South urban district and old urban district of Jishui County, Ji'an City, Jiangxi Province

(4) The project components: The drainage pipeline networks reconstruction engineering of south urban district and old urban district of Jishui county

The newly-built drainage pipeline networks length of this project is 42.6km. Of it, the wastewater pipe (DN200-DN600) length is 27.4km; the rainwater pipe or ditch (DN600-DN2000) is 15.2km. Three new integrated sewage pumping stations are built, namely, the Wenshan Avenue sewage pumping station, the En River Bridge sewage pumping station and the En River North Avenue sewage pumping station. The existing improvement and expansion one is the Xiaojiangkou sewage lift pumping station, and the scale is expanded from 10,000m^3/d to 15,000m^3/d.

The project components and the construction content are presented in Table 2-1.

Engineering	Project	Construction Content	Construction Type	Location	Service Coverage
The Drainage Pipeline Networks	Sewage pipeline network	Wastewater pipeline (DN200-DN600) is laid along the road, and total	Newly-built	South urban district and old	South urban district and old

Reconstruction Engineering	engineering	long 27,400m. Sewage will be treated on the existing sewage treatment plant after being collected. And the collected sewage quality will reach 13,000 m^3/d in the short term, reach 16,500 m^3/d in the middle term, and reach 20,000m^3/d in the long term.		urban district	urban district
	Rainwater pipeline network engineering	Rainwater pipeline or ditch (DN600-DN2000) is laid along the road, and total long 27,400m. Rainwater will be discharged into Gan River or drainage ditches after being collected.	Newly-built	South urban district and old urban district	South urban district and old urban district
	The sewage pumping station	The integrated pumping station with 1,500 m^3/d	Newly-built	The Wenshan Avenue sewage pumping station	South urban district
		The integrated pumping station with 2,500m^3/d	Newly-built	The En River North Avenue sewage pumping station	Old urban district
		The integrated pumping station with 5000m^3/d	Newly-built	The En River Bridge sewage pumping station	South urban district
		Expanded from 10,000m^3/d to 15,000m^3/d	Improvement and Expansion	The Xiaojiangkou sewage lift pumping station	South urban district and old urban district
Others	The water environment monitoring system room	One room	Newly-built	Jishui Environmental Protection Bureau	Being responsible for remote monitor, data collection and transmission, data statistics and application of the automatic

					water quality monitoring station.
	The automatic water environmen t monitoring station of river sections	Two stations, every station has two floors and each building area is 153.5m^2.	Newly-built	One located nearby the water environment monitoring station of river sections of Cuntou Group, Zhuanmen Village, Wenfeng Town, Jishui County. The other located nearby the water environment monitoring station of river sections of Dajiangling Group, Tangbian Village, Dingjiang Town, Jishui County.	One monitors the water quality of Gan River's main stream at the junction of Qingyuan District, Jizhou District and Jishui County. The other monitors water quality of Gan River, Wujiang River and Dajiangling at the junction of Yongfeng County and Jishui County.
	The automatic water environmen t forecast station	Four automatic telemetry forecast systems of water environment	Newly-built	Namely are Zhuqi Village of Badu Town, Yangjia Village of Jintan Town, the water plant on the south of Jishui, and the river section of Wujiang River's estuary	Water quality of Zhuqi Village of Badu Town, Yangjia Village of Jintan Town, the water plant on the south of Jishui, and the river section of Wujiang River's estuary
Engineering Investment	The estimated total investment is 174.5836 million yuan. We proposed to apply for 17.5 million dollars (1$= ¥6.6, that is 115.5 million yuan) from World Bank, The counterpart funding is 59.3723 million yuan, which will be raised by the local government and higher authorities.				

Table 2-1 The Project Components and Construction Content

2.1.2 Project Scale

2.1.2.1 Sewage Volume Prediction

According to investigations of the project, per capita comprehensive index method,

aggregate indicator method of land area, classification water forecast method and the rocking method of water consumption are combined to predict the sewage quantity. The population is calculated according to the predicted number. The land is calculated based on north urban district and south urban district within the scope of Jishui domestic sewage treatment plant. And now south urban district has the industry-used land, that is South Industrial Park.

Table 2-2 The Sewage Quantity Prediction of South Urban District

	Completed Time (2023)		Long Term (2030)	
	Population (10,000 capita)	Industrial Land (km^2)	Population (10,000 capita)	Industrial Land (km^2)
Quantity	3.0	0.5	4.0	0.65
Average Daily Water Quantity Index	185 L/(capita·d)	2200 $m^3/(km^2·d)$	220 L/(capita·d)	3000 $m^3/(km^2·d)$
Average Daily Water Consumption (10,000 m^3/d)	0.56	0.11	0.88	0.20
Average Daily Sewage Quantity (10,000 m^3/d)	0.44	0.08	0.70	0.14
Total Sewage Quantity (10,000 m^3/d)	0.52		0.84	

Table 2-3 The Forecast of Sewage Volume of Old Urban District

	Completed Time (2023)	Long Term (2030)
Population (10,000 capita)	5.5	6.0
Average Daily Water Quantity Index	185 L/(capita·d)	220 L/(capita·d)
Average Daily Water Consumption (10,000 m^3/d)	1.02	1.32
Average Daily Sewage Quantity (10,000 m^3/d)	0.81	1.06

According to the calculation result, the water consumption of similar counties, and the idea that the municipal infrastructure construction should be appropriately advanced without divorcing from reality, the average daily sewage quantity of this project is determined as 20,000 $m^{3/}$d in the long term (2030). The average daily sewage quantity of this project is 13,000 $m^{3/}$d in the completed time (2023), and the added quantity of collected sewage in south urban district and old urban district is 7,000 m^3/d in the completed year.

2.1.2.2 Engineering Quantity

Major project engineering quantities include the drainage pipeline networks reconstruction engineering of south urban district and old urban district in Jishui. South urban district includes: Wenshan Avenue, Longhua South Avenue, Shuinan Road, Vehicle Administration Office Road, Yanshan Road, Jinsheng Road, Jinhui Road, Jinhua Road and Jintaimiye Road, etc. Among them, pipelines are laid on both sides of Wenshan Avenue, pipelines are laid on one side of other roads. Old urban district includes: Yongji Road, Xiejin Road, Wanli Avenue (Tongsheng Road to Jiyang Road), Tongsheng Road, Garden Road, Wenming North Road, Wenshui Avenue, Wenhua West Road, South Gate Lane, Minying Street and Wenjiao Road, etc. Among them, pipelines are laid on both sides of Wenshui Avenue, pipelines are laid on one side of other roads. Major project quantities are presented in Table 2-4.

Table 2-4 Major Project Quantities of Drainage Pipeline Networks

No.	Type	Project	Engineering Quantity	Unit	Note
1	Sewage Pipeline Network Engineering	Sewage pipeline (DN300) and auxiliary construction	563	m	The steel reinforced polyethylene spiral corrugated pipe
2		Sewage pipeline (DN400) and auxiliary construction	15,251	m	The steel reinforced polyethylene spiral corrugated pipe
3		Sewage pipeline (DN500) and auxiliary construction	2,410	m	The steel reinforced polyethylene spiral

No.	Type	Project	Engineering Quantity	Unit	Note
					corrugated pipe
4		Sewage pipeline (DN600) and auxiliary construction	1,616	m	The steel reinforced polyethylene spiral corrugated pipe
5		Sewage pressure pipeline (DN250) and auxiliary construction	1,210	m	PE pressured drain
6		Sewage pressure pipeline (DN400) and auxiliary constructions	306	m	PE pressured drain
7		Sewage building unite pipe (DN200)	3,000	m	The steel reinforced polyethylene spiral corrugated pipe
8		Sewage building unite pipe (DN300)	3,000	m	The steel reinforced polyethylene spiral corrugated pipe
9		1.2mx1.2m sewage intercepting well	4	piece	
10		1.4mx1.2m sewage intercepting well	2	piece	
11		1.6mx1.2m sewage intercepting well	2	piece	
12		1500m^3/d sewage pumping station	1	piece	Integrated sewage pumping station
13		2500m^3/d sewage pumping station	1	piece	
14		5000m^3/d sewage pumping station	1	piece	
15		The volume of the sewage lift pumping station of Xiaojiangkou is expanded to 15,000 m^3/d	1	piece	
16	Rainwater Pipeline Network Engineering	Rainwater pipeline (d600) and auxiliary construction	1,449	m	The steel reinforced polyethylene spiral corrugated pipe
17		Rainwater pipeline (d800) and auxiliary construction	6,306	m	The steel reinforced polyethylene spiral corrugated pipe
18		Rainwater pipeline (d1000) and	1,467	m	The steel reinforced polyethylene spiral

No.	Type	Project	Engineering Quantity	Unit	Note
		auxiliary construction			corrugated pipe
19		Rainwater pipeline (d1200) and auxiliary construction	1,728	m	The steel reinforced polyethylene spiral corrugated pipe
20		Rainwater pipeline (d1500) and auxiliary construction	1,261	m	The steel reinforced polyethylene spiral corrugated pipe
21		Rainwater pipeline (d2000) and auxiliary construction	1,300	m	The steel reinforced polyethylene spiral corrugated pipe
22		Drainage culvert (B × H=2m × 2m)	1,700	m	Culvert

2.1.3 Implementation Schedule

The project is planned to come into operation on January, 2018, complete all subprojects and have final acceptance of construction at the end of December, 2022. The construction period is 5 years.

2.1.4 Engineering Investment

1. Total Investment

The estimated total investment is 174.5836 million yuan.

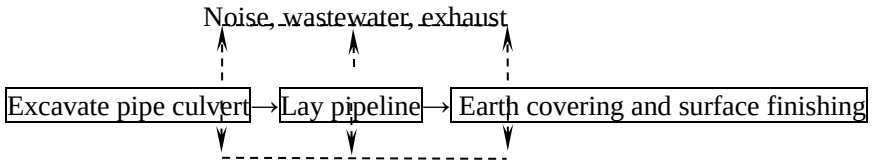
2. Fund Raising

The project is proposed to apply for 17.5 million dollars (115.5 million yuan, $1= ¥6.6) from World Bank. The counterpart funding is 59.3723 million yuan, which will be raised by the local government and higher authorities.

2.2 Project Analysis

2.2.1 Technological Process and Pollution Generation Process

Pollutant influencing periods of the project are the construction period and the operation period. The pollution production process during construction period of the urban drainage networks reconstruction engineering is presented in Picture 2-1. The main pollutant is the noise induced by the sewage lift pumping station during the operation period.



Pic.2-1 The Technological Process of Urban Drainage Networks Reconstruction Engineering during construction period

2.2.2 Analysis of Main Pollution Sources

2.2.2.1 Analysis of Pollution Sources during Construction Period

(1) Wastewater during Construction Period

The wastewater of project construction mainly includes domestic sewage of constructors and construction wastewater.

① Domestic Sewage

On the project construction peak, there are 120 constructors scattered on every pipeline construction section. If the water use for constructors is calculated at 50L/person/day, and the emission factor at 0.8, the amount of domestic sewage generated by constructors, 4.8m^3/d and the contained COD, 250mg/L, BOD5 150mg/L, SS 200mg/L and NH3-N 35mg/L, then pollution outputs will be COD 1.2kg/d, BOD_5 0.72kg/d, SS 0.96kg/d and

NH_3-N 0.18kg/d.

The domestic sewage produced during construction period will be collected and treated by domestic sewage collection and treatment facilities of local residents, instead of being discharged.

②Construction Wastewater

There are two kinds of discharged wastewater during construction: One is a small amount of slime water induced by excavating pipelines and washing vehicles; the other is construction wastewater produced by field operation, such as flushing grits and rocks, stirring and depositing concrete on project construction site. Major pollutants of construction wastewater are SS and petroleum, etc. Construction wastewater is sprinkled for dust suppression after subsiding.

(2) Exhaust during Construction Period

Construction dust pollution is the major source of exhaust during construction period. the pollution includes: the dust produced by the vehicle transportation, the dust produced on construction sites, such as excavating pipelines, piling up earthwork, loading and unloading building materials, etc.

Indicated by relevant documents, the dust produced by the vehicles transportation accounts for over 60% of the total dust on the construction. The amount of dust also correlates with road pavements and vehicle speeds. In general, with the effects of natural wind, the scope affected by dust induced by construction roads is within 100m. If water is sprinkled frequently (4-5 times a day) for dust suppression during construction period, it will reduce dust in the air by about 70%, and the effect is good. Sprinkling water also can limit the TSP pollution within the range of 20-50m. The trial result is presented in Table 2-5.

Table 2-5 The Trail Result of Using Watering Cart for Dust Suppression during Construction Period

Distance to Roadside (m)		5	20	50	100
TSP Concentration (mg/m^3)	No Watering	10.14	2.810	1.15	0.86
	Watering	2.01	1.40	0.68	0.60

The other major source of dust on construction is wind-blown dust on open storage areas and bare sites. The characteristic of wind-blown dust is that it will be affected by the yard's humidity and wind speed during the operation period. Therefore, it is effective to suppress wind-blow dust by sprinkling water on road surface and yard, forbidding operation on windy day and reducing air storage.

Moreover, vehicle emissions during construction period and oil-fired exhausts produced by construction machines are sources of construction exhausts. Major pollutants are HC, CO, NOx and so on, and their quantities are small.

(3) noise during Construction Period

Noise during construction period mainly derives from material transportation, pipeline excavation, loading and unloading of pipe and construction machinery, such as loaders, bulldozers, excavators and trunks, etc., in the process of backfilling. Furthermore, the noise is intermittent and the noise level of mechanical equipment is around 750dB(A)~90dB(A). Thus, noise will affect surroundings without control during construction period.

Table 2-6 Source Intensities of Major Construction Machinery Noise (dB(A))

No.	Machinery	Distance between the Measure Point and the Machinery (m)	Maximum Sound Level
1	Loader	5	90
2	Road Roller	5	81
3	Bulldozer	5	86
4	Excavator	5	84
5	Heavy Duty Trunk		86

6	Light Trunk		75

(4) Solid Waste

Solid wastes produced during construction period mainly are household refuses of constructors and discarded earthworks during construction period.

①Household Refuse

Calculated at 0.5kg/person/day of household refuses for 120 people, the household refuse output is about 60kg/d. The environment impact assessment unit suggests to set up garbage collection boxes and environmental protection billboards, and authorize the Jishui sanitation department to transport refuses after the unified collection.

② Project spoil

It is estimated that the project construction earthworks mainly derive from the pipeline construction. Of it, the total excavated volume is 36,125m^3, the total fill volume is 1,4548m^3, and the discarded engineering earthwork volume is 16,288m^3. The construction unit should transport spoil to designated places in time, hand them over to the local Environment Sanitation Bureau who uniformly allocates spoil to other civil works in Jishui county.

(5) Ecological Impacts, Water and Soil Erosion

Based on the layout of pipeline networks and the on-the-spot survey along the line, the drainage pipeline network reconstruction engineering of the project mainly does not involve the resettlement and demolition. However, the temporary land acquisition is involved.

Some vegetation will be destructed during construction. And the destruction has impacts on ecological environment. Thus necessary engineering measures and vegetation measures should be taken to afforest exposed surfaces and slop surfaces, in order to reduce incidences to environment, prevent and treat water and soil erosion.

2.2.2.2 Pollution Analysis during Operation Period

The project does not produce sewage for the sewage pipeline networks is a closed pipe system. Sewage collected by pipeline will be lifted to the sewage treatment plant by the pumping station. The process does not produce odor for the retention time of sewage is short. Crushed rack bar screens have been installed on the pumping station, and sundries in sewage will enter into the collecting tank after being smashed, so they have no impact on the operation of pumping stations and will not produce trashes. The water quality monitoring center will produce wastewater (experimental waste liquid, domestic sewage) and solid waste (household refuse) during the operation period.

(1) Noise

Noise derives from equipment operation, such as submersible pumps on every pumping station and crushed rack bar screens. The sound level of noise is presented in Table 2-7.

Table 2-7 Major Noise Sources and Noise Reduction Measures

Noise Source	Sound Level of Noise (dB(A))	Noise Reduction Measure
Submersible pump	60~70	Choosing the low-noise type, installing rubber shock pads on the base, using the buffer connection, attenuating vibration, eliminating noise, and keeping maintenance regularly
Crushed rack bar screen	75~85	

(2) Wastewater

①Experimental Waste Liquid of the Water Environment Monitoring System Room

During the operation period, the water environment monitoring system room will produce hazardous wastes, namely, HW34, HW35, HW42. Based on data from labs of similar scale, about 300kg of said liquid waste will be produced. After collection, the waste will be treated by units with the authority of treating hazardous wastes instead of being discharged outward.

②Domestic Sewage of the Water Environment Monitoring System Room

There are 10 staffs in water environment monitoring system room and they work 255 days per year. If the water use is calculated at 50L/person/day, the domestic water consumption will be 0.5m^3/d. Supposing the drainage rate is 80%, the sewage quantity of the laboratory will be 0.4m^3/d, 102t/a.

(3) Solid Waste

The major solid waste during the project operation period is the household refuse of administrative staffs of the water environment monitoring system room. The situation of household refuse output is presented in Table 2-8.

Table 2-8 Household Refuse Output

Site	Number of People (capita)	Annual Workdays (day)	Personal Output (kg/capita/d)	Daily Output (kg/d)	Annual Output (t/a)
Water Environment Monitoring System Room	10	255	0.5	5	1.28

2.3 Production and Prediction of Main Pollutants

Table 2-9 Production and Prediction of Main Pollutants

Project \ Content		Emission Source (No.)	Pollutant	Concentration and Output	Emission Concentration and Emission Load
Water Pollutant	Construction Period	Household sewage	Wastewater quantity, COD, BOD_5, SS, NH3-N	4.8m^3/d 1.2kg/d, 250mg/L 0.72 kg/d, 150mg/L 0.96kg/d, 200mg/L 0.18 kg/d, 35mg/L	Taking advantage of local residents' domestic sewage treatment facilities instead of being discharged
		Construction wastewater	SS	Little	Little

Project \ Content		Emission Source (No.)	Pollutant	Concentration and Output	Emission Concentration and Emission Load
	Operation Period	Experimental waste liquid	HW34, HW35, HW42	300kg/a	Being treated by the authorized unit
		Domestic sewage of the water environment monitoring system room	Wastewater Quantity , COD, BOD_5, SS, NH3-N	$0.4m^3/d$ 0.1kg/d, 250mg/L 0.06 kg/d, 150mg/L 0.08kg/d, 200mg/L 0.01 kg/d, 35mg/L	Through municipal pipeline networks to be treated by sewage treatment plants
Atmospheric Pollutant	Construction Period	Construction fugitive dust	TSP	Little, unorganized	Little with no organization
		Oil-fired exhaust of construction machinery	HC, CO, NOx	Little, unorganized	Little, unorganized
Noise	Construction Period	Construction machinery	Construction noise	Around 80dB(A)~85dB(A)	
	Operation Period	Equipment operation	Equipment noise	Around 60dB(A)~85dB(A)	65.3dB(A)
Solid Waste	Construction Period	Engineering construction	Discarded engineering earthwork	21,577	21,577
		Daily life	Household Refuse	60kg/d	Transported by the sanitation department
	Operation Period	Daily office work	Household refuse	1.28t/a	Transported by the sanitation department

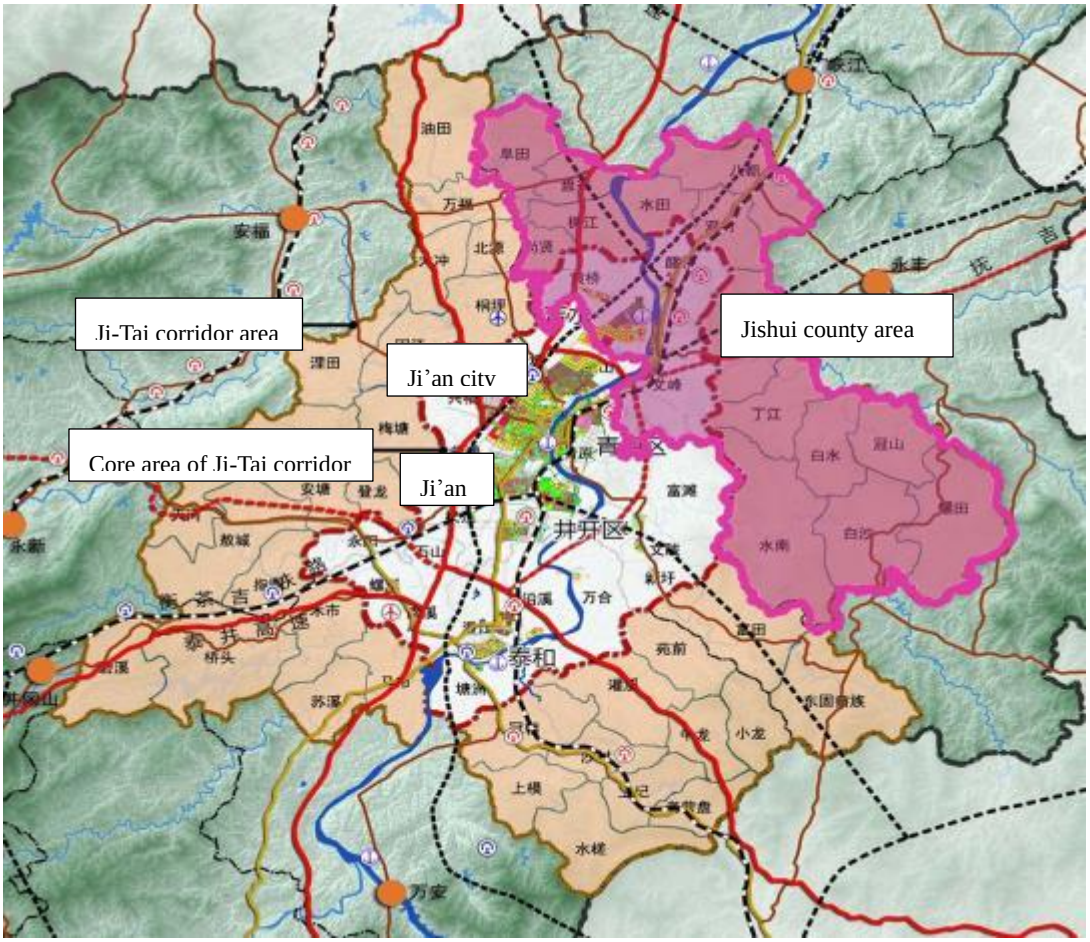
Major Ecological Impacts: The project site has the typical urban ecological environment, and the project construction and operation has few impacts on ecological environment. But activities, such as surface excavation during construction period, will destroy the original surface and will result in water and soil erosion for uncovered loose soil is scoured by the surface runoff.

3 Environment Situation

3.1 Natural Environment

3.1.1 Geographical Location

Jishui county is located in central of Jiangxi Province, on the middle reach of Gan River and in the northwest of Ji'an City. Jishui borders Yongfeng County in the southeast, Ji'an City and Ji'an county in the southwest. Jishui ranges from 26°52'-27°33'N and 114°38'-115°36'E. Jishui has a total area of 2,509.73km^2, with the length from south to north being 80km, and the narrowest of the county central section from east to west is 22km. Because Gan River joins Yongfeng River (the En River) 20km away from the bottom of Ji'an, and both of them surround islets that shapes like the Chinese character "吉" (*Ji*), hence name "吉水" (Jishui). Moreover, Gan River and Yongfeng River are separated from each other for the Qinghuzhou is divided through the middle, and it shapes like the Chinese character "文" (*Wen*), so Jishui can also be called as Wen River or Wenshui.



Pic.3-1 The District Map of Jishui County (plotting scale: 1/500,000)

The government of Jishui is located in Wenfeng town that is situated in the west-middle-trending of Jishui and to the east of Gan River. The town was named after the Wenfeng Mountain in the south of the town. The town is the political, economic, cultural and traffic center. The urban area is 23km to the northeast of Ji'an, 196 km to the south of Nanchang (capital of Jiangxi province), 57km to the west of Yongfeng county and 75km to the southeast of Xianjiang county. There are five communications arteries that go through Jishui, namely, Ganyue Expressway, Fuji Expressway, Beijing-Kowloon railway, the No.105 National road and Gan River Waterway.

Service scopes of the project are south urban district and old urban district of Jishui county. South urban district is located to the east of Gan River, to the south of En River, on the west of Beijing-Kowloon railway and on the north of Qingyuan District in Ji'an.

Furthermore, the planned urban construction land scale in the long term is 3.81km^2 (2030). Old urban district is located to the east of Gan River, to the north of En River, on the west of Dadong Mountain and on the south of Jiyang Road. Moreover, the planned urban construction land scale in the long term is 4.3km^2 (2030).

3.1.2 Geology and Landform

There are three kinds of landforms in Jishui, namely, mountains, hills and plains. In particular, hill is the main form of landform. The topography is high in the east, north and south parts and low in the west and northwest parts, and inclines from east to west so that it forms an half-opened basin. Jishui is broad in the southeast and the northwest of Jishui, and the central part is narrow. Dadong Mountain, in the northeast of Jishui, is the highest spot with 891.3m above sea level. Beixin Wharf of the county is the lowest place with 38.0m above sea level.

3.1.3 Climatic Characteristic

Located in the subtropical monsoon climate zone, Jishui features moderate climate, sufficient sunshine and rainfall, distinctive seasons and the east Asian monsoon. The average temperature for years is 18.2℃ and ranges from 17.3℃ to 19℃. The average temperature in January, the coldest month, is 6℃; the average temperature in July, the hottest month, is 29.5℃. The extremely high temperature for years is 41.3℃, and the extremely low temperature is -7.6℃. The average annual accumulated temperature is greater than or equal to 6,683℃. The average frost-free period is 292 days, and the frost-free period ranges from 250 days to 348 days. In particular, the major frost period ranges from December to February of the next year.

3.1.4 Water System and Hydrology

Jishui boasts many rivers with abundant hydraulic power. The basin area of Jishui is 141.7km$^{2.}$ Of it, the river area is 74.4km^2. The potential power of water conservancy is great, because in addition to the transit water capacity which is 53.754 billion m^3, it also has

surface water which is 2.256 billion m^3. The hydropower deposit of all rivers in Jishui is 209,200kw, 82,000kw of which is available, and the yearly power output is 333.48 million kw/h. In addition, Jishui is abundant with groundwater runoff, and the gross reserve of groundwater that has been verified is 166.44 million m^3. However, the groundwater that is available for exploitation and utilization is little, and accounts for only 1.4% of the total amount of groundwater.

3.1.5 Groundwater

The verified total amount of shallow groundwater in Jishui is 165 million m^3, the average water output is 166m^3/km^2/day with uneven distribution. Although the groundwater reserve is abundant, the groundwater that is available for exploitation and utilization amounts to only 30 million m^3. Rainfall is the major source to supplement groundwater.

3.1.6 Soil

In accordance with the soil nomenclature, the soil in Jishui is divided into 5 great soil groups (paddy soil, red soil, fluvo-aquic soil, purple soil and lime soil), 11 subgroups (submerged paddy soil, hydromorphic paddy soil, gley paddy soil, bleached paddy soil; red soil, red-nature soil, red-yellow soil, medium loam soil, sandy soil; acid purple soil, lime purple soil, brown calcareous soil), 40 soil genus and 136 soil species.

3.2 Social Environment

1. Administrative Division and Population

Under Jishui's direct administration there are 15 towns and 3 townships with 249 village committees and 28 neighborhood committees, including Wenfeng town, Futian town, Pangu town, Fengjiang town, Huangqiao town, Jintan town, Badu town, Shuangcun town, Laoqiao town, Luotian town, Baisha town, Baishui town, Dingjiang town, Wujiang town, Shuinan town, Shangxian township, Shuitian township and Guanshan township. At present, the county government is located in Wenfeng and the county had a population of around

530,000 by the end of 2014. Now south urban district of project area has a population around 20,000, and old urban district's population is around 50,000.

2. Comprehensive Economy

In 2015, Jishui achieved 12.3 billion yuan of GDP, up by 10.1%; the investment in fixed assets was 13.2 billion yuan, up by 19.8%; the totaled fiscal revenue was 1.4 billion yuan, up by 13.8%. Tax revenue accounted for 76.1% of the total fiscal revenue and the increased amount of tax revenue in Ji'an city was the highest; the public fiscal revenue was 1.08 billion yuan, up by 10.77%; the total retail sales of consumer goods was 3.67 billion yuan, up by 13%; urban per capita disposable income was 22,935 yuan, up by 10%; rural residents per capita disposable income was 12,760 yuan, up by 13%.

The west urban industrial park develops rapidly and has initially formed leading industries, such as electronic information, chemical spices, leather bags, pollution-free food and so on. Because the south urban industrial park has no development space, the west urban industrial park expands rapidly in recent years and becomes the key area of Jishui developed industries. The structure ratio of the three industries was adjusted from 23.7:47:29.3 in 2010 to 11.8:53.9:34.3 in 2014.

3. Communications and Transportation

There are four communications arteries that go through Jishui, namely Ganyue Expressway, Beijing-Kowloon railway, the No.105 National road, and Gan River Waterway. The under-construction Chang-Ji-Gan passenger transport way has built Jishui West Railway Station on here. In December 2015, Jiyang Bridge and Wenfeng Bridge were officially opened to traffic, and Binjiang Avenue and Jiyang Avenue were connected to each other by the whole line. New district of Jintan established comprehensive management system and operational mechanism, and initiated the preliminary work of "three verticals and four horizontals" road networks.

3.3 Ecological Environment

Jishui county's major plants are rosin, little mangosteen, honeysuckle, azalea, camellia, nanmu, yacca, chamaecyparis pisifera, deodar, boxwood, camphor, cypress, sassafras, maple, lotus and so on. After consulting the forest department and site survey, the EIA unit do not find precious wild plants in the project area. At present, precious animals barely exist in the project area due to frequent human activities. In addition to common species, for example, finch, rat, rabbit and snake, there are no animals under key protection in the engineering region.

