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Zhejiang Rural Water Supply and Sanitaion Project

Consolidated EIA Report

Zhejiang Huanke Environmental Consultancy Co., Ltd.

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1 Introduction

1.1 Background

Zhejiang Province locates on the south wing of Yangtze River Delta in the southeast coastal region in China, facing the East China Sea in east, contacting Fujian in south, connecting with Anhui and Jiangxi in west and bordering on Shanghai and Jiangsu in north. Both the east-west and the south-north linear distance of Zhejiang Province are about 450km and covering a land area of 101,800 sq.km, which accounts for 1.06% of overall national territorial area, and is one of China' smallest provinces as for area. By the end of 2011, the urbanization rate of the entire Zhejiang Province reached 62.3%, which is 11% higher compared with the national average of 51.27%.

Zhejiang is complicated in terrain with 70.4% for mountains and hills, 23.2% for plain and basin, 6.4% for rivers and lakes, and 2,081,700 hectares of agricultural acreage; therefore, there is a saying of "70% of hills, 10% of waters and 20% of farmlands". The terrain is inclined from the southwest to northeast, and basically divided into Northern Plain of Zhejiang, Western Zhejiang Hill, Eastern Zhejiang Hill, Central Jinqu Basin, South Zhejiang Mountain, Southeast Coastal Plains and Coastal Islands. There are eight river systems as Qiantang River, Ou River, Lingjiang River, Tiaoxi Stream, Yong River, Feiyun River, Aojiang River and Beijing-Hangzhou Canal (Zhejiang section) in the province.

At the beginning of 2005, provincial Party committee and provincial government in Zhejiang issued *the Essentials on Balancing Urban-rural Development and Promoting Urban-rural Integration in Zhejiang Province*, where it points out that the social and economical growth in Zhejiang is undergoing a critical period with economic growth style transition, economic reshuffling and social structural transformation and the method is crucial considering how to rapidly promote the process of industrialization, urbanization and marketization and to solve the problems in rural area with relatively weak foundation, hysteretic development and increased pressure on increment. Balancing urban and rural development and promoting urban and rural integration are to uniformly plan and prepare rural-urban economy and society growth, destroy the urban-rural dual structure, integrate all initiatives about industrialization, urbanization and agricultural and rural modernization, put effort into problem resolving about "agriculture, rural area and farmers", shorten rural-urban difference, give full play to the leading role of the urban to the rural, as well as the supporting role of the latter to the former, and realize complementary and harmonious development, as well as common prosperity. Many counties and cities in Zhejiang have executed various material and substantial projects including rural-urban integration of water supply.

In June, 2010, it has witnessed the opening of the Seventh Plenary Session of the Twelfth Central Committee of Zhejiang Provincial Party Committee, where, on the basis of the strategic requirements on ecological civilization construction raised in the 17th CPC National Congress, it comprehensively analyzed the situation and tasks, seriously concluded construction experiences about ecological province and initiatively issued the Decisions about *Promoting the Construction of Ecological Civilization in China*, proposing to insist on the eco-province construction plan, adhere to the road of ecologically developing the province, make an ecological Zhejiang with "prosperity, beauty, harmony and health" and strive to be a

demonstration zone of national ecological civilization, which, as a result, indicates directions to harmonize economical and social growth and environmental protection from a higher level. In the very same year, in order to coordinate rural-urban development, Zhejiang Province put forward to build beautiful villages and dedicatedly formulated *the Action Planning of the Construction of Zhejiang's Beautiful Villages (2011 - 2015),* according to which, the Province will strive to build beautiful villages with scientific planning layout, clean and tidy environment, increased business and incomes and civilized mind and body, that are appropriate for living, businesses and tourism. By 2015, the Province aims for realizing overall job requirements on the construction of beautiful villages in about 70% of all counties, cities and districts, launching the beautiful villages' construction plan in more than 60% villages and towns and accomplishing domestic wastewater treatment project in over 70% of rural areas.

Through years of effort, our province has implemented the project of "Thousands of villages for demonstration, and ten thousands of villages for renovation" and boosted the construction of beautiful village, which have entered a new stage. At present, comprehensive treatment on rural domestic sewage is not only the depth extension of beautiful rural construction but the topic of improving the level of beautiful rural construction. The vast rural areas are the depth backland of cities of the whole province, and the main source of river water. Rural domestic sewage is many in sites, large in quantity, wide in influence surface, complicated in treating condition, and weak in treatment basis, so they are the key and difficult points of water environment comprehensive treatment of the whole province.

