

EXECUTIVE SUMMARY: Poyang Lake Basin Town Water Environment Management Project

Environmental and Social Impact Assessment

Executive Summary

For

Poyang Lake Basin Town Water Environment Management Project

(Final)

Jiangxi Provincial Development and Reform Commission

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1. INTRODUCTION

1.1 Project Background

Poyang Lake is in the north of Jiangxi Province, covering an area of catchment of 162,000 km². Poyang Lake is renowned as the largest freshwater lake in China and a wetland of national and international significance.

Since the 1980s, with rapid economic development and population growth, the water quality of Poyang Lake has deteriorated because of discharge of untreated wastewater from industrial, domestic, and agricultural sources. As a result, the livelihood of 40 million people closely linked to Poyang Lake is under threat.

The Government of China and Jiangxi Provincial Government recognize the needs to protect the lake. A series of measures have been triggered at national, provincial, and county levels to protect the value of the lake as a unique resource and a national heritage, to control the lake's pollution, and to restore the vital water quality and its associated functions. The Government of China issued the Poyang Lake Ecological Economic Zone Development Plan (PLEDP) in 2009 focusing on ecological development of Poyang Lake. Under the PLEDP, there is an implementation plan and 18 specific sector plans, including water environment management, water resources, five river management plans, and so on. In 2014, the Jiangxi Government also issued a plan for establishment of ecological and civilization demonstration areas, stating actions and targets for industrial and domestic wastewater, and solid waste management. Based on the plan, by 2020, the chemical oxygen demand (COD) would decrease by 5 percent compared to the 2015 baseline, the wastewater treatment ratio would reach 90 percent, and the urban solid waste treatment ratio would reach 85 percent.

This proposed project is an integral part of the PLEDP and intends to employ an integrated approach to addressing the water quality issue through focusing on enhancement of ecological and institutional sustainability of water/environment and strengthening of the domestic wastewater and solid waste management system.

This project has been classified into Category A, which requires an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP), collectively known as the Environmental Assessment (EA) documentation. An EIA and EMP were prepared for each project county by the CERI Eco Technology Co. Ltd. Based on the project counties' EIAs and EMPs, a consolidated EIA and EMP were prepared for the project. Social Impact Assessments (SIAs) and Resettlement Action Plans (RAPs) have been prepared by Hohai University for this project with main findings and conclusions incorporated into the EA documentation. This document is a summary of EA documentation and the SIA document.

1.2 Environmental Policies, Laws and Regulations

1.2.1 Laws and Regulations

The basis of the EIA reports includes national and local environmental laws, regulations, policies, and the World Bank's environmental and social safeguard policies. The main applicable laws and regulations include the following:

- Environmental Protection Law of the People's Republic of China, 1989

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- The Law of the People’s Republic of China on Prevention and Control of Water Pollution, 2008
- The Law of the People’s Republic of China on the Prevention and Control of Atmospheric Pollution, 2000
- The Law of the People’s Republic of China on Prevention and Control of Pollution from Environmental Noise, 1996
- The Law of the People’s Republic of China on Environmental Impact Assessment, 2003
- Technical Specifications for Environmental Impact Assessment; and various applicable standards for air, water, and noise.

1.2.2 Applicable Standards

The most important assessment criteria and environmental quality standards are the Ambient Water Quality Standard (GB3838-2002), which classifies the ambient water quality into five classes for areas zoned for different functions, as follows:

- Class I: Waters for national natural reserves and water sources
- Class II: Waters for Class I buffer zone for concentrated drinking water source, habitats for rare species, and sites for breeding and spawning of fish
- Class III: Waters for Class II buffer zone for concentrated drinking water source, wintering sites and migratory routes for fish, aquaculture sites, and swimming
- Class IV: Waters for use in ordinary industries and recreational activities
- Class V: Waters for use in agriculture and scenery

Other applicable standards are included in Table 1.1.

Table 1.1. Applicable Standards

Category	Reference	Name of Standard
Environment quality standard	1	Surface Water Quality Standard (GB3838-2002)
	2	Acoustic Environment Quality Standard (GB3096-2008)
	3	Ambient Soil Quality Standard (GB 15618-1995)
Pollutant discharge standard	4	Discharge Standard for Municipal Wastewater (CJ 3082-1996)
	5	Noise Limits on Boundaries of Construction Sites (GB12523-90)
	6	Noise Standard on Boundaries of Enterprises (GB12348-2008)
	7	Pollutants Limits for Agricultural Application of Municipal Sludge (GB4284-84)
	8	Quality Standard for Sludge Applied to Woodlands, Disposal of Municipal Sludge (CJ/T362-2001)
	9	Pollution Control Standard for Sites of Storage and Disposal of General Solid Waste (GB 18599-2001)

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1.2.3 Safeguard Policies and EHS of the World Bank Group

The safeguard policies triggered for this proposed project include the following:

- **OP 4.01 (Environmental Assessment).** Category A and full assessment.
- **OP 4.04 (Natural Habitats).** Poyang Lake is a significant natural habitat of both national and international significance. The proposed project will reduce the water pollution loads into Poyang Lake, without leading to degradation or conversion of Poyang Lake.
- **OP 4.09 (Pest Management).** The project will support training and studies for nonpoint sources pollution management for agriculture activities, which may lead to the reduction of pesticides discharged into Poyang Lake. As such, this policy is triggered.
- **OP 4.12 (Involuntary Resettlement).** The project will involve land acquisition in the seven counties, both permanent and temporary.

The reasons for not triggering other safeguards policies are the following:

- **OP 4.11 (Physical Cultural Resources).** The site survey and information obtained during consultation with the relevant government department confirm that there are no physical cultural resources in or near the proposed project.
- **OP 4.36 (Forests).** The project will not have impacts on the health and quality of forests, nor affect the rights and welfare of people and their level of dependence upon or interaction with forests, nor aim to bring about changes in the management, protection, or utilization of natural forest or plantations.
- **OP 4.37 (Safety of Dams).** The project will not finance construction or rehabilitation of any dams as defined under this policy, and there is no dam impact on the safety and operation of the project-financed facilities.
- **OP 4.10 (Indigenous People).** The proposed project does not involve the ethnic minority concentrated areas.

The Environmental, Health, and Safety (EHS) Guidelines of the World Bank Group considered in the preparation of the EA include the EHS General, EHS Waste Management Facilities, and EHS Water and Sanitation. The applicable standards of the EHS have been considered and compared with that of China and the good practices of the EHS have been adopted in the EA and Environmental and Social Management Plan (ESMP).

1.3 Assessment Scope, Period and Key Issues

The scope and key objects of environmental assessment are shown in Table 1.2.

Table 1.2. Assessment Scope

No.	Environmental Factor	Assessment Scope	Protected Objects
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1	Ambient air	The surrounding area in a radius of 300 m of the project	The residential, education, and working areas, for example, government agencies, research and education institutions, schools, hospitals, sanitarium, resorts, and office buildings.
2	Surface water environment	Water bodies to be directly affected	Surface waters Drinking water intakes
3	Acoustic environment	Areas in 200 m radius of project	The residential, education, and working areas, for example, government agencies, research and education institutions, schools, hospitals, sanitarium, resorts, and office buildings.
4	Ecological environment	Areas in a radius of 300 m from boundaries of the sites	Natural and artificial greens Poyang Lake National Wetland Park
5	Social issues	Area 100 m from the pipelines Areas in 100 m radius of transfer stations	Social and economic zones in affected areas, for example, institutes, enterprises, residential areas, cultural sites and education areas, hospitals, and commercial areas.

2. PROJECT DESCRIPTION

The proposed project development objective (PDO) is to reduce the pollutant discharge into key selected waterways in the Poyang Lake Basin and to improve management of water quality.

Seven counties with total population of about 5 million—Duchang, Poyang, Yugan, Jishui, Fengxin, Jing'an, and Shangli, have been selected for project planning and implementation. These seven counties represent a mixed pattern of geographic distribution across the Poyang Lake Basin: three sites are in close proximity to the main lake, one site along the midstream of a main river draining into the lake, two sites adjacent to the tributary streams of a main river, and one site at the remotest distance from the lake. The water quality of Poyang Lake is closely associated with the quality and environment of the water and land bodies in these contributing catchments and vice versa.

- **Component 1: Strengthening Institutional Capacity for Managing Water Environment in the Poyang Lake Basin.** This component will finance capacity-building and awareness-raising activities to improve participatory wastewater and solid waste management, enforcement of environmental regulations, and creating preconditions for sustainability of project results.
- **Component 2: Improvement of Lake and River Environmental Restoration and Enhancement of Domestic Wastewater Management System.** This component will finance activities related to protection and restoration of the water environment of selected rural and urban water environments in the Poyang Lake Basin through collection of urban and rural wastewater; collection and safe disposal of storm water from both rural and urban watersheds; and implementation of integrated engineering and biological as well as low-impact development (LID) interventions in selected rural and urban waterways.
- **Component 3: Construction of Solid Waste Collection and Transportation System.** This component is to improve solid waste collection and transportation system in rural and urban areas to reduce solid waste disposal to the river system of the Poyang Lake Basin.
- **Component 4: Project Implementation Support.** This component is to support

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the effective and efficient implementation of the project activities. This component will finance project management, project implementation supervision, project social, resettlement and environmental monitoring, domestic and international training and study tours, and relevant project management equipment and facilities.

The subprojects of the project are listed in Table 2.1 and location of the project is shown in Annex 1.

Table 2.1. Project Description

Subproject	Description
Duchang	<ul style="list-style-type: none"> • Component 1: Construction of a water quality monitoring system; capacity-building and awareness-raising activities • Component 2: Dredging Zoujiazui Lake at an amount of 3,000 m³; embankment of 0.8 km; construction of pilot LID; construction of sewers 11 km, 4.0 km interceptors around Zoujiazui Lake; storm water pipeline 8.7 km; collecting wastewater 30,000 m³ per day for the short term, and 52,000 m³ per day for the long term • Component 3: Construction of three solid waste transfer stations—22.7 tons per day at Beishan Town, 29 tons per day at Wangdun Town, and 25 tons per day at Dashu Town • Component 4: Relevant project management equipment and facilities
Poyang	<ul style="list-style-type: none"> • Component 1: Establishing water quality monitoring system • Component 2: Setting up constructed wetland 154,765 m² and constructing wastewater intercepting ditch 95.85 km; constructing 35 small integrated wastewater treatment facilities with the capacity ranging from 250 tons per day to 50 tons per day, and associated sewers • Component 4: Relevant project management equipment and facilities
Yugan	<ul style="list-style-type: none"> • Component 1: Establishing water quality monitoring system; capacity-building and awareness-raising activities • Component 2: Constructing sewers 5.5 km to collecting wastewater at 1,600 m³ per day in the short term and 1,900 m³ per day in the long term, and constructing a pumping station at a capacity of 3,500 m³ per day; dredging the outlet canal of Pipa Lake at 6,800 m³; constructing ecological embankment and greening works • Component 3: Converting the existing solid waste transfer station into solid waste collection points, and purchasing compaction vehicles • Component 4: Relevant project management equipment and facilities
Fengxin	<ul style="list-style-type: none"> • Component 1: Establishing water quality monitoring system; capacity-building and awareness-raising activities • Component 2: Constructing 22 km sewers and 19 km storm water pipelines, constructing three pumping stations, to collect the wastewater at 15,700 m³ per day in the short term and 20,000 m³ per day in the long term; dredging the Beizhizhen Ditch, Nan Ditch, and Dazhai Ditch, the quantity of sediments being 1,200 m³, 1,500 m³ and 9,00 m³ respectively. • Component 4: Relevant project management equipment and facilities.
Jing'an	<ul style="list-style-type: none"> • Component 1: Establishing water quality monitoring system; capacity-building and awareness-raising activities • Component 2: Constructing sewers 29 km and storm water pipeline 17 km, to the capacity of collecting wastewater at 10,000 m³ per day in the short term and 17,200 m³ per day in the long term • Component 3: Upgrading two solid waste collection points, by installing 1,620 watertight dust bins, purchasing solid waste vehicles • Component 4: Relevant project management equipment and facilities
Jishui	<ul style="list-style-type: none"> • Component 1: Establishing water quality monitoring system; capacity-building and awareness-raising activities • Component 2: Constructing sewers 27 km and storm water pipeline 15 km, to

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	<p>collect wastewater at 13,000 m³ per day in the short term and 20,000 m³ per day in the long term; constructing three pumping stations at a capacity of 1,500 m³ per day, 2,500 m³ per day, and 5,000 m³ per day respectively, and expanding an existing pumping station from the current 10,000 m³ per day to 15,000 m³ per day</p> <ul style="list-style-type: none"> • Component 4: Relevant project management equipment and facilities
Shangli	<ul style="list-style-type: none"> • Component 1: Establishing water quality monitoring system; capacity-building, and awareness-raising activities • Component 3: Constructing six solid waste transfer stations respectively in the six towns of Yangqi, Changping, Futian, Penggao, Dongyuan, and Chishan, and constructing 89 solid waste collection points • Component 4: Relevant project management equipment and facilities

3. ENVIRONMENTAL BASELINE

3.1 Overview of the Poyang Lake Basin

Poyang Lake is in the north of Jiangxi Province and to the south of Yangtze River. Poyang Lake is the largest freshwater lake in China with a maximum surface area reaching 5,050 km² and a storage capacity of 30 billion m³. The basin area of the lake is about 162,200 km² covering over 97 percent of the land area of Jiangxi Province. The lake plays many vital functions—hydro-morphologic, environmental, social, cultural, and economic; the livelihood of more than 40 million people is closely linked to the water and environment of Poyang Lake. Poyang Lake connects to Yangtze River in the middle reach at Hukou, Jiujiang County. The dynamics of the lake water movement is governed by both the stages of Yangtze River and the discharges from its five major tributaries (Gan, Xin, Fu, Rao, and Xin Rivers). While the annual water level in Poyang Lake has remained stable in the recent years, the area of the lake fluctuates dramatically between the wet and dry seasons. In normal years, the average lake area is about 3,200 km². The fluctuations are also affected by severe climate events, for example, in early 2002, due to serious drought, the area of the lake reached a low of 200 km².

Poyang Lake is also a wetland of national and global importance, which provides a key habitat for half a million migratory birds. It has been recognized as one of the priority protection targets in the international treaties, that is, the Migratory Waterfowl Protection Strategy in the Asia-Pacific Region, the Migratory Bird Treaty between China and Japan, the China-Australia Migratory Bird Treaty, and China Biodiversity Conservation Action Plan. It is the home for over 95 percent of the world's white cranes, 60 percent of white-napped cranes, 55 percent of hooded cranes, 60 percent of white storks, and 96 percent of the swan goose population. Poyang Lake is also a species gene pool with 156 species of aquatic plants, 136 planktons, 230 species of benthic animals, 58 species of fishes, 89 species of water birds, and so on. It also plays a significant role in the seasonal flow regulation of Yangtze River. The average amount of lake water entering Yangtze River is about 150 billion m³, amounting to 15.6 percent of the mean annual runoff of the river.

The water quality of Poyang Lake has been comparatively good (with 83 percent falling under Class I–III, 13 percent under Class IV, and 4 percent under Class V). However, research results of the World Bank-supported China - Economic Reform Implementation Project (TCC5) and the available monitoring data of the Ministry of Environmental Protection show a concerning trend of water quality deterioration, with COD and ammonia-nitrogen (NH₃-N) gradually increasing and dissolved oxygen (DO) gradually decreasing. The primary sources for total phosphorus (TP) and total nitrogen (TN) in the basin are the domestic and agricultural sectors. Agriculture alone discharged 61.09 percent and 75.7 percent of the total TN and TP of the province respectively. The existing data on COD discharge collected by the local governments in the lake basin show that domestic

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wastewater (about 60 percent) and solid waste disposal (about 30 percent) produce the major water pollution. While industrial pollution remains an issue, discharges from industries are gradually decreasing. This is largely due to the industrial pollution control actions taken by the provincial government through the maximum load limit and relocation of industries into the concentrated industrial parks where the wastewater treatment facilities are ready to treat the industrial wastewater to the discharge standard. In addition, the five tributaries of the basin collectively contribute over 80 percent of the total pollution loads into Poyang Lake.

Relatively, a small percentage of wastewater and solid waste are collected and treated. The wastewater treatment ratio in the basin is low. By provincial environmental statistics, only 79 percent of domestic wastewater is treated in urban areas of Jiangxi Province, which is much lower than the national average of 85 percent. Similarly, solid waste collection and treatment rate in the province is 69 percent compared to the national average of 80 percent. Conclusions from recent studies and discussions with provincial governments identify the following key causes for increase of pollution levels in the water bodies feeding into Poyang Lake: (a) lack of basin-wide integrated water/environment management; (b) inadequate water quality and pollution source monitoring and disclosure system; (c) lack of public awareness and incentives in the communities on environmental protection; (d) weak enforcement of regulations related to disposal of untreated industrial and domestic wastewater directly into water bodies; (e) lack of investment in infrastructure for wastewater collection and treatment systems in urban and rural areas as well as for solid waste management in the small cities and towns and rural areas; and (f) lack of use of good practices on proper domestic solid waste disposal and agriculture practices.