3.4 Land Use Status

Table 3-1 Land Use Status of Project Area

No.	Project Type	Site	Land Type
1	Pipeline network engineering	Old District and South District	Construction land
2	The water environment monitoring system room	Jishui Environmental Protection Bureau	Construction land
2	The automatic water environment monitoring station of river sections	The water environment monitoring station of river sections of Cuntou Group, Zhuanmen Village, Wenfeng Town, Jishui County;	Wasteland
		The water environment monitoring station of river sections of Dajiangling Group, Tangbian Village, Dingjiang Town, Jishui County.	Wasteland

3.5 Drainage Status

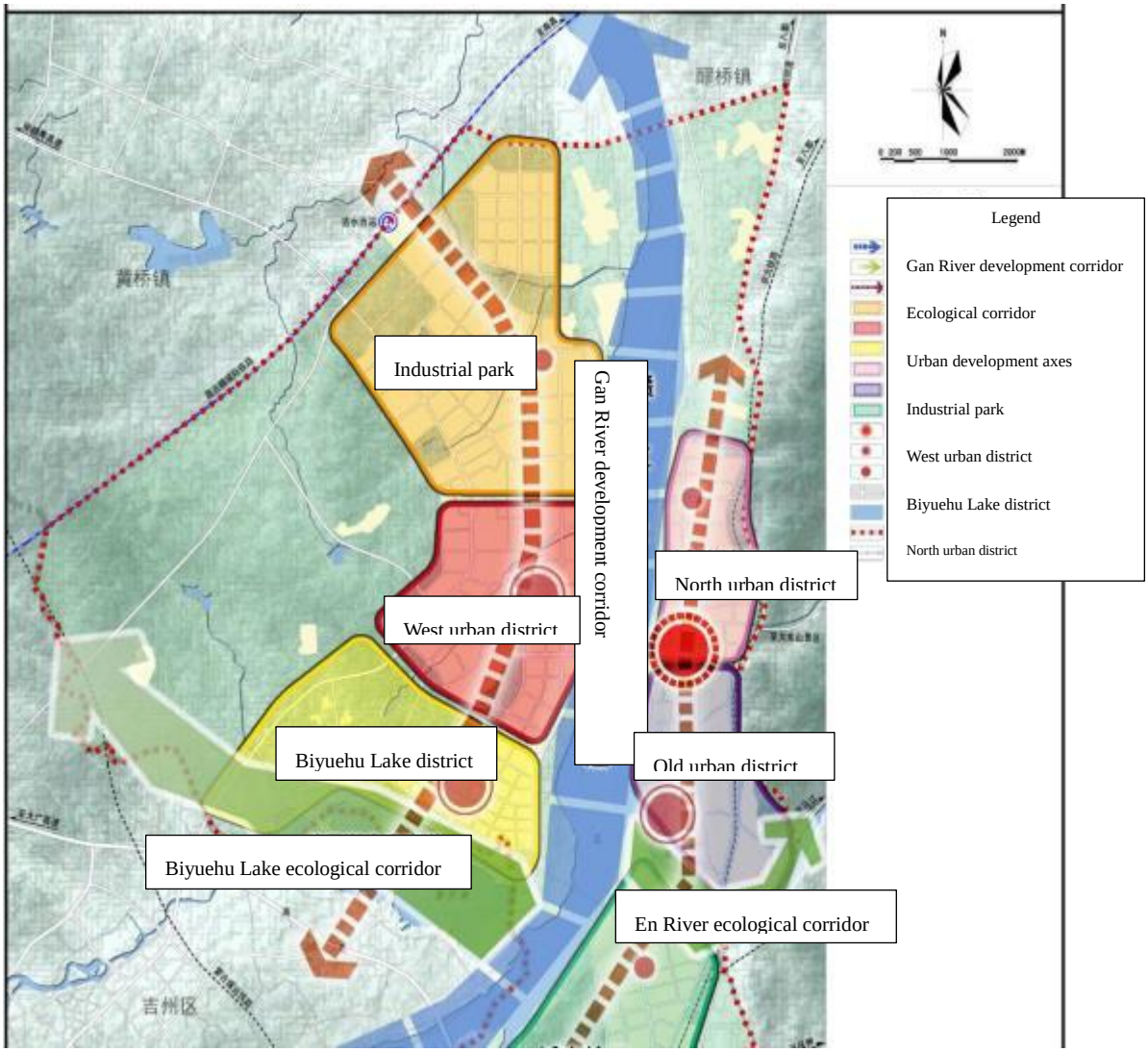
3.5.1 Drainage Status of Jishui County

According to *Urban Master Plan of Jishui County* (201-2030), Jishui will be divided into six urban function divisions, namely, old urban district, north urban district, south urban district, west urban industrial park, west urban district and Biyuehu Lake district. They are

presented in the following picture. And north urban district is the newly-built one, west urban industrial park is the developing industrial concentration district, west urban district and Biyuehu Lake district are planning areas.

There are two existing sewage treatment plants: the sewage treatment plant of west urban industrial park and the sewage treatment plant of old urban district in Nijiazhou group (to the east of Gan River), Zhushan village, Wenfeng town, Jishui county. Service scopes of the sewage treatment plant in old urban district are old urban district and north new district. Phase I (Step I) (10,000m^3/d engineering) has been completed and brought into production, Phase I (Step II) (10,000m^3/d engineering) is under construction and planned to start production this year, and the treatment scale will reach 20,000m^3/d after being brought into operation. The sewage treatment plant has been built in west urban industrial park and the treatment scale is 10,000m^3/d (30,000m^3/d in the long term), the under-construction sewage treatment plant of food industrial park is 10,000m^3/d (30,000m^3/d in the long term). The sewage treatment plant of west urban district is in preparation.

North urban district and west urban industrial park are newly-built districts, their pipeline networks are perfect and realize the rainfall-sewage separation. However, the pipeline networks construction in south urban district and old urban district lags so far behind than most sewage. Without effective treatment, a large quantity of sewage is discharged into nearby water bodies and then flows into Gan River. The urban drainage system has not been effectively protected, thus sewage not only pollutes the water quality of receiving water, results in the terrible water body and the deterioration of water quality or even odor, but also threats the surrounding ecological environments and has impacts on citizens physical health and urban economic development. Therefore, south urban district and old urban district are chosen as service scopes of this project.



Pic.3-2 Land Use Structure of Jishui County

3.5.1 South Urban District

(1) Drainage Situation of South Urban District

At present, combined system and separate system, that is the mixed drainage system, coexist in south urban district. Rainwater pipes and sewage pipes are respectively laid on the new developing region, which is in the north of Longhua Avenue, according to rainwater and sewage divisions. Rainwater flows into Gan River after the collection of pipelines, sewage flows into combined sewers of Longhua South Avenue after the collection and finally flows into Gan River through ditches in the west of Longhua South Avenue. The

early construction region in the south of Longhua South Avenue uses the combined sewerage system, and most drain pipes are ditches with cover. Drainage pipelines are intensively laid on Longhua South Avenue, Wenshan Avenue, Shuinan Road, Jinsheng Road, Bandao Road, Nanshan Road and Nanwan Road,etc. The total length is 21.6km, of it, rainwater pipes are 3.8km long, sewage pipes 1.6km, combined sewers 4.5km and combined ditches with cover around 11.5km.

(2) Existing Problems of Drainage in South Urban District

The combined coverplate ditch is the major drainage system in south urban district. Some streets even have no drainage pipeline system. Because some pipe routs is tortuous, the gradient is small, some pipes are out of repair for long years and the silting is severe, some sections pipes cannot meet the demand of drainage. Therefore, these problems result in domestic sewage overflowing, drainage difficulties in rainy season, serious waterlogging and difficulties for walking. These problems also affect environmental health and urban residents' normal lives. More seriously, due to the blocking of Gan River and En River, sewage in this district is discharged into nearby surface water bodies and flows into En River and Gan River, or is even directly discharged into En River and Gan River before being transported to sewage treatment plants to have effective treatment. The sewage pollutes En River and Gan River, and has severely impacts on the normal lives of nearby residents.

3.5.2 Old Urban District

(1) Drainage Situation of Old Urban District

The basic drainage system in old urban district is combined drainage system, and most are combined ditches with cover. Rainwater pipes and sewage pipes (ditches) are laid on the under-construction Wenfeng Avenue according to rainwater and sewage divisions. Rainwater and urban domestic sewage flow into Xiaojiangkou after being collected by pipelines. Through sewage pumping stations, part of combined sewage is lifted to the sewage force main on Wenfeng Avenue and then flows into the sewage treatment plant.

However, part of combined sewage is lifted through the waterlogging pumping station and discharged into Gan River.

Drainage pipelines in old urban district are mainly laid on Longhua Middle Avenue, Wenhua Road, Wenfeng Avenue, Wenshui Avenue, Wenming Road, Wanli Road and En River North Road, etc.The total length is 30.9km, of it, rainwater pipes are 3.1km long, rainwater ditches with cover 4.4km, sewage pipes 6.56km, combined sewers around 12.2km and combined ditches with cover around 4.5km.

(2) Existing Problems of Drainage in Old Urban District

Rainwater pipes and sewage pipes are laid on the Wenfeng Avenue which is under construction. Combined pipes (or ditches with cover) are laid on other roads. Some streets even have no drainage pipeline system. Because some pipe routes are tortuous, the gradient is small, some pipes are badly broken and out of repair for long years, and the silting is severe, also some ditches with cover severely collapsed or are embezzled by houses, some sections pipes cannot meet the demand of drainage. Therefore, these problems result in domestic sewage overflowing, drainage difficulties in rainy season, serious waterlogging and difficulties for walking. These problems affect environmental health and urban residents' normal lives. After being collected by pipes or ditches with cover, sewage in old urban district is discharged into open channels that in front of the Xiaojiangkou drainage station, and open channels use the combined sewerage system. The water amount is large, hence, after being leaded to the pumping station nearby channels, part of sewage is lifted to sewage pipelines in the urban north. The rest sewage is discharged into Gan River through the drainage station at the end of the open channel. Moreover, the terrain in the southeast of old urban district (the area encircled by En River North Road, Wenfeng Avenue and Beijing-Kowloon Railway) is lower, sewage is discharged directly into Gan River and pollutes the water body.

3.6 Current Situation of Environment Quality

3.6.1 Current Situation of Atmospheric Environment Assessment

To learn about the current atmospheric environment, the assessment uses monitoring results of *The Monitoring Report of Air Environment Quality of Jishui County* that are produced every three months by Jishui environment monitoring station that monitors Jishui atmospheric environment in 2015. The monitoring report is presented in Annex I.

(1) Monitoring Factor

Monitoring factors of atmospheric environment quality: SO_2, NO_2, PM_{10}.

(2) Monitoring Site

Table 3-2 Monitoring Site of Atmospheric

Site	The Monitoring Site in the County
On the southeast of Jishui county administration center	Old urban district

(3) Assessment Methods

The single standard index method is adopted for the current atmospheric environment assessment, that is:

$$I_{ij}= C_{ij} /C_{si}$$

In which: I_{ij}——The index of Type i pollutant and Monitoring Site j;

C_{ij}——Average monitoring value of Type i pollutant and Monitoring Site j;

C_{si}——Standard assessment value of Type i pollutant.

(4) Assessment Standards

Category I Standard in *Ambient Air Quality Standard* (GB3095-2012) is applied to the project area.

(5) Monitoring and Assessment Results

Table 3-3 Monitoring and Assessment Results

Factor \ Project		Average Time	Scope of Monitoring Value (μg/m^3)	Maximum Concentration (μg/m^3)	Category II Standard (μg/m^3)	Exceeding Standard Rate (%)	Standard Index	Standard or Not
Southeast of Jishui county administration center	PM_{10}	Daily average value	61~68	68	150	0	0.45	Standard
	NO_2	Daily average value	18~20	20	80	0	0.25	Standard
	SO_2	Daily average value	30~35	35	150	0	0.23	Standard

(6) Result Analysis

According to Table 3-2, standard indexes of SO_2, NO_2 and PM_{10} in the southeast of Jishui county administration center monitoring site in 2015 are less than 1. The monitoring result meets the Category II Standard in *Ambient Air Quality Standard* (GB3095-2012), and it indicates the ambient air quality in project area is good.

3.6.2 Current Surface Water Environment Assessment

1.Investigations of Pollution Sources

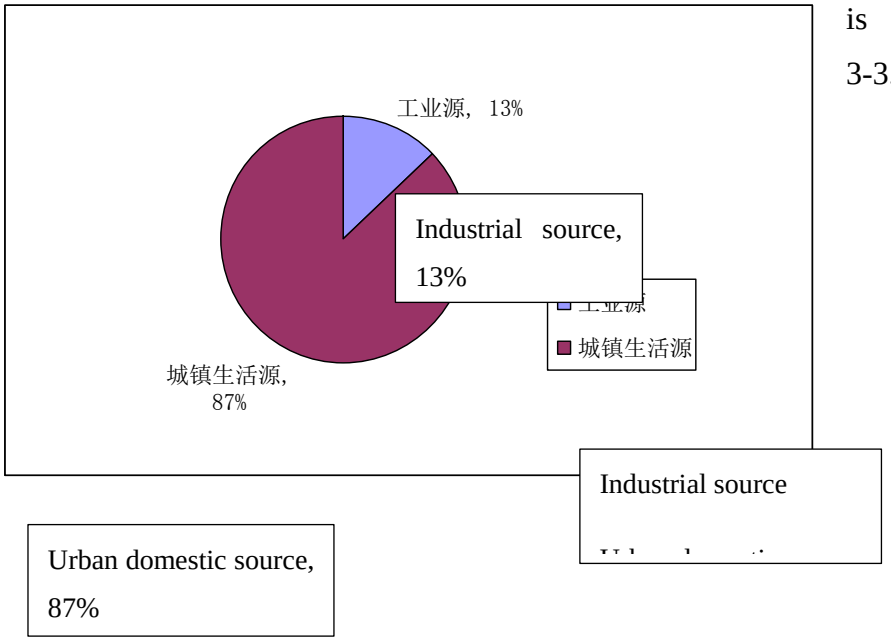
The Jiangxi Province Environmental Protection Bureau provides data of Jishui wastewater discharge quantities in recent five years, see details in Table 3-4.

Table 3-4 Data of Jishui Wastewater Discharge Quantities in Recent Five Years (10,000m^3)

Year	Total Discharge Quantity of Wastewater	Industrial Source	Urban Domestic Source
2011	1,357.1722	180.2422	1,176.93
2012	1,454.747588	177.746588	1,277.001

2013	1,499.7548	187.7388	1,312.0160
2014	1,500.949377	188.933377	1,312.016
2015	1,697.71934	252.81034	1,444.9090
Total	7,510.343	987.4713	6,522.872

Data in the above table show that data of Jishui wastewater discharge quantities from 2011 to 2015 only take wastewater discharge of industrial sources and urban domestic sources into consideration, but do not calculate the wastewater discharge quantity of agricultural sources and centralized management facilities. Calculated wastewater discharge quantities of industrial sources and urban domestic sources are listed from high to low, that is to say, from urban domestic sources to industrial sources. The proportion of all pollution sources' sewage quantities is shown in Picture 3-3.



Pic.3-3 The Proportion of All Pollution Sources' Wastewater Quantities in Jishui from 2011 to 2015

Data of COD and NH_3-N which are discharged by every pollution source of Jishui in recent five years are shown in Table 3-5 and Table 3-6.

Table 3-5 Data of COD Discharged by Every Pollution Source of Jishui in Recent Five Years (t)

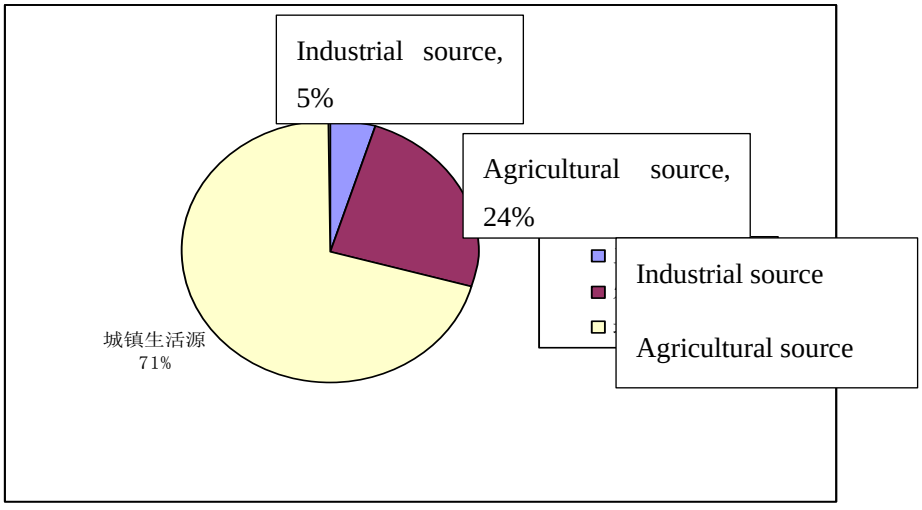
Year	Total Discharge	Industrial Source	Agricultural Source	Urban Domestic

	Quantity of COD			Source
2011	6,772.112	397.7	2,076.573	4,297.839
2012	6,866.677	397.70	1,602.0430	4,866.0430
2013	6,836.2470	267.69	1,558.263	5,010.294
2014	6,806.347	237.79	1,558.263	5,010.294
2015	6,699.423	406.72	1495.72	4,796.98
Total	33,980.806	1707.6	8,290.862	23,981.45

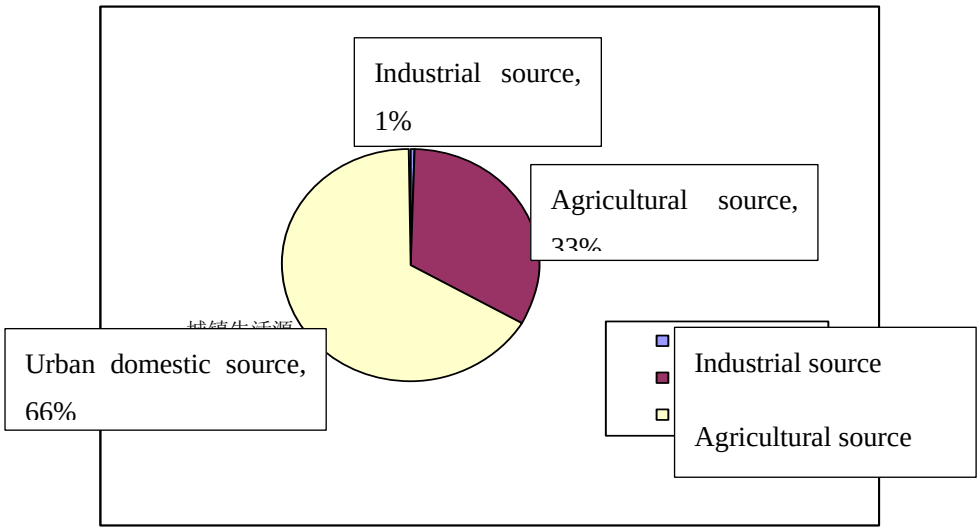
Table 3-6 Data of NH_3-N Discharged by Every Pollution Source of Jishui in Recent Five Years (t)

Year	Total Discharge Quantity of NH_3-N (t)	Industrial Source (t)	Agricultural Source (t)	Urban Domestic Source (t)
2011	749.801	8.93	265.048	475.823
2012	802.8961	6.61	253.1251	543.16
2013	812.784	6.01	246.685	560.089
2014	810.534	4.03	246.415	560.089
2015	786.728	10.49	278.017	498.221
Total	3,962.743	36.07	1,289.29	2,637.382

Data in the above show that pollution sources which discharge COD and NH_3-N in Jishui from 2011 to 2015 are listed from high to low, that is to say, from urban domestic sources, agricultural sources to industrial sources. The proportion of COD and NH_3-N which are discharged by every pollution source is shown in Picture 3-4 and Picture 3-5.



Pic.3-4 The Proportion of COD Which is Discharged by Every Pollution Source of Jishui in Recent Five Years



Pic.3-5 The Proportion of NH_3-N Which is Discharged by Every Pollution Source of Jishui in Recent Five Years

Through analysis, at present, urban domestic sources are major sources of pollutants in Jishui. Among them, emissions of industrial pollution sources in Jishui county mainly concentrate on the industrial park located on the northwest of the central urban area. The industrial park of Jishui is planning to implement the sewage treatment plant and the supporting pipe networks engineering in the park. West urban district is just at the beginning of development, and Biyuehu Lake district has not been developed yet. Therefore, the project mainly solves the sewage collection and treatment of Jishui south urban district and old urban district. Jishui is a large county with a large population. Emissions of agricultural pollution sources are decentralized, and there are not many agricultural pollution sources within the scope of Jishui. At the same time, the county is popularizing the soil testing and fertilizer recommendation as well as the use of organic fertilize. Therefore, the management of agricultural sources pollutants is not included in the project.

2. Current Situation of Water Environment Quality

To investigate the water quality of Gan River and En River, the assessment uses the monitoring results of *The Monitoring Report of Surface Water Environmental Quality of Jishui County* which was released by Jishui environment monitoring station. The monitoring station arranges three monitoring sections, namely, the Jishui south water plant intake, Yangjia village of Jintan town and Zhuqi village of Badu town to sample and monitor Gan River. From February, 2015 to December, 2015, the monitoring station also arranges one monitoring section that is En River (water on Wujiang River estuary) to sample and monitor surface water. See Annex II for the monitoring report, and see details in Table 3-7.

Table 3-7 Current Water Quality Environment Assessment

Time	River	Section Name	Applied Standard	Water Quality Type	Standard or Substandard
2015.2.4-9	Gan River	The Jishui south water plant intake	Ⅱ	II	Standard
		Yangjia village of Jintan town	III	III	Standard
		Zhuqi village of Badu town	III	III	Standard
	En River	Wujiang River estuary	III	III	Standard
2015.4.1-6	Gan River	The Jishui south water plant intake	II	II	Standard
		Yangjia village of Jintan town	III	II	Standard
		Zhuqi village of Badu town	III	II	Standard
	En River	Wujiang River estuary	III	II	Standard
2015.5.7-12	Gan River	The Jishui south water plant intake	II	II	Standard
		Yangjia village of	III	II	Standard

		Jintan town			
		Zhuqi village of Badu town	III	II	Standard
	En River	Wujiang River estuary	III	III	Standard
2015.6.16-21	Gan River	The Jishui south water plant intake	II	II	Standard
		Yangjia village of Jintan town	III	II	Standard
		Zhuqi village of Badu town	III	II	Standard
	En River	Wujiang River estuary	III	II	Standard
2015.7.14-19	Gan River	The Jishui south water plant intake	II	III	Standard
		Yangjia village of Jintan town	III	II	Standard
		Zhuqi village of Badu town	III	II	Standard
	En River	Wujiang River estuary	III	III	Standard
2015.8.6-11	Gan River	The Jishui south water plant intake	II	II	Standard
		Yangjia village of Jintan town	III	II	Standard
		Zhuqi village of Badu town	III	II	Standard
	En River	Wujiang River estuary	III	II	Standard
2015.9.15-20	Gan River	The Jishui south water plant intake	II	II	Standard

		Yangjia village of Jintan town	III	II	Standard
		Zhuqi village of Badu town	III	II	Standard
	En River	Wujiang River estuary	III	II	Standard
2015.10.13-19	Gan River	The Jishui south water plant intake	II	II	Standard
		Yangjia village of Jintan town	III	II	Standard
		Zhuqi village of Badu town	III	II	Standard
	En River	Wujiang River estuary	III	II	Standard
2015.11.4-10	Gan River	The Jishui south water plant intake	II	II	Standard
		Yangjia village of Jintan town	III	II	Standard
		Zhuqi village of Badu town	III	II	Standard
	En River	Wujiang River estuary	III	II	Standard
2015.12.21-27	Gan River	The Jishui south water plant intake	II	II	Standard
		Yangjia village of Jintan town	III	II	Standard
		Zhuqi village of Badu town	III	II	Standard
	En River	Wujiang River estuary	III	II	Standard

From the table above, it can be seen that the current water environment quality of Gan

River and En River is good. The water quality of monitoring site in the Jishui south water plant meets the Category II Standard in *Surface Water Environment Quality Standard* (GB3838-2002). Water qualities of other sites meet the Category III Standard in *Surface Water Environment Quality Standard* (GB3838-2002), and current water qualities of these sites are good. With the rapid development of Jishui county, the county should do good jobs in the management of industrial wastewater and domestic sewage, especially in improving the quality of industrial wastewater and domestic sewage of south urban district and old urban district that will be discharged into Gan River. Thus the project should effectively improve the water quality of Gan River and reduce the pollution pressure on Poyang Lake.

3.6.3 Current Situation Assessment of Acoustic Environment

Equipment running noise of pumping stations influence nearby sensitive spots. This is the major environment impact on the project operation period. To investigate the current situation of acoustic environment quality, this assessment monitors all pumping stations and their acoustic environment sensitive spots. Among them, the Wenshan Avenue sewage pumping station is located in the south urban industrial park, and there is no residential area within 200m of the pumping station. Thus EIA should only monitor the current acoustic environment in which Wenshan pumping station is located.

Instrument Types: HS6288E multifunctional noise analyzers；

Monitoring Time：May 13, 2016；

Monitoring sites and results are presented in Table 3-8.

Table 3-8 Monitoring Results of Environment Noise in Jishui (Unit: dB(A))

No.	Monitoring Sites	Monitoring Results		Standard Limits		Standard or Substandard	
		Day	Night	Day	Night	Day	Night
1	The location of En River Bridge sewage pumping station	53.6	48.4	70	55	Standard	Standard

2	Shuinanbei village	52.3	46.4	60	50	Standard	Standard
3	The location of Xiaojiangkou sewage lift pumping station	54.1	47.3	60	50	Standard	Standard
4	Wenshui village	52.6	46.6	60	50	Standard	Standard
5	The location of En River North Avenue sewage pumping station	53.7	46.3	70	55	Standard	Standard
6	North court of En River North Road	53.4	46.8	60	50	Standard	Standard
7	The location of Wenshan Avenue sewage pumping station	54.6	48.5	70	55	Standard	Standard

Current monitoring results indicate that Category 4a Standard in *Acoustic Environment Quality Standards* (GB3096-2008) is applied to En River Bridge sewage pumping station, Wenshan Avenue sewage pumping station and En River North Avenue sewage pumping station. And Current monitoring results also indicate that Category II Standard in *Acoustic Environment Quality Standards* (GB3096-2008) is applied to Xiaojiangkou sewage lift pumping station. Category II Standard in *Acoustic Environment Quality Standards* (GB3096-2008) is applied to acoustic environment sensitive spots of pumping stations, namely, Shuinanbei village, Wenshui village and north court of En River North Road.

4 Alternatives Analysis

The analysis of project alternatives comparison and selection has two major aspects: one is the comparison and selection of Zero Alternative; the other is the comparison and selection of the drainage pipe network's technical scheme.

General principles of project alternatives comparison and selection are:

(1) Quantification: trying to quantify the project environmental impacts of each alternative.

(2) Comprehensive comparison and selection principle: comparing and analyzing project alternatives from many aspects, such as environment, technology, economy and society, etc.

(3) Consistent comparison and selection principle: the selected plan should be consistent with related development plans and standard requirements, at the same time, be adapted to local conditions.

4.1 Comparison and Selection of Zero Alternative

From the perspective of environmental costs and benefits and social economy, comparison and analysis on whether the project with plan were conducted in the project EIA. Results are presented in Table 4-1.

Table 4-1 Comparison and Selection of Project Zero Alternative

Category	With the Project Plan	Without the Project Plan (Zero Alternative)
Major Advantages	(1) Conforming to technical policies of Chinese urban domestic sewage treatment and the pollution prevention; (2) Conforming to the plan of Poyang Lake ecological economic zone; (3) Good for protecting the water quality of Poyang	(1) Maintaining the current situation, such as vegetation will not be destroyed and so on; (2) Not changing the land use value (no land occupation); (3) Problems of environment impacts,

	Lake basin. By 2023, the estimated annual reduction of pollutant into Poyang Lake Basin water bodies include 20.44t of TN, 2.04t of TP and 183.96t of COD; (4) Improving people's living qualities and living conditions; (5) Speeding up the infrastructure construction, improving the urbanization level and realizing the urban sustainable development.	such as vegetation destruction on the construction period and fugitive dust, do not exist.
Major Disadvantages	(1) Occupying Lands: land acquisition; (2) Producing fugitive dust for vegetation destruction during construction period, and being affected by construction noise; (3) Pipeline construction has adverse effects on social environment in certain time.	(1) The plan seriously pollutes the surface water, because sewage directly flows into the surface water body before being treated; (2) The backward condition of current drainage system cannot be thoroughly solved.
Comprehensive Analysis	From the perspective of society and environment, it is better to implement the project scheme.	

Table 4-1 indicates that Zero Alternative does not have problems of environment impacts during construction and operation, but it seriously pollutes environment because sewage will be directly discharged into the surface water body. Although the implementation of the project plan will bring certain environment impacts, these problems can be avoided and mitigated by relevant anti-pollution measures. Moreover, environmental impacts during construction are temporary, but social and environmental benefits brought by project implementation and operation are lasting, particularly the positive effects on protecting and improving the water quality of Poyang Lake basin and improving urban infrastructure. From the perspective of promoting social economic development and environmental protection, it is better to implement the project scheme than not. Thus the project construction is necessary.

4.2 Comparison and Selection of Technical Alternatives

4.2.1 Principles of the Selection of Technical Alternatives

The comparison and selection of technical alternatives is in compliance with following

principles:

(1) Small covering area. Land resource is precious, so the project should conserve land as far as possible.

(2) Having small adverse effects on environment.

(3) Saving investment. On the premise of meeting the demand of drainage, the project should use the most economical techniques and give full play to investment benefits.

(4) Easy to manage and the low operating cost. The local management level and the annual operating cost should be taken into consideration, then the project should select the plan that is easy to manage and whose operating cost is low.

4.2.2 Comparison and Confirmation of Technical Alternatives

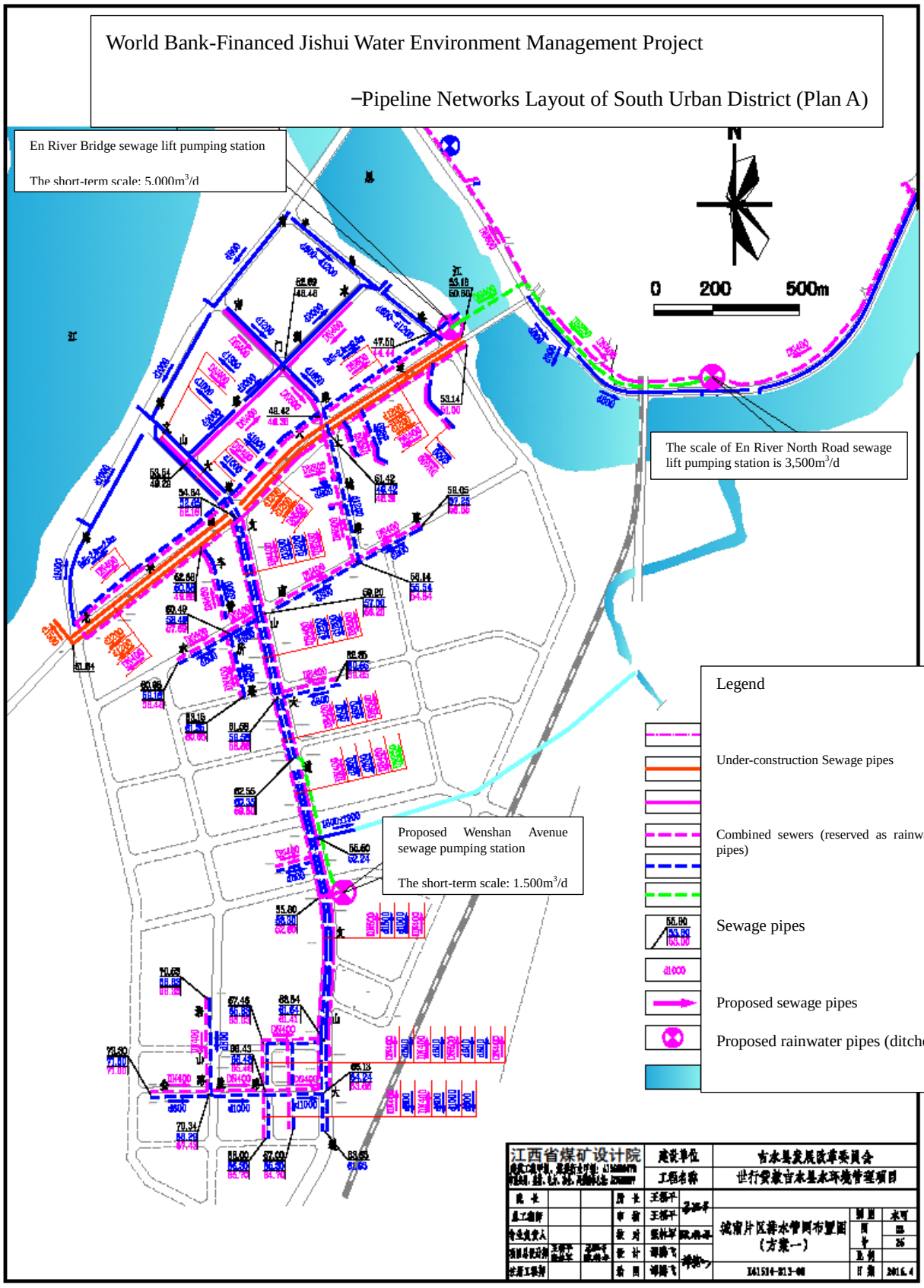
Service scopes of the project are south urban district and old urban district of Jishui county, and there are large differences between their current construction situation: the proportion of under-construction area and planning construction area of south urban district is large, the road is wide and population density is small, and rainwater pipes and sewage pipes are laid on some newly-built areas. However, old urban district basically is built-up area, parts of its roads are narrow while population density is large, and businesses concentrate on some areas, which results in crowded population and heavy traffic flow. Moreover, except the reconstructed Wenfeng Avenue that uses separated sewers, others use combined sewers. Therefore, the project adjusts measures to local conditions, compares and selects pipeline network plans for south urban district and old urban district according to the practical situation.