Zhejiang is famous for water, beautiful for water and prosperous for water. Water is the source of life and the source of Zhejiang. As a coastal developed area, Zhejiang has developed its economy, but bears a huge pressure in water environment. With the rapid growth of the economy and the consistent promotion of urbanization in Zhejiang Province, it is increasingly obvious that it is facing insufficient resource and environmental carrying capacity, as well as expanded pressure on pollutants discharge reduction, especially in the vast rural areas, where, with seriously lagging sewage treatment systems, the overall ecological and environmental quality and the production and living quality have been influenced. To accelerate domestic sewage treatment facilities establishment, improve water environment quality and perfect public service level in the rural. To this end, the provincial government of Zhejiang plans to borrow a loan which is worthy USD 200million from the World Bank and apply domestic funds of about USD 200million to carry out the rural sewage treatment program with a total investment of approximant RMB 2.46324 billion in four counties with critical ecological functions and locations, i.e. the AnJi County in the northwestern mountainous region in Taihu Lake Basin, the Fuyang City in Hangzhou suburb and the lower reaches of the Qiantang River, the Tiantai County in the eastern mountainous region of Zhejiang and the upper reaches of Jiaojiang River and the Longquan City in southern mountainous region of Zhejiang and the upper reaches of Ou River, so as to boost new rural development, strengthen sustainable development and improve people's living standards of small towns and the rural area in these four counties in Zhejiang Province.

1.2 Overview of Zhejiang Rural Sewage Treatment System Using World Bank

Loan

1.2.1 Overview

Taking use of the World Bank loan, the rural domestic sewage treatment system and drinking water engineering in Zhejiang Province covers four counties, i.e. the AnJi County, the Fuyang City, the Tiantai County and the Longquan City, including the perfection project of water supply and drainage in market towns, the treatment of decentralized wastewater and the improvement project of the wastewater collection network. 28 subprojects are included.

Totally eight subprojects will be performed in AnJi County, including the perfection of joint water supply and drainage facilities in rural areas in six regions, including Tianzihu Town (9 villages), Meixi Town (19 villages), Tianhuangping Town (11 villages), Banshan Town (10 villages), Xiaofeng Town (18 villages and 3 communities) and the expansion of urban sewage plants (4 villages, 13 communities and rural areas in Xiaofeng Town and Tianhuangping Town). The first package batch of rural sewage treatment project covering 19 decentralized villages and the second package radiating 15 villages. In total, 105 villages are considered. Owner of the project is AnJi Guoyuan Water Co., Ltd and operations taken in the later period is also performed by the same company. See Table 1.2-1 for details.

The total number of subprojects to be performed in Fuyang Area is 9, consisting of the Fuyang sewage treatment project Phase IV, the construction project of joint water supply and drainage facilities in four rural market towns, i.e. Xindeng Town, Dayuan Town, Changkou Town and Longyang Town, two packaged sewage treatment projects in 19 decentralized villages and two packaged sewage interruption pipeline construction projects in 41 villages. Totally 84 villages are covered by the project: 19 decentralized villages, 41 ones in the sewage interruption pipeline construction project and 24 ones in joint rural market towns. The Owner of the project is Fuyang Water Group Company and operations and maintenances to be taken in the later period are also performed by the same company. See Table 1.2-2 for details.

The Tiantai Area has five subprojects totally, including perfection projects of water supply and drainage system for villages respectively in the north central section, the eastern section and the western section of Tiantai Basin, as well as the packaged sewage treatment project in 49 decentralized villages constructed in the Phase II project. The Owner of the project is Tiantai Water Supply Company and operations to be taken in the later period are also performed by the same company. See Table 1.2-3 for details.

Nine subprojects in total are to be executed in Longquan, including the perfection project of water supply and drainage infrastructure of urban areas, the improvement project of lanes and alleys of urban areas, the perfection project of connection water supply and drainage infrastructure in An’ren, Badu, Xiaomei, Lanju and Zhatian villages, and two rural sewage treatment projects constructed in two phases. Totally 100 villages are considered. Owner of the project is Longquan Township Water-supply Station and Longquan Water-supply and Drainage Co., Ltd and operations and maintenances to be taken in the later period are also performed by these two same units. See Table 1.2-4 for details.