3.2 Water Use and Wastewater Discharge

The statistical data for water use in Jiangxi Province shows that the annual water use reached the peak in 2013 as high as 26.481 billion m³ while it plunged to 23.975 billion m³ in 2010. Among the water users, agricultural irrigation used the largest share typically ranging from 60.22 percent to 63.43 percent, while the industrial sector used 22.71 percent to 24.21 percent, and the domestic sector used 1.70 percent to 2.26 percent. The data on wastewater discharge generally follow the same pattern of water use. The majority of the wastewater flow is discharged from the agricultural sector, accounting for 81.45 percent to 79.57 percent, and the domestic sector contributed the second largest share of wastewater flow ranging from 12.21 percent to 14.56 percent. Industries discharged a smaller share of wastewater mainly because of increased recycling rate of water inside the industries.

3.3 Topography and Geology

The Poyang Lake Basin is surrounded by mountains in the east, south, and west, and it slopes from the south to the north. The landform of the basin can be distinguished by the hilly region in the middle and the vast plain in the north, which is centered in Poyang Lake.

The geology of the basin is very complex. The basin is located on the transitional area of two different geotectonic elements, with the northeastern part of the basin on the southeastern edge of Yangtze Platform, and the middle and southern parts on the South China Fold System.

3.4 Climate

The Poyang Lake Basin is located in a humid subtropical zone largely affected by the

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monsoons and characterized by wild climate and rich precipitation, sufficient sunshine, and a long frost-free period. The temperature averages 16.3°C to 19.7°C and slightly decreases from the north to the south. The extreme high temperature ranges from 41.2°C to 44.9°C, while the extreme low temperature ranges from -15.2°C to 11.2°C. The high temperature often occurs during July and August, while the low temperature occurs during January to February. The Poyang Lake Basin is widely recognized as one of the areas with the greatest precipitation in China, with the precipitation averaging 1,638.4 mm. The distribution of annual precipitation fluctuates largely in different months in Jiangxi Province. The precipitation during March to June represents 55.9 percent of the annual precipitation.

3.5 Soil

The Poyang Lake Basin has a rich variety of soil, which comprises 12 soil types, including red soil, yellow soil, rice soil, and so on. Among them, red soil is widely distributed in Jiangxi Province, accounting for 70.69 percent of the total area of the province. Rice soil is mainly distributed in the valleys and the plains, thus becoming the major arable soil in the province.

3.6 Ecology

An ecological survey has been conducted by the EA team in the assessment area of each subproject. The following are the major findings and conclusions of the survey:

- **Duchang, Yugan, Fengxin, Jing'an, Jishui, and Shangli.** These subprojects are located in the urban developed area and the areas drastically disturbed by human activities. Through consultation with the Forestry Department and site visits, it is confirmed that no rare or precious trees, no protected animals, no concentrated distribution area or habitats of birds, no sites of breeding, spawning, and wintering for fish, are recorded or observed within the assessment area.
- **Poyang.** Through consultation with the Forestry Department and site surveys, it is confirmed that there are no rare or precious trees and no sites of breeding, spawning, and wintering for fish are recorded or observed within the assessment area. There are some protected birds observed, that is, *Egretta garzetta* and *Ardeola bacchus* protected at provincial level, but the assessment area is not the concentrated distribution area for them.

Figure 3.1. Polluted Zoujiazui Lake



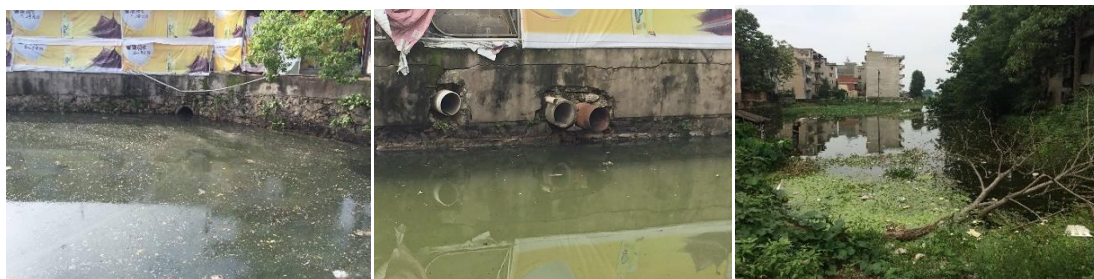
- **Zoujiazui Lake.** A small area of Zoujiazui Lake will be dredged under the Duchang subproject. Zoujiazui Lake is within the urban area of Duchang County and its water quality has been severely polluted by the direct discharge of

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domestic wastewater and agricultural wastewater. Zoujiazui Lake is not a significant natural habitat and there are no rare or endangered species reported or recorded in this lake. The ecosystem in the lake is dominated by common benthic species.

- **Pipa Lake.** Pipa Lake is within the urban area of Yugan County, it is hydraulically connected with Huhui River through an outlet channel which will be dredged under the project. Pipa Lake is so severely polluted by the discharge of domestic wastewater and the aquaculture activities in the Pipa Lake, that the water quality cannot meet Class V of the Surface Water Quality Standard. Pipa Lake is not a significant natural habitat and no rare or endangered species are found or recorded in this lake. The ecosystem in Pipa Lake is dominated by common benthic species. The relevant studies found that self-purification of Pipa Lake has become very inadequate.

Figure 3. 2. Polluted Pipa Lake



- Poyang Lake National Wetland Park was established in 2008, covering an area of 36,285 hm² with 96.8 percent being the water surface. This wetland park is in the east of Poyang Lake and places an important role on the migratory route in Northeast Asia, where the migratory birds stop for a rest and pass the winter. Pearl Lake, zoned for the drinking water source for the whole Poyang County, is located within the Poyang Lake National Wetland Park. The Poyang subproject will construct 35 integrated wastewater treatment stations of small capacities ranging from 50 tons per day to 250 tons per day, 101 plots of constructed wetland and 95.85 km bio-retention swales to collect and treat the domestic and agricultural wastewater discharged from the villages and farmland near Pearl Lake. The geological relation between the Poyang Lake National Wetland Park and the Poyang subproject is presented in Annex 2.

3.7 Acoustic and Atmospheric Environment

The data obtained from the local environmental monitoring stations show that the acoustic environment quality in the seven counties is good and meets the respective standard.

The air quality in the seven counties is good and meets Class II of the Ambient Air Quality Standard (GB3095-1996), except for Duchang where PM₁₀ and PM_{2.5} failed to meet the standard.

3.8 Quality of Sediments

The subproject in Duchang, Yugan, and Fengxin will involve the dredging of sediments. A sampling and analysis program was conducted in line with the Specifications for Water

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Environment Monitoring (SL219-2013) and Technical Specifications for Ambient Soil (HJ/T166-2004) respectively by local certified laboratories. The quality of the sediments to be dredged has been compared with the national relevant standards and the standards of the United States and the European Union (EU). The detailed information of the sediments quality is presented in Table 3.1.

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Table 3.1. Quality of Sediments

County	Water to be Dredged	Sampling Points (Sampling Date)	pH	Cu	Zn	Pb	Cd	Cr	Ni	Water content (%)
Duchang	Zoujiazui Lake	North of the lake (November 3, 2015)	6.52	26.05	53.86	17.03	Not detected	29.20	Not detected	90
		South of the lake (November 3, 2015)	6.56	33.45	97.15	19.85	Not detected	28.38	Not detected	90
		North of the lake (March 18, 2016)	6.54	36.83	93.20	16.06	Not detected	28.69	Not detected	90
Yugan	Pipa Lake	Point A (June 6, 2016)	7.21	26.4	928.9	16.25	Not detected	170.4	8.9	90
		Point B (June 6, 2016)	7.45	16.75	1,216.9	Not detected	Not detected	151.9	10.6	90
Fengxin	Nan Ditch (June 6, 2016)		6.45	6.45	2,118.4	Not detected	Not detected	245.1	26.4	90
	Dazhai Ditch (June 6, 2016)		6.82	6.82	1,163.5	1.5	Not detected	129.6	Not detected	90
	Beizhizhen Ditch (June 6, 2016)		6.99	6.99	2,774.6	3.0	Not detected	209.1	23.4	90
Standard	Class II of Ambient Soil Quality Standard GB/15618-1995		< 6.5	50	200	250	0.3	150	40	—
			6.5–7.5	100	250	300	0.3	200	50	—
	Pollutants Control Limits for Agricultural Application of Municipal Sludge GB4284-84		< 6.5	250	500	300	5	600	200	—
			≥ 6.5	500	1,000	1,000	20	1,000	200	—

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The soil environment quality evaluation standards for land use in the exhibition (HJ350-2007)	A	—	63	200	140	1	190	50	—
	B	—	600	1,500	600	22	610	2,400	—
Sludge Quality for application in WoodLands, Disposal of Municipal Sludge (CJ/T 362-2011)		5.5–8.5	1,500	3,000	1,000	20	1,000	200	60
Sludge Disposal and Use Standard (40CFR Part 503) (USA)		—	4,300	7,500	840	85	—	450	—
Standard for Agricultural Application of Sludge (Directive 86/278/EEC) (EU)		—	1,000–1,750	2,500–4,000	750–1,200	20–40	—	300–400	—

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The analysis results of the sediments quality show the following:

- (a) In Duchang, the quality of the sediments meets Class II of the Ambient Soil Quality Standard (GB/15618-1995) (pH 6.5–7.5), as well as the Pollutants Control Limits for Agricultural Application of Municipal Sludge (GB4284-84) (pH \geq 6.5). Therefore, the sediment to be dredged in the Duchang subproject is not toxic material and can be used in agriculture or landscaping. In Yugan, the heavy metals content in the sediments meets Class II of the Ambient Soil Quality Standard (GB/15618-1995) (pH 6.5–7.5), as well as the Pollutants Control Limits for Agricultural Application of Municipal Sludge (GB4284-84) (pH \geq 6.5). However, as the content of zinc exceeds both the above standards, the sediments can neither be regarded as natural soil nor be used in agriculture. Through further comparison with Class B of the Soil Environment Quality Evaluation Standards for Land Use in the Exhibition (HJ350-2007), Sludge Quality for Application in Woodlands, Disposal of Municipal Sludge (CJ/T 362-2011), Sludge Disposal and Use Standard (40CFR Part 503) (United States) and Standard for Agricultural Application of Sludge (Directive 86/278/EEC) (EU) the sediments to be dredged in Yugan are nontoxic materials and eligible for application in woodlands.
- (b) In Fengxin, the quality of the sediments meets the Sludge Quality for Application in Woodlands, Disposal of Municipal Sludge (CJ/T 362-2011), Sludge Disposal and Use Standard (40CFR Part 503) (United States) and Standard for Agricultural Application of Sludge (Directive 86/278/EEC) (EU); thus the sediments to be dredged in Fengxin are nontoxic materials and can be applied in woodlands.

3.9 Social and Economic Status

The total area of Jiangxi Province is 166,900 km². There are 11 prefecture level cities and 100 counties in the province of Jiangxi. The total population of Jiangxi in 2015 is 45.61 million of which 23.54 million are living in urban areas, accounting for 51.62 percent of the total provincial population.

Jiangxi is not an economically developed province in China. In terms of gross domestic product (GDP), it ranks in the middle among provinces in China. In 2015, the regional GDP of Jiangxi was RMB 1,672.38 billion, 9.1 percent more than 2014, and the disposable income per capita was RMB 18,437, 10.2 percent more than 2014. Industrial output dominates the economy of Jiangxi. The outputs from agricultural, industrial, and service sectors in 2014 was in the ratio 10.7:53.4:35.9. The industry is centered on petrochemical, iron and steel, construction materials, and automobiles.

The socioeconomic information on the seven project counties are summarized in Table 3.2.

Table 3.2. Socioeconomic Information of the Seven Project Counties

County	Area (km ²)	Population (thousands)	Regional GDP (RMB millions)	Disposable Income Per Capita (RMB)
Duchang	2,669.50	810.5	8,509	18,794 for urban residents and 5,461 for rural residents
Poyang	373.81	94.7	1,661	n.a.
Yugan	2,331.00	1,065.5	11,270	n.a.
Fengxin	1,642.00	334.1	10,568	n.a.

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Jing'an	1,377.00	151.5	3,393	n.a.
Jishui	n.a.	70.0	12,300	22,935 for urban residents and 12,760 for rural residents
Shangli	721.11	241	16,095	n.a.

4. Analysis of Alternatives

4.1 Introduction

During project development, various alternatives have been compared from technical, economic, and environmental regards. With regard to the environmental assessment of alternatives, the primary objective was to identify and adopt options with the least adverse environmental impacts at reasonable cost. The evaluation and comparison has included the following options:

- The scenario of with and without the project
- Wastewater management plans
- Wastewater treatment modes
- Wastewater treatment technologies
- Solid waste collection and transportation plans
- Dredging technologies
- Solid waste compaction technologies
- Sites for solid waste transfer stations

The following criteria formed the basis of identifying the most appropriate options for the project:

- Complying with the required standard
- Being appropriate with respect to local conditions
- Being proven in operation at or close to the scale proposed
- Supporting competitive bidding
- Representing the least-cost option

4.2 Alternatives of With and Without Project

Comparison of the alternatives of with and without project are made and it is clear that although the alternative of 'with project' could produce some adverse environmental impacts (especially during the construction phase), such as wastewater, noise, solid waste and airborne dust, the environmental benefits, particularly the social benefits, of the 'with project' will greatly outweigh these adverse impacts. Thus, the alternative of 'with project' is highly recommended.

4.3 Alternatives of Wastewater Management Plan

For the Duchang subproject, two alternatives for the wastewater management plans were developed and compared. Alternative 1 is to cancel the No. 2 pumping station while constructing a sewer to the wastewater treatment plant (WWTP), which could intercept the wastewater from the outfalls along Zoujiazui Lake and wastewater near the lake. Alternative 2 is to intercept the wastewater near Zoujiazui Lake to the No. 2 pumping station, which will be expanded to a capacity of 12,000 m³ per day. Through comparison against the criteria above, Alternative 1 is considered the preferred option as it avoids the noise impact and represents the least-cost option.

4.4 Alternatives of Wastewater Treatment Mode

Under the Poyang subproject, two alternatives were developed and compared for the wastewater treatment mode. Alternative 1 is to adopt the concentrated treatment mode and Alternative 2 is to adopt the scattered mode. Through comparison it is determined that Alternative 2 would produce less environmental impacts and the least cost in operation and maintenance. Thus, Alternative 2 is considered the preferred option.

4.5 Alternatives of Wastewater Treatment Technologies

Under the Poyang subproject, alternatives for the wastewater treatment stations and the constructed wetland were developed and compared. The criteria were carefully designed, which are adaptive to local conditions, such as sludge disposal requirement, land occupation requirement, and local landform and difficulty in operation, given the rural setting of the subproject. The alternative of a fluidized media bio reactor (FMBR) for integrated wastewater treatment stations is considered the preferred option as it is simple, costs less, and can avoid the production of surplus sludge. The alternatives of different combinations of wetland technologies were selected for adoption in each of the plots of the constructed wetland through comparison of the above criteria.

4.6 Alternatives of Solid waste Collection and Transportation Plans

Under the Jing'an subproject, four alternatives for solid waste collection and transportation were developed for comparison. Alternative 4 which will transport the solid waste by compaction trucks without constructing and expanding solid waste transfer stations is considered the preferred option, as it will avoid the environmental impact for nuisance odor, dust, and noise, while avoiding the demand for land acquisition and resettlement, thus resulting in less cost and the least social impact given the limited land resource in the urban area in Jing'an County.

4.7 Alternatives of Dredging Technologies

The Duchang, Yugan, and Fengxin subprojects will involve dredging activities. Two alternatives for dredging technologies were developed and compared for the three subprojects. The dredging technologies, which were selected, are adaptive to local conditions of the dredging sites, particularly with regard to land occupation and estimated amount of sediments, after comparison.

4.8 Alternatives of Solid Waste Compaction Technologies

Under the Duchang, and Shangli subprojects, solid waste transfer stations of small capacities will be constructed. Alternatives to the compaction technologies that are suitable for such small transfer stations were developed and compared. After comparison, the alternative of mobile compaction equipment is considered the preferred option because it can avoid the secondary pollution during compaction of solid waste, that is, leachate, and is simple and cheap to operate.

4.9 Alternatives of Sites for Solid Waste Transfer Stations

Alternatives of sites for the solid waste transfer stations were developed and compared based on the criteria carefully designed by considering the public opinions collected in consultation and local conditions. The alternative with the least demand for land occupation and longest distance from residential areas is considered the preferred option, as it will cause least social and environmental impacts.

5. ENVIRONMENTAL IMPACT ASSESSMENT

5.1 Impact Assessment in Construction Phase

Potential adverse impacts of the project in the construction phase are summarized in the following paragraphs.

5.1.1 Air Pollution

Air pollution is primarily caused by the airborne dust generated during trench excavation, material transportation, and vehicular emission. About 60 percent of the airborne dust is contributed by the movement of transport vehicles. Typically, the area of influence of airborne dusts is limited to 50 m outside the boundary of the construction site or 150 m leeward. However, the impact of airborne dust can be easily mitigated by water spray and careful management of the construction site including fencing and prohibition of excavation in strong windy days. The vehicular emission may cause a minor impact. Therefore, the impact on air quality during the construction is not severe and will disappear once the construction is completed.

Under the Duchang subproject, the sediments will be exposed for natural drying by using the confer dam in the dry season. During the drying period, the sediments may produce a nuisance odor affecting the residents nearby. However, the dry season in Duchang is from November to January of the next year, and the nuisance odor is not as strong as in summer. The odor suppression agents will be sprayed on the exposed sediments to effectively mitigate the nuisance odor.