4.2.2.1 Pipeline Networks Alternatives of South Urban District

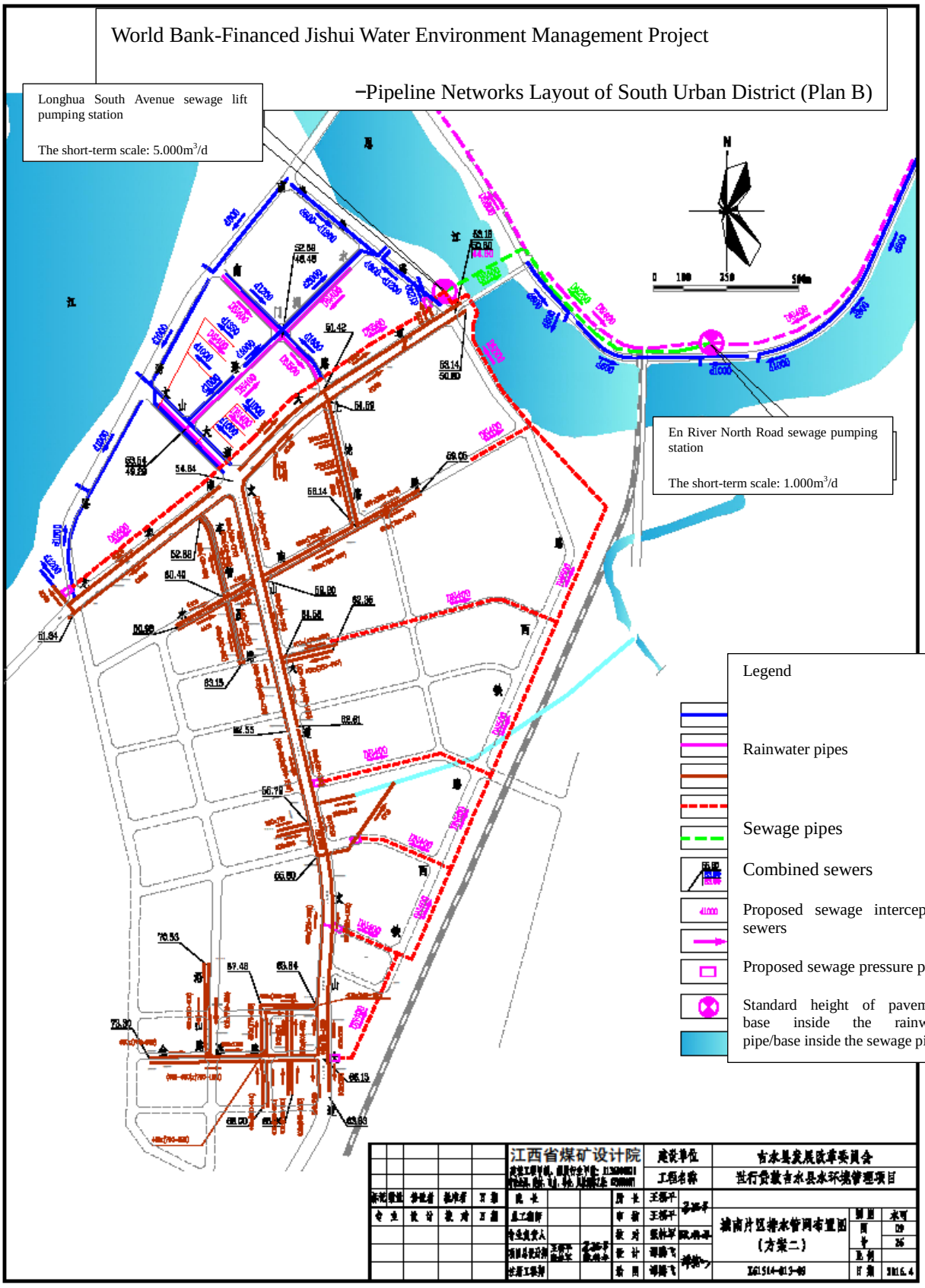
Plan A: Using complete rainfall-sewage separation system, discarding existing combined ditches with cover and laying rainfall-sewage separated pipeline networks. Trunk sewers are laid near canals on Wenshan Avenue and the north of Longhua South Avenue.

Branch sewers are laid on the rest roads. And setting sewage pumping stations on the bridgehead of En River Bridge to lift sewage to pipeline networks of old urban district. See Picture 4-1.

Plan B: Using mixed drainage system. The north of Longhua Avenue retains the rainfall-sewage separation system, the south of Longhua Avenue (including Longhua Avenue) uses combined system with interception facility and retains existing combined ditches with cover. At the same time, intercepting wells should be built on the existing sewage draining exit, and trunk sewage intercepting pipelines should be laid along the planning roads of Beijing-Kowloon railway and on the south shore of En River. And setting sewage pumping stations on the bridgehead of En River Bridge to lift sewage to pipeline networks of old urban district, then transporting sewage into the sewage treatment plant. See Picture 4-2.



Pic.4-1 Pipeline Networks Layout of South Urban District (Plan A)



Pic.4-2 Pipeline Networks Layout of South Urban District (Plan B)

Table 4-2 Comparison and Selection of Drainage Pipelines of South Urban District

Project	Plan A	Plan B
Major Engineering Quantity	Sewage pipelines: 12.3km; rainwater pipelines: 10.3km	Trunk sewage intercepting pipelines: 7.3km
Land Acquisition and Demolition	Pipelines are basically laid along the existing roads, thus there is no need of land acquisition and demolition	Pipelines are basically laid along the planning road. There are farmland, dry land, mountain land and river bank along the planning roads. Thus, the project needs a lot of land acquisition and parts of demolition.
Earthwork Volume	Total amount of excavation: 26,693m^3; total amount of fill: 10,405m^3; amount of spoil: 16,288m^3	Total amount of excavation: 18,432m^3; total amount of fill: 8,143m^3; amount of spoil: 10,289m^3
Environmental Impacts	The adverse effect is small. Both pumping station boundary during the operation period and sensitive spots of acoustic environment can meet the requirements of acoustic environment	The adverse effect is small. Both pumping station boundary during the operation period and sensitive spots of acoustic environment can meet the requirements of acoustic environment
Effects of Sewage Collection	Complete rainfall-sewage separation system is used and sewage pipelines are newly-built. Moreover, the sewage collection rate is high.	Combined system with interception facility is used, and congestion and leakage of existing combined coverplate ditch are severe. Moreover, the sewage collection rate is low and the effect is bad.
Social Impacts	The reconstructed section is made by concrete and roadbed quality is bad because of the long time. After laying rainwater and sewage pipelines, the project needs to repair the existing roadbed that gains high support rate of residents, so it has high practicability.	The involved scope of local residents is large due to farmland, dry land, mountain land and river bank along with pipelines, so the project has great social impacts and high construction risks.
Engineering Investment	80.8868 million yuan	39.9765 million yuan (land acquisition and resettlement: 922,300 yuan)
Operating Cost	1.2511million yuan/a	1.4915million yuan/a

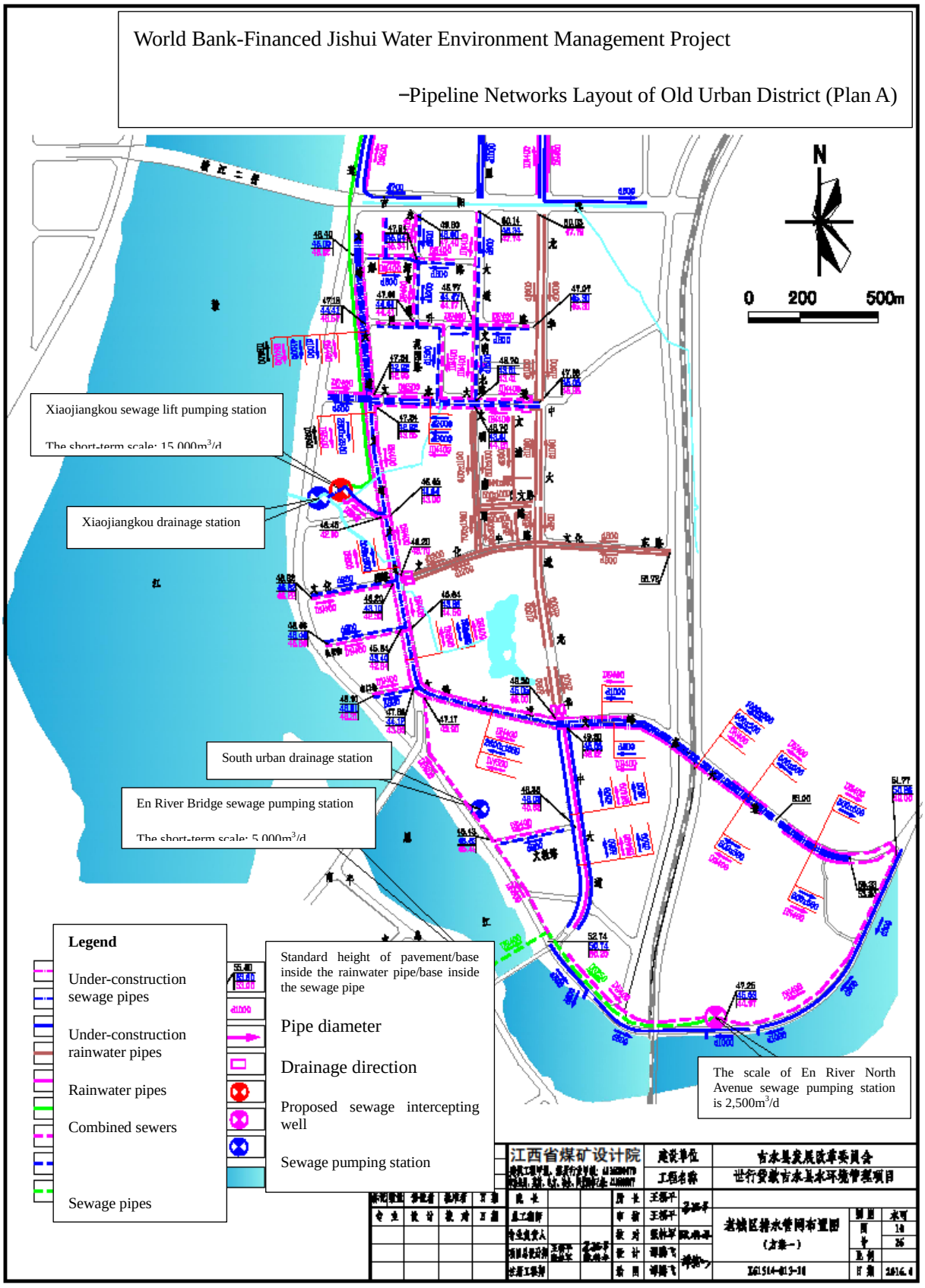
Construction Investment + Operating Cost = Net Present Value (8%)	93,4384 million yuan	78,8385 million yuan
Advantages	Sewage pipelines are laid along the existing roads without demolition, and the effect of sewage collection is great, operating cost is low. Moreover, it provides a good foundation for long-term development and construction.	Low engineering investment
Disadvantages	High engineering investment	The project needs demolition and has difficulties in implementation. The effect of sewage collection is bad and operating cost is high.
Conclusion	Recommended	

As comparison shows, both plan A and plan B have little adverse impacts, but plan A is superior to plan B because of its good effect of sewage collection, small social risks and low operating costs. Moreover, there is no need of land acquisition and demolition for plan B. Therefore, the project recommends plan A.

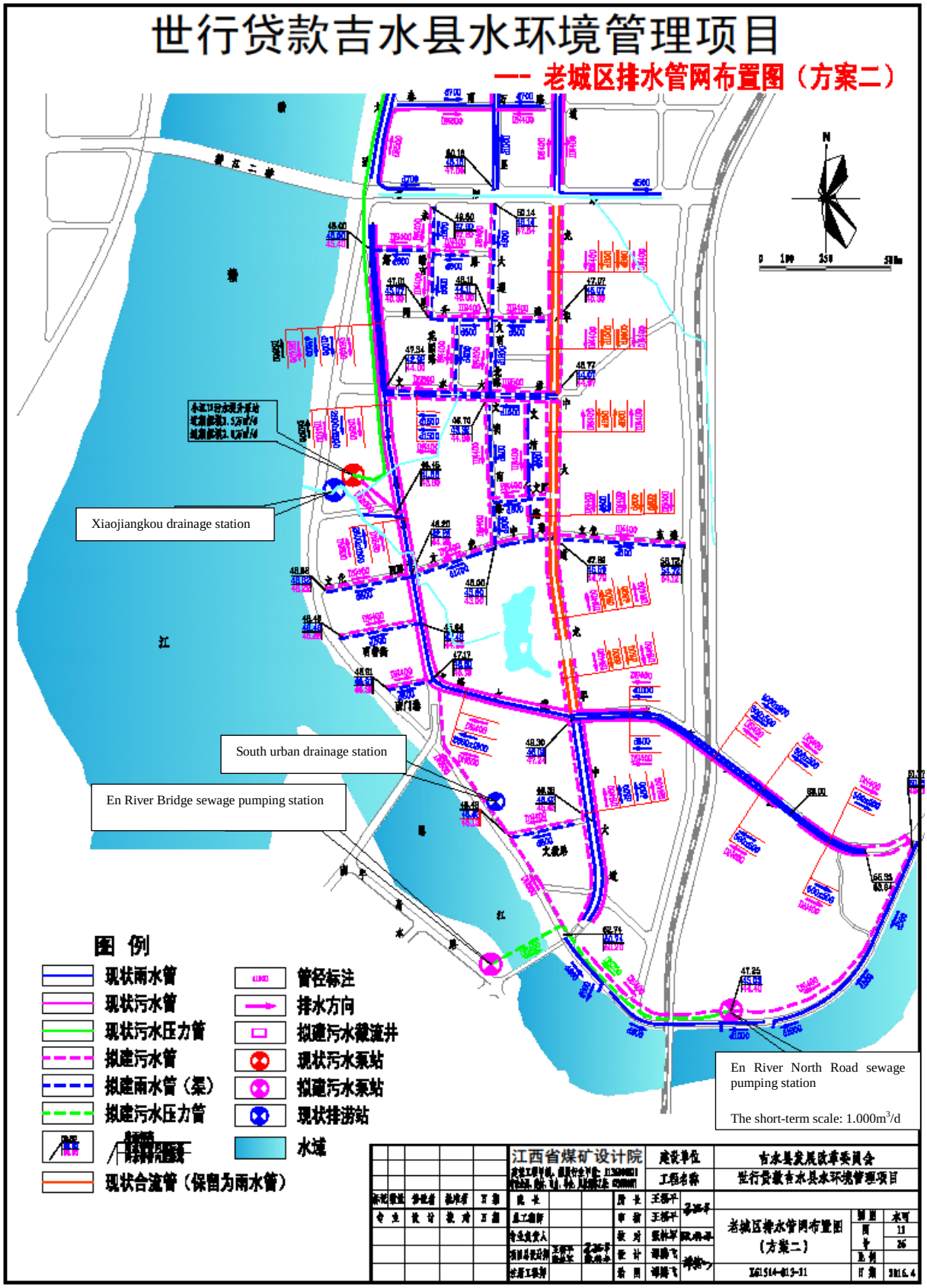
4.2.2.2 Pipeline Networks Alternatives of Old Urban District

Plan A: A mixed drainage system is used recently to expand the diverging area of rainwater and sewage, meanwhile, using the system to increase the sewage collection rate under the premise of minimizing nuisances as far as possible. Namely, sections of the newly reconstructed Longhua Middle Avenue (north of Wenfeng Avenue) and Wenhua Middle Road, furthermore, sections of Wenming South Road, Wenqing Road and Renwen Road that have narrow roads, crowded population, heavy traffic flow and concentrated businesses. Combined sewage pipelines (ditches) of above roads are reconstructed into combined system with interception facility by setting intercepting wells. Other roads use rainfall-sewage separation system. See Picture 4-3.

Plan B: Complete rainfall-sewage separation system is used, and rainwater pipelines and sewage pipelines are laid on roads within the district.



Pic.4-3 Pipeline Networks Layout of Old Urban District (Plan A)

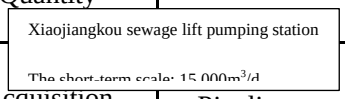

世行贷款吉水县水环境管理项目
—- 老城区排水管网布置图（方案二）
Xiaojiangkou drainage station
South urban drainage station
En River Bridge sewage pumping station
En River North Road sewage pumping station
The short-term scale: 1.000m3/d
图 例
现状雨水管
现状污水管
现状污水压力管
拟建污水管
拟建雨水管（渠）
拟建污水压力管
现状合流管（保留为雨水管）
管径标注
排水方向
拟建污水检查井
现状污水泵站
拟建污水泵站
现状排涝站
水域
江西省煤矿设计院
建设单位
吉水县发展改革委员会
工程名称
世行贷款吉水县水环境管理项目
老城区排水管网布置图（方案二）

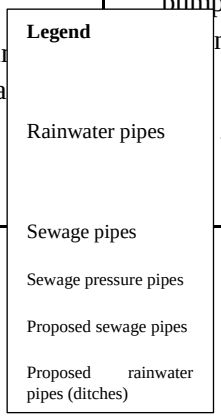
World Bank-Financed Jishui Water Environment Management Project

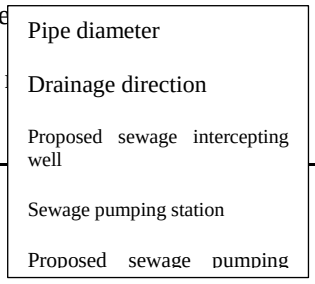
−Pipeline Networks Layout of Old Urban District (Plan B)

Table 4-3 Comparison and Selection of Drainage Pipelines of Old Urban District

Project	Plan A	Plan B
Major Engineering Quantity	Sewage pipelines: 9km; rainwater pipelines: 4.8km	Sewage pipelines: 11.7km; rainwater pipelines: 6km
Acquisition and Demolition	Pipelines are basically laid along the existing roads, thus there is no need of land acquisition and demolition	Pipelines are laid along the existing roads, thus there is no need of land acquisition and demolition
Earthwork Volume	Total amount of excavation: 9,432m^3; total amount of fill: 4,143m^3; amount of spoil: 5,289m^3	Total amount of excavation: 13,353m^3; total amount of fill: 5,405m^3; amount of spoil: 7,948m^3
Effects of Sewage Collection	Parts of the project use combined sewers. And a small amount of sewage overflow into water bodies by intercepting wells in rainy day.	Complete rainfall-sewage separation system is used. There is no overflowing.
Environ Impa	The adverse effect is small. Both pumping station boundary during n and sensitive spots of acoustic e the	The adverse effect is small. Both pumping station boundary during operation and sensitive spots of acoustic environment can meet the requirements of acoustic environment







Social Impacts	Pipelines are excavated and laid on existing roads have certain effects on nearby residents. A small amount of sewage maybe overflows recently and will influence on life due to sections of roads do not implement the reconstruction of rainfall-sewage separation.	Longhua Middle Avenue (north of Wenfeng Avenue) and Wenhua Middle Road with crowded population and heavy traffic flow just have been reconstructed. The adverse impact will be great if sewage pipelines are excavated and laid on there. Wenqing Road and Renwen Road are narrow, but the project needs closed construction of pipeline implementation. Thus the project has great effects on nearby residents.
Engineering Investment	54.2341 million yuan	79.4883 million yuan
Operating Cost	1.2034 million yuan/a	1.2037million yuan/a
Construction Investment + Operating Cost = Net Present Value (8%)	66.0485 million yuan	91.5455 million yuan
Advantages	The plan can implement rainfall-sewage separation step by step. Small social impacts and low investments of the plan can reduce the financial burden.	All sewage can be collected
Disadvantages	A small amount of sewage maybe overflows in rainy day	The investment is high. Some roads are too narrow and it is difficult for implementation; it has great adverse impacts on excavating and laying sewage pipelines soon after reconstruction.
Conclusion	Recommended	

As comparison shows, both plans have little adverse impacts on environment. However, plan A can implement rainfall-sewage separation step by step, and it has small social impacts and low investments. Although a small amount of sewage maybe overflows in rainy day, comparison shows the effect of sewage collection has been improved a lot. At the same time, compared with plan B, plan A saves significant investments so it reduces local financial burden. In the long term, the system of plan A can be reconstructed into rainfall-sewage separation system with the development of the city. Therefore, the project recommends plan A.

5 Environmental Impact Assessment and Mitigation Measures

5.1 Environmental Impact Assessment and Mitigation Measures during Construction Period

5.1.1 Water Environmental Impact and Mitigation Measures during Construction Period

5.1.1.1 Water Environmental Impact during Construction Period

Domestic sewage of constructors and construction wastewater are major resources of wastewater during construction period. Main pollutants of domestic sewage are COD, BOD_5, SS and NH_3-N, and the output is 4.8m^3/d. The construction wastewater mainly includes slime water induced by excavating pipelines and washing mechanical vehicles, and the output is small. Moreover, the construction wastewater also includes slime water induced by dinas flushing, stirring and concreting on construction site during construction period. Main pollutants of slime water are SS, petroleum and so on.

Surrounding water bodies will be polluted if the above construction wastewater and domestic sewage during construction period are casually discharged. The domestic sewage of project constructors will be treated by surrounding existing residential sewage treatment system instead of being discharged. Construction wastewater will be used to sprinkle for dust suppression after sedimentation. After above measures are adopted, construction wastewater has no adverse effect on the surrounding water environment.

5.1.1.2 Mitigation Measures

Domestic sewage of constructors and construction wastewater are major resources of wastewater during construction period. The following measures will be adopted to protect water environment during construction period:

1. Construction Wastewater

After the treatment of sedimentation tank, wastewater produced by the aggregate production system is used in mixing concrete and sprinkling for dust suppression during construction period, and shall not be discharged into water bodies along the line. Slurry produced during construction period will be lifted by the slurry pump to the sedimentation tank and then be treated, finally be solidified through drainage and evaporation. After being treated by settlement and oil separation pond, flushing wastewater of mechanical equipment will be used to sprinkle for dust suppression during construction period, and shall not be discharged into water bodies along the line.

The construction site layout should consider the need of drainage and be kept away from rivers or water bodies as far as possible. Meanwhile, the layout should ensure that the construction site, warehouses, sites used to store diesel and asphalt as well as equipment used to produce asphalt are no less than 500 meters away from rivers. Efforts should be made to avoid pollutants entering into rivers, especially to avoid leakage through lands and surface water in rainy season.

During the project construction, the work area should be cleaned. Sewage and pollutants should be prevented from entering into excavated trenches, otherwise it will form the sewage infiltration.

If the site is used to store oil, the warehouse must have anti-seepage treatment. Measures should be taken when the oil is stored and used to prevent oil leakage, otherwise oil will pollute water bodies.

The foundation construction should be implemented in the non-flood season as far as possible, which can reduce impacts of shallow groundwater on construction.

2. Domestic Sewage

The domestic sewage of project constructors will be treated by the existing domestic sewage treatment system of surrounding residential buildings on construction sites instead of being discharged. In accordance with requirements, anti-seepage measures should be taken

in the staging room.

5.1.2 Ambient Air Impact and Mitigation Measures during Construction Period

5.1.2.1 Ambient Air Impact during Construction Period

(1) The Dust Produced By the Vehicle Transportation

According to relevant references, in the process of construction $Q = 0.123(V/5)(W/6.8)^{0.85}(P/0.5)^{0.75}$, the dust induced by the vehicle transportation accounts for more than 60% of the total. Under completely dry conditions, the dust produced by the vehicle transportation can be calculated according to the following empirical formula:

In which: Q——Dust produced by moving vehicles, kg/km·per unit；

V——Vehicle velocity, km/h；

W——Vehicle carrying capacity, t；

P——Dust amount on the road, kg/m$^{2.}$

Table 5-1 shows the amount of dust generated by a truck of 10t when passing a 1km road under different pavement cleanliness and different driving speed. This shows that under the condition of the same degree of road surface cleanliness, the faster the speed, the greater the amount of dust will be; under the condition of the same speed, the dirtier the road surface, the greater the amount of dust will be. Therefore, limiting the vehicle speed and keeping road surface clean are the most effective ways to reduce the dust induced by the construction vehicle transportation.

Table 5-1 Dust Induced by Vehicles with Different Speeds and Road Surface Cleanliness Degree

(Unit: kg/unit·km)

Dust Amount	0.1	0.2	0.3	0.4	0.5	1.0

Vehicle Speed	kg/m^2	kg/m^2	kg/m^2	kg/m^2	kg/m^2	kg/m^2
5 (km/m^2)	0.0511	0.0859	0.1164	0.1444	0.1707	0.2871
10 (km/m^2)	0.1021	0.1717	0.2328	0.2888	0.3414	0.5742
15 (km/m^2)	0.1532	0.2576	0.3491	0.4332	0.5121	0.8613
25 (km/m^2)	0.2553	0.4293	0.5819	0.7220	0.8536	1.4355

In the meanwhile, if water is sprinkled frequently (4-5 times a day), it will reduce dust in the air by about 70%, and the effect is good.

(2) Dust on Construction Sites

Another main source of dust on engineering construction is wind-blown dust of open storage areas and bare sites. Due to the need of construction, building materials are stored in open areas. At some construction sections, the topsoil needs artificial excavation and temporary storage. Therefore, when the weather is dry and windy, dust will be generated. And the dust emission can be calculated according to the following empirical formula in storage yards:

$$Q = 2.1(V_{50} - V_0)^3 e^{-1.023W}$$

In which: Q——Dust emission, kg/t·y；

V_{50}——Wind speed at the space 50m above the ground, m/s；

V_0——Wind speed for blowing away dusts, m/s；

W——Moisture content of dust particle, %.

Wind speed and particle size are associated with moisture content. Therefore, reducing air storage and bare grounds, and ensuring a certain moisture content are effective means to reduce wind-blown dust. Diffusion and dilution of dust in the air are related to meteorological conditions, such as wind speed, and also related to sedimentation velocity of dust. The sedimentation velocity of dust of different particle sizes is presented in Table 5-2.

It shows that the sedimentation velocity of dust increases rapidly with the increase of the particle size. When the particle size is 250μm, the sedimentation velocity is 1.005m/s. Therefore, it can be seen that when the dust particle size is greater than 250μm, the main influence area is within the close range of the downwind of dust source, and it is dust of tiny particle size that has real effects on external environment.

Table 5-2 Sedimentation Velocity of Dust of Different Particle Sizes

Dust Particle Size (μm)	10	20	30	40	50	60	70
Sedimentation Velocity (μm)	0.003	0.012	0.027	0.048	0.075	0.108	0.147
Dust Particle Size (μm)	80	90	100	150	200	250	350
Sedimentation Velocity (m/s)	0.158	0.170	0.182	0.239	0.840	1.005	1.829
Dust Particle Size (μm)	450	550	650	750	850	950	1050
Sedimentation Velocity (m/s)	2.211	2.614	3.016	3.418	3.820	4.222	4.624

(3) Exhaust of Construction Machinery and Transport Vehicles

In the process of operation, construction machinery, such as bulldozers, excavators, haulage trucks and so on, produce some exhaust gases that contain pollutants. These pollutants include HC, CO and NOx, etc., which will have impacts on surrounding environment to some extent. In general, both exhaust emission amount and effluent concentration are small when vehicles reduce speed. Hence, for the sake of reducing the impact of automobile exhaust gases, when bulldozers, excavators and haulage trucks pass villages or enter into construction areas, they should slow down. Meanwhile, repairing and maintaining construction machinery aim at making them operate normally and reducing exhaust emission.

5.1.2.2 Mitigation Measures

1. Using advanced construction technology. The dinas system and the concrete system adopt wet crushing and are equipped with dust collection equipment. Vehicle speeds and exhausts and coal-fired exhausts should be controlled, and water should be sprinkled (4-5 times a day) as required on construction area. The construction group should use clean energies, such as liquefied gas, electricity and so on. At the same time, afforestation of construction and the labor protection of constructors should be strengthened. All these will mitigate the impact on ambient air.

2. Setting vehicle cleaning platforms on the entrance and exit of material and muck transportation trucks. The facility of the cleaning platform should meet following requirements: spill-proof abutments are set around vehicle cleaning platforms to prevent car washing wastewater from overflowing construction sites; before vehicles leave construction sites, wheels and bodies shall be washed at washing platforms with no sludge on surfaces; the height of materials and mucks should not exceed the top edge of the vehicle groove of material and muck transportation trucks, and it should cover the hopper with tarpaulins or use the airtight car hopper.

3. Using commodity concrete and asphalt instead of setting asphalt mixing plants and bituminous mixing plants on construction sites.

4. When bulldozers, excavators, haulage trucks, etc., pass villages or enter into construction areas, they should slow down. Meanwhile, repairing and maintaining construction machinery are to make them run normally and reduce exhaust emission.

5. Setting dust prevention shields on the surrounding of construction area, especially those that are close to the residential areas, hospitals and schools.

6. Reducing the production of dusts and particles as much as possible to avoid the impact on surrounding residents and businesses, and focusing on the protection of susceptible groups, such as children, the elderly, etc.