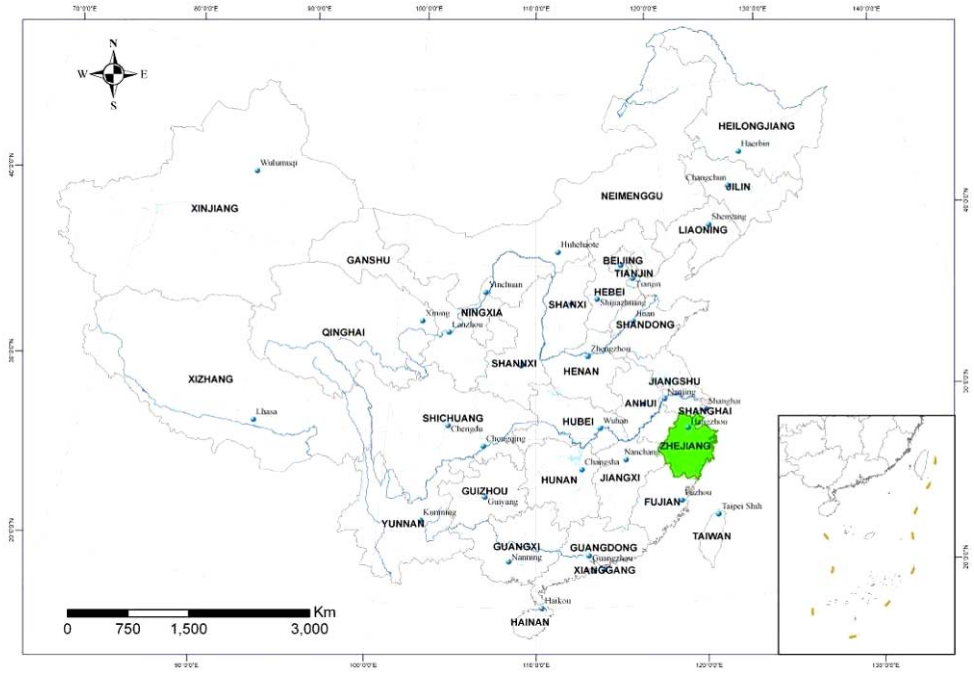


Figure 1.2-1 Location of Zhejiang Province in China

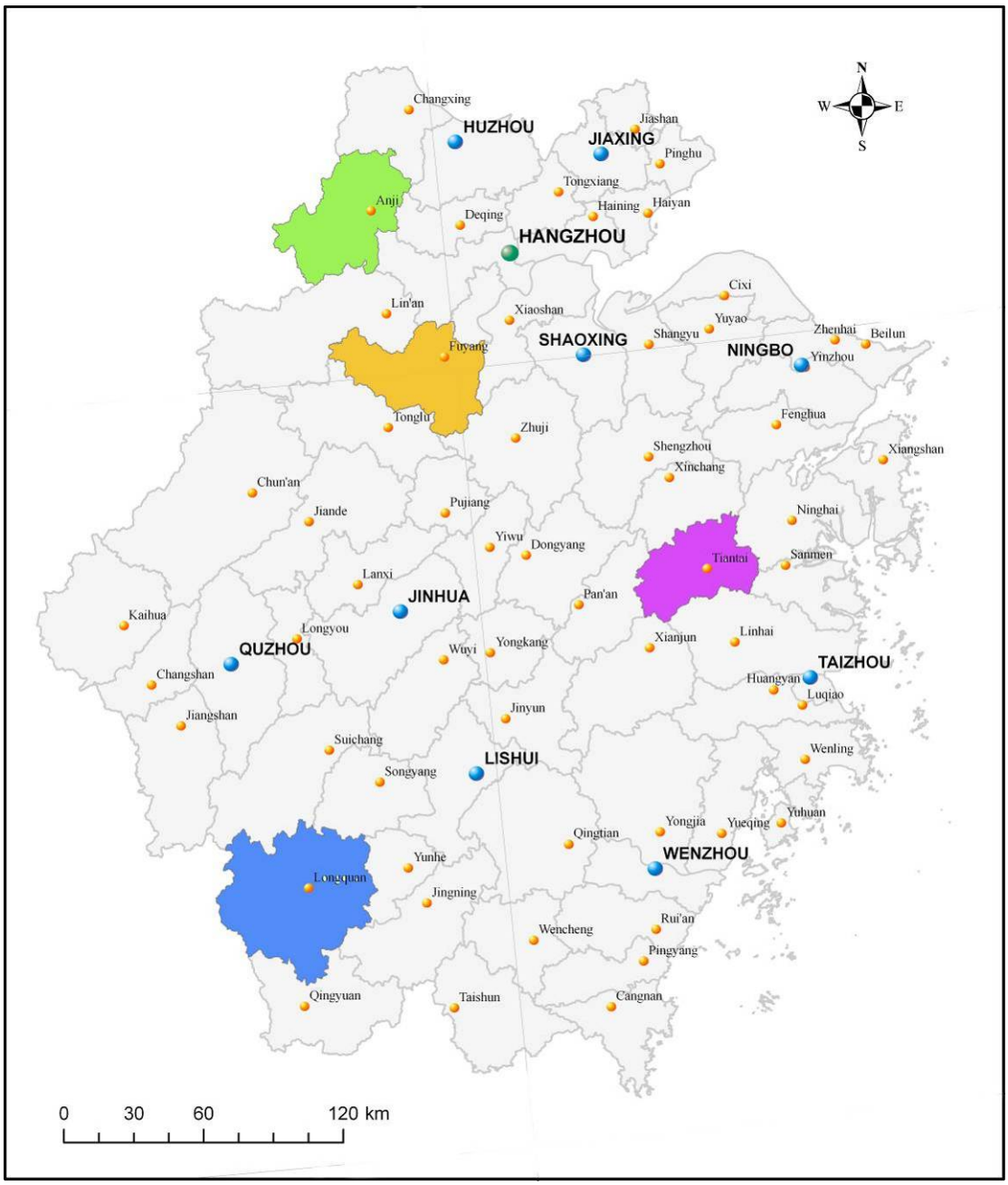


Figure 1.2-2 Location of the Four Related Counties and Cities in the Project in Zhejiang Province

Table 1.2-1 Subproject Overview in AnJi Area

Subproject No.	Subproject Name	Phase	Engineering Constitution	Construction Unit	Operation and Maintenance Unit
A1	The Perfection Project of Water Supply and Drainage infrastructures in Tianzihu Area	Long List	(1) Newly-built water distribution pipelines: 14km, branch pipes for water supply inside the villages: 21km, newly-constructed sewage pipe network: 18km; branch pipes for drainage inside the villages: 27km; (2) Implement drinking water engineering in four natural villages, which will improve regional centralized water supply popularizing rate. Improve and expand the old pipe network in the region. (3) Sewage produced by the nearby 14 natural villages will be discharged into the Tianzihu Sewage Treatment Station through sewage line primarily, in association with decentralized processing.	AnJi Guoyuan Water Co., Ltd.	AnJi Guoyuan Water Co., Ltd.
A2	Perfection Project of Water Supply and Drainage Facilities in Meixi Area	Short List	(1) Gaoyu water plants will be expanded from 20,000m^3/d to 45,000m^3/d, 5000m^3/d West Road water supply booster pump station and 38km water distribution pipelines will be newly built, and 3 natural villages will perfect their water supply pipeline. (2) 32km of sewage pipe network will be newly built, 7 natural villages will implement sewage pipeline connected to each family project at the same time. Meixi Sewage Plants will be expanded from 10,000m^3/d to 20,000m^3/d;	AnJi Guoyuan Water Co., Ltd.	AnJi Guoyuan Water Co., Ltd.
A3	The Perfection Project of Water Supply and Drainage Facilities in Tianhuangping Area	Short List	(1) The newly-built Tianhuagntan booster pump station for water supply will cover 13,000m^3/d; 23km of water distribution pipelines will be newly constructed; 2 natural villages will perfect water supply pipelines; (2) The newly-built sewage pump station will cover 5500m^3/d, 47km of water drainage pipeline will be newly built, and 47 natural villages will implement sewage pipeline connected to each family project at the same time.	AnJi Guoyuan Water Co., Ltd.	AnJi Guoyuan Water Co., Ltd.