5.1.2 Noise

Construction and transport vehicles will have potential impacts on acoustic environment, especially hospitals and schools. The operating equipment will generate high-level noise affecting the area within 100 m from the construction sites. Although the construction will be banned during the night, the sensitive receptors near the construction sites may be affected by noise. However, the noise impact can be effectively mitigated by adoption of low-noise equipment and good maintenance of equipment, installation of noise barriers near the

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sensitive receptors, and slowdown of transport vehicles. Thus, the noise in construction will not cause a significant impact and is temporary.

5.1.3 Water Pollution

Water pollutants will come from the domestic wastewater of workers and the small amount of wastewater generated from the construction of the pipelines and washing of vehicles. In addition, washing aggregates, mixing, and concrete casting will also generate small amounts of wastewater. As the project will be mostly constructed in urban areas where the municipal sewers are easily accessible, the domestic wastewater can be discharged into the sewers, and construction wastewater can be reused for suppressing airborne dust by spraying on sites after resettling. Thus, the impact of water pollution is minor.

Under the Poyang subproject, untreated sewage from villages is discharging into Pearl Lake where there are seven concentrated drinking water sources. To reduce the water pollution, 35 small size integrated wastewater treatment stations and bio-retention swales will be constructed to treat domestic wastewater from the villages. The effluent, after being treated to the requested standard, will be discharged into the waters. To avoid the adverse impact on these drinking water sources, the location of the outlets of the wastewater treatment stations have been carefully selected so that the outlets are all at least 100 m downstream of the drinking water sources. Thus, it will be ensured that the location of the outlets of integrated wastewater treatment stations is compliant with the relevant national regulations, and the effluent will not affect the quality of the water in these drinking water sources. However, during construction, if the wastewater is discharged directly into the waters where the drinking water source are located, or solid waste is dumped into the water area, the water quality of the drinking water sources will be affected. Mitigation measures have been developed: that is, material sites, spoils sites, and workers' camps should be prohibited from the protection zone of the concentrated drinking water sources; temporary peripheral ditches should be set up around construction sites to intercept the wastewater into the resettling tank; solid wastes should be banned from being dumped into the waters, and so on. Hence, the adverse impact on the water quality of these drinking water sources can be mitigated effectively to an acceptable level.

Under the Duchang subproject, the water within the coffer dam for dredging sediments will be discharged through a long ditch at a very slow velocity so as to settle the suspended solids (SS) to the standard for discharging into Zoujiazui Lake. Under the Yugan subproject, the outlet channel will be dredged by using hydraulic suction dredging technology. During the dredging, the sediments will be disturbed causing re-suspension of SS, which affects the water quality. Relevant experience shows that the area of the impact on water quality by dredging is limited to a small area.

Under the Fengxin subproject, three man-made irrigation ditches will be dredged using small equipment or manual method as there is essentially no flow in the dry season in the ditches. Thus, the dredging in the three ditches may not cause water pollution because the dredging is scheduled for the dry season.

Under the Yugan and Fengxin subprojects, the dredged sediments will be dewatered to 50 percent water content on temporary stockpiling sites and the effluent from the dewatering machines will be discharged into the on-site settling tanks to reduce the SS concentration to the standard before being discharged into the waters. Thus, the dredging activities would not cause severe impact on water quality with the mitigation measures practiced.

5.1.4 Solid Waste

The solid wastes generated during the construction period include domestic waste, spoil, and the dredged sediments. It is estimated that 330 kg per day of domestic solid waste will be generated and will be collected and transported to the landfill site on time. After careful balancing, the spoil is estimated at 227,406 tons, which will be reused in other projects for grade filling. The construction solid waste will be 10,750 tons, which will be transported to local construction solid waste landfill facility for landfill.

Under the Duchang subproject, 3,000 m³ of sediments will be dredged, weighing about 300 tons. The sediments have been sampled and analyzed against relevant standards, and it is found that the sediments are not toxic materials and can be applied for landscaping or agriculture use. Given the small quantity of the sediments, the sediments will be directly transported to the disused land in the Guling of Wangdun Town for landscaping, 3 km from the site, without being stockpiled temporarily on-site. The area of the disused land is 300 ha, which can accommodate 900 tons of sediments based on the application rate provided in the Pollutants Control Limits for Agricultural Application of Municipal Sludge (GB4284-84) (pH ≥ 6.5). The sediments will be covered with soil at the site after application and warning signs will be set up to prevent the public from entering the site. The owner of the disused land, Wangdun Township Government, has agreed to accept the sediments.

Under the Yugan subproject, totally 6,800 m³ of sediments will be dredged, which is equivalent to a weight of 680 tons. Through sampling and analysis, the sediments are identified as nontoxic waste and can be applied in woodlands. The sediments will be dewatered to the water content of 50 percent on-site and transported to the woodlands in Xiaoganghe in Yuting Town which is 5 km from the site. The total area of the woodland is 80 ha, which is collectively owned by Yuting Town and capable of accommodating 2,400 ton sediments based on the application rate indicated in the standard for sludge application in woodlands. The owner of the woodland has agreed to accept these sediments. During the dredging, the dewatered sediments will be stockpiled on-site for a short period before being transported to the woodland for application. The stockpiling site covers an area of 800 m² to the south of the outlet channel. The sediments stockpile is located far from the residential buildings and fenced with compacted clay; during rainy days, if any, the stockpile will be covered with tarpaulin to prevent the sediments from being carried away. The effluent from the dewatering machine will be made to settle to remove SS before being discharged into the outlet channel. Soil erosion control measures will be taken at the land where the sediments are to be applied, so as to prevent the runoff of the sediments. The sediments will be covered with soil at the woodland after application and warning signs will be set up to prevent the public from entering the woodland.

Under the Fengxin subproject, totally 3,600 m³ of sediments will be dredged, weighing 360 tons and requiring proper disposal. Given that the sediments are not toxic and can be applied in the woodlands, the sediments will be transported to the woodlands in Huangxi Village of Ganzhou Town after being dewatered to a moisture of 50 percent on-site. The woodlands is only 7 km from the site and can accommodate 3,000 tons of sediments based on the application rate provided in the Sludge Quality for application in Woodlands, Disposal of Municipal Sludge (CJ/T 362-2011). It is considered that the application of the sediments in the woodlands in Huangxi Village is feasible technically and environmentally, and the owner, Yuantou Group of Huangxi Village, of the woodlands has agreed to accept the sediments. During the dredging, the dewatered sediments will be stockpiled on-site for a short period

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before being transported to the woodlands for application. The sediments stockpile will be located far from the residential buildings and fenced with compacted clay; during rainy days, if any, the stockpile will be covered with tarpaulin to prevent the sediments from being carried away. The effluent from the dewatering machine will be made to settle to remove SS before being discharged into the ditches.

Before the dredging operation on these waters, the solid waste at a combined quantity of 0.55 tons will be collected and transported by the local sanitation departments to the solid waste treatment/landfill facilities for disposal.

5.1.5 Ecology

The vegetation along the roads and in the construction sites will be affected by the construction. However, the vegetation can be replanted or restored after the construction is completed. Thus, the impact on vegetation is limited. To prevent invasion of alien species, only indigenous plants are allowed for the revegetation/rehabilitation purpose. Monitoring and alarm systems will be established and operated for the alien species.

Poyang subprojects are in the vicinity of Pearl Lake which is a part of the Poyang Lake National Wetland Park. Construction of the small integrated wastewater treatment stations and constructed wetland and bio-retention swales will cause noise, wastewater, airborne dust, and the bad behavior of the workers could affect the ecology, that is, birds and biodiversity. However, the physical investments are in the rural area (that is, farmland and villages), which has been disturbed by human activities. Construction of these small-scale works will only involve small equipment and a small number of workers, and the construction period is very short and the construction site is only limited to the land area. It is expected that the adverse impact on the ecology of the Poyang subproject is limited, provided proper mitigation measures are adopted. These mitigation measures include the prohibition of construction in the nighttime, good conduct of workers; use of low-noise equipment and machineries, wastewater collection and reuse for spraying on-site after resettling, and so on. During EA preparation, the management of National Poyang Lake Wetland Park has been consulted and they agreed with the project and the impact analysis results and the proposed mitigation measures.

The project will involve the dredging of a small part of Zoujiazui Lake in Duchang County and the dredging of the outlet channel of Pipa Lake in Yugan County. Zoujiazui Lake is within the urban area of Duchang County and is not a significant natural habitat. The water quality of Zoujiazui Lake is worse than Class V, which is considered the lowest category of surface water quality in China. The dredging of Zoujiazui Lake will lead to the loss of the benthic animals and the vegetation in the lake. However, the dredging activity in Zoujiazui Lake has been carefully designed so as to limit the depth of dredging to only 1.0 m which is the most polluted, so that most of the benthic species will be preserved. In addition, the dredging will be conducted on a small area of the lake and is scheduled in the dry season when there is essentially no water in Zoujiazui Lake. The influence on the ecosystem in Zoujiazui Lake is expected to be limited and the ecosystem will be restored very quickly, and even the biodiversity in the lake will be increased, after the completion of the project.

Pipa Lake is located within the urban area of Yugan County and has been heavily polluted by the discharge of domestic wastewater and the aquaculture activities in the lake. The water quality of Pipa Lake is worse than Class V, which is considered the lowest category of surface water quality in China. Pipa Lake is not a significant natural habitat and no rare or

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endangered species are found or recorded. To improve the water quality of Pipa Lake, its clogged outlet channel connected with Huhui River will be dredged. Dredging will cause the re-suspension of SS, which will affect the water quality and the loss of biomass. However, given the dredging only for the outlet channel and the proposed dredging method, the impact on the ecosystem of Pipa Lake is quite limited. With the improvement of water quality, the biomass will be largely increased after the project is completed.

The three ditches to be dredged under the Fengxin subproject are man-made irrigation ditches. These ditches are not natural habitats as they have been drastically influenced by human activities. The dredging activities on the three ditches will not cause major ecological impact.

5.1.6 Social Impact

Social impacts in the construction stage are diversified, specifically including the following:

- **Impacts on local traffic.** During pipeline construction, pavement excavation will occur. In the course of excavation, it is necessary to enclose the road sections around the construction area and reduce the number of lanes, thus affecting local traffic. However, since there are not many such additional vehicles, the impacts on traffic flow along the roads should be minor. This impact can be mitigated by the careful coordination with the traffic department to develop the measure to adjust or divert the traffic flow and enhance traffic management. The measures suggested include pipe jacking to shorten the construction period when the pipelines are to be constructed across busy roads.
- **Impacts on municipal facilities.** Pipeline construction may interrupt the existing underground pipelines and cables. Before the commencement of the construction, the underground pipelines and cables will be identified together with the associated management departments, and the construction plan will be prepared by the contractors to submit to the supervisor for approval.
- **Impacts on business activities.** Construction of a pipeline will produce certain adverse impacts on business activities along the roads by blocking accessibility and noise and dust. However, the adverse impacts will be temporary and will disappear when the construction is completed. Access to roads will be provided to the roadside commercial businesses and water spraying will be intensified on the road sections near the businesses, so that the impact on roadside businesses can be mitigated effectively.
- **Impact on community safety.** Construction of the pipelines near communities, hospitals, and schools will cause safety concerns. The stockpile of the materials, movement of trucks, and operation of equipment are considered the major source for safety issues. The construction sites should be enclosed to prohibit the people, particularly the kids, from entering the sites, and corridors will be established to ensure that people and vehicles can access the public facilities and residential buildings. Staff of the contractors will be assigned to help guide the people to walk around the construction sites, and the drivers of the trucks will be trained on safety issues and the operation of the trucks will be monitored. Through these mitigation measures, the safety concern for communities will be addressed.

5.1.7 Land Acquisition and Resettlement

The land acquisition and resettlement has been minimized during the project development. An RAP has been prepared by the Hohai University which has identified that 140 villages under 19 towns in seven project counties will be involved in the land acquisition and resettlement. The RAP identified the following:

- Permanent occupation of land involves 193.61 mu of collective-owned land including 1.5 mu of dry farmland, affecting 443 people of 117 households; and 423.55 mu of state-owned land without involving land acquisition and resettlement.
- Temporary occupation of land will involve 1 mu of collective-owned land affecting 13 people in 3 households and 1121.47 mu of state-owned land. Totally 5,853 people of 1,336 households and 531 small businesses will be indirectly affected by the temporary occupation of land; no house/structure demolition will be involved.
- During the preparation of the RAP, site visits have been made to identify the vulnerable people and the RAP has been carefully developed so as to avoid adverse impact on the vulnerable group with regard to land occupation and resettlement.
- Compensation standards and a livelihood recovery plan have been developed in line with the domestic laws/regulations and OP 4.12, to ensure that the livelihood of the affected people is at least the same as that before the project.

Under the Yugan subproject, the water quality in Pipa Lake will be rehabilitated which will involve the closing down of a fish farm of 337.5 mu in the lake. The survey conducted by the social team identified that ownership of the water area for the fish farm belongs to the Yugan Water Scientific Study Institute, which contracted out this water area to three people for terms that expire on February 15, 2018 and February 15, 2017, respectively. Given the schedule of the Yugan subproject, which is to commence in the second half of 2018, the compensation to the three people because of the closing down of the fish farm is not necessary.

5.2 Impact Assessment in Operation Phase

5.2.1 Positive Impacts

The project will bring primary benefits after it becomes operational. The main positive impacts include the reduction of water pollution loads flowing into Poyang Lake and the reduced probability of water logging in the urban area, thus improving the living conditions of people and enhancing the sustainability of economic development. The reduction of water pollution loads and solid waste to be collected and the beneficiaries of the project are summarized in Table 5.1.

Table 5.1. Reduction of Water Pollution Loads and Solid Waste and Beneficiaries

County	Reduction of COD (tons per	Reduction of TN (tons	Reduction of TP (tons	Collection of Solid Waste (tons per	Population of Direct Beneficiaries	Women Beneficiaries
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	year)	per year)	per year)	year)	(million)	(million)
Duchang	239.40	17.50	4.40	1.70000	25.7000	12.2000
Poyang	1,886.00	484.70	33.43	—	33.1570	16.5785
Yugan	132.30	17.89	1.30	0.26750	13.2000	6.6000
Fengxin	215.50	15.00	2.40	—	12.0000	6.0000
Jing'an	52.56	5.84	0.58	0.24488	4.1719	2.0851
Jishui	183.96	20.44	2.04	—	17.0454	7.9556
Shangli	—	—	—	5.06400	23.2567	11.1864
Total	2,709.72	561.37	44.15	7.27638	128.531	62.6056

5.2.2 Negative Impacts in Operation Stage

Potential adverse environmental impacts during the operation phase of the project mainly come from substations.

5.2.2.1 Wastewater Impact

Operation of the solid waste transfer stations will generate leachate and wastewater, generated by washing equipment in the stations. It is estimated that under the Duchang subproject, annually 1,778 tons of wastewater will be generated in the three transfer stations, and the wastewater will be transported by tankers to Duchang Municipal WWTP for treatment. Under the Yugan subproject, annually 2,675 tons of wastewater will be generated in the two transfer stations and the wastewater will be discharged into the adjacent municipal sewers through which the wastewater will be treated at the Yugan Municipal WWTP. Under the Jing'an subproject, 1,511 tons of wastewater will be generated annually in the updated solid waste collection points, and will be discharged into the adjacent sewers to the Jing'an Municipal WWTP for treatment. Under the Shangli subproject, 5,743 tons of wastewater will be produced every year at the six solid waste transfer stations, and the wastewater will be transported by tankers to the leachate treatment stations of Pingxiang Municipal solid waste incineration facility for treatment.

The Jiangxi Environmental Protection Bureau (EPB) requires that the wastewater generated from industries—except for the chemical and electroplating enterprises—be discharged into the municipal WWTP for treatment so as to better use the capacities of the operating WWTPs. Based on the current capacities and process of the WWTPs, to ensure the normal operation of the WWTPs, the maximum industrial wastewater flow is expected to be less than 30 percent of the total wastewater flow in the WWTPs. Under the Duchang subproject, the wastewater from the industrial parks, which are established for garment making, will be collected and conveyed to Duchang WWTP for treatment. Through the sampling exercise, it is determined that the industrial wastewater collected by the Duchang subproject will not affect the normal operation of the WWTP with regard to the quality and quantity of industrial wastewater. In addition, it is also determined that the normal operation of the WWTPs, which will receive the wastewater or leachate from the solid waste transfer stations, will not be affected by the wastewater or leachate from the project.

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Operation of the water monitoring auto-stations will generate wastewater of small quantity requiring treatment. Under the Duchang, Yugan, Fengxin, Jing'an, Jishui, and Shangli subprojects, the wastewater will be discharged into the municipal sewers to the local municipal WWTP for treatment and the wastewater to be generated in the Poyang subproject will be discharged into the integrated wastewater treatment stations. In addition, the testing equipment in the water quality monitoring auto-stations will generate wasted liquid or wasted solvent, which are toxic materials. A local certified entity will be engaged to collect the toxic liquid and deliver it to the hazardous waste disposal center for disposal.

5.2.2.2 Air Pollution

The primary sources for air pollution are the solid waste vehicles and transfer stations in the operation stage. Solid waste transport vehicles with a watertight design will be selected so as to avoid the release of nuisance odor during traveling. During the operation of the transfer stations, not only nuisance odor but also airborne dust will be generated, which will adversely affect the nearby residential areas. During the consultation, the people to be affected by the solid waste transfer stations requested the installation of odor removal devices in the transfer stations, to address their concerns.