5.1.3 Acoustic Environmental Impact and Mitigation Measures during Construction Period

5.1.3.1 Acoustic Environmental Impacts during Construction Period

The construction noise will disappear along with the construction implementation. However, the noise is strong and will have severe effects on the surrounding acoustic environment, especially on important sensitive spots, such as hospitals and schools, etc. Therefore, the noise control should be attached importance to during construction period. The location of pipeline construction changes constantly, so the equipment operation quantity also changes at different times but in the same construction phase. So it is hard to exactly predict noise values at boundaries of construction sites. According to the noise attenuation model of the point acoustic source, the noise value of every construction machinery at different distances can be calculated. The noise attenuation model is as follows:

$L_P = L_{PO} -20Lg(r/ro)- \triangle L$

In which: L_P—Sound pressure level (dB(A)) at site r (m) away from noise source;

L_{PO}—Sound pressure level (dB(A)) at site ro (m) away from sound source;

$\triangle L$—All kinds of decrements (except the divergence decrement), dB(A). And calculated based on the outside noise $\triangle L$ of zero.

Without regard to noise decrements of trees and buildings, predicted results of noise values (not add present values) of all construction machinery at different distances are shown in the table below.

Table 5-3 Predicted Values of noise of All Construction Machinery at Different Distances

Unit: dB(A)

No.	Machinery	Predicted Values of Noise								
		5m	10m	20m	40m	50m	80m	100m	150m	200m
1	Loader	90	84.0	78.0	72.0	70.0	66.0	64.0	60.5	58.0

2	Road roller	81	75.0	69.0	63.0	61.0	57.0	55.0	51.5	49.0
3	Bulldozer	86	80.0	74.0	68.0	66.0	62.0	60	56.5	54.0
4	Excavator	84	78.0	72.0	66.0	64.0	60.0	58.0	54.5	52.0
5	Heavy Duty Trunk	86	80.0	74.0	68.0	66.0	62.0	60	56.5	54.0
6	Light Trunk	75	69.0	63.0	57.0	55.0	51.0	49.0	45.5	43.0

Comparison indicates that the acoustic environment can meet *Standards for Ambient Noise Emission at Construction Site Boundary* (GB12523-2011) (day 70dB(A), night 55dB(A)) when it is 50m beyond the construction machinery, but it basically cannot meet the standard limit within 200m of the construction machinery at night. Therefore, during the daytime, construction noise have great effects on the acoustic environment within 50m of the construction site, while the impact is more serious when construction is at night, and the influence scope is 200m. However, this is the short-term and temporary influence which will disappear after the project implementation. The project does not construct at night. Important sensitive spots of the affected area in daytime are as follows.

Table 5-4 Situations of Important Sensitive Spots Affected by Construction noise

No.	Sensitive Spot	Location	Distance (m)	Affected People
1	Wenfeng Primary School	The West of Wenfeng Middle Avenue	10	1,500
2	Jishui Experimental Primary School	The South of Wenjiao Road	20	3,000
3	Jishui No.4 Middle School	The Southwest of Shuinan Road	48	1,555
4	Jishui Middle School	The East of Wenshan Avenue	32	4,300
5	Jishui Hospital of TCM	The North of Wenhua East Road	29	300

6	Jishui Ai'min Hospital	The North of Wenshui Avenue	14	200
7	Jishui Center Kindergarten	The East of Wenming South Road	17	200
8	Jishui Maternal and Child Health Hospital	The South of Renwen Road	17	400
9	Jishui No.3 Middle School	The West of Longhua Middle Avenue	14	3,650
10	Jishui Chin-shih School	The North of Tongshi Road	10	4,157
11	Jinggangshan Economic and Trade School	The East of Longhua Middle Avenue	12	1,700
12	Wenfeng Health Center	The West of Wenshan Avenue	10	20

Therefore, measures should be taken to reduce the impact of the construction noise on environmental sensitive spots.

5.1.3.2 Mitigation Measures

The main following protection measures are taken to protect acoustic environment during construction period:

1. Noise sources, propagation paths and traffic noise should be controlled. Therefore, no-horn signs should be set up on sections of roads which are sensitive to acoustic environment, such as hospitals, schools, kindergartens and rest homes, etc. Furthermore, low-noise equipment shall be used, constructors should be equipped with noise-proof ear plugs and the construction time should be arranged reasonably.

2. In accordance with *Standards for Ambient Noise Emission at Construction Site Boundary* (GB12523-2011), the project should reasonably arrange the construction time to avoid the scenario of plentiful high-noise equipment working at the same time as much as possible and avoid operating at time points when the surrounding is sensitive to noise. At the same time, the construction time of high-noise equipment should be arranged in daytime to

reduce night transportation and strictly prohibit night (22:00-6:00) construction. Moreover, construction activities that have to be implemented at night should be approved by local relevant environmental protection administration. The project should have communications with residents in advance, at the same time, take noise-reducing measures, such as setting up sound barriers, to minimize the impact of construction noise on residents.

3. Speed of all construction vehicles on the road outsides the construction site shall not be greater than 25km/h.

4. Speed of vehicles within the construction site shall not be greater than 15km/h.

5. Keeping noise of machines and equipment below 90dB as far as possible.

6. When high-noise equipment on the sensitive area (including schools, hospitals and sanatoriums, etc.) is used, temporary noise barriers should be set on the side of the sensitive spots.

7. When construction produces noise and vibration, the construction unit should take proper measures to decrease effects on surroundings.

8. The construction unit should actively negotiate with schools and units nearby construction sections, adjust construction time or take other measures to reduce disturbances of construction noise on teachings and working to the greatest extent.

9. The construction unit has to choose and use construction equipment and transportation vehicles that meet the relevant national standard.

10. The project implementing agency should instruct the construction unit to indicate construction circulars and complaints hotlines on the construction site. The agency should timely get in touch with local environmental protection administration after receiving a report, in order to timely deal with various environmental disputes and ensure smooth construction.

5.1.4 Solid Waste Impact and Mitigation Measures during Construction Period

5.1.4.1 Solid Waste Impact during Construction Period

Solid wastes produced during construction period mainly are household refuses of constructors and spoil generated during construction period.

(1) Impacts of Constructors Household Refuses

The household refuse output during construction is around 60kg/d, and the organic waste is the main source of the household refuse. If the waste is abandoned casually, it tends to decay and ferment, which not only pollutes the water environment, but also breeds flies for fermentation and generates smelly gases that pollutes environment. Therefore, EIA proposes that the dustbin should be set up on the construction site, and the unified collected garbage shall be cleared and treated by sanitation departments.

(2) Impacts of Construction Waste

It is estimated that the project excavation amount is 36,125m^3, the backfill amount is 14,548m^3 and the spoil amount is 21,577m^3. At the same time, in the process of engineering construction, a certain amount of construction wastes will be produced, including cement concrete, rubble and sand-gravel material, etc. Some construction wastes can be reused, the unrecyclable waste should be transported to the local building landfill. The total output of construction waste is 3,100m^3. The construction unit should timely clear and transport the spoil to designated places, and hand it over to the local Environmental Sanitation Bureau who uniformly allocates construction waste to other civil works in Jishui.

If the spoil ground is not reasonably arranged for construction wastes, or if it casually piles waste slags induced by the construction unit, unplanned distribution of waste earthworks and waste residues will be easy to caused along both sides of construction area. Also the waste will occupy certain urban lands, and it will be difficult to control waste slag and water and soil erosion. Great adverse effects will be caused on ecological system around the spoil site. It is difficult to rehabilitate and utilize the temporary ground for waste slag.

Moreover, great adverse effects will be caused on landscape environment along the line. The construction unit should timely clear and transport spoil to designated places, hand them over to the local Environmental Sanitation Bureau who uniformly allocates spoil to other civil works in Jishui; construction wastes should be timely transported to and treated in the Jishui building landfill.

5.1.4.2 Mitigation Measures

Solid wastes produced during construction period mainly are household refuses of constructors and spoil generated during construction. And the project takes following mitigation measures targeting solid wastes produced during construction:

1. Engineering Spoil

Engineering spoil should be temporarily piled on the both sides of excavated pipelines, and the construction unit should timely clear and transport the spoil to the designated place, and hand over it to local Environmental Sanitation Bureau who uniformly allocates spoil to other civil works of the county.The temporary dump site of this project and Jishui Environmental Sanitation Bureau will take following measures:

① Temporary dump sites of earth and stone shall be laid out rationally away from sensitive spots such as residential area and schools as much as possible and from water bodies. It is suitable to lay out them on downwind and crosswind directions of summer prevailing wind direction of urban and residential areas;

② Less land shall be occupied as much as possible and temporary occupied area shall be restored based on the original land use types after completion of construction;

③ Earth and stone stacked temporarily shall be rammed, rolled and covered with tarpaulin with water-proof and wind-proof measures well adopted;

④ Mud drains shall be built around the temporary waste soil dump sites and mud detritus pits shall be built at the drains' outlet to slow down collected water and deposit silts;

⑤Spoil shall be sealed during transportation to avoid scatter;

⑥The operation of spoil work shall be conducted by specially-assigned persons in each section. Non-operating personnel shall be prohibited from entering into the operation area and operating personnel, vehicles and machine in the operation area follow managerial personnel's directions. The vehicles shall discard earth in accordance with the routes and areas designated by managerial personnel and not discard earth randomly, affecting normal earth discarding operation in the spoil grounds and outside the construction site;

⑦Water- proof and drainage treatment shall be made to ensure smooth drainage and avoid inundation around the spoil grounds and the operation site as well as water and soil erosion and environmental pollution;

⑧Safety standards on protection and construction in the temporary dump sites shall be made based on the relevant construction standard requirements;

⑨Specially-assigned persons shall patrol the spoil grounds after work and handle and report potential safety hazards in time. Warning signs shall be set up; the spoil on one day shall be handled on the same day as much as possible;

⑩After completion of the project, the temporary facilities in the construction site shall be dismantled, waste soil be cleaned up and the sites be leveled in time to restore the neighboring environment; during construction and shut-down period the sanitation in the construction site and the neighboring environment shall be maintained;

⑪ During the process of dumping earth, the operation shall be carried out through strictly paving and rolling, and the soil layer shall be rolled before being paved with the new one. During the paving of soil layer, the slope shall be high inside and low outside according to the construction progress. A certain number of runoff gathering pits shall be placed in the runoff ditches to deposit mud in water. Weather and local flood situation shall be mastered in time. Dredging work in drains and runoff gathering pits shall be ready and drains be improved ahead of time;

⑫After completion of earth work, equipment, surplus material, garbage and temporary facilities shall be cleared up in time.

2. Construction Wastes

Recyclable wastes should be comprehensively classified and recycled (selling scrap iron, scrap steel and packaging material, etc. to the salvage station, using broken bricks as the backing material for the road). Those that cannot be recycled should be timely cleared and transported to the building landfill, and should be sealed to avoid falling. Measures should be taken, such as waterproofing and windproof, for the temporary storage.

3. Household Refuse

Household refuse collecting barrels should be installed on the construction site. Everyday the refuse is swept, collected and classified by the specially-assigned person, then cleared and treated by the entrusted sanitation department.

5.1.5 Ecological Impact and Mitigation Measures during Construction Period

5.1.5.1 Ecological Impact during Construction Period

Ecological impacts during construction period mainly are three aspects:

(1) Impacts on Construction Region Plants

Engineering drainage networks are mainly laid along urban roads, and it does not have ancient or famous trees on the construction region. The temporary occupation land will be rehabilitated according to the original land-use type after the construction completion. Therefore, the engineering construction has little impact on regional vegetation.

(2) Impacts on Regional Animals

Fowls are the major animals within the engineering region, which has no animals under key protection and their centralized habitats. Therefore, the engineering construction has little impact on regional animals.

(3) Aggravating Water and Soil Erosion

In the process of construction, the configuration of construction sites destroys the vegetation which results in the increase of soil erosion modulus. Moreover, the temporary storage yard will press or bury the land vegetation. Meanwhile, the accumulated waste slag will lead to a new area of water and soil erosion. Water and soil erosion will be caused in rainy season.

The damage to ecology and landscape is limited and temporary during the engineering construction. As long as constructors manage and rehabilitate the temporary site after construction, the impact on ecology and landscape during engineering construction is acceptable.

5.1.5.2 Mitigation Measures

1. The construction unit should scientifically arrange the construction site and try to minimize land occupation. The temporary occupation land will be rehabilitated according to the original land-use type after the construction completion.

2. Strengthening propaganda and education. In the process of construction, if someone finds rare wild endangered plants, ancient and famous trees or local endemic plants and so on, he should report it to relevant departments and adopt in situ conservation. Controlling the construction noise and reducing construction noise disturbances on animals.

3. In the process of construction, the construction unit should excavate and stack by layers when removing surface soil. After construction completion, the unit should timely dismantle temporary facilities, loosen hardened soil, backfill surface soil in layers and rehabilitate vegetation. According to local climatic features, the rate of side slop and geological conditions, choosing the vegetation type that is fit for local.

4. Controlling Measures for Water and Soil Erosion

(1) Selecting the construction period. The construction should be avoided in rainy

season or rainy day as far as possible. Fences should be set up on the construction site to prevent construction materials or construction wastes from getting into surface water.

(2) According to the geographic and geomorphic conditions on the construction site, to slow down the flow velocity of catchment and subside sediments, earthy drainage ditch should be set around the site, and earthy detritor should be set up at the drainage ditch exit.

(3) Combining major harnessing on water and soil conservation with surface defense, combining engineering measures with vegetation measures. Engineering measures are taken as precursors to give play to their fast-acting property and security effect. Vegetation measures have lasting and stable effects on water and soil conservation, they are auxiliary measures for water and soil conservation. Meanwhile, afforesting and beautifying surroundings on project region will be done.

(4) Protecting the leaf litter and organics of topsoil, and backfilling them to damaged areas to promote the growth of indigenous plants.

(5) Indigenous grass and vegetation should be used to cover the eroded barren areas, or harden this region's soil surface.

(6) Erosion control measures should be prepared before the coming of rainy season, so that the construction unit can better implement the following constructions. After the completion of a construction site, corresponding erosion measures should be prepared.

(7) Setting up deposition control facilities on all construction sites. Before the rehabilitation of vegetation, these deposition control facilities can slow down the flow velocity, change flow directions and subside sediments. These deposition control facilities include material pile, stone pathway, settling pond, straw bale, hedgerow and sludge pile, etc.

(8) Taking measures, such as setting up ditches, berms, grass and fences, and piling up stones, to prevent water from flowing into the construction site and avoid the scenario.

(9) Keeping and continuing to take erosion control measures until the vegetation rehabilitates fully.

(10) Watering dirt roads, excavated regions, padding and soil-storing areas to reduce the wind erosion when it is necessary.

5.1.6 Social Environment Impact and Mitigation Measures during Construction Period

5.1.6.1 Social Environment Impact during Construction Period

1. The Impact of Engineering Land Occupation

Existing temporary occupation lands are mainly roads in the county. After construction completion, temporary occupation lands will be restored to the original land use type. Therefore, the engineering land occupation nearly has no impact on the regional land utilization.

2. Impacts on the Public Facility Service

The project pipe networks are mainly laid on curbs, sidewalks, bicycle lanes or under original cover plate drainages. In the process of construction, it is likely to cause the interruption of drainage, power supply, fuel gas and bus route, and affects on lives of residents.

3. Impacts on Businesses along the Street

In the process of pipe network construction, the traffic congestion induced by pavement excavation will influence the normal operation of shops along the street. For example, the access to shops are blocked, and it is inconvenient for shops to load or unload goods.

4. Impacts on Traffic and Security

The pipe network construction has obvious impacts on the road traffic. Although the method of staged construction can be taken, there are always some earthworks that need the temporary storage during the engineering construction. The impact of temporary storage will

be caused on the road traffic along the pipe network construction. If the slotting method is used, the crossing road pipeline will tend to cause traffic jam and have great impacts on the traffic condition. Therefore, with the permission of geology and edaphic conditions, impacts of road excavation during construction will be reduced by pipe jacking construction. However, at the moment, the road bearing capacity (supporting power) is declining. Trucks have to be forbidden to go through in a short period, and the transportation of construction materials will affect the downtown traffic and security.

It is estimated that the construction of pipeline crossing every road will continue for about 20 days. Thus the impact on road traffic will continue for about 20 days. Pipe network constructions in main roads, and constructions on sections of schools and hospitals have obvious impacts on traffic and security. The situation of main roads and their sensitive spots on both sides involved in the project is shown in Table 5-5.

Table 5-5 Urban Main Roads Involved in Project

No.	Name	Road Grade	Redline Width	Engineering Content	Pipeline Layout Site	Situation of Sensitive Spot
1	Wenfeng Avenue	Main road	40m	Rainwater main pipe (culvert) and sewer main pipe	Pipeline laid on one side	Wenfeng Primary School, Jishui County People's Hospital
2	Wenshui Avenue	Main road	40m	Sewage pipe and rainwater pipe	Pipeline laid on two sides	Jishui Ai'min Hospital
3	Wenshan Avenue	Main road	48m	Sewer main pipe and rainwater main pipe	Pipeline laid on two sides	Jishui Middle School, Wenfeng Health Center

Therefore, the civil construction contractor should plan carefully and start construction as soon as possible. The contractor is requested to use pipe-jacking construction. At the same time, the construction unit should negotiate and make the traffic management scheme with the local traffic administration department before the construction. Furthermore, the construction unit should notify residents within the region of construction influence in

advance. Moreover, the construction unit should set up rack notice on construction sites and ask someone to solve traffic congestion. Further measures should be taken to prevent traffic congestion, strengthen the management during construction period and shorten the construction period.

5.1.6.2 Mitigation Measures

1. Mitigation Measures for Engineering Land Occupation

Arranging the construction site and trying to minimize land occupation. The temporary occupation land will be rehabilitated according to the original land-use type after the construction completion.

Arranging the temporary stacking site of earthwork. The site should be kept away from environmental sensitive spots, such as residential areas and schools.

2. Mitigation Measures for Impacts of Pipe Network Construction on the Public Facility Service

(1) Informing the public service interruptions (including of water, electricity, fuel gas, and public traffic lines) at least five days ahead by putting up notifications on the project site, public traffic stops, as well as affected residents and enterprises.

(2) On the basis of getting construction organization done well, ensuring the construction progress and construction safety. Moreover, in order to recover municipal services, the construction unit should shorten the construction period and complete the construction as far as possible.

3. Mitigation Measures for Impacts on Businesses along the Street

Setting up fenders on the opposite side of commercial shops and reserving the pedestrian passageway. Thus the project can guarantee that shops along the street are not affected.

4. Mitigation Measures for Impacts on Traffic and Safety

(1) The civil construction contractor should negotiate and make the traffic management scheme with the local traffic administration department before the construction. On construction nameplate, the construction unit shall provide the information on construction and work schedule, traffic detours and interim public traffic lines, and relocation, etc.;

(2) Setting up warning plates in front of the entrance of every construction area, each intersection, traffic aisles, or at the bend of a road and at the lane change of a road. On the plate, the construction unit shall provide clear indication of speed limit, height limit and other relevant requirements of traffic restriction in construction areas;

(3) In principle, the construction activity is prohibited at night (22:00-6:00). If necessary, the activity has to get the approval of local relevant environmental protection departments, and the construction unit should communicate with residents in advance. At the same time, noise reduction measures (for example, set up noise barriers) should be taken to minimize the impact of construction noise on residents;

(4) To reduce traffic pressures of surrounding roads, in addition to the special circumstance, earthmoving vehicles should avoid urban traffic peaks and should transit at night. Other construction vehicles need reasonably adjust operating time in accordance with factors, for example, season, weather, holidays and emergencies, that affect vehicles' access to construction sites;

(5) For works with construction period of more than 30 days, the boundary of construction site shall be enclosed and have color plate enclosure, which can adjust measures to local conditions. The enclosure shall be at equal to or more than 2.5m at construction site of common areas; the enclosure shall be at equal to or more than 3m at key areas;

(6) The enclosure set up shall be straight, orderly, clean, beautiful, and damage-free, and the appearance shall be harmonious with surrounding environment;

(7) The enclosure constructed on road shall be within 5m range of visibility at crossroad.

Straight and rigid enclosure of metal mesh panel shall be set up without blocking the visual line of drivers and pedestrian on the precondition of guaranteeing traffic safety. Within 5m range of visibility, articles are forbidden to stack around the panel;

(8) In case the enclosure is equal to or less than 5m from residence, or the construction point is equal to or less than 15m from sensitive buildings like residence, hospital and school, etc., proper measures shall be taken to lower the noise, such as raising the enclosure, etc., and the enclosure in sensitive areas shall be up to 3m high; and the scope of 5m outside the enclosure shall be kept clean;

(9) Never stacking materials, tools, and earthwork, etc. within the scope of 1m inside the enclosure;

(10) Never using the enclosure as retaining wall or the support of other facilities and equipment;

(11) When constructions along the line go through the passageway of residents, impacts on nearby residents and vehicles movements should be reduced. The construction unit should organize half construction and make a concentrated effort to finish the construction as soon as possible. Earthing after the construction completion in time. If the construction cannot be finished on the same day, trenches should be covered with steel plates to guarantee normal traffic and security.

(12) The full-time “traffic picket” and the full-time group of traffic safety and civilized construction should be established. The “traffic picket” and the group will guarantee the implementation of traffic safeguard measures, manage and maintain traffic safeguard measures during construction period. Moreover, the “traffic picket” and the group will keep the traffic order of construction sections, and assist in solving traffic problems during construction period.

(13) During construction period, vehicles and personnel who get access to construction sites should strictly obey traffic laws and managements of the traffic management

department. Furthermore, the construction unit should accept the supervision and the examination of traffic management department and project implementing agency and rectify problems that affect traffic in time.

(14) Paying attention to the implementation of civilized constructions and the prevention measures of nuisance during construction period, especially dust prevention and control measures, noise control measures and slurry and earthwork management measures. The construction unit should come into contact with units and communities along the line in advance, try to acquire residents' understandings and supports to ensure the construction carried out smoothly.

(15) When the construction unit establishes the design of construction organization, the cooperation with traffic is listed as one of the design contents of construction organization. Before the construction implementation, the construction unit should take the initiative to contact with the transportation department to introduce and report the project overview, construction schemes, general layouts, engineering materials and earthwork transportation plans. Moreover, the construction unit should improve and perfect transportation schemes, and formulate implementation rules according to the support and the guidance of transportation department.

(16) In case hidden well cover is opened or raised for construction on urban road maintained open to traffic, folding construction curb fender shall be adopted at the boundary of construction area;

(17) Never using red and white flag, safety isolation rope, or other materials to replace the construction curb fender;

(18) The setting of construction curb fender shall surely make the long-side section of channel steel on the foundation face towards construction area; in case construction passageway is set up between construction curb fender and construction area, the passageway shall be equal to or more than 0.6m wide;

(19) In case the external surface of buildings (structures) is painted, refurbished, or cleaned, construction curb fender shall be used as fully-closed enclosure at the boundary of construction area, and various mechanical equipment, tools, and materials shall be placed within the scope of enclosure;

(20) Never removing construction curb fender before the road construction takes interim passing measures or the works is completed;

(21) In key areas, road pipeline shall be constructed by means of "excavating a section, paving a section, and renovating a section", and the whole pipeline shall never be excavated simultaneously;

(22) For construction occupying urban road, the construction unit shall observe relevant regulations of public security, traffic department, and road administration department, handle relevant examination and approval formalities, and set up interim road according to specifications;

(23) Construction unit shall observe the license regulations on construction period strictly, and shall never execute construction by occupying road or exceeding the licensed construction period;

(24) Setting up interim road according to regulations for construction occupying urban road and impacting the travel of vehicles and pedestrian. Especially in the hospital, setting up temporary passages can provide easy access for the ambulance. After setting up temporary passages on construction sections of kindergarten and school, construction sites should be strictly closed and infants or children should be forbidden to enter into construction areas

(25) For construction occupying footway, the construction unit shall build up solid, flat and continuous pedestrian shortcut with safety edge enclosure at the access side neighboring commerce, enterprises, office building or residence, etc., and dispatch special personnel to guide the traffic at peak period of traveling, in order to guarantee the safe passing of the

pedestrian;

(26) The construction unit shall adopt sheet flattening method for construction in case the ditch or pipeline slot is excavated on urban road which is used as traffic road, and the works cannot be completed on the very day;

(27) The supporting and consolidation scheme shall pass safety argumentation, and be reported to construction unit for approval; the steel plate covering road shall be at least equal to or more than 0.03m thick. The edge of the steel plate and metal slope rack adopted shall be burnished to remove sharp edges and burrs, in order to ensure the safety of personnel and vehicles.

(28) Metal shape shall be adopted for supporting and consolidating the lower end of covering steel plate in case the excavation width of ditch (pit) is equal to or more than 0.8m.

5.1.7 Health and Safety during Construction Period

The project quantity and the number of constructors is small. However, housing and sanitary conditions in construction sites are relatively poor. Meanwhile, the labor intensity is great. Thus the prevalence of disease tends to be caused. To ensure the construction safety, constructors should have comprehensive medical examination before entering into the site. Prohibiting those who suffered from communicable diseases to enter the construction site. Staffs in dining room should have regular medical examination. And those who have suffered from diseases should be timely treated and transferred out to prevent disease transmission. The construction site should establish a centralized water supply or utilize municipal water supplies, and should be equipped with medical and health facilities as well as medical workers. Protecting constructors, ensuring their health and safeties and ensuring smooth project.

5.2 Environmental Impact Analysis and Mitigation Measures during Operation Period

The water environment management project includes pipeline construction engineering and non-engineering measures. The environmental impact analysis of the assessment during operation period is mainly the project positive effect or others on environment.

5.2.1 Positive Influence

The implementation of this project will gradually solve south urban district and old urban district's problems. For example, sewage cannot be effectively collected into sewage treatment plants because of having no drainage system, and the treatment effect and the emission reduction efficiency will not be improved. By the completed time (2023), the collected sewage quantity of south urban district and old urban district will increase 7,000m^3/d (the total is 13,000m^3/d). The sewage will be treated effectively in Jishui sewage treatment plants. The estimated annual reduction of pollutant into Poyang Lake Basin water bodies include 20.44t of TN, 2.04t of TP and 183.96t of COD. The direct benefit population number is about 170,000, including around 79,600 women.

5.2.3 Atmospheric Environmental Impact during Operation Period

During operation period, the pipeline network engineering of this project does not produce exhaust gas. Thus the pipeline network engineering has little impacts on surrounding atmospheric environment.

5.2.4 Water Environmental Impact Analysis and Mitigation Measures during Operation Period

5.2.4.1 Water Environmental Impact during Operation Period

5.2.4.1.1 Reconstruction Engineering of Drainage Pipeline Networks

1. Normal Working Conditions

After the completion of reconstruction engineering of drainage pipeline networks, collecting sewage by pipelines avoids overflow or infiltration of sewage. Otherwise sewage will pollute water bodies. After the pipeline networks operation, urban sewage will flow into sewage treatment plants, which will reduce a large amount of leakage from sewage to underground water, and can basically avoid the original sewage infiltration. Underground water and surface water environments will be improved step by step.

The completion of drainage pipeline networks will gradually improve the incomplete drainage system in south urban district and old urban district, solve the inefficiency of collecting sewage and enhance the treatment effects and emission reduction efficiency of waste water treatment plants. When the project is completed (in 2023), newly collected wastewater of 7000 m^3/d in south urban district and old urban district will be effectively treated in the wastewater treatment plant in the county seat, greatly reducing pollutants that enter the water body, including TN of 20.44t, TP of 2.04t, and COD of 183.96t.

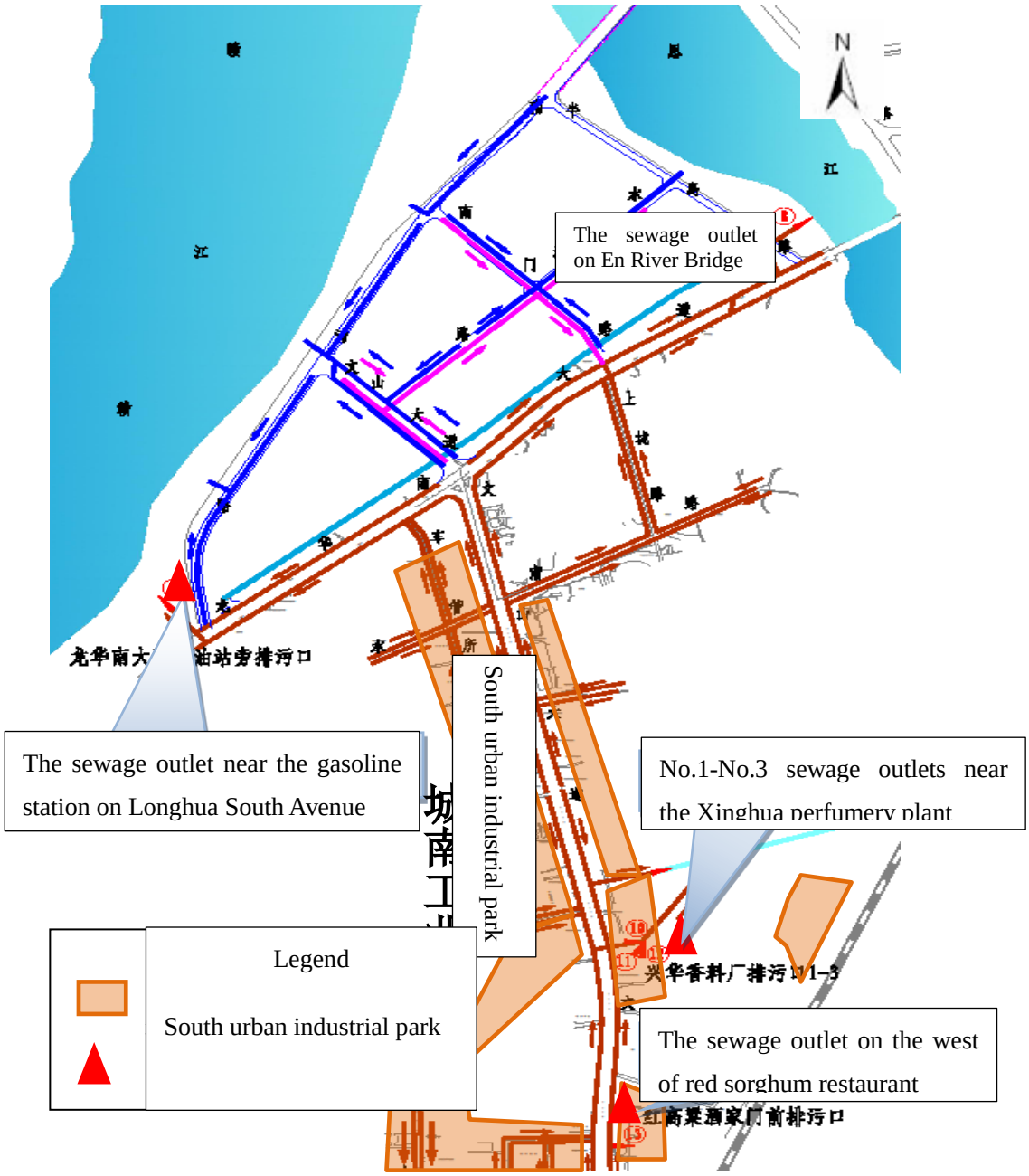
2. Impact of Sewage in South Industrial Park on Sewage Treatment Plant

The requirement of *Several Opinions on the Construction of Municipal and Industry Zone Wastewater Treatment Plants* of Jiangxi province environmental protection authority is as follows: making full use of the processing capacity of the existing urban sewage treatment plants, and avoiding repeated construction. Moreover, in addition to professional industrial parks, such as chemical and electroplate, in principle, other industrial parks' sewage can be discharged into and treated in urban sewage treatment plants. According to the present processing capacity and technology of urban sewage treatment plants in Jiangxi province, the proportion of the industrial sewage that discharged into urban sewage treatment plants is less than 30% of the total treated sewage.