A4	Perfection Project of Water Supply and Drainage Facilities in Banshan Area	Short List	(1) The raw water pipeline of the newly-built Banshan water treatment plant is 16km; the newly-built Banshan water treatment plant covers an area of 20,000m^3/d; the newly-built distribution pipes are 12km long; Xiaoyuan Village perfects the village water supply pipeline. (2) The newly-built water drainage pipeline is 14km, and 16 natural villages/communities will implement sewage pipeline connected to each family project at the same time.	AnJi Guoyuan Water Co., Ltd.	AnJi Guoyuan Water Co., Ltd.
A5	Perfection project of water supply and drainage facilities in Xiaofeng	Long List	(1) The newly-built water supply and distribution pipe is 47km in length; Jianshan Village perfects the village water supply pipeline. (2) The newly-built water drainage pipeline is 47km, and 66 natural villages will implement sewage pipeline connected to each family project at the same time.	AnJi Guoyuan Water Co., Ltd.	AnJi Guoyuan Water Co., Ltd.
A6	Expansion Project of AnJi Urban Sewage Disposal Plant	Long List	(1) The newly-built water supply and distribution pipe is 11km in length;; (2) The newly-built water drainage pipeline is 29km, and 8 natural villages will implement sewage pipeline connected to each family project.; the Sewage Disposal Plant in AnJi will be expanded from 30,000m^3/d to 50,000m^3/d; and the current 30,000m^3/d will be renovated.	AnJi Guoyuan Water Co., Ltd.	AnJi Guoyuan Water Co., Ltd.
A7	Sewage Disposal System for Decentralized Villages in AnJi County (refer to the List of Villages for details)	Short List	50 natural villages under 19 administrative villages will implement decentralized sewage collection and treatment project.	AnJi Guoyuan Water Co., Ltd.	AnJi Guoyuan Water Co., Ltd.
A8	A8: Sewage Disposal System for Decentralized Villages in AnJi County	Long List	47 natural villages under 15 administrative villages will implement decentralized sewage collection and treatment project.	AnJi Guoyuan Water Co., Ltd.	AnJi Guoyuan Water Co., Ltd.