The model provided in the Technical Method for Developing Local Air Pollutants Emission Standard (GB/T13201-91) was used to estimate the concentration of H₂S and NH₃ at the boundary of the transfer stations and the sensitive receptors in the nearest proximity. The result shows that the air quality either on the boundary of the transfer stations or at the sensitive receptors will meet the standards, provided the odor removal devices are installed.

In addition, the estimation of the intensity of the odor and dust show that the concentration of odor with regard to H₂S and NH₃ can meet the Sanitation Design Standard for Industrial Enterprises (TJ 36-79) and the dust concentration can meet the Integrated Air Pollutants Emission Standard (GB 16297-1996). Thus, the impact on the occupational health of the operation staff in the transfer stations is minor and acceptable.

5.2.2.3 Impact of Noise

The major cause for noise in the operation phase is the operation of pumps in pumping stations, the equipment in the transfer stations, and the solid waste transportation vehicles.

The model provided in the EA Technical Guideline-Acoustic Environment (HJ2.4-2009) has been used to predict the noise level at the boundary of the pumping stations and the transfer stations. It is clear that the noise level on the boundary of the stations meet the standard, if the mitigation measures are adopted. These measures include the selection of low-noise equipment, provision of a cushion base, and noise insulation windows and gates. The noise at the sensitive receptors at the nearest proximity has been estimated and it is thought that the noise levels at these sensitive receptors are in compliance with the standard.

Through modeling, it is clear that the noise level during the day at 5 m from the roads can meet Class IVa and at 10 m can meet Class I of the Acoustic Environment Quality Standard (GB 3096-2008) when the solid waste vehicles travel near the residential buildings. Given that the solid waste vehicles are banned from operating in nighttime, the impact of noise by the operation of solid waste vehicles is minor and acceptable.

5.2.2.4 Impact of Solid Waste

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Solid waste will be generated by the operation staff in the transfer stations and the water quality monitoring auto-stations. The domestic solid waste in the transfer station will be placed in the compaction equipment and transported by solid waste vehicles to the sanitary landfill.

The integrated wastewater treatment stations to be built under the Poyang subproject will adopt the FMBR process, which will provide a long retention time to digest the sludge, thus there will not be any surplus sludge generated from the operation of the wastewater treatment stations.

5.2.2.5 Impact on Ecology

After the implementation of a set of mitigation measures supported by the project (for example, sediments dredging, sewage interception, and lakeshore improvement), water quality of Zoujiazui Lake and Pipa Lake are expected to improve, leading to less pollution load discharge into Poyang Lake and improvement of the environment.

Figure 5.1. Perspective Landscape of the Two Lakes (Zoujiazui, Pipa)



After the outlet channel of Pipa Lake is unclogged, fresh water from Huhui can flow into Pipa Lake by gravity during the wet season. During the dry season, fresh water (maximum 3,464 m³ per day) will be introduced into Pipa Lake by a pump station from Huhui River to offset the water loss because of evaporation and infiltration. Huhui River is a 54 km river originating at Jingtou Zoujia and flowing into Poyang Lake at Shikou. The water quantity to be taken from Huhui River in the dry season is a very small percentage (0.14 percent) of the flow in Huhui River, which is expected to cause little impact on the ecological flow and the ecosystem of Huhui River.

5.2.2.6 Social Impacts

The social assessment report is prepared by the Hohai University and the following are the main findings, conclusions, and suggestions made in the social assessment report.

The project will bring tremendous social benefits, which largely outweigh the social impact. The main social benefits are

- improved living environment for residents;
- increased opportunity for employment for farmers and vulnerable groups;
- reduced mortality rate and improved health conditions for residents;

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- sustainable assistance in urbanization in rural areas; and
- promotion of the restructuring of the economy and boosting the development of green economy.

However, this project also faces potential social risks, which mainly come from land acquisition and resettlement and the sustainability expectation after the completion of the project. Thus, from a social perspective, it is suggested that during the development of the project, the vulnerable groups should be given equal attention with regard to fair treatment. To enhance the benefit and avoid or minimize the adverse impact in social aspects of the project, the following suggestions are made:

- Minimizing the area to be occupied, either temporary or permanent, through alternative development, which should include the criteria of land acquisition and relocation of people
- Carrying out participatory activities, which employ the approach of involving the stakeholders throughout the whole process of design, implementation, management, and supervision of the project
- Developing and implementing the environmental awareness promotion and public health education program
- Developing a proper RAP based on consultations with the affected people and relevant national laws and regulation, to ensure that the livelihood of the affected people is not lesser than that before the project
- Providing employment opportunities for migrant workers, poor families, and women during the construction and operation of the project
- Developing and implementing the favorable billing policy for the poverty group, through the public hearing procedure, which is adapted to the local conditions of poverty status
- Scheduling the construction progress by soliciting the concerns and comments of the local people
- Enhancing training to the contractors and project management offices (PMOs) on the safeguard policies of the World Bank
- Establishing the management mechanism for sustainability in the operation phase of the project, which will include the community management team with a representative of villagers being selected by a voting process
- Strengthening the law enforcement of environmental laws/regulation and training on environmental protection to the villagers

The above suggestions have been considered in the design of the project and included in the ESMP.

5.2.2.7 Impact of Studies

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The project will support studies and capacity-building activities. They are the Water Environment Vulnerability of the Poyang Lake Basin, the Financing Mechanism for the Water Environment Management of Poyang Lake, and the institutional strengthening package to enhancing the water environment management system. Based on the Interim Guidelines on the Application of Safeguard Policies to Technical Assistance (TA) Activities in World Bank-financed projects and Trust Funds administered by the World Bank, these studies and the institutional packages are assessed and categorized. The potential impacts of the studies and the institutional package are expected to be positive and would not cause any significant and irreversible adverse impact on Poyang Lake; the studies and the institutional package are EA Category B or C. Draft terms of references (TORs) for the proposed studies will be prepared including the requirements of analysis of potential environmental and social issues.

5.3 Cumulative Impact

The methodology for the cumulative impact assessment defined in the Good Practice Handbook-Cumulative Impact Assessment of the International Finance Corporation has been adopted. During the assessment, it is determined that the major negative impacts will occur in the construction stage and they are temporary and readily mitigated, while the operation of the project will generate a limited impact on air quality and acoustic quality because of the transfer stations which also is readily mitigated. In addition, the long-term impacts of the project are largely limited to the water quality improvement in the Poyang Lake Basin. Through the consultation with relevant groups and experts, the valued environmental components (VECs) selected for further cumulative assessment is the Water Quality in Poyang Lake in terms of COD, TN, and TP. In the current stage, specific projects from the past, ongoing, or planned for the future on water pollution control in the Poyang Lake Basin are identified within the context of the relevant water quality control planning in Jiangxi Province, that is, the thirteenth 5-year Plan and theth fourteenth 5-year Plan for Environmental Protection of Jiangxi Province, and the Water Pollution Control Action Plan of Jiangxi Province are used to represent the relevant projects in past, present, and future. The result of the cumulative impact show that this proposal is an integral part of the overall water pollution control effort in Jiangxi Province and will assist in achieving the target of water pollution load reduction set by the government. The analysis of the cumulative impact also suggests strengthening the implementation of the water pollution control efforts in Jiangxi.

5.4 Due Diligence Review

A due diligence review has been made by the EA team on the facilities that will receive and treat/dispose the wastewater and solid waste collected by the project, to ensure that the facilities are capable of accommodating the wastewater/solid waste in an environmentally sustainable manner. The information about the relevant facilities is shown in Table 5.2.

Table 5.2. Relevant Facilities

Subproject	Wastewater/Solid Waste	Relevant Facilities	Description
Duchang	Wastewater	Duchang County Municipal WWTP	This WWTP was built in July 2010 following the environmental procedure with the current capacity being 20,000 tons per day, which will be increased to 40,000 tons per day in 2020. The effluent quality meets the relevant standard and there is adequate surplus capacity to accommodate the wastewater collected under this subproject. The environmental performance of the plant

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			is Satisfactory.
	Solid waste	Duchang Municipal Solid Waste Treatment Plant	This plant has been in operation since May 2016 following the environmental procedure with a capacity of 380 tons per day using the composting technology. The remaining waste that cannot be composted will be sent to the Jiujiang Municipal Solid Waste Treatment Plant No. 2 for landfill. The plant has already taken into account the quantity of the solid waste to be collected by the subproject during the design stage of the plant.
		Jiujiang Municipal Solid Waste Treatment Plant No. 2	It was built in January 2011 following the environmental procedure with a capacity of 1000 tons per day, which will be expanded to 2,000 tons per day in 2017. It adopts the sanitary landfill procedure and it is capable of accommodating the waste that cannot be composted in the Duchang solid waste treatment plant.
Yugan	Wastewater	Yugan Municipal WWTP	The first phase of this plant was built in 2009 at a capacity of 20,000 tons per year following the environmental procedure and the second phase of capacity 20,000 tons per day will be completed in 2020. The surplus capacity currently is 5,000 tons per day, which is capable of accommodating the wastewater collected by the subproject, and the environmental performance of this plant is Satisfactory.
	Solid waste	Yugan County Sanitary Landfill	The landfill was built in 2014 and the environmental examination will be conducted by the end of 2016. The capacity is 237 tons per day, which has already taken into account the solid waste collected by this subproject in the design of the landfill.
Fengxin	Wastewater	Fengxin Municipal WWTP	The first phase of this plant was built in 2009 at a capacity of 10,000 tons per year and the second phase of 10,000 tons per day was completed in 2014 following the environmental procedure. The service area of the plant includes the project area and the wastewater to be collected by the subproject has been considered in the design of the plant. The environmental performance of this plant is Satisfactory.
Jing'an	Wastewater	Jing'an Municipal WWTP	This plant became operational in 2010 and the capacity is 10,000 m ³ per day. The long-term capacity of the WWTP is 20,000 m ³ per day. The surplus capacity of the plant is 2,000 tons per year, which is adequate to accommodate the wastewater collected by this subproject in the short term, but when the wastewater volume in the long term to be collected by the subproject becomes 17,400 m ³ , the capacity of the WWTP should be expanded to 20,000 m ³ per day. The advice to accelerate the expansion of the WWTP to the capacity of 20,000 m ³ has been provided to the local government. The environmental performance of this plant is Satisfactory.
	Solid waste	Jing'an County Municipal Solid Waste Sanitary Landfill	This landfill is 7.5 km from the urban area of the county, and its footprint is 123 mu. It was built in 2014 and the environmental performance is satisfactory. The service span of the landfill is 20.2 years and the area of the subproject is the service area of the landfill.
Jishui	Wastewater	Jishui County municipal	The first phase of the plant was built in 2010 with a capacity of 10,000 m ³ per day, and the second phase is being constructed for an additional 10,000 m ³ per day and will become operational by the end of 2016. The

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		WWTP	final total capacity is 40,000 m ³ per day, which will be achieved in 2020. The service area of the plant includes the subproject area and it is identified that the wastewater to be collected by the subproject either in the short term or in the long term can be accommodated by the plant provided the final capacity of 40,000 m ³ per day is realized by the end of 2020.
Shangli	Solid waste	Pingxiang Municipal Solid Waste Incineration Plant	This plant is being constructed and will become operational in 2017, while the subproject will be completed by the end of 2022. The plant can provide incineration service for this subproject before the subproject become operational. The capacity of the plant is 700 tons per day. The subproject area has already been included in the service area of the plant in the planning stage. The environmental facilities associated, that is, leachate treatment and flue gas treatment, have been designed and are being constructed with the incinerators. The fly ash will be immobilized and landfilled in the landfill site, designed to the sanitary standard, within the plant. The EA for this plant has been prepared and approved by the EPB.

The monitoring requirements have been developed according to the relevant technical specifications and standards of China in each EA for the above facilities. Such monitoring requirements also have been included in the monitoring plan of the ESMP for this project. In addition, it is required that the progress of the facilities under construction that will treat/dispose the wastewater or solid waste to be collected by the project need to be reported in the ESMP.

5.5 Environmental Risks

The environmental risks include the breaking of sewers, accidents of wastewater discharge within the industrial parks, occupational health and safety risk for workers during maintenance of the facilities, malfunction of solid waste transfer stations, and leakage of leachate transport vehicles. The mitigation measures and the emergency preparedness plan have been developed and included in the ESMP.

6. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

6.1 Public Consultation

In accordance with the requirements of China's EA Law and Method for Public Participation, as well as the World Bank safeguard policies, two rounds of public consultation were conducted by the EIA team. The first round focused on environmental screening to define public concerns, to assist identification of key environmental issues, and to draw public response and comments on the initially developed mitigation measures for the potential adverse impacts identified before EA TOR finalization. The second round was designed to ensure public awareness of the EA effort and final project definition and mitigation of the adverse impacts by presenting a draft EA report to the public through access to information procedures. Details of the two rounds of public consultation undertaken are presented in Table 6.1.

Table 6. 1. Implementation of the Public Consultation

Subproject	Round	Timing	Participants	Form
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Duchang	1	November 2015 to January 2016	Affected local residents and concerned agencies	Interviews, questionnaires, and public meetings
	2	May 2016	Affected local residents and concerned agencies	Questionnaires and interviews
Poyang	1	December 2015 to January 2016	Local residents affected and of interest and concerned agencies	Questionnaires, interviews, and public meetings
	2	May 2016	Affected residents and concerned agencies	Questionnaires and interviews
Yugan	1	December 2015 to January 2016	Affected residents, sensitive receptors, and concerned agencies	Interviews
	2	May 2016	Affected residents, sensitive receptors, and concerned agencies	Questionnaires, interviews, and public meetings
Fengxin	1	December 2015 to January 2016	Affected residents and concerned agencies	Questionnaires, interviews, and public meetings
	2	May 2016	Affected residents and concerned agencies	Questionnaires, interviews, and public meetings
Jing'an	1	December 2015 to January 2016	Affected residents and concerned agencies	Questionnaires, interviews, and public meetings
	2	May 2016	Affected residents and concerned agencies	Questionnaires, interviews, and public meetings
Jishui	1	December 2015 to January 2016	Affected residents and concerned agencies	Questionnaires, interviews, and public meetings
	2	May 2016	Affected residents and concerned agencies	Questionnaires, interviews, and public meetings
Shangli	1	December 2015 to January 2016	Affected residents and concerned agencies	Questionnaires, interviews, and public meeting
	2	May 2016	Affected residents and concerned agencies	Questionnaires, interviews, and public meetings

Responsive consultation was carried out throughout the EA preparation. During the first round of consultation, it was understood that the public are very supportive of the project and eagerly expecting the improvement of the environment as a result of the project. However, the public expressed some concern on the adverse impact of the project, including the nuisance odor of the solid waste transfer stations, soil erosion, and traffic blocking. The EA team explained these potential impacts and the mitigation measures that would be developed in the EA to address these impacts.

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During the second round of consultation, the public were provided with EA documents and explanations on the main findings and mitigation measures. The public agreed with the conclusions and measures provided in the EA.

6.2 Information Disclosure

Information on each of the subprojects has been disclosed to the public during the public consultations. During the first round of consultations, the project information and major elements of draft EA TORs have been disclosed. During the second round of consultations, the draft sub-EA has been placed in the local libraries or village committees easily accessible to the affected people. Advertisements have been posted in the affected villages/communities during the first round and second round of consultations, to inform the public of project details and potential impacts, invite them to express their concerns, and inform the public about the location from which they can access relevant information and draft EIA reports.

The consolidated EA was placed in the website of the provincial PMO on July 25, 2016 at http://wzb.jxdpc.gov.cn/notice/201607/t20160725_193462.htm and the hard copy was placed in the library of Jiangxi. An advertisement was published in the Jiangnan City Newspaper on July 30, 2016.

7 ENVIRONMENTAL and SOCIAL MANAGEMENT PLAN

7.1 Institutional Arrangement

The institutional arrangement (IA) and responsibilities of relevant agencies and organizations for environmental management are as follows:

- The subproject IA will take the ultimate responsibility for environmental protection and management, with the responsibility for engaging environmental supervisors and monitoring agencies.
- Environmental supervisors, to be engaged by the IA, will be responsible for day-to-day environmental management during the construction phase. Their responsibilities will include response to environmental monitoring reports and the taking of appropriate mitigation actions. They will also handle any environmental events which may occur during construction and operation.
- The provincial PMO will be responsible for supervising overall implementation of the EMP.
- Local EPBs will be responsible for enforcement of environmental regulations and standards and review of environmental monitoring reports.
- Monitoring stations, to be engaged by the IA, will undertake environmental monitoring of air quality, noise, water quality, and other impacts on the environment in the project construction and operation.
- Contractors will be responsible for implementing the mitigation measures in the implementation phase.
- Relevant facilities will be responsible for provision of the emission monitoring

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report conducted by local EPB.

- A training program will be undertaken during project implementation for management and technical staff from the above organizations. Training course contents will include environmental regulations, environmental monitoring, mitigation measures, safety practice for small boiler demolition, and handling and responses to environmental incidents.

7.2 Mitigation Measures

Mitigation measures for the potential impacts in the design, construction, and operation phases are summarized in Annex 1.