The project sewage pipeline networks collect sewage in south urban district and old urban district. Sewage in south urban district contains residents domestic sewage and industrial wastewater of the south urban industrial park. There are over 50 small and medium sized enterprises in south urban industrial park. The randomness of entered enterprise

property is big, most enterprises operating cycles are short and change frequently. Moreover, most of enterprises are in the process of stopping production or half-stop production. In recent, the output of wastewater in south urban industrial park is 800m^3/d, in the long term is 1,400m^3/d, respectively are 6.2% and 7% of the project total collection scale.

At present, sewage outlets in South Industrial Park are as follows: the sewage outlet near the gasoline station on Longhua South Avenue, the sewage outlet near the Xinghua perfumery plant (including three outlets), the sewage outlet on the west of Red Sorghum Restaurant. Locations are shown in Picture 5-1. Main situations of water quality is shown from Table 5-6 to Table 5-8.



Pic.5-1 Existing Sewage Outlets in South Urban District

Table 5-6 Water Quality Monitoring of Sewage Outlets in South Urban District (A) (mg/L)

Monitoring Time	Monitoring Site	Monitoring Item and Result				
		COD	BOD_5	NH_3-N	TN	TP
2015.11.6	The sewage outlet near the gasoline station on Longhua South Avenue	200.9	98.65	31.6	32.86	1.26

2015.11.6	No.1 sewage outlet near the Xinghua perfumery plant	33.1	15.76	13.87	15.3	0.18
2015.11.6	No.2 sewage outlet near the Xinghua perfumery plant	31.0	13.87	2.60	5.6	0.07
2015.11.6	No.3 sewage outlet near the Xinghua perfumery plant	53.7	13.97	11.43	13.6	0.28
2015.11.6	The sewage outlet on the west of Red Sorghum Restaurant	81.4	60.36	13.91	18.3	0.39
Category B Standard in *Wastewater Quality Standards for Discharge to Municipal Sewers* (GJ343-2010)		500	350	45	70	8

Table 5-7 Water Quality Monitoring of Sewage Outlets in South Urban District (B) (mg/L)

Monitoring Time	Monitoring Site	Monitoring Item and Result				
		COD	BOD_5	NH_3-N	TN	TP
2016.3.4	The sewage outlet near the gasoline station on Longhua South Avenue	217.4	75.8	28.5	30.3	4.57
2016.3.4	No.1 sewage outlet near the Xinghua perfumery plant	98.9	35.5	1.4	1.75	0.69
2016.3.4	No.2 sewage outlet near the Xinghua perfumery plant	0.3	/	7.3	8.3	0.13
2016.3.4	No.3 sewage outlet near the Xinghua perfumery plant	185.1	59.9	4.3	5.4	0.27
2016.3.4	The sewage outlet on the west of Red Sorghum Restaurant	213.4	60.0	3.7	4.6	0.56
Category B Standard in *Wastewater Quality Standards for Discharge to Municipal Sewers* (GJ343-2010)		500	350	45	70	8

Table 5-8 Water Quality and Heavy Metal Indexes Detection of Sewage Outlets on South Urban District and Effluent Structures on the Sewage Plant (mg/L)

Moni	Monitoring Site	Monitoring Item and Result

torin g Time		Total Cd	Total Pb	Total Cr	Total Ni	Total Zn	Total Cu	Total Mn	Total Fe	Total As
2016. 7.26	The coarse screen on the sewage treatment plant	Negative	0.006	Negative	0.013	0.012	0.053	0.538	Negat ive	Nega tive
2016. 7.26	The collecting basin on the sewage pumping station	Negative	0.007	Negative	0.016	0.021	0.037	0.379	0.234	0.064
2016. 7.26	The sewage outlet near the gasoline station on Longhua South Avenue	Negative	0.010	0.004	0.007	0.089	0.058	0.047 7	0.323	0.043
2016. 7.26	No.1 sewage outlet near the Xinghua perfumery plant	Negative	0.003	0.001	0.008	0.019	0.038	0.434	0.042	0.045
2016. 7.26	No.2 sewage outlet near the Xinghua perfumery plant	Negative	0.010	Negative	0.008	0.114	0.036	0.181	0.042	0.036
2016. 7.26	No.3 sewage outlet near the Xinghua perfumery plant	Negative	Negative	Negative	0.006	0.029	0.048	0.326	0.059	0.027
2016. 7.26	The sewage outlet on the west of Red Sorghum Restaurant	Negative	0.002	0.002	0.005	0.021	0.047	0.329	0.054	Nega tive
Category B Standard in *Wastewater Quality Standards for Discharge to Municipal Sewers* (GJ343-2010)		0.1	1	1.5	1	5	2	5	10	0.5

Above data indicate that COD, BOD_5, NH_3-N, TN, TP and heavy metal pollutants of sewage in South Industrial Park meet Category B Standard in *Wastewater Quality Standards for Discharge to Municipal Sewers* (GJ343-2010) and can meet the water quality

requirement of acceptance in Jishui sewage treatment plant. There is no heavy pollution enterprise in south urban industrial park, and the proportion of sewage in the park is less than 30% of the total treated sewage. The major source of sewage is domestic sewage, and the influent quality has little impact on sewage treatment plants. Thus sewage in south urban industrial park can be treated in Jishui sewage treatment plant. To prevent the out of limits of industrial park drainage, regular sampling and monitoring is required on drainage outlets of south urban industrial park. If there is any abnormal phenomenon, the construction unit should find out causes from primary pollution sources and relative enterprises should take emergency measures. At the same time, controlling emissions of microorganism and toxic materials. The industrial sewage of enterprises in south urban industrial park has to be preprocessed to meet the emission standard that is stipulated by China and the industry. Moreover, applying for urban drainage license according to regulations. The enterprises should be supervised and implemented by Jishui environmental protection agency.

5.2.4.1.2 Water Environment Monitoring System Room

The domestic sewage amount of water environment monitoring system room is 0.4m^3/d, 102t/a. The domestic sewage is discharged into municipal sewage pipeline and treated in urban sewage treatment plant. HW34, HW35, HW42 which induced by laboratory are hazardous wastes and the output is 300kg/a. After unified collection, the hazardous waste will be treated by the unit with the authority of treating hazardous wastes instead of being discharged.

By the overall analysis, the engineering implementation will be helpful to eliminate pollutants on the water environment and protect the water environment.

5.2.4.2 Mitigation Measures

1. Reconstruction Engineering of Pipeline Networks

(1) Dredging pipeline networks and replacing damaged pipelines to avoid sewage leakage. Otherwise the sewage leakage will pollute surrounding water bodies and

underground water.

(2) Sampling and monitoring regularly on drainage outlets of Industrial Park. If there is any abnormal phenomenon of water quality, the construction unit should find out causes from primary pollution sources of the catchment system and relative enterprises should take emergency measures. At the same time, controlling emissions of microorganism and toxic materials.

(3) Jishui environmental protection agency will supervise the preprocessing of enterprises sewage and issue the pollutant discharging license.

(4) Paying attention to following aspects in the process of examining & repairing and cleaning

①Warning sign should be set up and barriers on the surface of pool should be removed to ensure the smoothness of traffic before cleaning inspection wells, and non-operating personnel should be evacuated before lifting the pool cover;

②Never using drilling steel and anus anvil, etc. to pry the cover on inspection wells, in order to avoid sparkle, combustion and explosion;

③ In case electric motor is used to draw and drain sewage, check whether the motor, power source, circuit, and knife switch, etc. are of creepage, in order to avoid electric shock;

④Before desilting in a well, operating personnel shall eliminate harmful gases like CO, CO2, hydrogen sulfide and methane, etc. from the well by means of natural ventilation, and use relevant instrument to test the well and to confirm that the well is safe and harmless;

⑤ Operators of wells shall wear anti-static clothes, and shall never bring hard metal objects like keys, etc. into the well;

⑥ Personnel operating above the well shall hold safety belt in the hand, and keep contact with the personnel in the well anytime;

⑦After completion of cleaning, restore the well cover and execute renovation; in case the works can not be completed on the very day, operating personnel shall set up warning sign or protective enclosure here.

(5) Paying attention to following aspects during maintenance and management:

①Inspection wells shall be cleaned periodically, inspected frequently, and repaired in time, in order to ensure the smoothness and soundness of sewage interception pipelines and inspection wells;

②Never pouring garbage, pollutants, and impurities into inspection wells, or stacking impurities or house above inspection wells, or reconstructing the pollution discharge pipeline at random;

③Inspection wells shall be covered airtight in order to prevent stink and accidents;

④Never using open fire nearby inspection wells;

⑤Mud residue cleared off from inspection wells shall be transported to the specialized treatment factory specified by the municipal environmental health authorities, with relevant records made, in order to avoid cross contamination.

2. Experimental Waste liquid

During the operation period, the water quality detection laboratory will produce hazardous wastes, namely, HW34, HW35 and HW42. The hazardous waste output is around 300kg. The following are control measures:

(1) Classifying and collecting hazardous wastes, putting them in impermeable and leakproof sealed containers with clear color identifications;

(2) Setting up impermeable, leakproof and temporary storage rooms for hazardous wastes. Never storing hazardous wastes in the open air;

(3) Hazardous wastes are collected, transported and disposed by the unit with operation

permit of hazardous wastes. The construction unit should pay for the expense of treating hazardous wastes;

(4) Executing the transfer allowed system of hazardous wastes and the transfer table system;

(5) Abandoning or sprinkling hazardous wastes during transportation is prohibited. Dumping and stacking hazardous wastes on non-storage sites or mixing hazardous wastes with domestic wastewater and household refuse are prohibited. If someone has no business certificate or disobey the stipulation of business certificate, his activities, such as collecting, storing, transporting and disposing hazardous wastes, etc. are prohibited.

5.2.5 Acoustic Environmental Impact Analysis and Mitigation Measures during Operation Period

5.2.5.1 Acoustic Environmental Impact during Operation Period

5.2.5.1.1 Noise Characteristic

The Major noise source of this project is mechanical equipment, such as lift pump and crushed rack bar screen. Major performances are the air power noise and the mechanical noise. All noise sources are set in the integrative prefabricate pump station and buried underground. Moreover, the sound wave spreads outside buildings.

Evaluation criteria: Category 4a standard in *Acoustic Environment Quality Standards* (GB3096-2008) is applied to the acoustic environment of En River Bridge sewage pumping station, Wenshan Avenue sewage lift pumping station and En River North Avenue sewage lift pumping station. Category II standard is applied to Xiaojiangkou sewage lift pumping station. Category IV standard in *Emission Standard for Industrial Enterprises Noise at Boundary* (GB12348-2008) is applied to the noise of En River Bridge sewage pumping station, Wenshan Avenue sewage lift pumping station and En River North Avenue sewage lift pumping station. Category II standard in *Emission Standard for Industrial Enterprises Noise at Boundary* (GB12348-2008) is applied to Xiaojiangkou sewage lift pumping station.

Category II standard is applied to spots which are sensitive to acoustic environment of pump stations, namely, Shuinanbei Village, Wenshui Village and the North Court of En River North Avenue.

The mechanical equipment of this project is set in pump stations. Because there are integrative prefabricate pump stations, the scope of noise source intensity of submersible sewage pump is roughly similar. Calculated based on the maximum value of noise source intensity, that is to say, the noise source intensity of submersible sewage pump is 70dB(A), and the noise source intensity of crushed rack bar screen is 85dB(A). Generally the value range of sound insulation and noise reduction is from 15dB(A) to 25dB(A), and we use 20dB(A). The burial depth of integrative prefabricate pump station is 5m. Major sound sources are shown in Table 5-9.

Table 5-9 Primary Noise Sources and Noise Reduction Measures

Noise Source	Source Intensity (dB(A))	Single-seated Pump Station Quantity (Set)	Noise Reduction Measures	Compound Sound Pressure Level	Sound Pressure Level at Boundary
Immersible pump	60~70	2	Choosing the low noise type, installing rubber shock pads on the base, using the buffer connection, attenuating vibration, eliminating noise, and keeping maintenance regularly	65.3	51.3
Crushed rack bar screen	75~85	1			

5.2.5.1.2 Noise Environmental Impact Prediction

1. Prediction Model Selection

Total noise attenuation from noise sources to receivers are integrated by distance from the noise source to the receiver, sound insulation of the wall, air absorption and attenuation of building barrier. This prediction only considers attenuation of the distance and sound insulation of the building wall. The air absorption can be neglected considering the noise source is near the predicted position. The noise source is to be processed by simplifying into three point sound sources considering the distance of each noise source.

(1) Prediction of sound pressure level of simple sound source

a) The formula for contribution value of equivalent sound level (L_{eqg}) generated by sound source during construction at the predicted position：

$$L_{eqg} = 10\lg(\frac{1}{T}\sum_i t_1 10^{0.1L_{Ai}})$$

In which: L_{eqg}—The contribution value of equivalent sound level generated by sound source during at the predicted position, dB(A);

L_{Ai}—Sound level A generated by the sound source i at the predicted site, dB(A);

T—Time period calculated by the predication, s;

t_i —Running time of sound source i in time period T, s;

b) The formula for the equivalent sound level (L_{eq}) predicted at the predicted position:

$$L_{eq} = 10\lg(10^{0.1L_{eqg}} + 10^{0.1L_{eqb}})$$

In which: L_{eqg}—The contribution value of equivalent sound level generated by sound source during construction at the predicted position, dB(A);

L_{eqb}—Background value at the predicted site, dB(A).

(2) Geometric divergence attenuation of point sound source

The fundamental formula for non-directional point sound source is:

$$L_p(\mathrm{r}) = L_p(r_0) - 20\lg(r / r_0)$$

(3) Prediction for sound pressure level of multiple sound sources

The sound pressure level at the predicted position under the multiple source sources is the decibel sum of noise level of the noise for the receiver.

Formula: $$L_{P_T} = 10 L_g \left(\sum_{i=1}^{n} 10^{L_{P_i}/10} \right)$$

In which: L_{P_T} —The total sound pressure level superposed at certain predicted position, dB(A);

L_{P_i} —The sound pressure level contributed by sound source i to certain predicted sites, dB(A).

2. Predicted Content

According to the distribution of the construction project's noise source, the EIA unit has predicted calculation of the noise around the boundary of pump station and sensitive spots. And the EIA unit compares the project contribution values with applied standards.

3. Predicted Result and Analysis

Predicted results of effects of equipment noise sources on the boundary of pump station and sensitive spots are shown in Table 5-10 and Table 5-11.

Table 5-10 The Distribution of Project Noise Source and Source Intensity

Noise Source	Source Intensity after Governance (dB(A))	Distance (m)	Predicted Value (dB(A))
The En River Bridge sewage pumping station	65.3	30	35.8
		To boundary (5m)	51.3
The Xiaojiangkou sewage lift pumping station	65.3	20	39.3
		To boundary (5m)	51.3
The En River North Avenue sewage lift pumping station	65.3	130	23.0
		To boundary (5m)	51.3
Wenshan Avenue Sewage Lift Pumping Station	65.3	To boundary (5m)	51.3

Table 5-11 The Prediction of Pump Station Noise after the Project Operation

Unit: dB(A)

Predicted Site and Period		Contribution Value	Background Value	Superimposed Value	Above-standard or Not	Standard
The boundary of En River Bridge sewage pumping station	Day	51.3	53.6	55.6	No	70
	Night	51.3	48.4	53.1	No	55
Shuinanbei Village	Day	35.8	52.3	52.4	No	60
	Night	35.8	46.4	46.7	No	50
The boundary of Xiaojiangkou sewage lift pumping station	Day	51.3	54.2	56	No	60
	Night	51.3	47.3	52.7	No	50
Wenshui Village	Day	39.3	53.6	53.6	No	60
	Night	39.3	46.6	47.3	No	50
The boundary of En River North Avenue sewage lift pumping station	Day	51.3	53.7	55.6	No	70
	Night	51.3	46.3	52.4	No	55
The North Court of En River North Avenue	Day	23.0	53.4	53.4	No	60
	Night	23.0	46.8	46.8	No	50
The boundary of Wenshan Avenue Sewage Lift Pumping Station	Day	51.3	54.6	56.2	No	70
	Night	51.3	48.5	53.1	No	55

The superimposed predicted noise value in Table 5-11 shows that Category 4a standard in *Acoustic Environment Quality Standards* (GB3096-2008) is applied to acoustic environment around En River Bridge sewage pumping station, Wenshan Avenue sewage lift pumping station and En River North Avenue sewage lift pumping station. Category II

standard in *Acoustic Environment Quality Standards* (GB3096-2008) is applied to acoustic environment around Xiaojiangkou sewage lift pumping station. Category IV standard in *Emission Standard for Industrial Enterprises Noise at Boundary* (GB12348-2008) is applied to the noise of En River Bridge sewage pumping station, Wenshan Avenue sewage lift pumping station and En River North Avenue sewage lift pumping station. Category II standard in *Emission Standard for Industrial Enterprises Noise at Boundary* (GB12348-2008) is applied to Xiaojiangkou sewage lift pumping station. Category II standard is applied to spots which are sensitive to acoustic environment of pump stations, namely, Shuinanbei Village, Wenshui Village and the North Court of En River North Avenue.

5.2.5.2 Mitigation Measures

Choosing the low-noise type, installing rubber shock pads on the base of equipment, adopting the buffer connection, attenuating vibration and eliminating noise, and keeping maintenance regularly.

5.2.6 Solid Waste Impact Analysis and Mitigation Measures during Operation Period

Household refuse of staffs in the monitoring center is the major source of solid wastes during the project operation period. The household refuse output is 5kg/d, 1.28t/a.

After the unified collection of municipal sanitation workers, household refuses induced by project will be transported to refuse landfill and be buried in there. Therefore, the waste has little impact on environment.

5.2.7 Social Environmental Impact during Operation Period

After the operation of reconstruction engineering of drainage pipeline networks in the urban area, the engineering will prevent the regional sewage from being discharged into nearby surface water body. And the regional sewage will be collected by the sewage pipeline networks. The engineering can effectively solve problems of water accumulation and waterlogging of some urban sections. The engineering benefits the renovation of towns appearances in Jishui and creates nice living conditions for local residents. The engineering

construction is of obvious social environmental benefits. Moreover, the engineering benefits the public.

5.3 Due Diligence

Service scopes of drainage pipeline project are south urban district and old urban district. The municipal sewage collected by the project finally enters into Jishui sewage treatment plant. Therefore, the EIA has due diligence on Jishui sewage treatment plant.

1. Location of Sewage Treatment Plant

The sewage treatment plant is located in the 60m north of Nijiazhou group, Zhushan village, Wenfeng town, Jishui county.

2. Construction Situation and Scale of Sewage Treatment Plant

In 2009, the sewage treatment plant was built up in Jishui. The total designed sewage treatment scale of the plant will be 40,000m^3/d by 2020, the sewage treatment scale achieved 20,000m^3/d which was the primary designed scale in 2008. Phase I (Step I) (10,000m^3/d engineering) started in December, 2008, it had been built up and brought into production in April, 2010. Phase I (Step II) (10,000m^3/d engineering) is under construction and planned to start production this year, and the treatment scale will reach 20,000m^3/d after commissioning. Furthermore, the planned factory land acquisition scale is 40,000m^3/d (total area of used land is 2.43ha).

3. EIA and Environmental Protection Acceptance

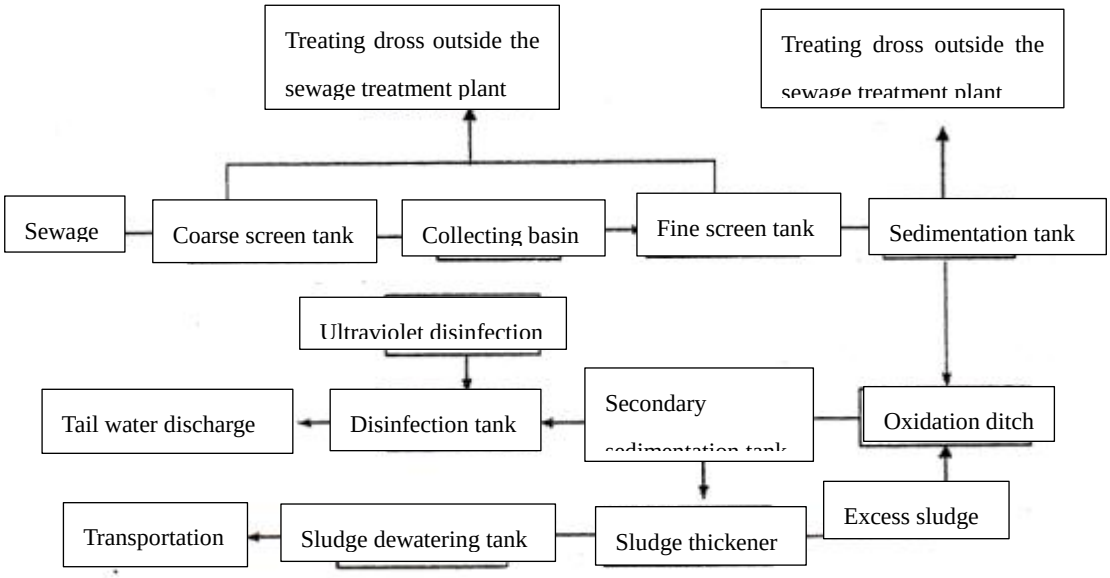
Environmental Protection Agency of Jiangxi Province made official reply for the EIA of Jishui sewage treatment plant (20,000m^3/d) in August 12, 2008 and the official reply number is No.343 [2008] of Gan Huan Du Zi (Annex III). Environmental Protection Agency of Jiangxi Province made official reply and acceptance for the built-up Phase I (Step I), and the official reply number is No.573 [2010] of Gan Huan Ping Zi (Annex IV).

4. Service Scope

South urban district, old urban district and north urban district.

5. Treatment Process

Adopting modified Carrousel oxidation ditch process. The technological process is shown in Picture 5-2.



Pic.5-2 Technological Process of Sewage Treatment Plant

7. Operational Situation

According to the material that provided by Jishui sewage treatment plant, the plant is in good operation and the average daily treatment capacity is 8,500t/d. The sludge output is 1,520t/y, and the moisture content is 78.3% which meets the *Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant* (GB18918-2002). In *Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant* (GB18918-2002), the moisture content of dehydrated sludge is less than 80%. In general, such sludge does not contain heavy metals. Because the sewage treatment plant transports sludge to the designated place by the closed trunk. And the sludge is used for landscaping.

According to data from January to April of Monthly Report of Jiangxi Hongcheng Waterworks Environmental Protection Co.Ltd. about Jishui County Sewage Treatment

Plants Lab Data (Annex V), the average value of actual influent and effluent quality of Jishui sewage treatment plant is shown in Table 5-12.

Table 5-12 The Actual Influent and Effluent Quality of Jishui Sewage Treatment Plant

(Unit: mg/L)

Type	pH	COD	BOD_5	SS	TN	NH_3-N	TP
Actual Influent Quality	7.1	120.58	60.63	107.75	28.63	21.48	2.22
Actual Water Quality Standard	6.9~7	19.98	8.65	7.77	10.93	1.60	0.72
Emission Standard	6~7	≤60	≤20	≤20	≤20	≤8 (15)	≤1.0

The above table indicates that Category IB standard in *Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant* (GB18918-2002) is applied to the effluent quality of sewage treatment plant.

8. Match Analysis of Treatment Water Capacity

Collection areas of the sewage pipeline network project are south urban district and old urban district. By the project completion (2023), the total sewage quantity that is transported to sewage treatment plant by the project is 13,000m^3/d, or 32.5% of the long term (2020) treatment scale (40,000m^3/d) of sewage treatment plant. And the project collects newly-added sewage in south urban district and old urban district, the quantity is 7,000m^3/d, or 17.5% of the sewage treatment plant. And the project sewage quantity in the long term is 50% of the treatment capacity of sewage treatment plant. Therefore, Jishui sewage treatment plant is able to accept the sewage quantity which is collected by the project.

In conclusion, according to the due diligence on Jishui sewage treatment plant, processing capacity and technology of the sewage treatment plant meet the the demand of this project. Running in good condition can effectively treat the sewage collected by the project pipeline networks.

6 Environment Risk Analysis and Mitigation Measures

6.1 Identification of Environmental Risks

According to the impact analysis of project engineering features, the identification results of major environment risks are:

(1) Due to pipelines are buried underground, sewage leaks may exist in the transportation process if anti-seepage measures are improper on the joint of pipelines or pipeline is broken;

(2) The collection scope of this project sewage pipe network includes South Industrial Park. The sewage pipe network may result in accident discharge of industrial wastewater if industrial enterprises in the park are in sudden accidents;

(3) Maintaining workers' health and security when workers maintain or repair pipelines.

6.2 Environmental Risk Accident Impact Analysis

1. Pipe Leakage

Sewage leaks of pipeline flows into underground will not only pollute surrounding soil and hygienic conditions, but also have adverse effects on groundwater quality. According to the running condition of existing rainwater and sewage pipeline networks, in addition to long years out of repair, aging, uncivilized construction and man-made sabotage, there is small probability of pipeline breakage.

2. Industrial Wastewater Accident Discharge

If there is any malfunction of enterprise or industrial equipment in south urban industrial park, it is probably that sewage is discharged into urban sewage pipe without disposal. That is wastewater accident discharge, which results in sudden changes of influent

quality and water yield in sewage treatment plant. For example, the impact load of influent wastewater is excessive, the pH is beyond the range of 6-9, refractory organic poison exceeds standards, etc. These abnormal conditions will cause the decline of biochemical microbial activity in sewage treatment plant, or even the destruction between creatures and the sludge bulking. Eventually these abnormal conditions will result in the deterioration of effluent quality which out of the emission standard stipulated by China. Moreover, these abnormal conditions also have great adverse effects on water environment and ecological system.

3. Maintaining Workers' Health and Security

When sewage pipeline is blocked or accidents happen to one structure, these problems should be eliminated immediately. At this moment, maintenance workers need operate in sewage pipeline, water-collecting well or sewage tank. High concentrations of toxic gases tends to be generated or accumulated in above places., For example, hydrogen sulfide, methane and carbon dioxide, etc. If pay no attention to take safeguards in the process of maintenance, maintenance workers will inhale toxic gases for ventilation obstructed. The workers will have symptoms, such as dizziness, hard breathing and son on. Or even seriously the death. Furthermore, the pipeline generates the flammable gas, methane. These gases will cause explosion for touching open fire, thus they endangers personal safety.

6.3 Risk Accident Mitigation Measures

1. Risk Controlling Measures of Pipe Leakage

(1) Appropriate pipes should be selected. Meanwhile, guaranteeing the quality and the service life of pipeline in accordance with specific circumstances of the city during the piping design. The foundation of pipe drainage engineering has to meet designed mechanics requirements, otherwise, it has to be processed correspondingly. The fundamental construction should be strictly in accordance with width, thickness and intensity that are required by the design drawing.

(2) Corresponding inspection works should be done before workers getting into the pipe. On the one hand, pipes on the construction site should be checked to avoid pipes with cracks or loopholes being laid into the groove. On the other hand, the construction unit should check up on whether the center line and the side line of pipe foundation, the size and the intensity of the well base meet requirements against drawings. Moreover, the construction unit should check up on whether the well site, the well spacing, the strength grade of each part's concrete and the mix of anti-seepage mortar on the joint meet China standards.

(3) Cement mortar that is needed by wipe belt should be made in accordance with specified ingredients over lay-off when pipes are laid. Installing seams of two drainage pipes often results in protuberant joints at the seams for squeezing. To ensure that water is unobstructed in the drainage pipe, protuberant joints should be disposed in time at the seams of two pipes. Thus the pipe will not reduce running water section or affect water velocity. Moreover, sundries stack or even block will not be caused in pipelines.

(4) The groove should not be backfilled until the concrete cradle and the wipe belt mortar have a certain intensity. And sand-gravel materials cannot strike the pipe body directly. Hard objects, such as big macadam or bricks, cannot be mixed with sand-gravel materials. Both sides of pipes should be backfilled and compacted at the same time. Backfilling and compacting in layers above the top of pipes can make the fill form a pressure resistant object. The object can protect the pipe body for it has the effect of dissipating forces on the top of pipes.

(5) In order to timely dredge pipe networks and replace the broken pipes, the project implementing agency should establish a set of complete pipe network supervision systems during the project operation period. The sewage leakage that pollutes surrounding water bodies and underground water will not be generated.

In a word, during the project construction, although the pipe generates pollutants, such as wastewater, noise, solid waste and so on, the construction has little impacts on air quality, water body and acoustic environment of surroundings. Therefore, the project construction is

feasible.

2. Risk Controlling Measures of Industrial Wastewater Accident Discharge

(1) Sampling and monitoring regularly on drainage outlets of industrial parks.

(2) If there is any abnormal phenomenon of water quality, the construction unit should find out causes from primary pollution sources of the catchment system and relevant enterprises should take emergency measures. Meanwhile, controlling emissions of microorganism and toxic materials is necessary.

3. Risk Controlling Measures of Maintaining Workers' Health and Security

It is vital for operating workers to take personnel safety safeguards to prevent toxic gas from harming them. The most effective way to avoid being poisoned is letting hazardous gases dissipated and making the working space full of fresh air by ventilation methods. If the place is unable to be fully ventilated, workers should avoid entering into dangerous spaces. When they have to do so, workers should wear effective protective equipment. Gas masks, air supply respirators and so on are protective equipment, gas detector and test paper are checkout equipment.

6.4 Emergency Organization and Contingency Plan

For this project, the emergency processing of emergent environmental risk accident is related to several units and departments, including environmental protection agency, public security department, sanitary administrative organs and fire department, etc. If there is an accident, the contingency plan should be launched immediately according to *Jiangxi Provincial Contingency Plans for Environmental Emergencies* and *Contingency Plans for Environmental Emergencies of Jishui County*.

The project emergency organization is mainly composed of the office which is subject to the leading group and all emergency response teams, including rescue party, liaison party, logistic party and automobile party. All team's responsibilities and divisions of labor are as

follows. The responsibility organization is shown is Picture 6-1.

(1) The leading group should formulate the contingency plan and put the plan into effect in case of environment risks. The leading group is in charge of overall commands on the site and harmonizing the coordination with external units.