Table 1.2-2: Subproject Overview in Fuyang Area

Subproject No.	Subproject Name	Phase	Engineering Constitution	Construction Unit	Operation and Maintenance Unit
F1	The Fuyang City Sewage Treatment Project Phase IV	Short List	(1) The Fuyang Sewage Disposal Plant will be reconstructed from the current Class 1B 80,000 m³/d to the Class 1A 60,000m³/d; (2) It will be expanded to 80,000 t/d, with the yielding water reaching the Class 1A standards.	Fuyang Water Group Company	Fuyang Water Group Company
F2	Perfection project of joint for Water Supply and Drainage Pipeline Modification Project	Short List	(1) Rebuild 43km branch lines (2) Rebuild and expand 52.4km sewage pipe and 1.6km rain pipe (3) Implement water supply service and sewage supply in 12 villages	Fuyang Water Group Company	Fuyang Water Group Company
F3	Fuyang City Longyang Sewage Disposal Project	Long List	(1) The newly-built sewage collection is 13.7km in length; (2) The newly-built 1000t/d sewage treatment station is with yielding water of Class 1 Standard. (3) Implement project to collect the sewage pipe to each family in Wanshi and Dongqiao Village.	Fuyang Water Group Company	Fuyang Water Group Company
F4	Perfection Project of joint for Water Supply and Drainage Pipeline Modification Project	Short List	(1) Rebuild 16.5km branch lines (2) Rebuild and expand 32km sewage pipe system (3) Implement water supply service and sewage supply in 9 villages,such as Dayuanting Mountain,etc.	Fuyang Water Group Company	Fuyang Water Group Company
F5	Perfection Project of joint for Water Supply and Drainage Pipeline Modification Project	Long List	(1) Rebuild 10.13km branch lines (2) Rebuild and expand 15.55km sewage pipe system	Fuyang Water Group Company	Fuyang Water Group Company
F6	Sewage Interruption Pipeline Construction Project in Rural Areas in Fuyang (The first batch)	Short List	Sewage collection pipe network in 18 villages	Fuyang Water Group Company	Fuyang Water Group Company
F7	Sewage Interruption Pipeline Construction Project in Rural Areas in Fuyang (The second batch)	Long List	Sewage collection pipe network in 20 villages	Fuyang Water Group Company	Fuyang Water Group Company
F8	Sewage Disposal Project in Decentralized Villages in Fuyang (The first batch)	Short List	Sewage collection pipe network in 6 central villages	Fuyang Water Group Company	Fuyang Water Group Company
F9	Sewage Disposal Project in Decentralized Villages in Fuyang (The second batch)	Long List	13 natural villages under 6 administrative villages will implement sewage collection and treatment.	Fuyang Water Group Company	Fuyang Water Group Company