7.3 Environmental Supervision

ESMP implementation will be managed by the Jiangxi PMO. An environmental and social management unit has been established in the PMO with dedicated safeguards staff. Civil work contractors and supervision companies will be required to assign qualified environmental staff to their team to ensure effective implementation of the ESMP. The PMO, with the assistance of on-site environmental supervisors, the local EPB, and an external monitoring institution, will supervise the implementation of the ESMP. To improve the local capacity, the ESMP proposes capacity-training activities for civil work contractors, the PMO, environmental supervisors, monitoring institutions, and so on. The ESMP also specifies a monitoring plan and budget for ESMP implementation. A set of environmental compliance checklists for the contractors and supervisors have been developed for the construction period including checking the implementation of all of the mitigation measures and correction of environmental practice and environmental acceptance for checking the implementation of the monitoring plan, mitigation measures, and reporting system.

7.4 Reporting and Public Grievance Mechanism

The requirements for environmental supervision and monitoring, as well as the reporting system has been clearly specified. The public grievance mechanism will be established and maintained throughout the project to deal with any public concerns in environmental management.

7.5 Training Plan

A training program has been developed for the PMO staff, environmental supervisors, contractors, and environmental monitoring units with the contents focusing on the responsibilities of the relevant organizations, environmental regulations, mitigation measures, supervision, the reporting system, and public grievance.

7.6 Environmental Monitoring Plan and Cost Estimate

An environmental monitoring plan has been developed for the construction and operation phases and incorporated into the ESMP, which includes the monitoring location, monitoring parameters, methods, frequency, and cost estimate.

The total cost estimate for the environmental protection measures is RMB 3.90 million for the construction phase, RMB 1.70 million for the operation phase, and RMB 2.20 million for

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monitoring.

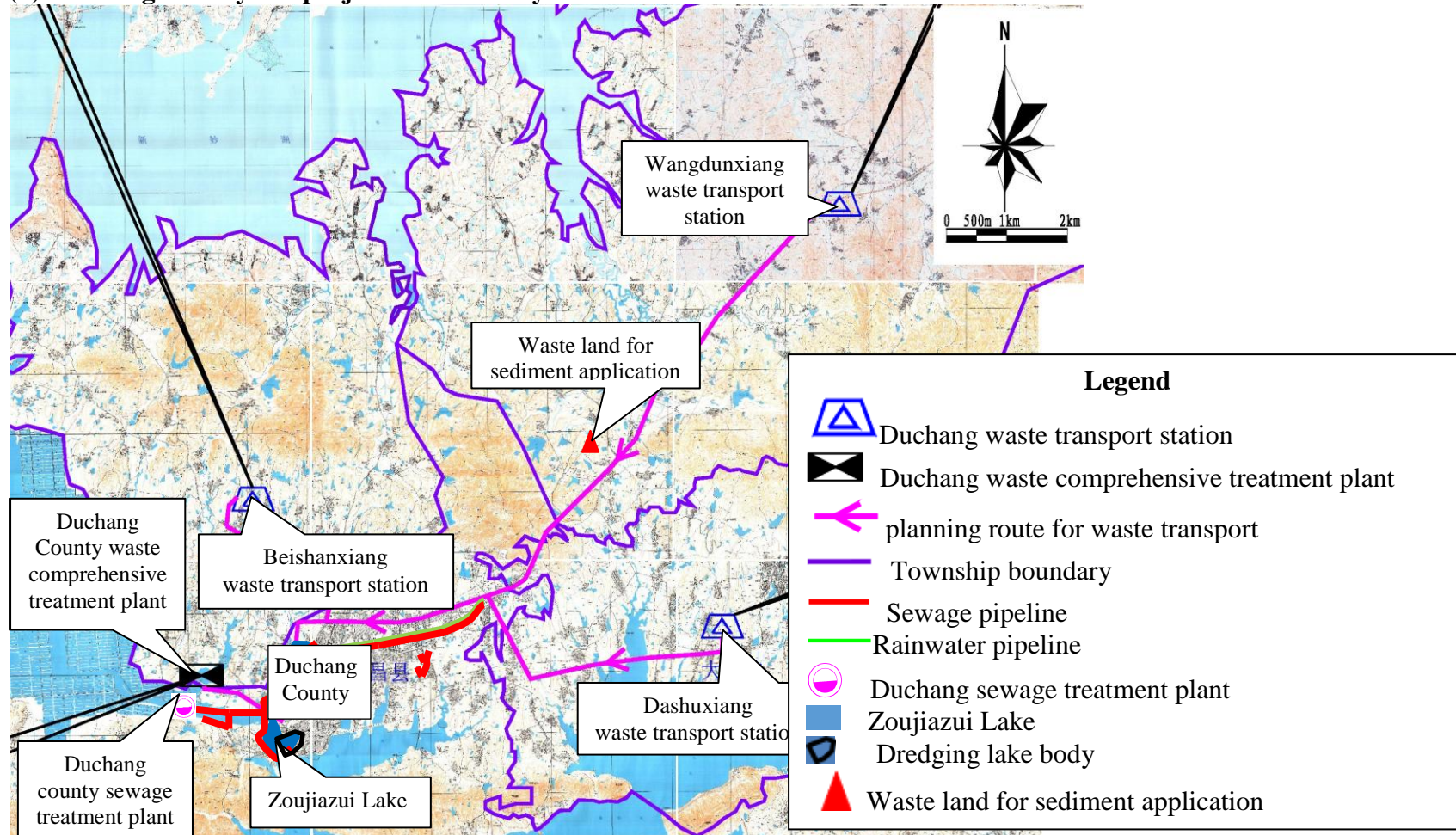
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Annex 1. Project Location



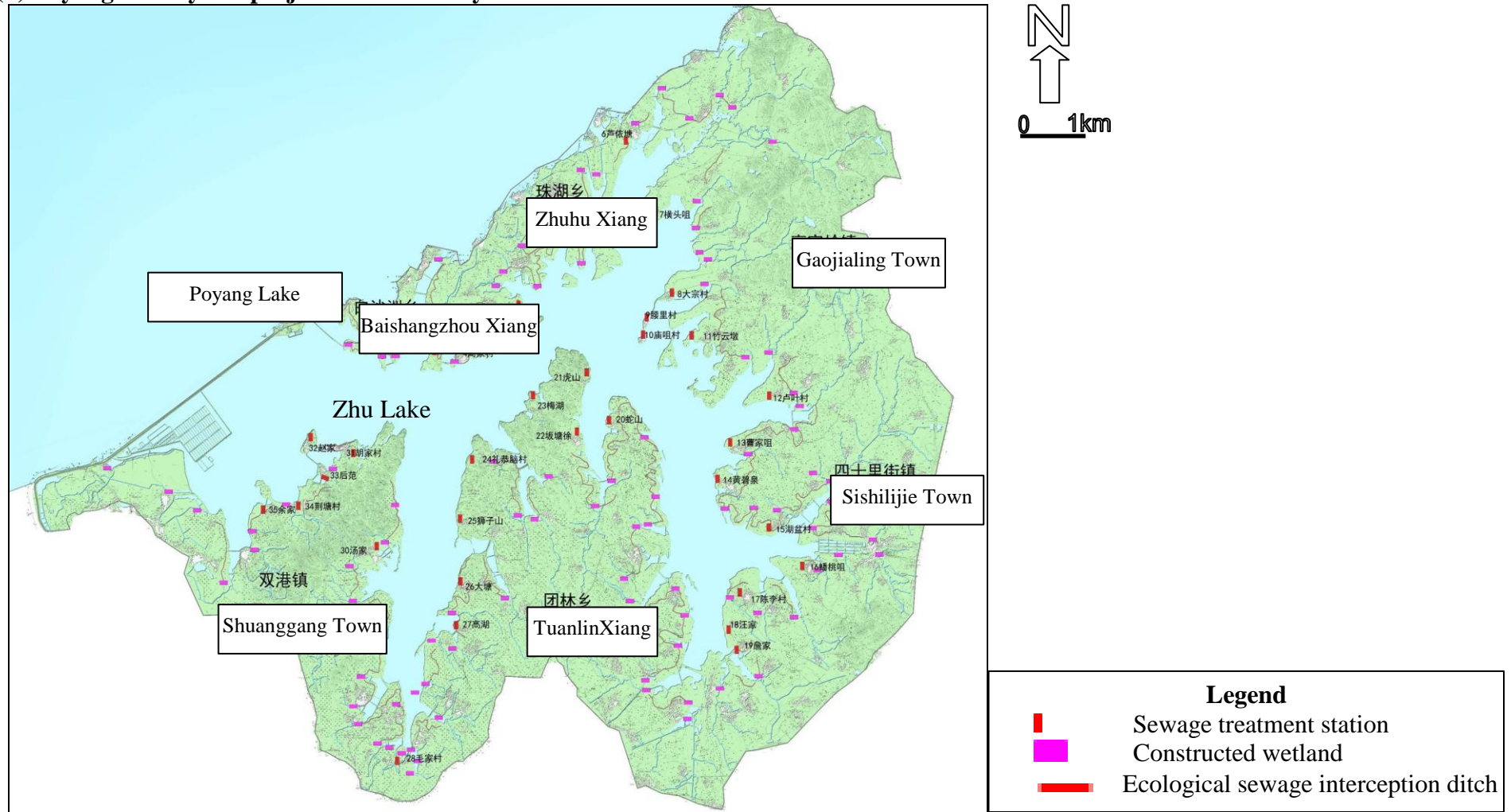
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(a) Duchang County Subproject - General layout



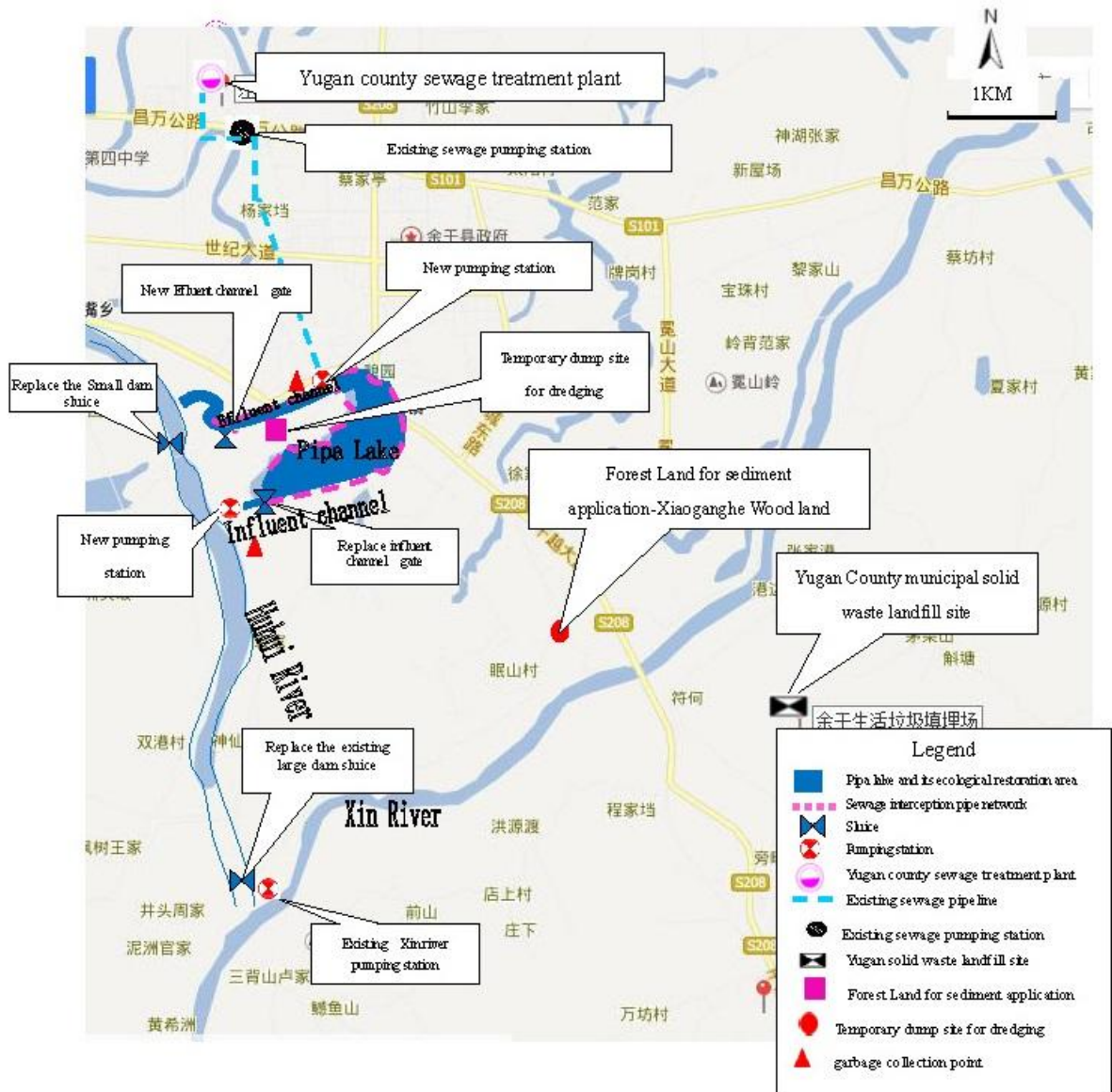
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(b) Poyang County Subproject - General Layout