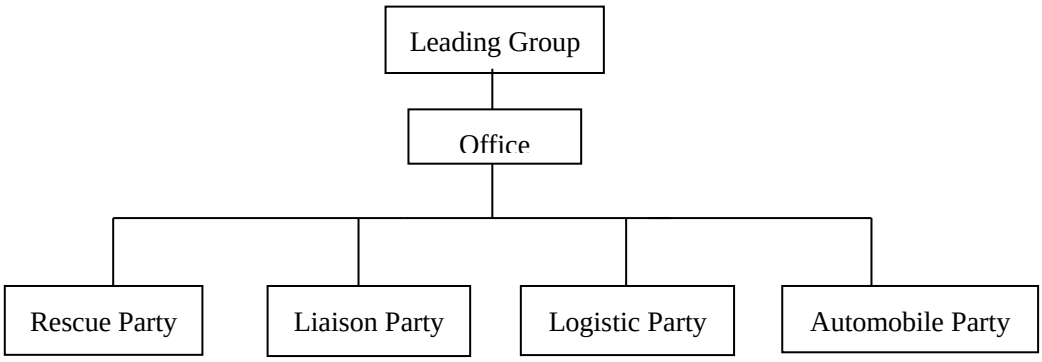
(2) The responsibility of the office is assisting the leading group in dividing the work, supervising and examining.

(3) Under the unified command of the leading group, rescue party is in charge of the specific implementation of the risk accident management and repairing relative equipment.

(4) Liaison party is in charge of the work coordination among rescue party, logistic party and automobile party.

(5) Logistic party is responsible for assisting in rescuing poisoned people, taking corresponding emergency measures for poisoned people, handling hospital observation and treatment procedures, nursing poisoned people and assembling related rescue materials.

(6) Automobile party is in charge of allocation and utilization of automobiles, for example, transporting poisoned people to be hospitalized and transporting rescue materials.



Pic.6-1 Set-up Diagram of Project Emergency Organization

7 Industrial Policy Analysis

7.1 Analysis of Compliance of Industrial Policy

The project is subject to pipeline engineering construction (E4852) and falls under the 22nd category (22. Urban Infrastructure: 9. urban water supply and discharge pipeline network project, water-supply source and water treatment plant project) of encouraged projects in the *Guiding Catalogue for Industrial Restructuring (2011 Version)* (2013 Revision). Moreover, the project complies with related China industrial policies.

7.2 Analysis of Compliance of Urban Planning

The project will reconstruct pipeline networks of south urban district and old urban district in Jishui county. Moreover, the project complies with *Urban Master Plan of Jishui County* (2014-2030).

8 Public Consultation and Information Disclosure

8.1 Purpose and Approach

In the process of the project construction and operation period, World Bank-financed Jishui County Water Environment Management Project will have environmental impacts on surrounding area. Vital interests of the people around the project are directly involved. Pursuant to requirements of *Tentative Methods for Public Participation in Environmental Impact Assessment* (Huan Fa [2006] No.28), *Circular on Further Strengthening Public Participation in Supervision and Administration of Environmental Impact Assessment for Construction Projects of Jiangxi Province Environmental Protection Department* (Gan Huan Ping Zi [2014] No.145) and the World Bank Operation Policy OP4.01, two rounds of public consultation and information disclosure are conducted. The first round is conducted before the outline of EIA is finalized. Key activities of the first round include providing project overviews and potential environmental impacts for the public who are affected by the project. Meanwhile, the public opinions are solicited. To have the public's understandings and supports for the project construction and mitigation measures, the second round is conducted after the draft of the preparation of EIA, including publicizing the complete edition of EIA, and having the public consultation for main contents and EIA conclusions.

Public consultation and information disclosure are a type of two-way information sharing between the project implementing agency and the public, and an important component of environmental impact assessment and play a critical role in improving decision-making. The purposes of public consultation and information disclosure are disclosing relevant project information to the project areas and the public who are concerned about the project, keeping the public informed of the project's main contents, its implementation and operation features and significant environmental issues or problems related to the project; helping assessment staff identify issues or problems, confirming all significant environmental issues or problems triggered by the project that have been analyzed and assessed in the EIA; confirming the feasibility of environmental protection measures and implementation of optimal measures. Public consultations highlights the importance of linkages and communications between all project-related parties with the public, and they can directly reflect views of the public and enable decision-makers to timely

identify potential issues or problems and timely revise and improve design so that concerns of the public can be adequately addressed, thereby contributing to further improvements and stronger rationality of the project's planning, design, environmental monitoring and management, as well as the most optimal coordination between the project's environmental, social and economic benefits.

8.2 Public Consultation

Two rounds of public consultation are conducted in the project; main methods of consultation are site visit, questionnaire survey and discussion meeting, relevant documents are provided in the Annex VI

8.2.1 First Round of Public Consultation

8.2.1.1 First Round of Public Consultation

The situation of first round of public consultation is shown in the following table.

Table 8-1 Time, Participant and Method of First Round of Public Consultation

Stage	Approach	Date	Venue	Participants	Contents
First Round	①Site Visit; ② Questionnaire Survey; ③ Discussion Meeting	December, 2015; January, 2016	Jishui County	①Site visit, questionnaire survey: units representatives of Jishui county government, Jishui Water Supplies Bureau, Jishui Urban Management Bureau, Jishui Environmental Protection Agency, Jishui Road Transport Bureau, Jishui sewage treatment plant and residents on sensitive spots, namely, Jishui County People's Hospital, Jishui Siyuan Experimental School, Wenfeng Health Center, Jishui Chin-shih School, Jishui Center Kindergarten, Jishui Maternal and Child Health Hospital, Jishui No.3 Middle School, Jinggangshan Economic and Trade School, Jishui Hospital of TCM, Jishui Ai'min Hospital, Chengdong Primary School, Jishui No.2 Middle School, Jishui Experimental Primary School, Jishui No.4 Middle School, Jishui Middle School, Wenfeng Primary School and Shanshuihaocheng	Providing project overviews and potential environmental impacts for the public who are affected by the project. Meanwhile, soliciting the public opinions.

Stage	Approach	Date	Venue	Participants	Contents
				Court ②Discussion meeting: one time, representatives of affected residents and units.	

8.2.1.1 Feedback of Public Opinions

Public opinions and feedback during the first round of public consultation are shown in the following table.

Table 8-2 Summary Sheet of Public Opinions and Feedback

Stage	Approach	Public Questions/Opinions	Feedback of Public Opinions Given by Implementing Agency
First Round	①Site Visit; ②Questionnaire Survey; ③Discussion Meeting.	1. The public support the project implementation and they have no objection. 2. Hoping the project could be operated and completed as early as possible. 3. Suggesting reduce the construction noise as far as possible, arranging the construction time and guaranteeing residents private safeties and smoothing the construction.	Project implementing agency and EIA unit: thank you for your understanding and support. We will further improve the design and the project preliminary work, and try to operate and complete as early as possible. Mitigation measures for construction noise and environmental management requirements of construction time should be implemented in EIA and the environmental management plan. The project also requires that the civil work contractor should complete traffic organization design of road construction to guarantee residents private safeties and smooth construction.

8.2.2 Second Round of Public Consultation

8.2.1.1 Second Round of Public Consultation

The situation of first round of public consultation is shown in the following table.

Table 8-3 Time, Participant and Method of First Round of Public Consultation

Stage	Approach	Date	Venue	Participants	Contents
Second Round	①Site Visit; ②Questionnaire Survey.	May, 2016	Jishui County	Site visit, questionnaire survey: residents on sensitive spots, namely, Jishui County People's Hospital, Jishui Siyuan Experimental School, Wenfeng Health Center, Jishui Chin-shih School, Jishui Center Kindergarten, Jishui Maternal and Child Health Hospital, Jishui No.3 Middle School, Jinggangshan Economic and Trade School, Jishui Hospital of TCM, Jishui Ai'min Hospital, Chengdong Primary School, Jishui No.2 Middle School, Jishui Experimental Primary School, Jishui No.4 Middle School, Jishui Middle School, Wenfeng Primary School and Shanshuihaocheng Court.	Having the public consultation for main contents and conclusions of draft EIA to acquire the public's understandings and supports for the project construction and mitigation measures.

8.2.1.2 Feedback of Public Opinions

Public opinions and feedback during the second round of public consultation are shown in the following table.

Table8-4 Summary Sheet of Public Opinions and Feedback

Stage	Approach	Public Questions/Opinions	Feedback of Public Opinions Given by Implementing Agency
Second Round	①Site Visit; ②Questionnaire Survey.	The public support the project implementation and accept environmental protection measures which are proposed to be taken.	Project implementing agency and EIA unit: thank you for your understanding and support, the project will strictly implement all environmental protection measures of the environmental management plan.

8.3 Information Disclosure

8.3.1 First Round of Information Disclosure

Date, venue and approach of first round of information disclosure are shown in the following table.

Table 8-5 Date, Venue and Approach of Information Disclosure

Stage	Disclosure Approach	Date	Venue	Disclosure Content
First Round	On-site Disclosure	January, 2016	The government bulletin board of Wenfeng Town	Mainly are project contents and potential environmental influences


Pic.8-1 Pictures of First Round On-site Disclosure

8.3.1 Second Round of Information Disclosure

Date, venue and approach of first round of information disclosure are shown in the following table.

Table 8-6 Date, Venue and Approach of Second Round of Information Disclosure

Stage	Disclosure Approach	Date	Venue	Disclosure Content
Second Round	Full Disclosure	May, 2016	1. The Reading Room on the second floor of neighborhood committee in Wenfeng Community, Wenfeng Town, Jishui County; 2. Room 313, North Building of Jishui Administrative Center.	Draft of full EIA
	On-site Disclosure	May, 2016	Bulletin boards of Jishui County People's Hospital, Jishui Siyuan Experimental School, Jishui Middle School, Shanshuihaocheng Court, etc.	(1) Project overview; (2) Proposed environmental protection measures; (3) Conclusions of draft EIA; (4) Reference venues and approaches of project full EIA.



Pic.8-2 Pictures of Project Full Disclosure

9 Resettlement and Social Assessment

The content below is a part of "Resettlement Plan for the World-Bank-Financed Jiangxi Poyang Lake Basin Water Environment Management Project" and "Social Assessment Report for World Bank-Financed Jiangxi Poyang Lake Basin Water Environment Management Project" made by Hohai University.

9.1 Resettlement Plan

9.1.1 Impacts of Land Occupation

Jishui County of Ji'an City is involved in land acquisition. This project involves permanent land acquisition and temporary land occupancy while no house demolition or minority communities are involved within the land to be acquired. The project impacts are illustrated in Table 9-1.

Table 9-1 Summary of the Project Impacts on Migrants

County	Project Name	Township and Town (in number)	Village (in number)	Acquired Collective Land (hectare)		Acquired State-owned Land (hectare)	Temporary Land Occupation (hectare)		Directly Affected Population		Indirectly Affected Farmer and Shop	
				Total	Paddy Field/Arid Land Included		Collective Land	State-owned Land	Household (by household)	People(capita)	Number (by household)	People(capita)
Jishui County	Drainage Pipe Networks Engineering of Jishui south urban district and old urban district	1				0.085		206.54			156	2948
	Water Environment					3						

County	Project Name	Township and Town (in number)	Village (in number)	Acquired Collective Land (hectare)		Acquired State-owned Land (hectare)	Temporary Land Occupation (hectare)		Directly Affected Population		Indirectly Affected Farmer and Shop	
				Total	Paddy Field/Arid Land Included		Collective Land	State-owned Land	Household (by household)	People(capita)	Number (by household)	People(capita)
	Monitoring System											

9.1.2 Measures to Reduce Impacts

In the planning and design stage, in order to reduce the impact of project construction on the local socio-economic and people's life, the design agency and owner of the project had adopted several effective measures:

(1) In the planning stage, when optimized selection for schemes was conducted, much consideration was put into the impact of project construction on the local socioeconomic, which was set as a key factor in the optimized selection for schemes;

(2) Design was optimized. To reduce the demolition immigrants, existing national and local roads were used to connect planned construction area.

(3) The design was optimized to occupy wasteland and state-owned land and reduce the occupancy of arable land.

In the Resettlement and the implementation stage, when the land acquisition and resettlement are unavoidable, in order to reduce the impact of construction projects, the following measures will be taken:

(1) The collection of basic material shall be strengthened and thorough analysis shall be conducted concerning the current situation of local socioeconomic and future development. Practical resettlement action plan shall be established according to local situation. The people affected by the project shall be prevented from suffering loss for project construction.

(2) The public participation shall be actively encouraged and information disclosure shall be strengthened and surveillance by the masses shall be accepted.

(3) Internal and external monitoring shall be reinforced and effective and unblocked feedback mechanism and channels shall be established. The information processing cycle shall be minimized to ensure the various problems in project implementing process be settled in time.

(4) Project sites are arranged in a scientific way by occupying as less land as possible. When construction is completed, temporarily occupied area will be recovered as provided by its original land use type.

(5) Temporary storage area of earthwork is properly arranged so that it is far from environmentally sensitive points such as residential quarters, schools and the like.

9.2 Social Assessment

9.2.1 Social Assessment

Social assessment of this project consists of items below:

(1) Generally, the project is of high economic and social benefit, consistent with medium or long-term development plan for representative counties of each sub-project. Meanwhile, it will have positive impacts on improving regional environment and boosting regional economic and social development.

(2) Most farmers/residents of representative counties will benefit directly from the project, since the project has extensive covering rate and inclusive beneficiaries.

(3) Disadvantaged groups will be direct beneficiaries of the project. Generally, the project has little adverse impact on their livelihood, but create some jobs for them to live a better life.

(4) Because the project is in line with the region’s customs, culture and religion, there is no relevant risks.

(5) Project management system of high enforcement capability provides institutional guarantee for the project’s smooth operation and implementation.

The project will alleviate pollution in Poyang Lake Basin and improve living, ecological and social environment for residents in the project area. Purposes of the project are in line with China's plan of utilizing foreign investment and pollution control. Local governments of various levels and beneficiary groups are all supportive to the project.

Sewage treatment and ecological restoration projects have been spreading in China's provinces for years. The technology is relatively mature. Moreover, the project areas have conducted similar pollution control projects and formed full-time technological teams, boasting a good working foundation. And staffs of project offices of all levels are experienced in project management. All of these are favorable for successfully completing the project.

Implementation of the project will bring favorable social benefits, including: improving people's living environment and their livelihood; creating more jobs for vulnerable groups and farmers; decreasing incidence of disease and improving people's health conditions, promoting rural urbanization and transforming farmers into urban residents, and facilitating industrial restructuring and green economic development.

Any project may encounter risks in the implementation. This project will face risks in the construction, difficult land acquisition and subsequent maintenance. Therefor, the project has to pay attention to the development of beneficiary groups and also attend to social equity. Undoubtedly, a more integral project design and high-quality project management will reduce potential social risks and prevent negative social impacts in the area.

9.2.2 Suggestions

Due to differences and complexity of project contents in various cities or towns and distinct economic and social development, we have to face potential risks brought by project construction. Those risks can be avoided through two methods. Firstly, optimize engineering design on the basis of no extra quantity. Secondly, owners should consult with stakeholders before, during and after the project construction to know their needs and desires, and

communicate with different departments. To this end, the social assessment group proposes the following suggestions:

1. General Advice

(1) Optimize the design

Project owners and feasibility study agencies should minimize the scale of land acquisition and demolition in design, and adopt advanced measures of environmental protection to avoid secondary pollution brought by environmental projects.

(2) Conduct participatory activities

Major stakeholders should be involved in the design, implementation, management and supervision of the project. Project owners, the PMO/PPMO and social assessment group formulate outline for beneficiary participation and initiate monitoring and evaluation to ensure that major stakeholders join in the whole process of the project, including the preparation, design, implementation, monitoring and supervision, and equip them with the awareness of environmental protection.

(3) Carry out training on environmental knowledge and public health education

Relevant government departments should organize public training on national and regional laws and regulations on environmental protection as well as environment indicators under the assistance of the publicity department, Bureau of Education, Environmental Protection Bureau, Bureau of Radio and Television, newspaper offices, and sub-district/town/township/village level residents' committees; launch training on water conservation, treatment of sewage and waste, control of point pollution, prevention of water-mediated diseases and recycle of waste; and publicize life-styles that may affect surrounding environment and help residents in the project area to realize that their way of living may have impacts on surrounding environment.

(4) Formulate a reasonable resettlement action plan

On the basis of public consultation, the PMO/PPMO, resettlement plan group and project owners should ensure that migrants' livelihood will not deteriorate due to the project construction.

(5) Create jobs opportunities

The PMO/PPMO, project owners, construction agency with the assistance of the Bureau of Civil Affairs and the Social Security Bureau will provide jobs opportunities for migrants, poverty-stricken families and women in cities and rural areas to involve them in the project construction.

(6) Formulate and implement preferential charging policy for impoverished groups

The PMO/PPMO, project owners and the Price Bureau should establish local charging policy for impoverished groups on the basis of public hearing.

(7) Safety and convenience maintenance during construction period

The project owners and construction agencies should schedule the construction progress by taking residents' need and habits into consideration.

(8) Institutional capacity building

The project managers and constructors should launch training on World Bank social and safeguard policies to better implement the project.

(9) Mechanism of follow-up project management

Residents should be involved in the follow-up management. It is proposed to establish a community team of follow-up project management based on the management group during the construction. Members of follow-up management team (women included) will be elected by villagers. Environmental institutions should strengthen the legislation and law enforcement on environmental protection and enhance environmental education for residents in the project area for sustainability of the project effects.

2. Suggestions on sub-projects

①Pipeline network construction will affect residents rest, shop business and industry operation on the two sides of roads. Therefore, pipe laying should shorten construction duration as much as possible to reduce unfavorable impacts. If possible, offer certain compensation to affected residents and shop owners;

②Trying to connect sewage of households within the construction and residential area from the source;

③Since the project area enjoys developed water system and abundant water, drainage project should be in line with local conditions to ensure construction quality and life time.

10 Environmental Management Plan

See details in the separated pamphlet: World Bank-Financed Jishui Water Environment Management Project Environmental Management Plan (EMP).

11 Analysis of Economic Cost-Benefit of Environmental Impacts

11.1 The Estimation of Environmental Protection Investment

The project total investment is 174.5836 million yuan. The estimation of environmental protection investment is shown in Table 11-1, mainly including costs for environmental protection measure, monitoring cost and training expense, which add up to 1.104 million yuan. Environmental protection investment accounts for 0.63% of the total project investment.

Table 11-1 The Estimation of Environmental Protection Investment

Environmental Management Cost	Environmental Monitoring Cost		Training Expense	Total Cost for Implementing EMP
	Construction Period	Operation Period		
890,000	74,000	60,000	80,000	1.104 million

11.2 Analysis of Economic Cost-Benefit of Environmental Impacts

11.2.1 Environmental Benefit

This is the pipe network reconstruction project. Major benefits of the project are environmental benefits, including the reduction of pollution loads, the benefit of water quality improvement and the benefit of environmental management capacity improvement, etc.

(1) Reduction of Pollution Loads

In 2023, after the completion of project, the sewage collection quantity of south urban district and old urban district is around 13,000m^3/d. The sewage collection rate will be greater than 80%. The estimated annual reduction of pollutant into Poyang Lake Basin water bodies include 20.44t of TN, 2.04t of TP and 183.96t of COD.

(2) Improving Water Quality

The project implementation will control pollutant sources of rivers and greatly reduce pollutants discharged into Gan River. Thus the project will reduce effects of pollutants on the local surface water bodies and protect water bodies in Poyang Lake basin. Therefore, the project will significantly improve Jishui environment conditions.

(3) Benefits of Environmental Management Capacity Improvement

The implementation of environmental monitoring and the construction project of management capacity provides powerful technical and supervisory measures for the local environmental protection. Therefore, the project implementation promotes the sound development of local environmental protection work and effectively prevent environmental pollution accidents. Moreover, the project reduces environmental risks. And the project takes management and technical measures that further reduce the pollution on regional surface water bodies, and improve regional environment conditions.

(4) Providing Favorable Environment for Regional Social and Economic Development

The project implementation accelerates the municipal infrastructure construction of the project site, establishes and perfects the network system of environmental infrastructure. Hence, the project implementation further eases contradictions between the regional urban development and the environmental constraint. Moreover, the project implementation improves the environmental quality of basin on the project site and enhances water environment functions. Furthermore, the project improves urban functions and creates appropriate environment conditions for the quicker and better development of Jiangxi economy and society.

11.2.3 Social Benefit

As this is a social public welfare project, project goals are very important for Jishui county to build a moderately prosperous society in all aspects. Goals include improving living conditions, coordinating urban development, strengthening management and

protection of water environment, improving the ecological civilization level of Jishui county and driving Jishui economy and society towards healthy and sustainable development. Moreover, the project will protect the ecological environment of the Jishui section of Gan River. Therefore, the social benefit is significant.

The water pollution of Gan River will be treated after the completion of the project. The project not only indirectly protects water sources of Poyang Lake, but also has positive meanings for further improving regional water environment of Jishui county and residents' life quality. In particular, the project benefits the development of Jishui ecological tourism, comprehensively promotes the competitiveness of tourism industry and the further improvement of investment environment.

Ecological engineering construction, economic structural adjustment, economic development of Jishui county and massive poverty alleviation are combined. The combination realizes the harmonious development between human and nature. The project construction is conducive to the environment-friendly society building, and also has demonstration effects on the green development of Poyang Lake ecological economic zone.

The project construction makes the public fully realize the necessity and the urgency to protect environment. Thus it helps to improve the ecological consciousness of urban and rural leaders and masses. Moreover, the project creates a good atmosphere of ecological environmental protection with all people being involved. The project construction abandons the extensive growth mode that seeks growth at the price of the environment and resources, and establishes the concept of harmonious development between human and nature. In a word, the project not only develops the economy, but also protects the ecological environment.

11.2.4 Economic Benefit

(1) The economic benefit is mainly showed by reducing economic losses of society. And the economic losses are caused by pollutants in sewage, shown as follows:

Industrial enterprise: The project reduces management costs of investment and operation that are added to by the decentralized wastewater treatment of every industrial enterprise, thus lightening the burden on enterprises;

Agriculture, animal husbandry and fishery: Water pollution may cause the reduction of yield and quality of grain crops, animal products and aquatic products. The project construction can reduce the above economic losses;

Physical health: Water pollution causes the increase of adult morbidity, the increase of healthcare expenditures and the decline of labor productivity, etc. The project construction will reduce the above economic losses.

(2) Benefits of Income Increase

With the improvement of urban infrastructure and environment, the urban land value will increase.

Economic benefits of this project are much larger than project costs. The project has good national economic benefits. So it is economically feasible.

11.3 Summary

The project is a part of phased plan that improves Jishui environmental conditions and promotes the management of water environment in Poyang Lake basin. The construction of engineering and non-engineering measures will have significant effects on the regional municipal infrastructure construction. Moreover, the construction will affect ecological environmental protection, or even national economy and social development.

The implementation of the project ①is beneficial to consolidate achievements of the environmental governance within the project region and further improves the local environment quality; ② is beneficial to improve production and living conditions of local residents, and promotes the living quality and health conditions of the masses; ③ is beneficial to introduce and learn advanced technologies and management experience from

domestic and overseas, promotes the marketization of Jishui infrastructure construction and management, and realizes the benign self-development of the municipal infrastructure construction; ④is beneficial to drive the water environmental safety construction in Poyang Lake basin, and ensures the sustainable development of economy and society by the sustainable development of environment. The project creates favorable conditions for the sustainable development strategy and ecological civilization of Poyang Lake ecological economic zone. Moreover, the project has good environmental, social and economic benefits.

12 Conclusion

The following conclusions can be made after the environmental impact assessment of the project:

(1) The project construction will improve the water environment in Gan River basin and perfect infrastructure. The project construction will change the situation that domestic sewage of Jishui is directly discharged into nearby surface water bodies without treatment. The project is beneficial to protect water quality of Gan River that receives sewage and improves environmental health conditions of Jishui county to some extent. Furthermore, the project greatly improves the living conditions of residents, protects nearby water sources, beautifies surroundings and creates a more comfortable and beautiful living environment. Moreover, the project will perfect and improve the quality of inhabited environment.

(2) The project construction complies with Chinese laws and regulations, urban master plan and environmental protection plan of the project site. Thus the project implementation has the basis of policies and regulations.

(3) The project implementation may involve some environmental protection targets (sensitive spots), such as residential area, school and hospital, etc. In the process of environmental impact assessment, taking approaches and measures, such as taking mitigation measures, formulating and implementing environmental management plan and having public participation, etc., can further reduce and eliminate adverse effects on environmental protection targets (sensitive spots) that are induced by the project construction. Moreover, taking approaches and measures will make potential impacts conform to stipulations of Chinese environment protection laws and regulations as well as standard specifications.

(4) The project implementation also possibly has adverse effects on surroundings. Major impacts are produced during construction period.

1) Major adverse effects during construction period: The effect of construction fugitive dust on the ambient air quality. The effect of construction vehicles and construction machinery noise on surroundings. The impact of construction domestic sewage, water and soil erosion induced by borrowing earth, discarding spoil, excavating and filling during the construction and the temporary storage of earthworks. Furthermore, the effect of sewage pipe networks laying construction on road traffic, and the destruction of construction on vegetation, etc.

2) Major environmental impacts during the operation period derive from mechanical equipment noise that are generated during the operation of sewage lift pumping stations. After sound insulation and shock absorption measures are taken, the noise has little impact on surroundings.

(5) Through taking mitigation measures, implementing environmental management plan, having public consultation and information disclosure, the project can control the extent and the scope of potential adverse impacts within the permissible range of Chinese laws and regulations as well as standard specifications.

In conclusion, after taking countermeasures that are proposed by the project, such as mitigation measures, EMP, public consultation and information disclosure, the implementation of the project is feasible for environment.

Annex I: The Monitoring Report of Air Environment Quality of Jishui County

江西省吉水县环境监测站

监 测 报 告

吉水环监字（2015）第 LK001 号

项目名称：吉水县空气环境质量监测

监测类别：例 行 监 测

报告日期：2015 年 6 月 23 日

（加盖测试专用章）

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江西省吉水县环境监测站

地　　址：吉水县行政中心东南楼

邮政编码：　331600

电　　话：0796—8680522

传　　真：0796—8680832

E---mail：jsxhjjcz@126.com

联 系 人：　罗春花

2015年3月9～11日，吉水县环境监测站在吉水县行政中心东南侧进行了环境空气 SO_2、NO_2 和 PM_{10} 的采样监测，现将监测情况介绍如下：

1、监测方法、仪器

环境空气 SO_2、NO_2 和 PM_{10} 监测方法、监测仪器见表 1

表 1　　SO_2 、NO_2 和 PM_{10} 监测方法、监测仪器情况一览表

监测项目	监测分析方法	所使用仪器名称及型号	仪器编号
SO_2	环境空气 二氧化硫的测定 甲醛吸收-副玫瑰苯胺分光光度法 HJ 482-2009	TH-150C 型大气采样器	33809711
		721E 型可见光分光光度计	KJ0108091707
NO_2	环境空气 氮氧化物的测定 盐酸萘乙二胺比色法（HJ 479-2009）	TH-150C 型大气采样器	33809711
		721E 型可见光分光光度计	KJ0108091707
PM_{10}	环境空气 PM_{10} 和 $PM_{2.5}$ 的测定 重量法（HJ618-2011）	TH-150C 型大气采样器	33809711
		AR1140 电子天平	8329290594

2、监测结果

（1）、环境空气 SO_2 监测结果见表 2

表 2　　SO_2 监测结果情况一览表　　单位：mg/Nm^3

监测点位	监测频次	监测时间及结果		
		2015.3.9	2015.3.10	2015.3.11
吉水县行政中心东南侧	8:00～9:00	0.033	0.035	0.034
	10:00～11:00	0.032	0.031	0.031
	14:00～15:00	0.033	0.030	0.034
	16:00～17:00	0.034	0.032	0.032
	均值	0.032	0.032	0.033

（2）、环境空气NO_2监测结果见表3

表3 NO_2监测结果情况一览表 单位:mg/Nm³

监测点位	监测频次	监测时间及结果		
		2015.3.9	2015.3.10	2015.3.11
吉水县行政中心东南侧	8:00～9:00	0.019	0.017	0.018
	10:00～11:00	0.020	0.020	0.019
	14:00～15:00	0.018	0.020	0.019
	16:00～17:00	0.021	0.019	0.017
	均值	0.020	0.019	0.018

（3）、环境空气PM_{10}监测结果见表4

表4 PM_{10}监测结果情况一览表 单位:mg/Nm³

监测点位	监测频次	监测时间及结果		
		2015.3.9	2015.3.10	2015.3.11
吉水县行政中心东南侧	8:00～17:00	0.066	0.067	0.064

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（加盖测试专用章）

2、监测结果

（1）、环境空气 SO_2、NO_2 监测结果见表 2

表 2　　SO_2、NO_2 监测结果情况一览表　　单位：mg/Nm³

监测点位	监测项目	监测频次	监测时间及结果		
			2015.6.10	2015.6.11	2015.6.12
吉水县行政中心东南侧	SO_2	8:00～9:00	0.034	0.033	0.035
		10:00～11:00	0.031	0.031	0.032
		14:00～15:00	0.033	0.030	0.034
		16:00～17:00	0.034	0.032	0.032
		均值	0.033	0.032	0.033
	NO_2	8:00～9:00	0.018	0.017	0.019
		10:00～11:00	0.019	0.019	0.020
		14:00～15:00	0.017	0.021	0.018
		16:00～17:00	0.020	0.018	0.016
		均值	0.019	0.019	0.018

（2）、环境空气 PM_{10} 监测结果见表 3

表 3　　PM_{10} 监测结果情况一览表　　单位：mg/Nm³

监测点位	监测频次	监测时间及结果		
		2015.6.10	2015.6.11	2015.6.12
吉水县行政中心东南侧	8:00～17:00	0.063	0.065	0.061

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2、监测结果

（1）、环境空气 SO_2、NO_2 监测结果见表 2

表 2　　SO_2、NO_2 监测结果情况一览表　　单位：mg/Nm^3

监测点位	监测项目	监测频次	监测时间及结果		
			2015.8.29	2015.8.30	2015.8.31
吉水县行政中心东南侧	SO_2	8:00～9:00	0.033	0.032	0.035
		10:00～11:00	0.031	0.030	0.031
		14:00～15:00	0.028	0.029	0.031
		16:00～17:00	0.029	0.032	0.032
		均值	0.030	0.031	0.032
	NO_2	8:00～9:00	0.017	0.016	0.018
		10:00～11:00	0.018	0.018	0.016
		14:00～15:00	0.020	0.019	0.019
		16:00～17:00	0.019	0.017	0.021
		均值	0.018	0.018	0.018

（2）、环境空气 PM_{10} 监测结果见表 3

表 3　　PM_{10} 监测结果情况一览表　　单位：mg/Nm^3

监测点位	监测频次	监测时间及结果		
		2015.8.29	2015.8.30	2015.8.31
吉水县行政中心东南侧	8:00～17:00	0.065	0.068	0.066

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2、监测结果

（1）、环境空气 SO_2、NO_2 监测结果见表 2

表 2　　SO_2、NO_2 监测结果情况一览表　　单位：mg/Nm³

监测点位	监测项目	监测频次	监测时间及结果		
			2015.11.23	2015.11.24	2015.11.25
吉水县行政中心东南侧	SO_2	8:00～9:00	0.038	0.036	0.037
		10:00～11:00	0.035	0.034	0.036
		14:00～15:00	0.028	0.029	0.033
		16:00～17:00	0.032	0.031	0.034
		均值	0.033	0.032	0.035
	NO_2	8:00～9:00	0.018	0.017	0.016
		10:00～11:00	0.019	0.019	0.017
		14:00～15:00	0.021	0.021	0.020
		16:00～17:00	0.020	0.019	0.019
		均值	0.020	0.019	0.018

（2）、环境空气 PM_{10} 监测结果见表 3

表 3　　PM_{10} 监测结果情况一览表　　单位：mg/Nm³

监测点位	监测频次	监测时间及结果		
		2015.11.23	2015.11.24	2015.11.25
吉水县行政中心东南侧	8:00～17:00	0.066	0.064	0.067

报告编制：_____复 核：_____审 核：_____签 发：_____

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（加盖测试专用章）

Annex II: The Monitoring Report of Surface Water Environmental Quality of Jishui County

江西省吉水县环境监测站

监 测 报 告

吉水环监字（2015）第 LS001 号

目名称：吉水县地表（下）水环境质量监测

监测类别：例 行 监 测

报告日期：2015 年 2 月 10 日

（加盖测试专用章）

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江西省吉水县环境监测站

地　　址：吉水县行政中心东南楼

邮政编码：　331600

电　　话：0796—8680522

传　　真：0796—8680832

E---mail：jsxhjjcz@126.com

联 系 人：　罗春花

二、监测结果：

水质监测结果见表2。

表2 水监测结果情况一览表 单位：mg/L(pH为无量纲)

监测时	水质类别	监测断（点位）	监测目及结果					
			pH值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.2.4-9	地表水	城南水厂	7.10	0.339	1.58	6.82	10.4	1.5
		金滩杨家	7.13	0.586	1.66	5.56	10.2	1.1
		八都住歧	7.06	0.535	1.78	8.44	10.4	1.4
		乌江入河口	7.08	0.636	1.94	9.90	11.1	2.0
	地下水	河西水厂	7.17	0.025_L	0.87	------		

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日 期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

2015年2月4日，吉水县环境监测站对城南水厂取水口和金滩杨家、八都住歧的赣江水、乌江入河口的乌江水以及河西水厂取水口的井水等5个监测断 （点位）的地表（下）水进行了采样监测。地表水监测 目有pH值、化学 氧量、氨氮、溶解氧、五日生化 氧量和 锰酸盐指数，地下水监测 目有pH值、氨氮和锰酸盐指数，监测 次为1天1次。现将监测情况介绍如下：

一、监测方法、仪器：

水监测方法、监测仪器见表1。

表1 水监测方法、监测仪器情况一览表

监 测 目	监测分析方法	所使用仪器 名称及型号	仪器 编号
pH值	水质 pH值的测定 玻璃电极法 （GB 6920-86）	pH315i 手提式pH测试仪	08370137
CODcr	水质 化学 氧量的测定 重铬酸钾法（GB11914-89）	—	—
NH_3-N	水质 氨氮的测定 纳氏试剂光度法（HJ535-2009）	721E型 可见光分光光度计	KJ0108091707
DO	水质 溶解氧的测定 碘量法（GB 7489-87）	—	—
BOD_5	水质 五日生化 氧量的测定 稀释与接种法（HJ505-2009）	SPX-150BS-Ⅱ 生化培养箱	0808214113
锰酸盐指数	锰酸盐指数的测定 GB11892-89	HH-4 电热恒温水浴锅	080823

吉水环监字（2015）第LS002号 第2 共2

二、监测结果：

水质监测结果见表2。

表2 水监测结果情况一览表 单位：mg/L(pH为无量纲)

监测时	水质类别	监测断（点位）	监测目及结果					
			pH值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.4.1-6	地表水	乌江入河口	7.12	0.146	2.37	6.54	7.1	1.4
		城南水厂	7.14	0.085	2.43	6.59	7.2	1.0
		金滩杨家	7.20	0.094	1.96	12.9	7.2	1.1
		八都住歧	7.14	0.114	2.12	8.44	7.0	1.2

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

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吉水环监字（2015）第LS003号 第2 共2

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测　目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.5.7-12	地表水	乌江入河口	7.03	0.894	3.58	13.3	6.9	2.1
		城南水厂	7.06	0.089	1.71	7.68	7.1	1.3
		金滩杨家	7.04	0.443	2.44	8.56	6.6	1.1
		八都住歧	7.03	0.384	2.57	7.91	6.8	1.4
	地下水	城西水厂	6.80	0.025_L	0.93	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测　目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.6.16-21	地表水	乌江入河口	6.96	0.450	1.98	5.66	5.9	0.9
		城南水厂	6.96	0.299	1.59	5.33	5.8	1.0
		金滩杨家	6.96	0.424	1.86	10.3	6.2	1.2
		八都住歧	7.01	0.439	2.27	9.18	6.1	1.2
	地下水	城西水厂	6.76	0.025_L	0.54	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测　目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.7.14-19	地表水	乌江入河口	6.94	0.166	2.07	7.42	5.9	1.4
		城南水厂	6.94	0.390	2.20	7.06	5.9	1.1
		金滩杨家	6.94	0.301	2.05	10.7	6.2	1.3
		八都住歧	7.04	0.333	2.35	11.1	6.0	1.0
	地下水	城西水厂	6.78	0.025_L	0.78	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测　目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.8.6-11	地表水	乌江入河口	7.96	0.134	1.87	8.36	6.3	1.0
		城南水厂	7.24	0.091	1.46	6.58	6.6	1.0
		金滩杨家	7.56	0.106	1.46	6.55	6.6	0.8
		八都住歧	7.56	0.138	1.83	7.14	6.4	1.2
	地下水	城西水厂	6.96	0.025_L	0.55	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测　目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.9.15-20	地表水	乌江入河口	6.94	0.119	1.67	8.52	6.8	1.2
		城南水厂	6.98	0.078	1.52	6.62	6.6	1.0
		金滩杨家	6.90	0.153	1.44	7.55	6.6	1.1
		八都往歧	6.86	0.183	1.61	7.84	6.6	1.3
	地下水	城西水厂	6.86	0.029	0.66	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

吉水环监字（2015）第 LS008 号　　第 2　共 2

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测　目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.10.13-19	地表水	乌江入河口	7.19	0.137	1.42	6.76	7.3	1.0
		城南水厂	7.14	0.095	1.46	5.52	7.2	0.9
		金滩杨家	7.12	0.105	1.36	14.4	7.1	0.8
		八都往歧	7.18	0.116	1.59	9.80	7.0	1.2
	地下水	城西水厂	7.02	0.025_L	0.50	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测　目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.11.4-10	地表水	乌江入河口	7.20	0.179	1.73	8.47	7.6	1.4
		城南水厂	7.23	0.162	1.79	11.0	7.7	1.6
		金滩杨家	7.22	0.169	1.86	14.2	7.6	1.7
		八都往歧	7.28	0.162	1.89	12.3	7.7	1.4
	地下水	城西水厂	6.93	0.025_L	0.55	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

吉水环监字（2015）第 LS010 号　　第 2　共 2

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测　目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.12.21-27	地表水	乌江入河口	7.22	0.232	2.13	9.54	9.1	1.6
		城南水厂	7.22	0.183	1.87	10.1	9.2	1.4
		金滩杨家	7.20	0.285	1.69	10.4	9.2	1.3
		八都住歧	7.28	0.257	1.97	9.31	9.0	1.5
	地下水	城西水厂	6.91	0.025_L	0.71	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

吉水环监字（2016）第 LS001 号　　第 2　共 2

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2016.1.14-19	地表水	乌江入河口	7.12	0.126	2.22	10.2	9.7	1.4
		城南水厂	7.04	0.109	1.76	9.80	9.6	1.3
		金滩杨家	6.60	0.165	1.85	8.60	9.5	1.2
		八都住歧	7.06	0.137	1.98	9.40	9.5	1.5
	地下水	城西水厂	7.02	0.025_L	0.66	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2016.2.23-28	地表水	乌江入河口	7.42	0.116	1.49	14.8	8.8	1.5
		城南水厂	7.46	0.112	1.21	16.5	9.0	1.0
		金滩杨家	7.24	0.137	1.23	17.4	9.0	1.1
		八都住歧	7.12	0.147	1.32	9.33	8.9	1.2
	地下水	城西水厂	7.36	0.025_L	0.46	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

二、监测结果：

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测 目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2016.3.15-21	地表水	乌江入河口	7.37	0.329	1.82	12.5	9.2	1.4
		城南水厂	7.62	0.313	1.48	13.6	9.3	1.5
		金滩杨家	7.53	0.295	1.92	14.8	9.4	1.6
		八都往歧	7.26	0.332	2.00	9.94	9.2	1.8
		村头	7.27	0.360	1.65	16.2	9.3	1.4
		大江岭	7.16	0.483	2.33	17.1	9.2	1.6
	地下水	城西水厂	7.22	0.025_L	0.55	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

吉水环监字〔2016〕第LS004号　　第2　共2

二、监测结果：

水质监测结果见表2。

表2　水监测结果情况一览表　　单位：mg/L(pH为无量纲)

监测时	水质类别	监测断（点位）	监测 目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2016.4.4-8	地表水	乌江入河口	7.26	0.234	1.46	16.2	8.9	1.4
		城南水厂	7.32	0.227	1.25	15.1	9.1	1.1
		金滩杨家	7.26	0.215	1.28	17.6	9.0	1.3
		八都往歧	7.18	0.206	1.36	10.3	8.8	1.2
	地下水	城西水厂	7.20	0.025_L	0.65	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

日 期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

水质监测结果见表 2。

表 2　水监测结果情况一览表　　单位：mg/L(pH 为无量纲)

监测时	水质类别	监测断（点位）	监测　目及结果					
			pH 值	NH_3-N	锰酸盐指数	CODcr	DO	BOD_5
2015.9.15-20	地表水	乌江入河口	6.94	0.119	1.67	8.52	6.8	1.2
		城南水厂	6.98	0.078	1.52	6.62	6.6	1.0
		金滩杨家	6.90	0.153	1.44	7.55	6.6	1.1
		八都往歧	6.86	0.183	1.61	7.84	6.6	1.3
	地下水	城西水厂	6.86	0.029	0.66	—		

报告编制：_____ 复核：_____ 审核：_____ 签发：_____

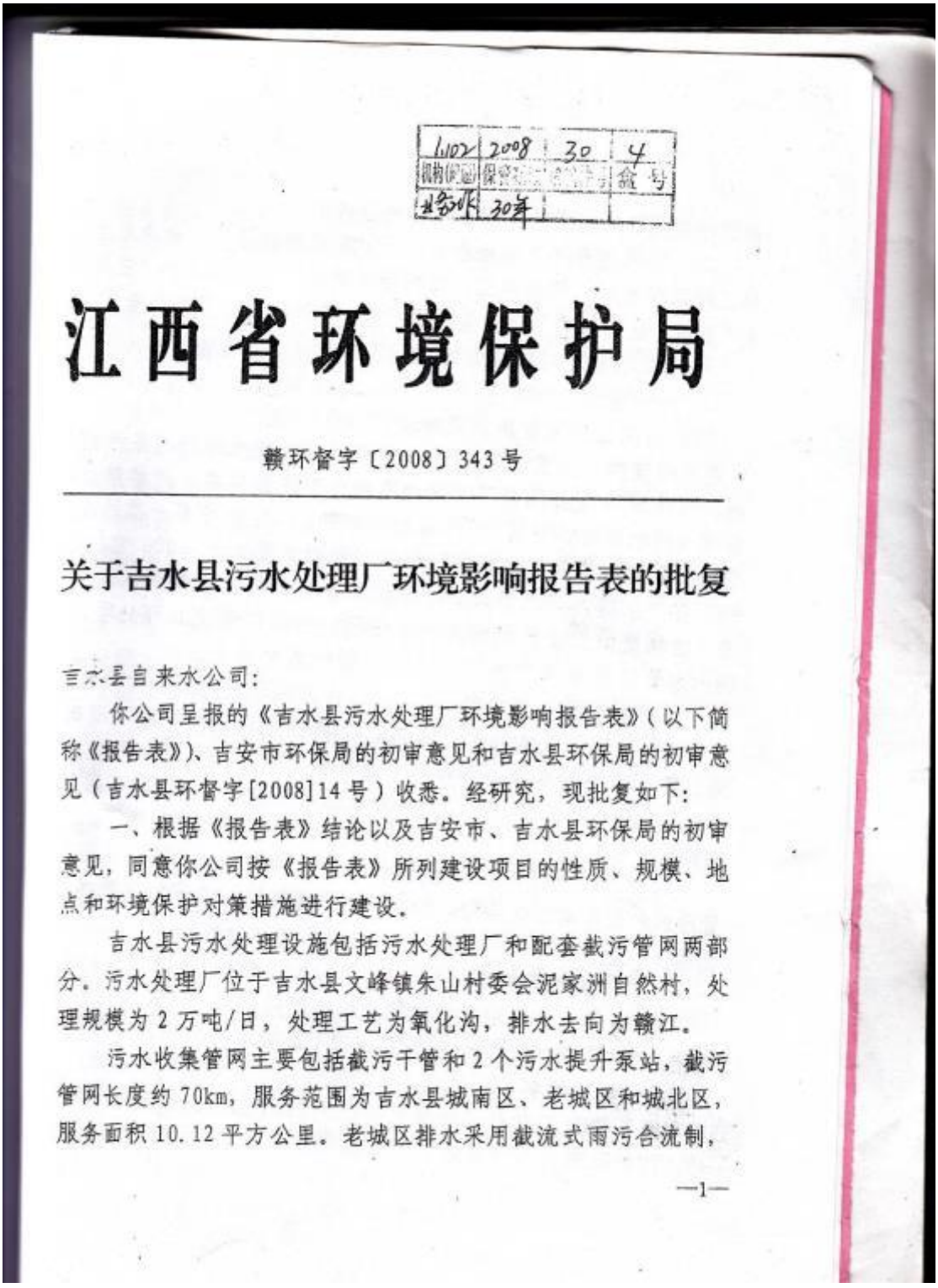
日　　期：_____ 日期：_____ 日期：_____ 日期：_____

（加盖测试专用章）

吉水环监字（2015）第 LS008 号　　第 2　共 2

二、监测结果：

Annex III: Official Reply for the EIA of Jishui Sewage Treatment Plant



江西省环境保护局

赣环督字〔2008〕343号

关于吉水县污水处理厂环境影响报告表的批复

吉水县自来水公司：

你公司呈报的《吉水县污水处理厂环境影响报告表》（以下简称《报告表》）、吉安市环保局的初审意见和吉水县环保局的初审意见（吉水县环督字[2008]14号）收悉。经研究，现批复如下：

一、根据《报告表》结论以及吉安市、吉水县环保局的初审意见，同意你公司按《报告表》所列建设项目的性质、规模、地点和环境保护对策措施进行建设。

吉水县污水处理设施包括污水处理厂和配套截污管网两部分。污水处理厂位于吉水县文峰镇朱山村委会泥家洲自然村，处理规模为2万吨/日，处理工艺为氧化沟，排水去向为赣江。

污水收集管网主要包括截污干管和2个污水提升泵站，截污管网长度约70km，服务范围为吉水县城南区、老城区和城北区，服务面积10.12平方公里。老城区排水采用截流式雨污合流制，

—1—

截污倍数为 1，新城区排水采用雨污分流制。

二、工程建设必须依法严格执行“配套的环境保护设施与主体工程同时设计、同时施工、同时投入使用”的环境保护“三同时”制度，认真落实各项污染防治措施，环保投资必须专款专用。

三、工程建设应重点做好以下工作：

（一）废水污染防治

1、为保证污水设施的正常运行，你公司要按照《报告表》中提出的接纳工业废水限制措施要求对工业废水进行有条件接纳，同时加强污水处理厂入水水质的自动在线监控，严格禁止含有《污水综合排放标准》（GB8978-1996）表 1 中第一类污染物的工业废水排入污水管网，严格限制排水量大于 2000 吨/天的工业废水排入污水管网，严格控制含有重金属、病源体和有毒有害物质的工业废水排入污水管网，各类工业废水预处理达到入水管网要求方能送污水处理厂进行集中处理。

2、污水处理厂事故排放时，赣江将出现较长的超标污染带，因此污水处理厂要加强运营管理，坚决杜绝事故性排放，同时建立事故时的应急预案和措施，将环境影响降低至最低程度。

3、工程建成后，外排废水必须达到《城镇污水处理厂污染物排放标准》（GB18918-2002）一级 B 标准后方可排入赣江。

4、污水处理厂应对排水的水质进行定期监测，排放口应设置污水水量自动计量装置、自动比例采样装置，并安装主要水质指标在线监测装置。

（二）大气污染防治

1、为防止营运期污水处理产生的恶臭对周边的影响，你公司应采取封闭系统、绿化等措施控制恶臭的产生和扩散，并向政府报告，严格控制污水处理厂周边规划，污水处理厂 200 米防护距离内不得新建食品等环境要求较高的企业和居民住宅等建筑物。防护距离内的现有居民必须在项目建成前拆迁完毕。

—2—

2、工程建成后，外排废气必须达到《城镇污水处理厂污染物排放标准》(GB18918-2002)二级标准，污水处理厂周围应同期建设绿化带。

（三）噪声污染防治

工程应选用低噪声设备，并对设备采取隔声减震、密闭等措施，降低噪声的影响。工程建成后，污水处理厂厂界噪声必须达到《工业企业厂界噪声标准》(GB12523-90) Ⅱ类标准。

（四）固体废物污染防治

1、污水处理厂的污泥应进行稳定化和脱水处理，污泥稳定化应满足《城镇污水处理厂污染物排放标准》(GB18918-2002)"污泥稳定化控制指标"要求，脱水后的污泥含水率应小于80%。

2、你公司应向政府汇报，加快垃圾填埋场的建设步伐，垃圾填埋场应和污水处理工程同步建设，同步投入使用，确保污泥得到妥善处理，防止产生二次污染。

（五）施工期污染防治

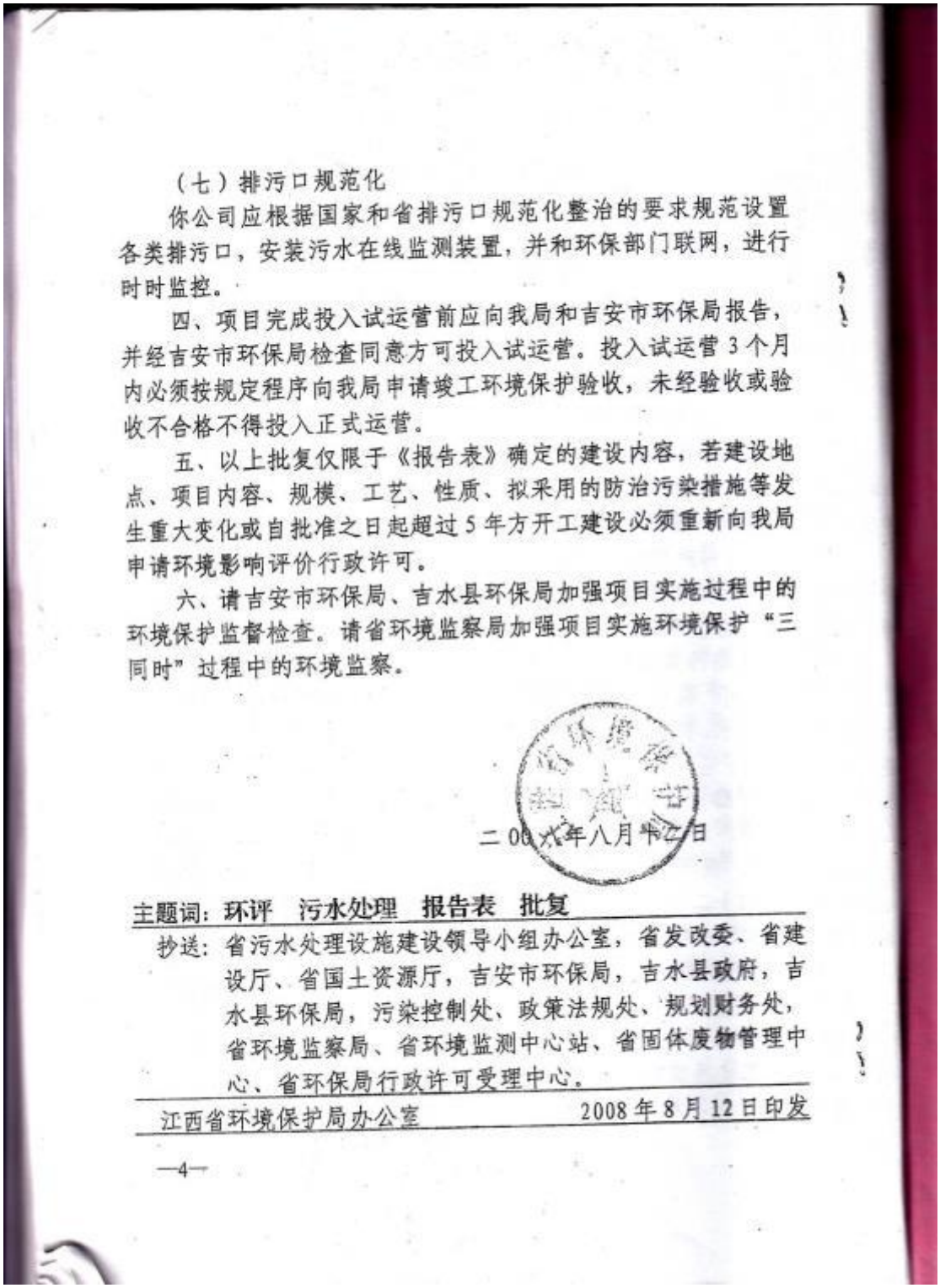
1、施工期间，应采取临时措施对管线、污水提升泵站和污水处理厂施工废水、废气(含施工扬尘)和噪声进行控制和治理，避免对附近居民产生不利影响。施工结束后应及时对施工场地进行绿化和硬化，防止水土流失。

2、施工期，场界噪声应满足《建筑施工场界噪声限值》(GB12523-90)，废气排放应满足《大气污染物综合排放标准》(GB13271-2001)二级标准和无组织排放监控浓度限值，废水排放应满足《污水综合排放标准》(GB8978-1996)表4中一级标准。

（六）环境监理

你公司应按照《报告表》的要求，制定并实施施工期环境监理计划，施工招标文件、施工合同和工程监理文件中应明确环保条款和责任，落实施工期污染防治措施，并定期向我局和当地环保局报告。

—3—



（七）排污口规范化

你公司应根据国家和省排污口规范化整治的要求规范设置各类排污口，安装污水在线监测装置，并和环保部门联网，进行时时监控。

四、项目完成投入试运营前应向我局和吉安市环保局报告，并经吉安市环保局检查同意方可投入试运营。投入试运营3个月内必须按规定程序向我局申请竣工环境保护验收，未经验收或验收不合格不得投入正式运营。

五、以上批复仅限于《报告表》确定的建设内容，若建设地点、项目内容、规模、工艺、性质、拟采用的防治污染措施等发生重大变化或自批准之日起超过5年方开工建设必须重新向我局申请环境影响评价行政许可。

六、请吉安市环保局、吉水县环保局加强项目实施过程中的环境保护监督检查。请省环境监察局加强项目实施环境保护“三同时”过程中的环境监察。

二00八年八月十二日

主题词：环评　污水处理　报告表　批复

抄送：省污水处理设施建设领导小组办公室，省发改委、省建设厅、省国土资源厅，吉安市环保局，吉水县政府，吉水县环保局，污染控制处、政策法规处、规划财务处，省环境监察局、省环境监测中心站、省固体废物管理中心、省环保局行政许可受理中心。

江西省环境保护局办公室　　2008年8月12日印发

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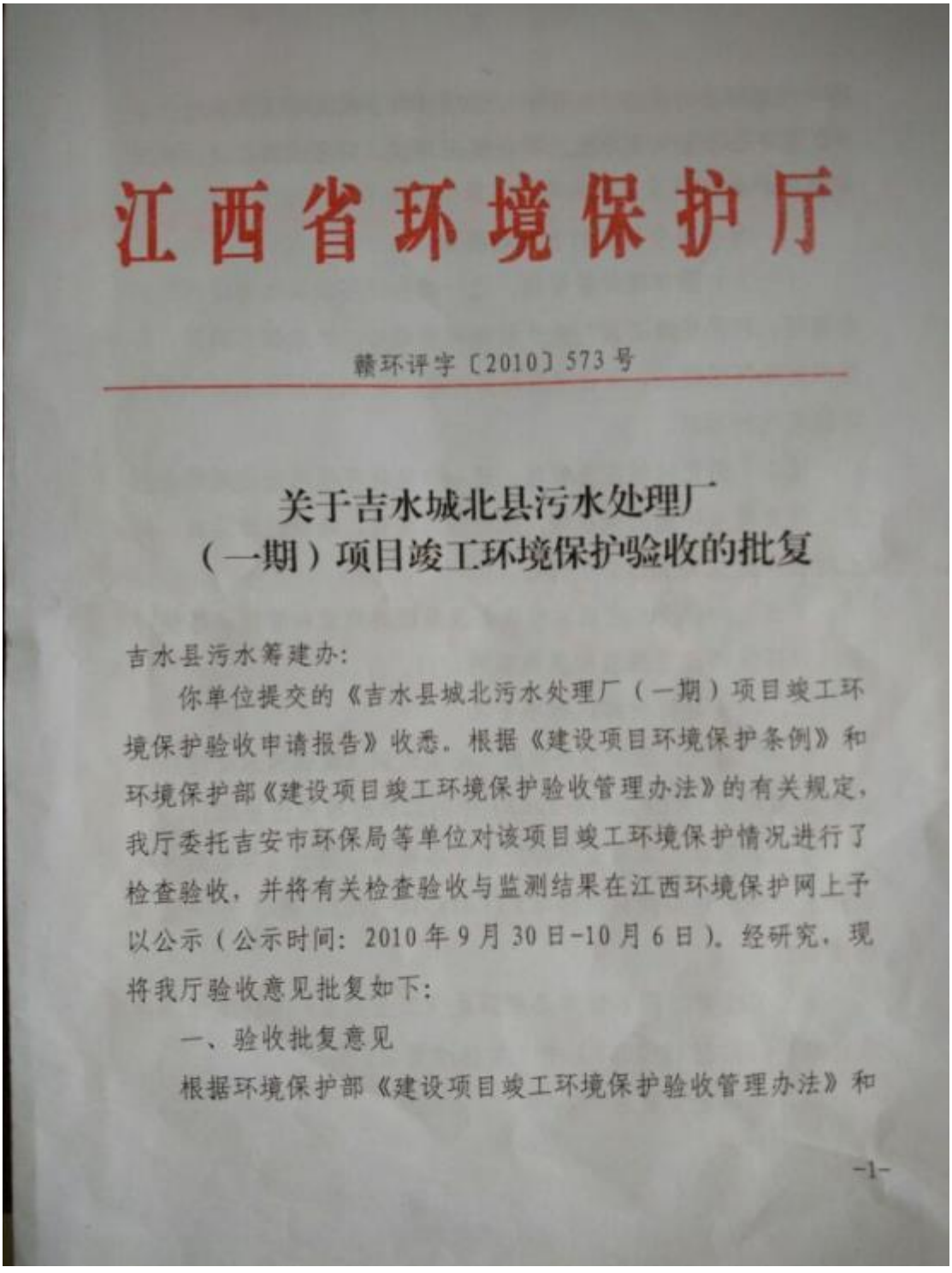
Annex IV: Official Reply and Acceptance for the Built-up Phase I (Step I) of Jishui Sewage Treatment Plant



江西省环境保护厅

赣环评字〔2010〕573号

关于吉水城北县污水处理厂
（一期）项目竣工环境保护验收的批复

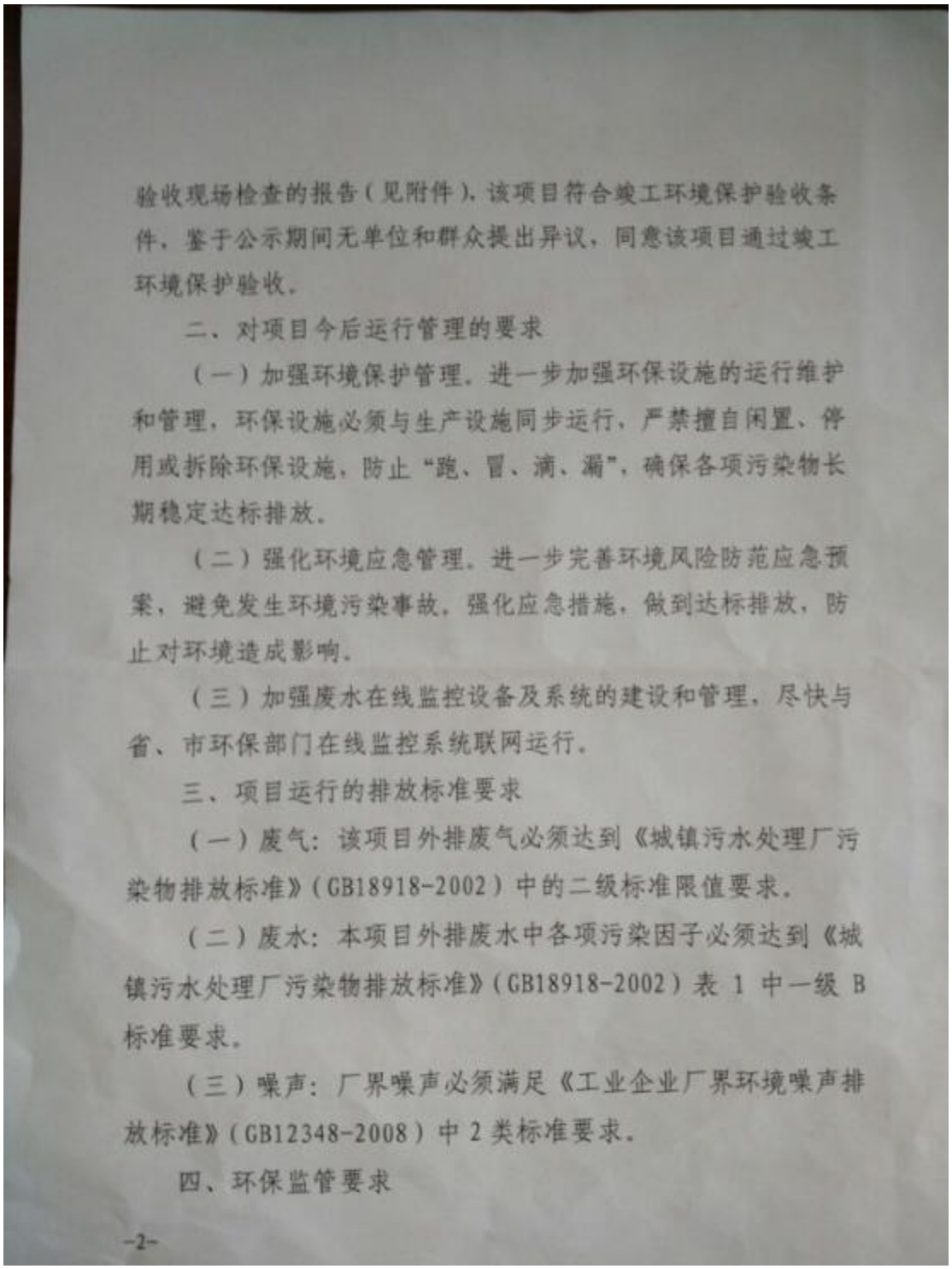
吉水县污水筹建办：

你单位提交的《吉水县城北污水处理厂（一期）项目竣工环境保护验收申请报告》收悉。根据《建设项目环境保护条例》和环境保护部《建设项目竣工环境保护验收管理办法》的有关规定，我厅委托吉安市环保局等单位对该项目竣工环境保护情况进行了检查验收，并将有关检查验收与监测结果在江西环境保护网上予以公示（公示时间：2010年9月30日-10月6日）。经研究，现将我厅验收意见批复如下：