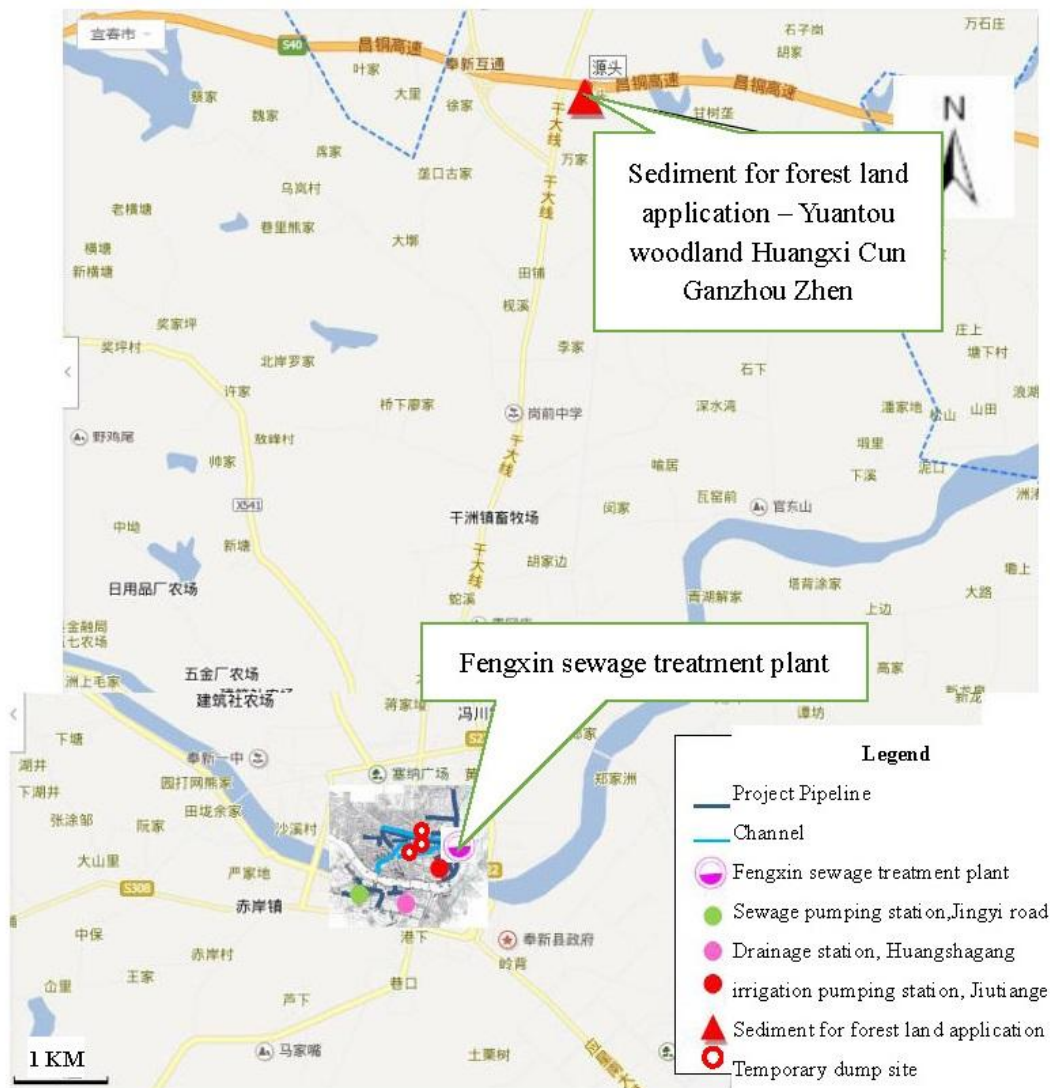


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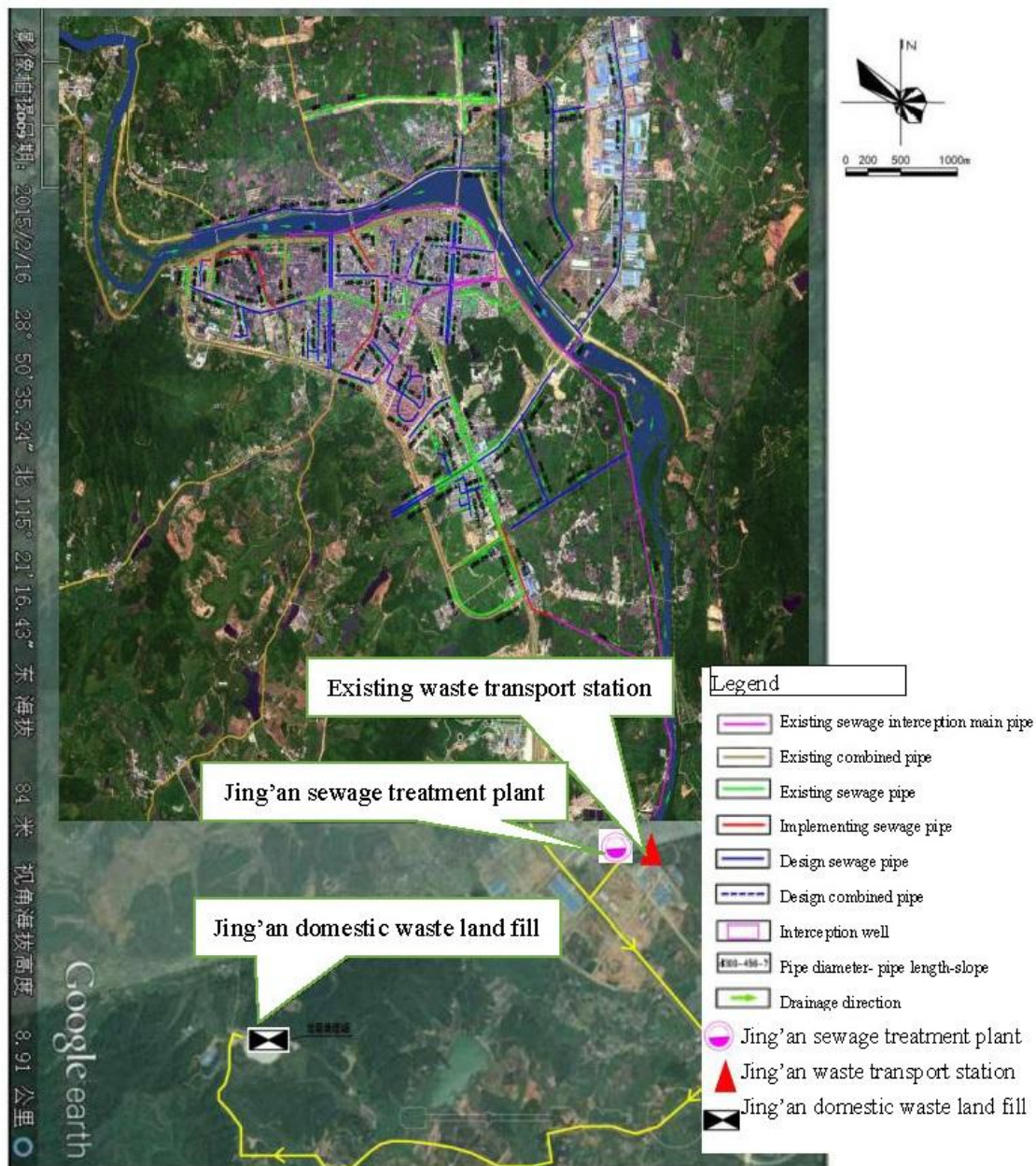
(c) Yugan County Subproject - General layout



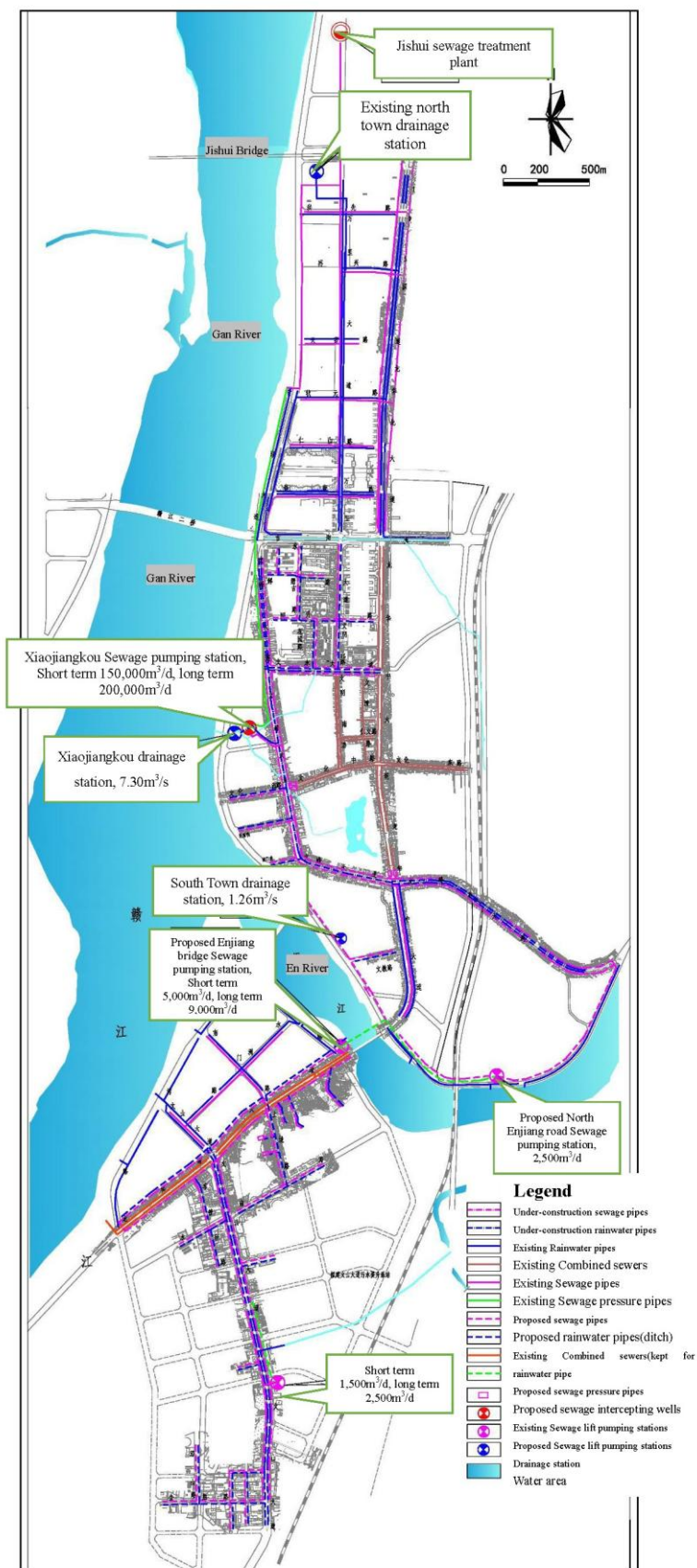
(d) Fengxin County Subproject - General Layout



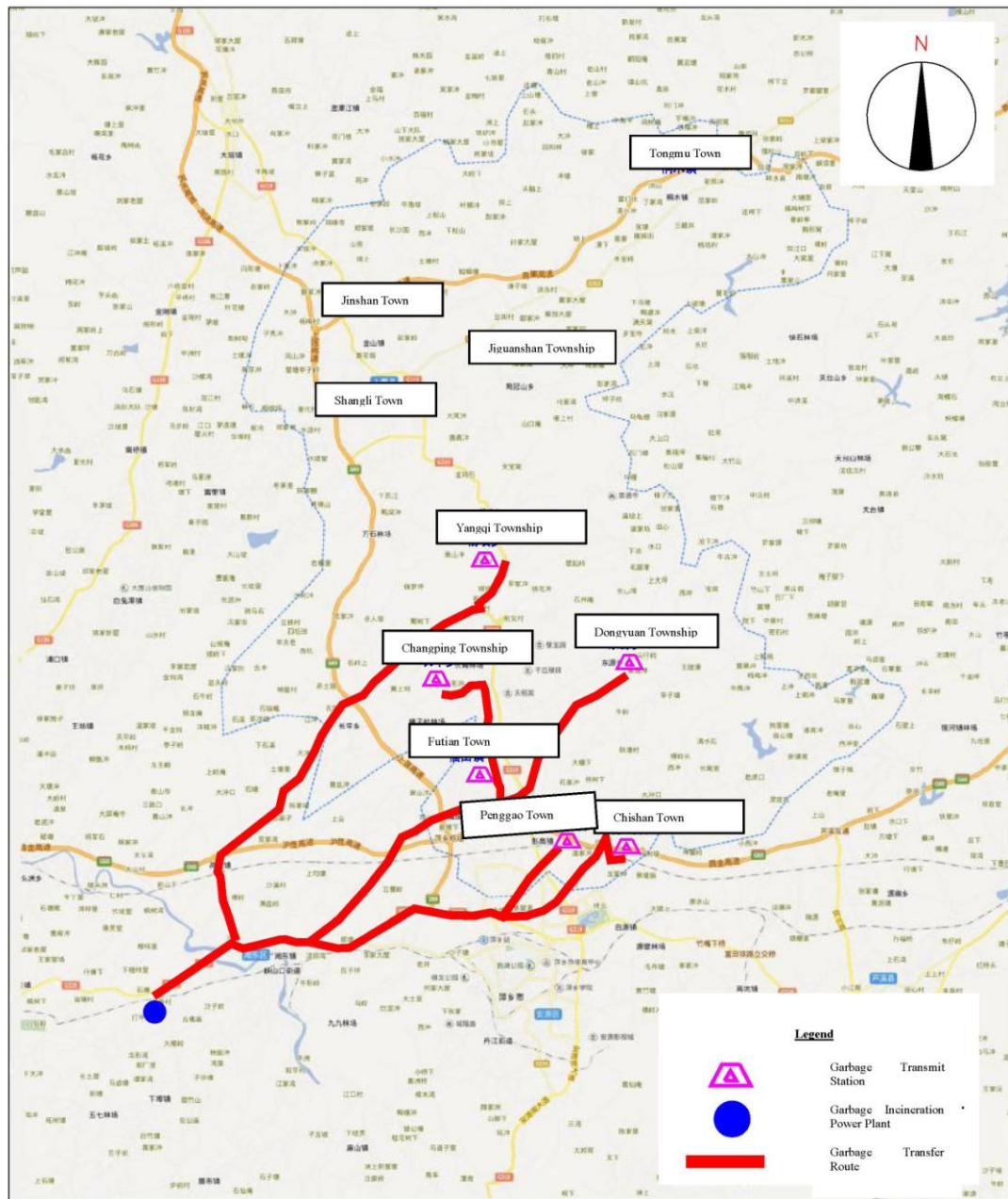
(e) Jing'an Subproject - General Layout



(f) Jishui County Subproject - General layout

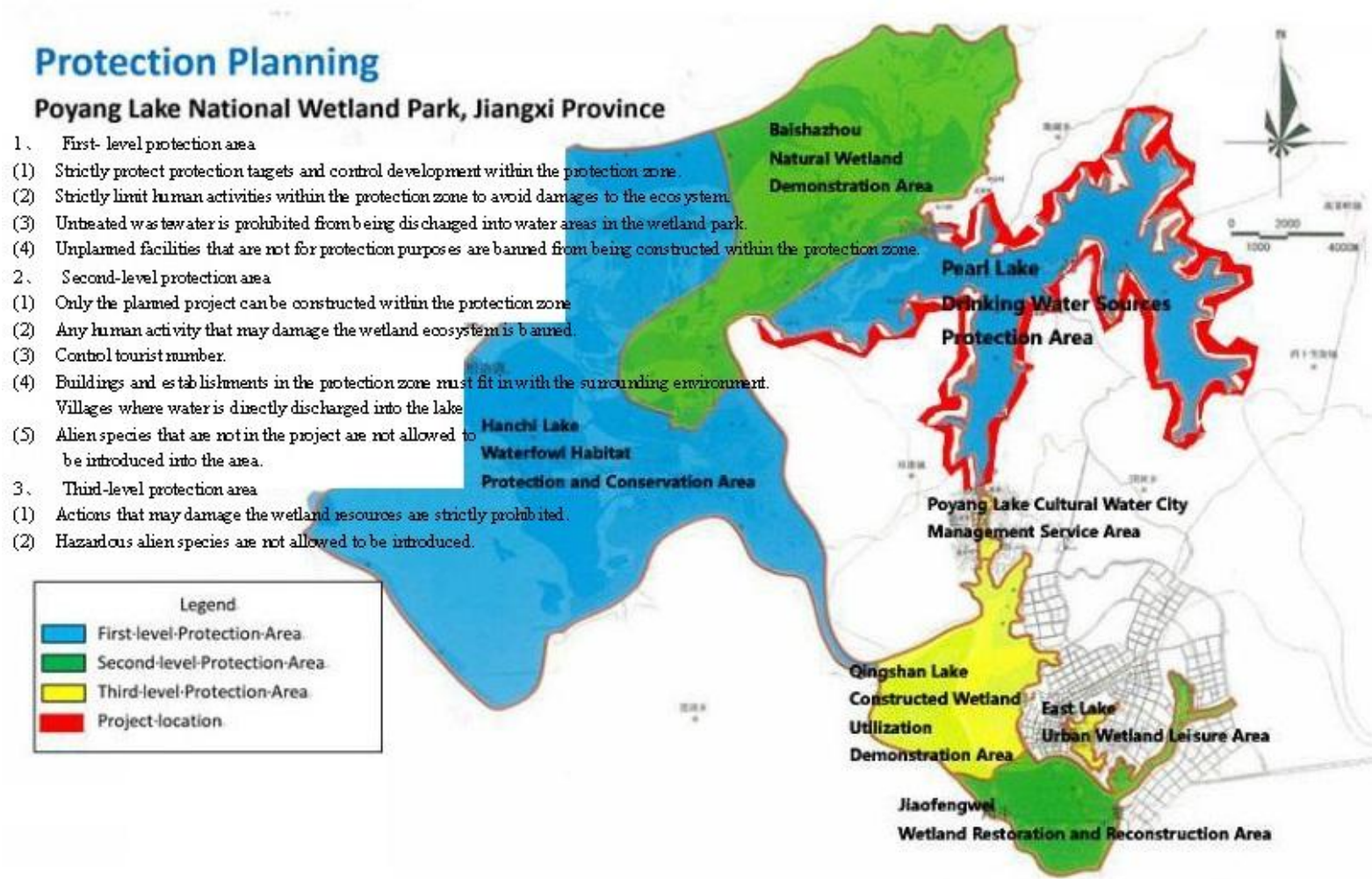


(g) Shangli County Subproject - General Layout



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Annex 2. Geological Relation between the Poyang Lake National Wetland Park and the Project



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Annex 3. Generic Mitigation Measures and EMP for Sensitive Receptors

Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
Preparation period					
Tendering and bidding	—	(1) An EMP should be included in the bidding documents. (2) An EMP should be included in the contracts with the contractor and the engineering supervision unit to be established.	—	Provincial PMO, County PMO	—
Prior to construction	—	(1) Inform the public on time about the information such as construction plan, environmental impact statement, pavement construction, and temporary bus routes. (2) Public should be notified about the public facilities failures caused by the construction, such as plumbing, electricity, telephone, bus routes failure, at least five days in advance by way of notice announcement in construction point, bus station, and affected regions.	—	Province PMO, County PMO	—
Construction period					
Earthwork excavation; site preparation; waste soil and slag storage	Destruction of vegetation; influence of crop production; disturbance of wild animals activities; influence of landscape; cause of soil and water loss; cause of geological disasters and so on	(1) Scientific layout arrangement of construction site, minimal land occupation and restoration of the temporary occupied areas in accordance with the original land use type after the construction. Reasonable selection of the construction period, avoiding the rainy season, rainy days as far as possible, and setting enclosure blocks around the construction area to prevent construction materials, and construction waste draining into surface water. (2) Soil drainage ditch should be set around the construction site according to the topography and geomorphology condition and should be provided with the soil grit chamber at the outlet point to slow down the water flow and settle down the sands. (3) In combination with the key and general soil and water conservation work, engineering measures and plant measures should be undertaken. With engineering	700	Construction Unit	Province PMO, County PMO, Project owner, County EPB, Forestry Bureau, Water Bureau

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Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
		<p>measures as the guide, and exerting the quick acting, effect of engineering measures and water and soil conservation supporting of plant measures. Plant measures play a long-term and stable role of soil and water conservation, greening and landscaping the surrounding environment of the project area.</p> <p>(4) To strengthen publicity and education, prohibit cutting down of the forest and hunting of wild animals.</p> <p>(5) During construction, if rare and endangered plants, ancient and local famous trees and plants are found, they should be reported to the relevant departments and protection measures should be taken locally.</p> <p>(6) To control construction noise, and to reduce the impact of construction noise on animals.</p> <p>(7) When stripping topsoil in the construction process, layered excavation and layered stacking should be employed, with timely removal of temporary facilities, loosening of the soil compaction, layered backfill of the soil, and restoration of vegetation being done after completion of construction. The appropriate type of vegetation in the region should be selected according to the local climate characteristics, slope rate, and geological condition.</p> <p>(8) Fire monitoring of the construction areas involving forests.</p> <p>(9) Strengthen the investigation of key protected plants and ancient and famous trees with regional distribution.</p> <p>(10) Strict management of construction work may prevent fires. During the period of forest fire prevention, it is forbidden to use fire in a mountainous area.</p> <p>(11) Protection of the litter leaf layer and organic matter in the surface soil, Provide a backfill to the damaged area to promote the growth of native plants.</p>			