一、验收批复意见

根据环境保护部《建设项目竣工环境保护验收管理办法》和

-1-



验收现场检查的报告（见附件），该项目符合竣工环境保护验收条件，鉴于公示期间无单位和群众提出异议，同意该项目通过竣工环境保护验收。

二、对项目今后运行管理的要求

（一）加强环境保护管理。进一步加强环保设施的运行维护和管理，环保设施必须与生产设施同步运行，严禁擅自闲置、停用或拆除环保设施，防止“跑、冒、滴、漏”，确保各项污染物长期稳定达标排放。

（二）强化环境应急管理。进一步完善环境风险防范应急预案，避免发生环境污染事故。强化应急措施，做到达标排放，防止对环境造成影响。

（三）加强废水在线监控设备及系统的建设和管理，尽快与省、市环保部门在线监控系统联网运行。

三、项目运行的排放标准要求

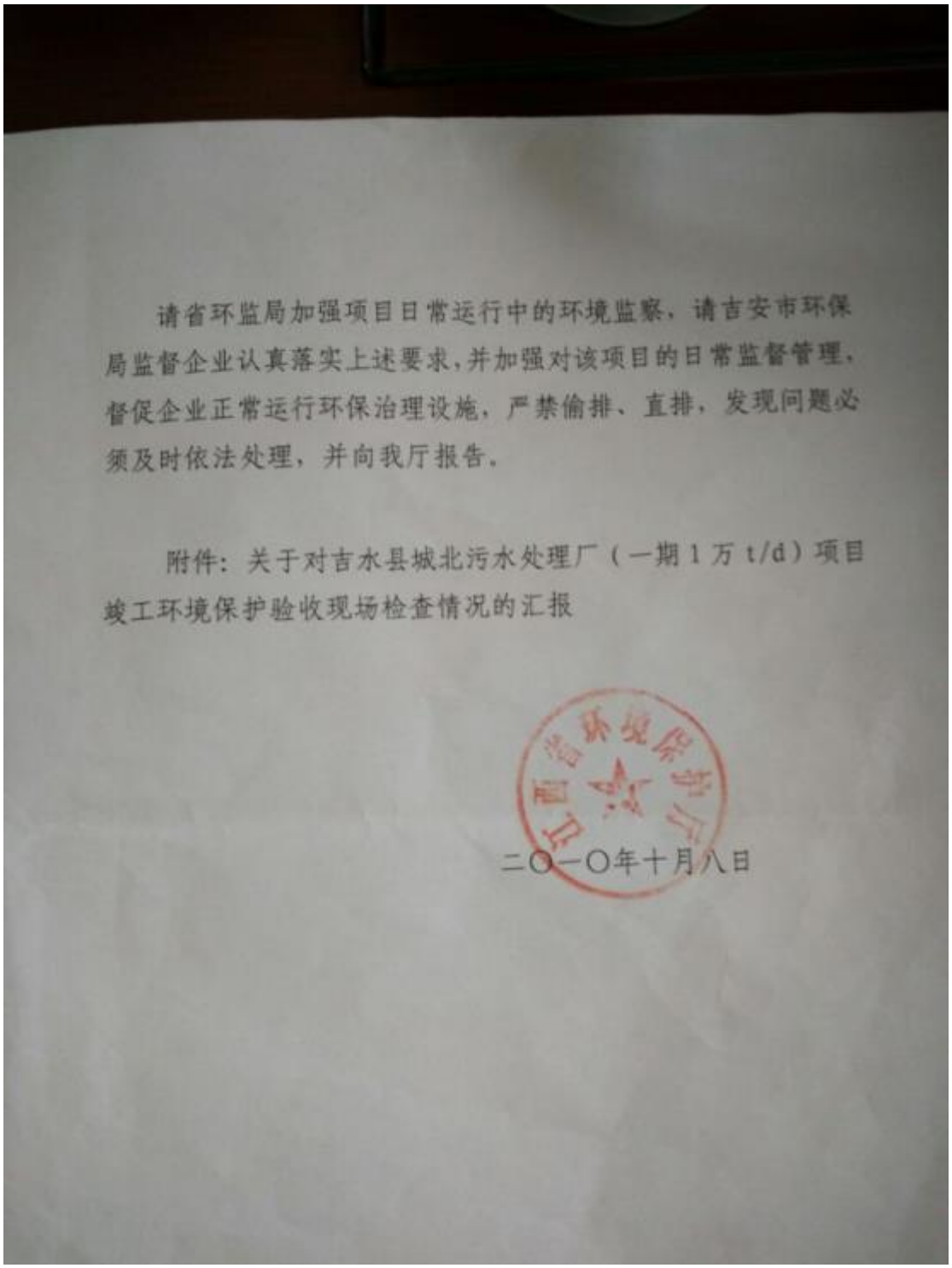
（一）废气：该项目外排废气必须达到《城镇污水处理厂污染物排放标准》（GB18918-2002）中的二级标准限值要求。

（二）废水：本项目外排废水中各项污染因子必须达到《城镇污水处理厂污染物排放标准》（GB18918-2002）表 1 中一级 B 标准要求。

（三）噪声：厂界噪声必须满足《工业企业厂界环境噪声排放标准》（GB12348-2008）中 2 类标准要求。

四、环保监管要求

-2-



请省环监局加强项目日常运行中的环境监察，请吉安市环保局监督企业认真落实上述要求，并加强对该项目的日常监督管理，督促企业正常运行环保治理设施，严禁偷排、直排，发现问题必须及时依法处理，并向我厅报告。

附件：关于对吉水县城北污水处理厂（一期1万t/d）项目竣工环境保护验收现场检查情况的汇报

二〇一〇年十月八日

Annex V: Monthly Report of Jiangxi Hongcheng Waterworks Environmental Protection Co.Ltd. about Jishui County Sewage Treatment Plants Lab Data

江西洪城水业环保有限公司

污水处理厂化验数据月报表

2015年3月1日－2015年3月30日

检测项目		检定次数	最大值	最小值	平均值	合格次数	合格率（%）
进水	PH	30	7.6	6.9	7.1	30	100%
	COD(mg/L)	30	182	72.5	109	30	100%
	SS(mg/L)	30	164	62	95	30	100%
	NH3-N(mg/L)	30	26.2	15.2	19.5	26	86.7%
	BOD5(mg/L)	30	91.0	29.6	54.4	30	100%
	TN(mg/L)	30	35.6	21.3	27.9	28	93.3%
	TP(mg/L)	30	2.94	1.24	1.99	30	100%
出水	PH	30	7.0	6.7	6.9	30	100%
	COD(mg/L)	30	25.6	10.8	18.7	30	100%
	SS(mg/L)	30	10	5	7	30	100%
	NH3-N(mg/L)	30	4.24	0.373	1.09	30	100%
	BOD5(mg/L)	30	11.8	4.89	7.95	30	100%
	TN(mg/L)	30	15.2	7.89	9.90	30	100%
	TP(mg/L)	30	0.887	0.392	0.660	30	100%
处理前后	污泥含水（前）						
	污泥含水（后）	29	79.4	76.2	78.1		
一组氧化沟	水温（℃）	30	22	14	19		
	SV_{30}（%）	30	38	28	33		
	MLSS(mg/L)	30	4530	3860	4213		
	MLVSS(mg/L)	30	2270	1010	1954		
	SVI（mL/g）	30	91.1	67.1	79.1		
	DO1(mg/L)	30	2.87	1.57	1.99		
	DO2(mg/L)						
	镜检	30					
二组氧化沟	水温（℃）	30	22	14	19		
	SV_{30}（%）	30	36	26	31		
	MLSS(mg/L)	30	4280	3590	3953		
	MLVSS(mg/L)	30	2120	1440	1805		
	SVI（mL/g）	30	88.8	68.0	78.1		
	DO1(mg/L)	30	2.25	1.64	2.01		
	DO2(mg/L)	30					
	镜检	30					

备注：

Annex VI: Minutes of Discussion Meeting

Environment Impact Assessment for World Bank-financed Jishui County Water Environment Management Project

Minutes of Discussion Meeting for Public Consultation

(1) Time: 1:30pm, January 14, 2016

(2) Venue: conference room of Jishui County Development and Reform Commission

(3) Content: public consultation and information disclosure discussion meeting about Environment Impact Assessment (EIA) for World Bank-financed Jishui County Water Environment Management Project

(4) Attendee: Jishui County Project Management Office (PMO) director Li and director Liu, director Li from the County Environmental Protection Bureau (EPB), director Zhao from the County wastewater treatment plant, representatives of residents from Wenfeng and Wenshui Communities, representatives from Jishui People's Hospital, representatives of teachers from Jishui Secondary School and stuff from the EIA institutes. Altogether 15 representatives were attended.

(5) Chairperson: Director Li of Jishui County PMO

(6) Meeting minutes

The meeting conducted public consultation on the terms of reference for EIA for World Bank-financed Jishui County Water Environment Management Project, and discussion on the project potential environmental impacts. Subject matters of the

meeting are hereby documented as follows:

①The chairperson introduced the attendees and distributed questionnaire.

②The EIA institutes introduced the purposes of public consultation:

Pursuant to requirements of PRC laws and regulations as well as management regulations and World Bank Operation Policy (OP4.01), two rounds of public consultation and information disclosure were conducted. The first public consultation was carried out after environmental issues are screened and before the terms of reference for EIA was finalized, mainly for informing affected residents of a brief introduction to the Project and its potential impacts on the environment; the second round was conducted when the draft EIA is prepared, mainly for discussion about environmental issues or problems of public concern and their mitigation measures to get public's understanding of the construction and related mitigation measures.

Disclose relevant information to the project areas and the public who are concerned about the project to: 1) keep them informed of the project's main contents, its implementation and operation features and significant environmental issues or problems related to the project; 2) help assessment staff identify issues or problems and confirm the feasibility of environmental protection measures and implementation of optimal measures.

③ The EIA institutes briefly introduced the project and its potential environmental impacts;

The proposed project, financed by the World Bank, will carry out pipe network transformation works in the south and the old districts of the town and implement other non-structural measures to reduce emissions of pollutants into the Gan River. The implementation of the project will bring us a more comprehensive urban drainage system to safeguard ecological security of urban water environment, to improve the urban diversion system of rainfall and sewage, and to increase the collection and

treatment rate of sewage. Therefore, pollution of Poyang Lake will be reduced from the source and sustainable urbanization will be achieved.

The potential environmental impacts will mainly be focused in the construction and operation periods. Impacts during the construction mainly include environment pollutions such as machinery noises, dusts, construction wastewater, domestic sewage and construction wastes, etc. and inconvenience to the traffic and travel security especially that near the sensitive areas like hospitals, schools, kindergartens and nursing homes when conducting pipe network construction on both sides of the roads; when the construction is completed, the pipe network will be functioned under the ground in an enclosed space, and will not cause severe pollution.

After adopting mitigation measures, EMP and public consultation proposed in this assessment, the implementation of this project is feasible when the environment is concerned.

④Representatives of affected residents and units made addresses: the delegates present all expressed support to the project, regarding it as a promoter of people's livelihood and urban development, and hoped that it could be operated as early as possible; meanwhile, they also suggested to minimize noises during the construction, reasonably arrange the construction time, and ensure residents' safety and convenience on construction affected roads.

⑤Feedback

County PMO and EIA institutes suggested: noise mitigation measures and environmental management requirements during the construction time should be proposed in the EIA. The PMO has to supervise the contractor of civil works to finish construction traffic organization design before the construction is initiated. The EIA institutes will implement said measures in the environmental management plan.

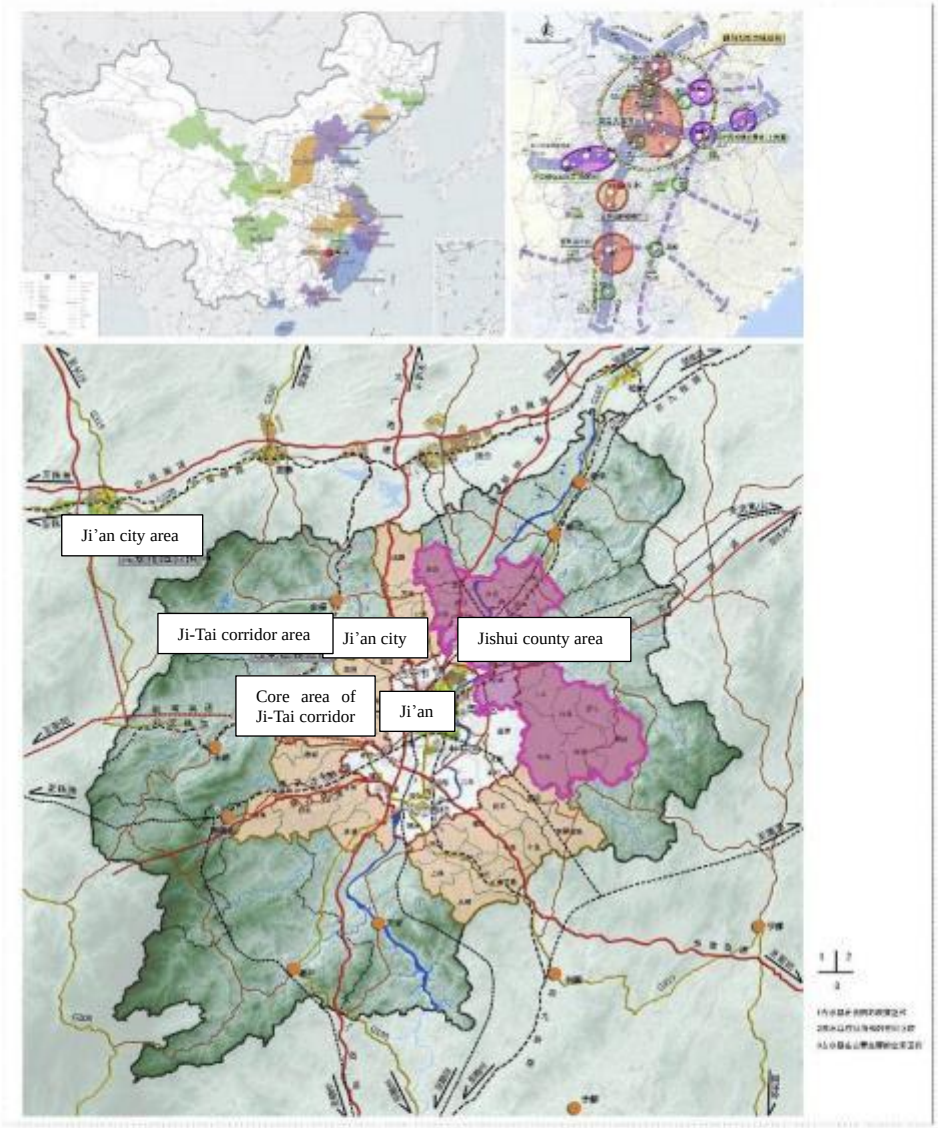
⑥Last, the chairperson summarized the contents and the meeting was over.

Figure 1 Discussion Meeting Pictures of Jishui County

Map 1: Geographical Location of the Project

The Drainage Pipeline Project of Jishui South Urban District and Old Urban District

–Geographical Location of the Project



江西省煤矿设计院

建设单位

吉水县发展改革委员会

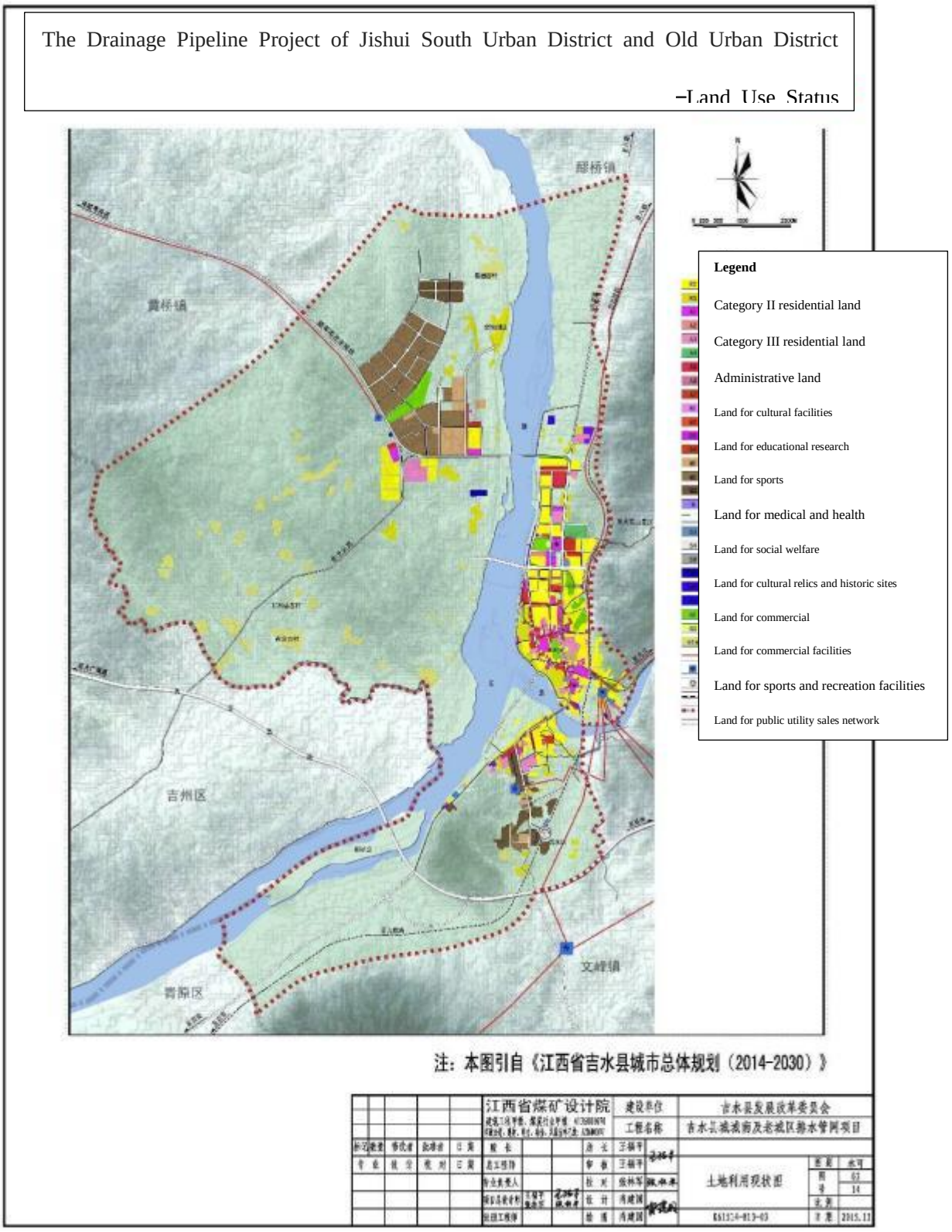
工程名称

吉水县城城南及老城区排水管网项目

区域位置图

061514-003-00

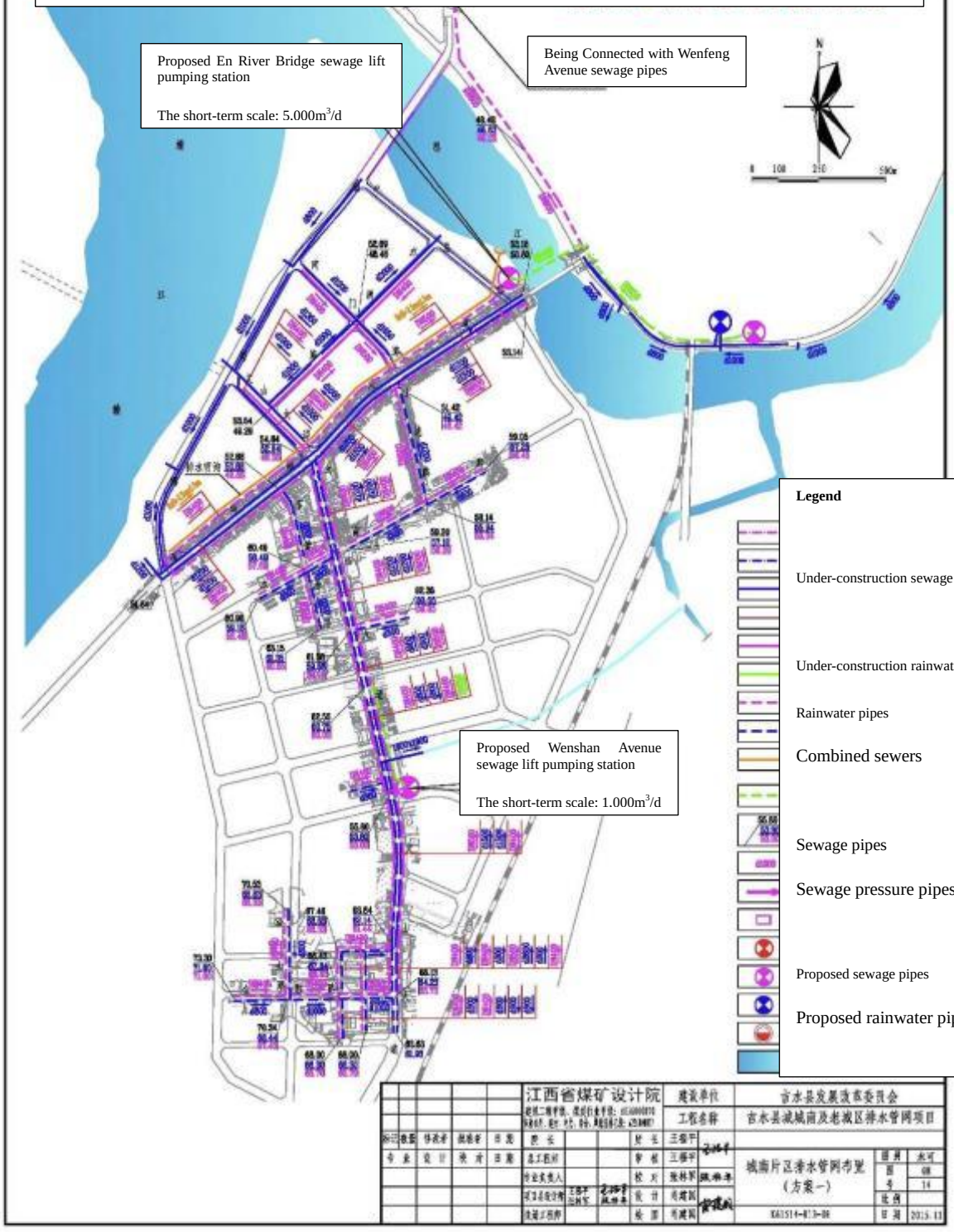
Map 2: Land Use Status of Jishui County



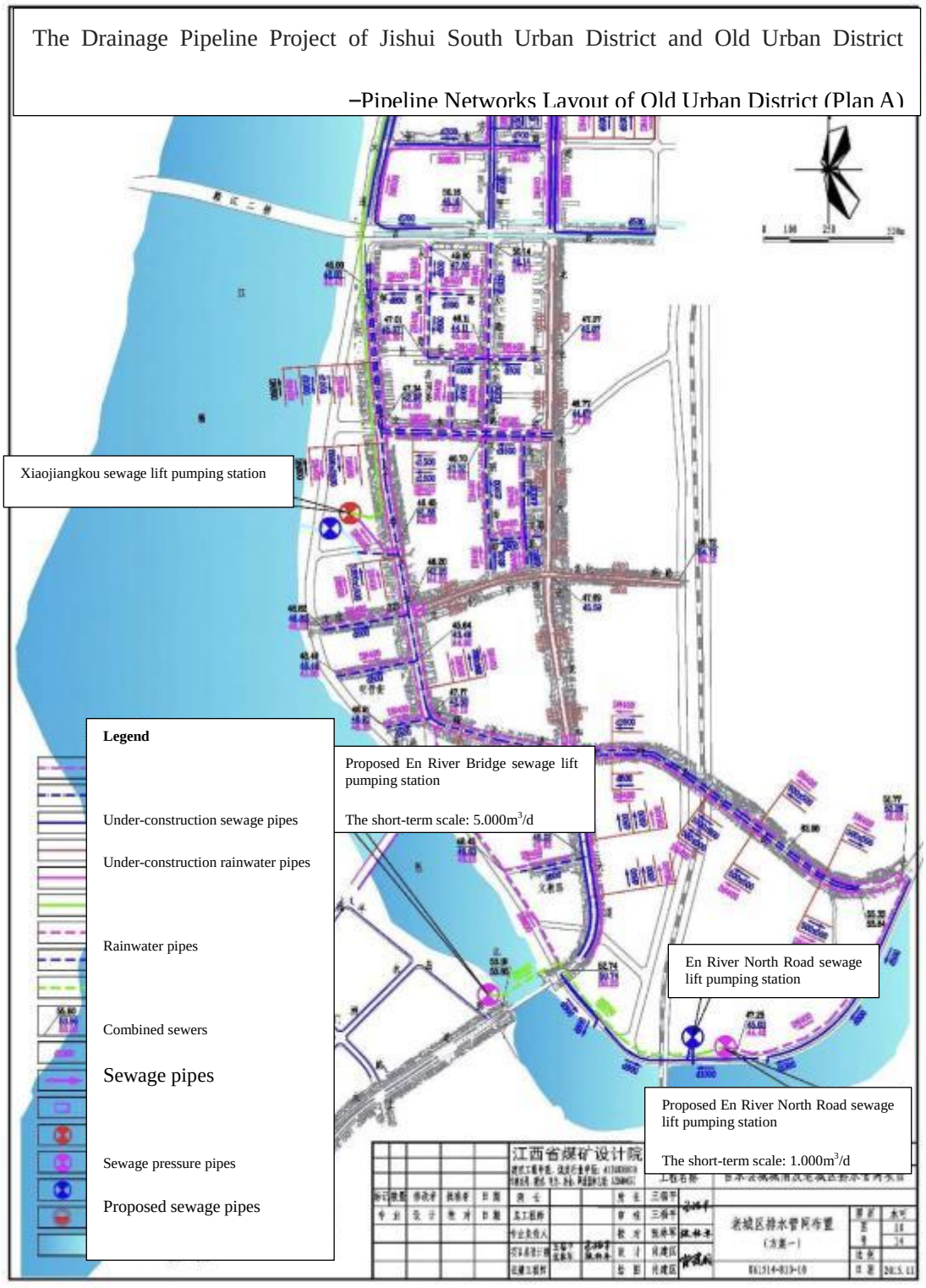
Map 3: Pipeline Networks Layout of South Urban District

The Drainage Pipeline Project of Jishui South Urban District and Old Urban District

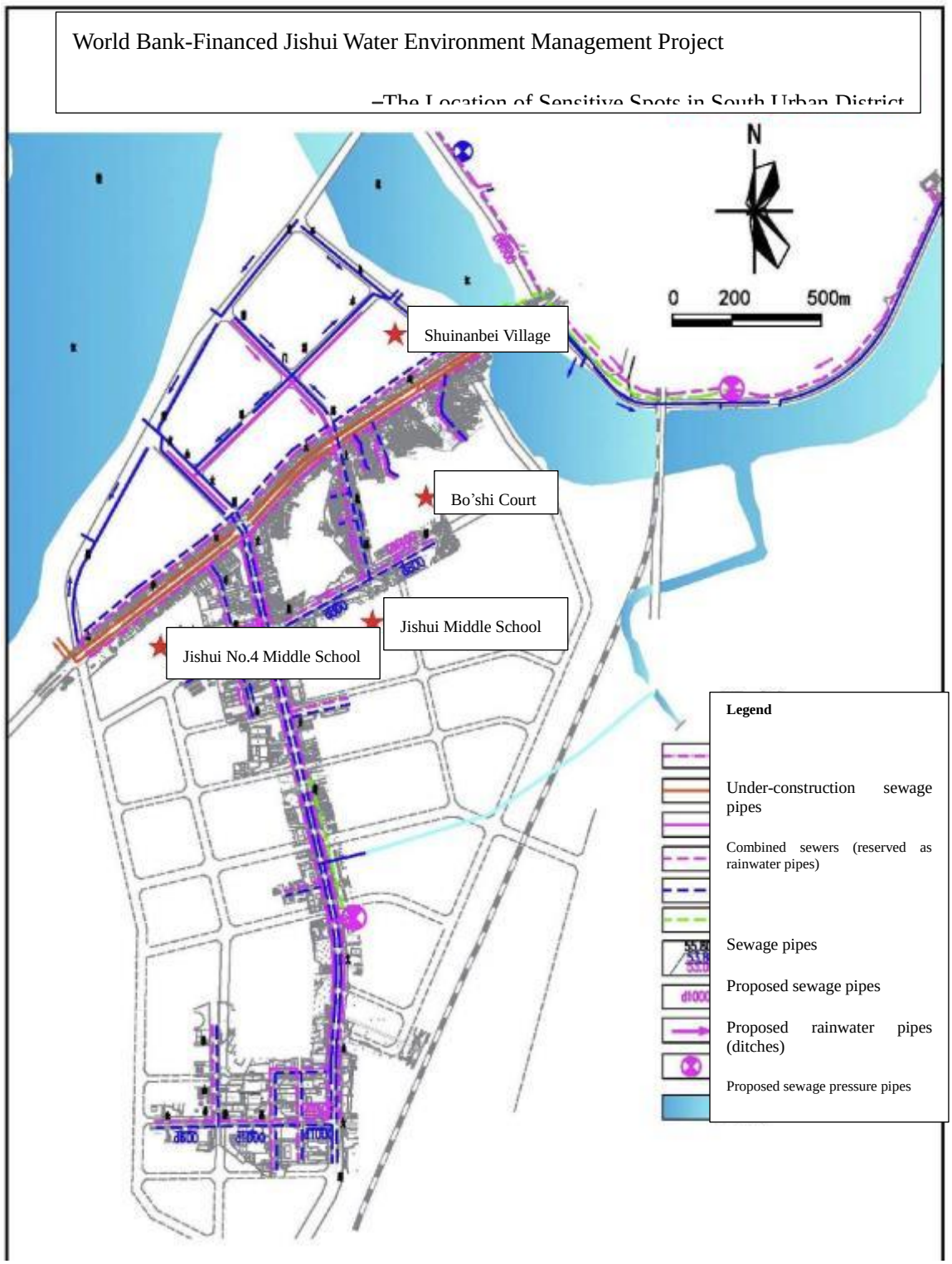
–Pipeline Networks Layout of South Urban District (Plan A)



Map 4: Pipeline Networks Layout of Old Urban District



Map 5: Sensitive Spots Location of South Urban District



Map 6: Sensitive Spots Location of Old Urban District