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Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
		<p>(12) Using local grass and vegetation to cover the erosion or barren areas, or hardening the soil surface in this region.</p> <p>(13) Erosion control measures should be taken before the advent of the rainy season to carry out the next construction work. Corresponding erosion measures should be completed for each complete construction point.</p> <p>(14) In all construction sites, before vegetation restoration, deposition control facilities should be set to slow down the runoff rate, change the direction of flow, settle the sands, and so on. These deposition control facilities include material heaps, stone roads, grit tanks, straw bags, hedgerows, mud slag heaps, and so on.</p> <p>(15) By laying ditches, berms, grass fences, and stone piles and other measures to prevent water rushing into the construction site or interfering with the site.</p> <p>(16) Maintain and continue to use erosion control until the vegetation is fully recovered.</p> <p>(17) When necessary, sprinkle water on the soil road, excavation area, filler and soil storage area to reduce wind erosion.</p>			
Material processing and transportation, and so on.	Impact of dust, transport vehicle exhaust emissions on the ambient air	<p>(1) Using advanced construction process; dust cleaning equipment; speed control of vehicles; exhaust gas control of vehicles and coals;</p> <p>(2) Water spraying on construction area (4–5 times per day), clean energy such as liquid petroleum gas, electricity for construction people, strengthening of the construction area, and management and labor protection for construction people. All of the above will reduce the ambient air impact.</p> <p>(3) Vehicle wash platforms are set up at the inner side of the entrances and exits for material and waste transport vehicles, meeting the following requirement:</p>	1000	Construction Unit	Province PMO, County PMO, Project owner, County EPB

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Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
		<p>anti-overflow block around the platform to prevent the overflow of the vehicle wash wastewater. Vehicles should wash the tires and vehicle body before leaving the construction area. The height of material and waste loaded on the transport vehicles should not exceed the edge of the vehicle. Truck body should be covered with tarpaulin or use a sealed hopper.</p> <p>(4) Use of commercial concrete and asphalt; no on-site concrete mixing station and asphalt mixing station.</p> <p>(5) Transport vehicles, bulldozers, excavators should be driven in low speed when passing by the village and entering the construction area; meanwhile the construction machinery should be kept in good condition and normal working to reduce the emission exhaust gases.</p> <p>(6) Set up the dust screen around the construction area, especially for those close to residential areas, hospitals, and schools.</p> <p>(7) Try to reduce the dust and particulate generation, to avoid the impact on the living and commercial activities of the residents living around the area, focusing on protection of sensitive people (such as children, the elderly, and so on).</p>			
Solid waste of construction (earthwork, construction waste, and so on)	Soil and water loss; river channel blocking; water body pollution and so on.	<p>I. Earthworks</p> <p>(1) In the early stage of construction, the excavation of the site must be carried out. Make full use of the terrain's natural drop, try to avoid digging at high places and filling at deep points.</p> <p>(2) As for the excavated earthwork, soil can be used for land preparation in later cultivation projects, and rocks can be used for the foundation stone for stone irrigation, side ditch, and so on and shall not be arbitrarily placed.</p> <p>(3) Temporary storage site for earthworks should be</p>	400	Construction Unit	Province PMO, County PMO, Project owner, County EPB

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Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
		<p>reasonably arranged, away from the environment's sensitive points of reception such as residences and schools, and should be located downwind or in the lateral wind direction of the urban and residential area's summer-dominant wind.</p> <p>(4) Temporary stacking of earthwork should be rolled and covered by felt cloth and other waterproof and windproof measures should be taken.</p> <p>(5) Soil drainage ditch should be set around the temporary storage site and provided with a soil grit chamber at the outlet point to slow down the water flow and settle down the sands.</p> <p>II. Construction waste</p> <p>(1) Comprehensive classification and recovery of recyclable waste should be carried out (scrap metal, scrap materials, packaging bags should be sold to scrap yards, waste brick should be used as road base material).</p> <p>(2) Waste that cannot be recovered should be promptly transported to local construction waste landfill sites. Transport vehicles should be sealed in the transport process, to avoid falling waste.</p> <p>(3) Temporary dumping site should take waterproof and windproof measures.</p>			
Domestic waste of construction camp	Easily corrupted, produces a stench, breeding of mosquitoes and bacteria, damage to the environment, even releases toxic gases	Domestic waste bin should be set up in the construction area, cleaned daily, collected, and classified by specific people, then collected and transported by the local sanitation department.	100	Construction Unit	Province PMO, County PMO, Project owner, County EPB
Construction wastewater	Water environment pollution	(1) The wastewater of sand and gravel processing systems is used for sprinkling on construction dust and so on, and	1000	Construction Unit	Province PMO, County PMO,

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Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
		<p>shall not be discharged into the water body.</p> <p>(2) Slurry produced in the construction process is pumped into the settling tank by the slurry pump, solidified by drainage and evaporation, and shall not be discharged into the water body. Wastewater of mechanical equipment washing is treated by the oil separation tank, then used for sprinkling of construction dust, and shall not be discharged into the water body.</p> <p>(3) The construction site layout should take full account of drainage needs; be as far as possible from river water; ensure that the construction site, warehouse, storage of diesel oil and asphalt, and equipment for the production of asphalt are not set within the 500 m range of the river; avoid pollutants flowing into the river during the operation time, especially leak by land or through surface water during the rainy season.</p> <p>(4) In the course of construction, the work area should be clean; sewage and pollutants should not enter into the excavation trench, leading to sewage infiltration.</p> <p>(5) If the oil needs to be stored on-site, impervious treatment must be done to the warehouse. Measures should be taken for oil storage and use to prevent water pollution from oil escaping, emitting, dropping, and leaking.</p> <p>(6) Foundation construction should be done in the non-flood season as far as possible to reduce the influence of shallow groundwater depth on construction.</p>			Project owner, County EPB, Water Bureau
Domestic wastewater	Water environment pollution	<p>(1) Existing domestic wastewater treatment systems near the construction area are proposed to treat the domestic wastewater of project construction people; no discharge into the water body.</p> <p>(2) Prevention measures should be taken for the domestic waste storage room according to the relevant</p>	200		

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Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
		requirements.			
Noise generated by construction machineries, transport vehicles, sand and stone processing systems, and other construction activities	Impacts of noise on nearby environment and construction personnel	<p>(1) Setting up no honking warning sign on the noise sensitive road sections; using low-noise devices; control of noise point source, transmission route, traffic noise and so on; construction personnel equipped with anti-noise ear plug; and reasonable arrangement of construction time.</p> <p>(2) Reasonable arrangement of construction time according to the emission standard of environment noise for boundary of construction site (GB12523-2011); avoiding multiple high-noise equipment working at the same time; avoiding the noise sensitive time to the surrounding environment; arrangement of the high-noise equipment working in the daytime as much as possible; reducing nighttime transportation; strict prohibition of construction at nighttime (22:00–6:00). The construction which has to be at nighttime, must obtain the approval of the local environmental protection department, and prior communication with the residents, taking noise reduction measures (such as setting noise barrier) at the same time, to reduce the influence of construction noise on the residents to a minimum.</p> <p>(3) All construction vehicles' speed should not exceed 25 km/h on the road outside the construction site.</p> <p>(4) All construction vehicles' speed should not exceed 15 km/h in the construction site.</p> <p>(5) Try to maintain the noise of machinery and equipment below 90 dB as much as possible</p> <p>(6) Setting up temporary noise barriers at the side of the sensitive point of reception (including schools, hospitals, nursing homes, and so on) when high-noise equipment construction is ongoing.</p> <p>(7) Using correct measures to reduce the noise and vibration</p>	500	Construction Unit	Province PMO, County PMO, Project owner, County EPB

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Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
		impacts caused by the construction.			
Wastewater works/ solid waste works/water rehabilitation works	Social impacts	<ol style="list-style-type: none"> (1) Minimizing the area to be occupied, either temporarily or permanently, through alternative development, which should include the criteria of land acquisition and relocation of people. (2) Carrying out participatory activities, which employ the approach of involving the stakeholders throughout the whole process of design, implementation, management, and supervision of the project. (3) Developing and implementing the environmental awareness promotion and public health education program. (4) Developing a proper RAP based on consultation with the affected people and relevant national laws and regulation, so as to ensure that the livelihood of the affected people is not less than that before the project. (5) Providing opportunity for employment for migrant workers, poor families, and women during the construction and operation of the project. (6) Developing and implementing the favorable billing policy for the poverty group, through the public hearing procedure, which is adapted to the local conditions of poverty status. (7) Scheduling the construction progress by soliciting the concerns and comments of the local people (8) Enhancing training to the contractors and PMOs on the safeguard policies of the World Bank. (9) Establishing the management mechanism for the sustainability in the operation phase of the project, which will include the community management team with the representative of villagers being selected by the voting process. (10) Strengthening the law enforcement of environmental 			

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Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
		laws/regulation and training on environmental protection to the villagers. (11) Schedule of pipeline works should be shortened to minimize the impact on the residents and businesses nearby. (12) The wastewater from the households and communities within the service scope should be connected. (13) The drainage works should be designed in a manner adaptive to local conditions. (14) The location of the solid waste facilities should be as far as possible from the communities. (15) More funds for solid waste collection facilities should be allocated to the rural areas;			

Operation Period Generic Mitigation Measures

Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
Operation period					
Domestic wastewater	Surface and groundwater pollution	Wastewater is collected by the municipal pipeline and discharged to the municipal WWTP for treatment. In areas without a pipeline, wastewater is collected by a closed vehicle and shipped to the municipal WWTP for treatment.	500	County PMO, Project owner	County EPB
Equipment noise	Impacts of noise on nearby environment	Measures of sound insulation and shock absorption for equipment	100	County PMO, Project owner	County EPB
Domestic waste	Influence of landscape; river channel blocking; water body pollution; and so on	Collected and transported to the waste transport station or handed over to municipal department for treatment	20	County PMO, Project owner	County EPB

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EMP and Mitigation Measures for Ecologically Sensitive Area in the Construction Period

Name of Ecologically Sensitive Area	Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
Design period						
National Wetland Park	Constructed wetland, ecological sewage interception channel	Alien species invasion	(1) Selection of indigenous tree species and shrubs, for constructed wetland and ecological sewage interception channel instead of introduction of new exotic trees and invasive tree species (2) Selection of native species in water ecological remediation, in the principles of biological diversity, which is beneficial for construction of a stable ecosystem (3) Selection of species that have significant effects on the improvement of the ecological system, to meet the requirements of water purification	—	Design Unit	Province PMO, County PMO, Project owner, County EPB, Forestry Bureau
Construction period						
All the ecologically sensitive areas	Construction preparation and organization	—	(1) Awareness dissemination and education for workers before construction; strengthening the protection of the ecological sensitive area; prohibiting the behavior of destroying the ecological environment, such as destruction of trees, grass, and illegal hunting of wild animals (2) In the process of project construction, construction should be in strict accordance with the construction drawings, and should not expand the scope. The construction area should be strictly defined; non-construction personnel should not enter the construction area. Optimize the construction sequence and construction site design and minimize the disturbance of the surface and the destruction of vegetation area. (3) Soil taking and dumping field, abandoned slag field, material dumping field, mixing field and construction camp are forbidden from being set up in the ecological sensitive area; mainly use local personnel for construction; non-local construction workers should rent local housing; try to use the existing road or choose the wasteland; avoiding crossing or occupying of the woodlands.	—	Construction Unit	Province PMO, County PMO, Project owner, County EPB, Forestry Bureau, Water Bureau
National Wetland	Wastewater treatment,	Affect water quality, birds,	I. Prevention and control measures of impacts on mammals and amphibians	—	Construction Unit	Province PMO, County

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Name of Ecologically Sensitive Area	Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
Park	waste collection, processing and transport	amphibians, aquatic organisms, and so on	<p>(1) The project area should be divided into several sections in the construction periods and enough distance should be maintained between sections, to provide enough space for mammals and amphibians to escape.</p> <p>(2) Discharge of construction period wastewater should be away from the protected area side as far as possible to reduce the impact of sewage on mammals and amphibians.</p> <p>(3) Mechanical stirring system and sand system should be installed with a silencer pad, equipped with sound insulation room or cover, and periodic inspection and maintenance should be done in strict accordance with the operation requirements of the mechanical equipment to reduce noise caused by improper lubrication of equipment; and to reduce the impacts of noise on mammals and amphibians.</p> <p>(4) Publicity and education should be imparted to the construction personnel, enhancing their awareness of wildlife conservation, to prevent the occurrence of hunting, and reduce the impact of personnel on mammals and amphibians.</p> <p>II. Prevention and control measures of impacts on birds</p> <p>According to the analysis of the impact of the project construction on birds in Wetland Park, the main measures are the following:</p> <p>(1) In the construction period, construction tasks should be arranged as little as possible during the time period of more birds in the area (from October to next March), while the construction intensity should be increased to finish the work on time during the time that the birds are away from the area.</p> <p>(2) Construction is not allowed at nighttime.</p> <p>(3) Mechanical stirring system and sand system should be installed with a silencer pad, equipped with sound insulation room or cover, and periodic inspection and maintenance should be done in strict accordance with the operation requirements of the mechanical equipment to reduce noise caused by improper lubrication of</p>			PMO, Project owner, County EPB, Forestry Bureau

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Name of Ecologically Sensitive Area	Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
			<p>equipment; and to reduce the impacts of noise on birds.</p> <p>(4) Construction and living areas should be far away from the protected areas, and a curtain should be fitted to block the light to reduce the impact of night light on birds.</p> <p>(5) Strengthen the management of construction activities and personnel during the construction period, strengthen the publicity of environmental laws and regulations, compile a bird knowledge manual, popularize knowledge in the area, and improve the bird protection consciousness of the construction personnel. Reduce the impact of personnel disturbance on birds.</p> <p>(6) Use native plants and prohibit the introduction of exotic species.</p>			
Water source protection area	Wastewater treatment, waste collection, processing and transport	Affect water quality, birds, amphibians, aquatic organisms, and so on	<p>(1) To inform the construction personnel of Poyang County that Pearl Lake is a water body used for drinking water, and also that it is a centralized drinking water source protection area and water source protection and conservation area of Wetland Park; strengthen the awareness of water conservation for construction personnel; strengthen environmental protection education for construction personnel; strict personal hygiene behavior of construction personnel; and prohibit the construction personnel to swim.</p> <p>(2) Prohibition of the establishment of the material field, waste dumps, construction camps, and so on in the centralized drinking water source protection area; try to avoid the concentrated distribution area of the agricultural irrigation ditch as far as possible.</p> <p>(3) Set up necessary temporary drainage ditch, dredging the construction wastewater, and using the sedimentation tank to reuse the wastewater in the construction.</p> <p>(4) When excavation is carried out at the rain and road surface runoff, a temporary sedimentation tank should be set up, to settle down the sands. A geotechnical cloth fence is arranged at the water outlet side to intercept the sands once again. Sedimentation tank should be flattened when the construction is complete.</p> <p>(5) The construction of temporary road must be with smooth drainage to</p>	—	Construction Unit	Province PMO, County PMO, Project owner, County EPB, Water Bureau

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Name of Ecologically Sensitive Area	Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
			prevent the massive sandy mud from flowing into Pearl Lake as a result of storms. (6) Prohibition of dumping of wastewater, waste, waste rock and other solid waste into Pearl Lake. (7) Slurry produced in the construction process pumped to the settling tank by slurry pump and solidified by drainage and evaporation, and shall not be discharged into the water body. (8) Wastewater of mechanical equipment washing is treated by the oil separating tank, then used for water sprinkling for construction dust, and shall not be discharged into the water body. (9) In the course of construction, the work area should be clean and sewage and pollutants should not enter into the excavation trench, leading to sewage infiltration. (10) Construction should be done in the non-flood season as far as possible to reduce the influence of shallow groundwater depth on construction. (11) Regular inspection and maintenance of construction machinery to prevent oil leakage. (12) Local residents' houses are rented as the construction camp. Existing domestic wastewater treatment systems nearby the construction area are proposed to treat the domestic wastewater of project construction people; no discharge into the water body. (13) Prevention measures should be taken for the domestic waste storage room according to the relevant requirements.			

EMP and Mitigation Measures for Ecologically Sensitive Area in Operation Period

Name of Ecologically Sensitive Area	Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000Yuan)	Implemented by	Supervised by
Operation period						
National	Wastewater	Affect water	(1) Prohibit dumping of domestic waste and sewage discharge in the	—	Construction	Province

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Name of Ecologically Sensitive Area	Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000Yuan)	Implemented by	Supervised by
Wetland Park	treatment, waste collection, processing, and transport	quality, birds, amphibians, aquatic organisms, and so on.	wetland protection area and its periphery protection zone. (2) Prohibit dangerous chemical vehicles passing on the roads in the scenic area.		Unit	PMO, County PMO, Project owner, County EPB, Forestry Bureau
Water source protection area	Wastewater treatment, waste collection, processing and transport	Affect water quality, birds, amphibians, aquatic organisms, and so on.	(1) Prohibit dumping of domestic waste and sewage discharge in drinking water source protection area. (2) Prohibit dangerous chemical vehicles passing on the roads in the scenic area.	—	Construction Unit	Province PMO, County PMO, Project owner, County EPB, Water Bureau

EMP and Mitigation Measures for Sensitive Receptors under Subprojects of River and Lake Water Environment Rehabilitation

Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
Design period					
Ecological revegetation, water purification, and aquatic ecosystem remediation	Alien species invasion	(1) Selection of indigenous tree species and shrubs, for ecological revegetation instead of introducing new exotic trees and invasive tree species. (2) Selection of native species in water ecological remediation, in the principles of biological diversity, which is beneficial for construction of a stable ecosystem. (3) Selection of species that have significant effects on the improvement of the ecological system, to meet the requirements of water purification.	—	Design Unit	Province PMO, County PMO, Project owner, County EPB, Forestry Bureau, Water Bureau, County Sanitation

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Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
					Department
(4) Construction period					
Dredging	Surface water pollution; impacts on aquatic animals and plants; impacts of abandoned sludge on environment	<p>(1) Duchang County</p> <ul style="list-style-type: none"> • Dredging should be done in dry season. • The plan is to use a long-arm excavator to excavate the sediment after coffer dam building, water drainage, and sediment air dry up. • Try to reduce the temporary land occupation and carry out timely removal. • The sediments are directly transported to wasteland in Gulingshan'ao Wangdunxiang in closed vehicles. • Block is set around the Wangdunxiang Gulingshan'ao wasteland dumping site to reduce water and soil loss. • Sediment will be covered by soil and virescence after natural drying in Wangdunxiang Gulingshan'ao wasteland dumping site. <p>(2) Yugan County</p> <ul style="list-style-type: none"> • Dredging should be done in dry season. • Environmental cutter suction dredger, under water excavation is adopted; dredging sediment is used for woodland in Changgangling after centrifuge dehydration and drying treatment, water content of below 60%. The woodland area using sediments cannot be used for cultivation of vegetables, grain, and other crops. Block is set to reduce water and soil loss. • Try to reduce the temporary land occupation and carry out timely removal. • The temporary land should be rehabilitated after the construction. <p>(3) Fengxin County</p> <ul style="list-style-type: none"> • Dredging should be done in dry season. • Mechanical plus artificial dredging method is adopted. • Dredging sediment is used for woodlands in Changkeng Village, Huangxi Village, and Ganzhou Town after centrifuge dehydration and drying treatment, water content of below 60%. The woodland area using sediments cannot be used for cultivation of vegetables, 	1200	Construction Unit	Province PMO, County PMO, Project owner, County EPB, Water Bureau, County Sanitation Department

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Activities	Potential Impacts	Mitigation/Prevention Measures	Investment Estimate (1,000 Yuan)	Implemented by	Supervised by
		grain, and other crops. Block is set to reduce water and soil loss. <ul style="list-style-type: none"> • Try to reduce the temporary land occupation and make timely removal. The temporary land should be rehabilitated after the construction. 			
Lakeshore restoration	Water body pollution	(1) Construction materials field should be away from the surface water as far as possible, and the general materials temporary stacked near the water due to the engineering requirement must be covered and fenced up. (2) The waste oil and other solid waste in the construction are forbidden from being dumped or thrown into the water and should be promptly transported to the designated location.	400	Construction Unit	Province PMO, County PMO, Project owner, County EPB, Water Bureau, County Sanitation Department

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Annex 4. Summary of Sensitive Receptors

Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People
(1) Normal environmental sensitive point of reception							
Duchang County	Wastewater Pipeline Improvement Project	Construction period	Construction dust, construction machinery noise, and so on	Zhanghe Village	Upstream area of Zoujiazui Lake Basin, west side of wastewater pipeline	10	20 households
				Chengbeichuntian	Midstream area of Zoujiazui Lake Basin, both east and south side of the wastewater pipeline	70	200 households
				Dawanlv Village	Midstream area of Zoujiazui Lake Basin, both east and south side of the wastewater pipeline, north side of Wanli Avenue	10	180 households
				Xuzongshi Village	Midstream area of Zoujiazui Lake Basin, both south and east side of the wastewater pipeline	10	180 households
				Zhaoshengmian Village	Downstream area of Zoujiazui Lake Basin, west side of the wastewater pipeline	10	30 households
				Yangjianggang	Downstream area of Zoujiazui Lake Basin, west side of the wastewater pipeline	10	50 households
				Zoujiazui	Downstream area of Zoujiazui Lake Basin, west side of the wastewater pipeline	10	220 households
				Xiawanlvjia	Both the south and east side of Wanli Avenue	20	200 households
				Ruanlonggao Village	North side of Wanli Avenue	15	200 households
				Changlingzhou Village	South side of Wanli Avenue	20	100 households
				Huimin Neighbourhood	South side of Wanli Avenue	15	200 households
				Tongshu Village	Both the south and east side of Wanli Avenue	15	220 households
				Caojia Village	North side of Wanli Avenue	15	50 households

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Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People
				Yangguan Neighbourhood	South side of Yingbin Avenue	20	200 households
				Xianghuo Village	Northeast side of the Donghu Avenue, west side of the wastewater pipeline	15	150 households
				Shiqiaoshao Village	Northeast side of the Donghu Avenue, west side of the wastewater pipeline	15	100 households
				Shijihuating	Northeast side of the Donghu Avenue, north side of the wastewater pipeline	20	200 households
				Yingzuibanchen Village	Northeast side of the Donghu Avenue, east side of the wastewater pipeline	80	100 households
				Shenjia	Northeast side of the Donghu Avenue, north side of the wastewater pipeline	15	50 households
				Defujiayuan	Northwest side of the Donghu Avenue, north side of the wastewater pipeline	40	180 households
				Xiangyangsan Village	Northwest side of the Donghu Avenue, east side of the wastewater pipeline	15	80 households
	Water System Ecological Remediation and Protection Project	Construction period	Construction dust, construction machinery noise	Zhaoshengmian	West side of Zoujiazui water system	30	30 households
				Yyangjiagang	West side of Zoujiazui water system	30	50 households
				Zoujiazui	West side of Zoujiazui water system	15	220 households
				Shaojiazhe	East side of Zoujiazui water system	180	50 households
				Shao Village	East side of Zoujiazui water system	100	120 households
				Bajiazui	Northeast side of Zoujiazui water system	30	120 households
				Siguayan	East side of Zoujiazui water system	20	120 households
(2) Key environmental sensitive point of reception							
Wastewater Pipeline	Construction period	Construction dust,	Duchang County Central Kindergarten	Downstream area of Zoujiazui Lake Basin	10	In construction	

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Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People
	Improvement Project		construction machinery noise and so on.	Duchang Experimental Primary School	Downstream area of Zoujiazui Lake Basin, south side of wastewater pipeline	80	5,500 people
				Duchang Third Primary School	North side of Wanli Avenue	15	4,000 people
				Maternal and Child Health Care Hospital of Duchang County	North side of Wanli Avenue	15	262 people
				Qinjiafan Primary School	South side of Wanli Avenue	40	1,500 people
				Union Hospital	South side of Donghu Avenue	15	300 people
	Domestic Waste Collection And Transportation Project	Operation period	Odor of operation period	Bachuantang	East side of Beishanxiang waste transport station	200	10 households
				Yanggang Village	North side of Wangdunxiang waste transport station	70	3 households
				Matang Village	South side of Dashuxiang waste transport station	20	10 households
	Poyang County	1) Normal environmental sensitive point of reception					
Wastewater Treatment Station, Pipeline And Ecological Sewage Interception civil works		Construction period	Construction dust, construction machinery noise, and so on.	Zhongnao	East side of the village's wastewater treatment station	100	400 people
				Tangli	East side of the village's wastewater treatment station	120	700 people
				Yaoli Village	East side of the village's wastewater treatment station	100	450 people
				Miaozui Village	East side of the village's wastewater treatment station	100	460 people
				Caojiazui	East side of the village's wastewater treatment station	130	1,200 people
				Ligongnao Village	South side of the village's wastewater treatment station	100	650 people
				Dating Village	East side of the village's wastewater treatment station	110	400 people

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Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People
				Hujia Village	South side of the village's wastewater treatment station	120	1,300 people
				Zhaojia	East side of the village's wastewater treatment station	100	500 people
				Caojia	East side of the village's wastewater treatment station	120	1,500 people
				Zhoujai	East side of the village's wastewater treatment station	130	1,300 people
				Dukou	West side of the village's wastewater treatment station	100	600 people
				Luyitang (Tongxing)	East side of the village's wastewater treatment station	120	900 people
				Hengtouzui	East side of the village's wastewater treatment station	100	600 people
				Zhuyundun	East side of the village's wastewater treatment station	130	1,000 people
				Luye Village	East side of the village's wastewater treatment station	100	450 people
				Dazong	East side of the village's wastewater treatment station	110	300 people
				Huangbiquan	East side of the village's wastewater treatment station	130	1,000 people
				Hupen Village	East side of the village's wastewater treatment station	150	800 people
				Pantaozui	South side of the village's wastewater treatment station	150	800 people
				Chenli Village	South side of the village's wastewater treatment station	150	1,200 people
				Wangjia	East side of the village's wastewater treatment station	130	400 people
				Zhanjia	East side of the village's wastewater treatment station	120	900 people

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Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People
				Shengshan	East side of the village's wastewater treatment station	100	1,300 people
				Hushan	West side of the village's wastewater treatment station	120	300 people
				Bantangxu	West side of the village's wastewater treatment station	120	1,300 people
				Meihu	South side of the village's wastewater treatment station	100	300 people
				Shizishan	East side of the village's wastewater treatment station	120	200 people
				Gaohu	East side of the village's wastewater treatment station	100	200 people
				Jiangjia Village	East side of the village's wastewater treatment station	100	3,155 people
				Tangjia	West side of the village's wastewater treatment station	100	1,300 people
				Houfan	South side of the village's wastewater treatment station	100	500 people
				Jingtang Village/Qiangfan	East side of the village's wastewater treatment station	120	700 people
				Yujia	South side of the village's wastewater treatment station	100	700 people
				Maojia Village	South side of the village's wastewater treatment station	120	200 people
Yugan County	(1) Normal environmental sensitive point of reception						
	Pollution interception	Construction period	Construction dust, construction machinery noise and so on.	Pipazhou Neighbourhood	Northwest side of the old municipal administration bureau waste transport station	100	100 people
				Guankou Village	Pipeline works	20	250 people

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Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People
	Wastewater Pumping Station	Operation period	Noise	Pipazhou Neighbourhood	East side of the pumping station	100	100 households
Fengxin County	Pipeline works	(1) Normal environmental sensitive point of reception					
		Construction period	Construction period dust, construction period mechanical noise	Zhonghe Jiayuan	West side of Yingxing Avenue	30	130 households
				Bishui Jiayuan	West side of Yingxing Avenue	56	120 households
				Victoria Huating	North side of Tonghua Avenue	28	110 households
				Yage Chuntian	South side of Xisha Road	33	280 households
				Weixing Binjiang Huacheng	West side of Jiutiange Road	113	220 households
				Qingtian Residential Area	North side of Fengchuan Road	31	65 households
				Xinyuancheng	East side of Guangshi Road	82	50 households
				Longshan Neighbourhood	West side of Guangshi Road	14	90 households
				Zhongxian Heanlidu	East side of Longshan South Avenue	70	130 households
				Jinqiaomingju	East side of Nongmin Street	30	90 households
				Biyunhuayuan	North side of Shuyuan Road	47	135 households
				Wenxinjiayuan	North side of Shuyuan Road	40	190 households
				Xingguang Modern City	South side of Shuyuan Road	35	360 households
		Chi'an Town	Fuyun Street	15	60 households		
Operation period	Pumping station noise	Weixing Binjiahuacheng	North side of Jiutiange Electric Pumping Station for irrigation	80	220 households		
		Hengchang Huayuan	South side of Huangshagong Pumping Station for drainage	70	80 households		

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Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People
(2) Key environmental sensitive point of reception							
	Pipeline works	Construction period	Construction period dust, construction period mechanical noise	Fengchuan Second Primary School	South side of Fengchuan Road	90	1,800 people
				Fengxin County Third Middle School	North side of Longshan East Avenue	120	3,300 people
(1) Normal environmental sensitive point of reception							
Jing'an County	Pipeline works	Construction period	Construction dust, construction machinery noise	Liaohe Huayuan	North side of Hougang Road	50	100 households
				Minsheng Fuyuan	North side of Huancheng South Road	100	300 households
				Meilu Huayuan	West side of Shi Road	10	80 households
				Luoja Xincun	West side of Shi Road	100	100 households
				Financial Bureau Dormitory	East side of Shi Road	10	200 households
				Phoenix Garden	East side of Nangang Road	50	80 households
				Nanhong Neighbourhood	South side of Linongxiaoxiang 2	20	80 households
				Weilan Jiayuan	South side of Linongxiaoxiang 2	10	325 households
				Xinyuan Huayuan	Southeast side of Denggao Road	10	60 households
				Jinlingguoji	Southeast side of Denggao Road	10	200 households
				Qinghuayuan	South side of Baofen Avenue	10	10 households
				Rijing Huayuan	South side of Baofen Avenue	10	80 households
				Guiduxuan	South side of Baofen Avenue	50	20 households

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Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People	
				Haili Huating	South side of Baofen Avenue	200	50 households	
				Meilu Huating	South side of Baofen Avenue	10	135 households	
				Shuianyuyuan	South side of Baofen Avenue	30	245 households	
				Dianlixincun	East side of Shuangxi Avenue	20	300 households	
				Fund raising room Of National Tax Bureau	West side of Xuefu Avenue	20	20 households	
				Fengxi Huayuan	West side of Zian Road	20	20 households	
				Shuanglong Huayuan	West side of Zian Road	20	20 households	
				Public rental housing	West side of Zian Road	20	—	
				Nong 1, Nong 2 Resettlement Housing	West side of Zian Road	20	—	
	(2) Key environmental sensitive point of reception							
	Pipeline works	Construction period	Construction dust, construction machinery noise	Jing'an Vocational School	South side of Hougang Road	20	1,500 people	
				Jing'an Hospital Of Traditional Chinese Medicine	South side of Hougang Road	10	200 people	
				Jing'an County First Primary School	East side of Shi Road	10	700 people	
				Jing'an Third Middle School	East side of Yabei Road	10	400 people	
				Jing'an Middle School	North side of Xuefu Avenue	15	1000 people	
Jing'an Second Primary School				West side of the intersection of Xuefu Avenue and Chengbei Avenue	20	1000 people		
Jishui	(1) Normal environmental sensitive point of reception							

EXECUTIVE SUMMARY: Poyang Lake Basin Town Water Environment Management Project

Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People
County	Pipeline works	Construction period	Construction period dust, construction machinery noise	Shanshui Haocheng	West side of Wanli Avenue	18	1,000 households
				Yulongwang	West side of Wanli Avenue	155	1,800 households
				Xinchengyihao	East side of Wanli Avenue	10	250 households
				Jiyang Neighbourhood	South side of Tongshi Road	20	550 households
				Hanwenyuan Neighbourhood	East side of Yongji Road	18	500 households
				Chengshi Huayuan Neighbourhood	West side of Huayuan Road	13	420 households
				Shidaishangmao Neighbourhood	East side of Wenmingbei Road	117	150 households
				Wenshui Neighbourhood	East side of Wenmingbei Road	17	170 households
				Hanlinyuan Neighbourhood	West side of Longhua Middle Avenue	23	40 households
				Tianchengyipin Neighbourhood	East side of Longhua Middle Avenue	99	500 households
				Shiyang Neighbourhood	West side of Longhua Middle Avenue	13	85 households
				Qinzhang Huayuan	East side of Longhua Middle Avenue	72	170 households
				Yangmingyuan Neighbourhood	South side of Wenhudong Road	13	80 households
				Longfu Yuan Neighbourhood	North side of Wenjiao Road	9	120 households
				Xinlongyuan Neighbourhood	South side of Wenfengdong Avenue	58	70 households
				Binjiang International City	East side of Wenfengdong Avenue	17	800 households
Boshi Yuan	North side of Shuinan Road	18	130 households				
Pumping	Operation	Equipment	Shuinanbei Village	West side of Enjiang Bridge Wastewater	30	20 households	

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Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People	
	station	period	noise		Pumping Station			
				Wenshui Village	Northeast side of Xiaojiangkou Wastewater Pumping Station	20	30 households	
				Enjiangbeiroad North Neighbourhoods	North side of Enjiangbei Road Wastewater Pumping Station	130	35 households	
	(2) Key environmental sensitive point of reception							
	Pipeline works	Construction period	Construction period dust, construction machinery noise	Jishui County People's Hospital	East side of Wanli Avenue	186	500 people	
				Jishui County Siyuan Experimental School	East side of Wanli Avenue	107	4,775 people	
				Jishui Jinshi School	North side of Tongshi Road	10	4,157 people	
				Jishui Aimin Hospital	North side of Wenshui Avenue	14	200 people	
				Jishui County Central Kindergarten	East side of Wenming South Road	17	200 people	
				Jishui County Maternal And Child Health Care Hospital	South side of Renwen Road	17	400 people	
				Jishui Third Middle School	West side of Longhua Middle Avenue	14	3,650 people	
				Jinggangshan Economic And Trade School	East side of Longhua Middle Avenue	12	1,700 people	
				Jishui Hospital Of Traditional Chinese Medicine	North side of Wenhua East Road	29	300 people	
				Chengdong Primary School	South side of Wenhua East Road	124	300 people	
Jishui County Second Middle School				North side of Wenhua East Road	99	3,300 people		
Jishui Third Middle School	South side of Wenhua East Road	170	3,650 people					
Wenfeng Primary School	West side of the Wenfeng Middle Avenue	10	1,500 people					

EXECUTIVE SUMMARY: Poyang Lake Basin Town Water Environment Management Project

Subproject Involved	Project's Contents	Impact Period	Impact Factor	Sensitive Point of Reception	Location	Distance (m)	Households/ People
				Jishui County Experimental Primary School	South side of Wenjiao Road	20	3,000 people
				Jishui Fourth Middle School	Southwest side of Shuinan Road	48	1,555 people
				Jishui Middle School	East side of Wenshan Avenue	32	4,300 people
				Wenfeng Health Center	West side of Wenshan Avenue	10	20 people