Table 1.2-3 Subproject Overview of Tiantai Area

Subproject No.	Subproject Name	Phase	Engineering Constitution	Construction Unit	Operation and Maintenance Unit
T1	T1: Perfection Project of Water Supply and Drainage System for Rural Area in the North Central Section of Tiantai Basin	Short List	(1) Perfect the sewage collection system (along three streets) in urban areas. The newly built trunk sewers are 20.5km in length; (2) Construct the domestic sewage pipe network system of 31 administrative villages	Tiantai Water Supply Company	Tiantai Water Supply Company
T2	T2: Perfection Project of Water Supply and Drainage System for Rural Area in Eastern Section of Tiantai Basin	Long List	(1) Cangshan Sewage Disposal Plant will be newly built with the design size being 5000t/d; as well as arterial drainage. The newly built trunk sewers are 10.5km in length; (2) Install domestic sewage pipe network for 35 villages. (57 natural villages).	Tiantai Water Supply Company	Tiantai Water Supply Company
T3	T2: Perfection project of water supply and drainage system for villages in western section of Tiantai Basin	Long List	(1) 8.6km trunk sewer from Jietou Town to Pingqiao Town and one 2000t/d lifting pump station will be erected; (2) Construct the domestic sewage pipe network system of 42 administrative villages (64 natural villages). (3) Connect the main water supply pipes of the village with that within the village.	Tiantai Water Supply Company	Tiantai Water Supply Company
T4	T4: Perfection Project of Water Supply and Drainage System for Decentralized Villages in Tiantai Basin (Short List)	Short List	Construct the domestic sewage pipe network system of 14 administrative villages (27 natural villages).	Tiantai Water Supply Company	Tiantai Water Supply Company
T5	T5: Perfection Project of Water Supply and Drainage System for Decentralized Villages in Tiantai Basin (Long List)	Long List	Construct the domestic sewage pipe network system of 43 administrative villages (77 natural villages).	Tiantai Water Supply Company	Tiantai Water Supply Company

Table 1.2-4: Subproject Overview in Longquan Area

Subproject No.	Subproject Name	Phase	Engineering Constitution	Construction Unit	Operation and Maintenance Unit
L1	Perfection Project of Water Supply and Drainage Facilities for Urban Areas in Longquan	Short List	(1) The Nandayang Water Plant is expanded from 30,000m3/t to 50,000m3/d and the supporting pipelines for water supply is 3.91km long; (2) Construct water supply network off 3.91km, sewage collection pipeline of 4.43km and rain drainage pipeline of 4.11km in the east district of the city;	Longquan Water Supply and Drainage Company	Longquan Water Supply and Drainage Company
L2	Perfection Project of Rural Connected Water Supply and Drainage Facilities in Zhatian Town	Long List	(1) Newly-built raw water pipeline 2.65km, 300m^3/d water supply plant and water distribution and supply pipeline of 5.6km; (2) Newly-built 500m^3/d sewage treatment station and 15.4km sewage collection network; (3) Serve Zhayi Village, Zhaer Village, Zhasan Village, Xixi Village, Xiawei Village, Xikou Village, Chenshan Village, Donghuang Village and other villages.	Longquan Water Supply and Drainage Company	Longquan Township Water Supply Station
L3	Perfection Project of Rural Connected Water Supply and Drainage Facilities in Xiaomei Town	Short List	(1) Newly-built Xiaomei 3000m^3/d; newly-built raw water pipeline 3.65km, Xiaomei water distribution pipeline 7.75km; (2) Newly-built Xiaomei sewage treatment station 600m^3/d; newly-built water drainage pipeline 8.55m; (3) Serve Meiyi Village, Meier Village, Meisan Village, Meisi Village, Luozhuang Village, Huangnan Village, Maoshantou Village and other villages.	Longquan Township Water Supply Station	Longquan Township Water Supply Station
L4	Perfection Project of Rural Connected Water Supply and Drainage Facilities in Lanju Village	Long List	(1) Newly-built raw water pipeline 1.7km, 3000m^3/d water supply plant, and water distribution pipeline 8.1km; (2) Newly-built 500m^3/d sewage treatment station and 12.9km sewage collection network; (3) Serve Yuzhang Village, Dawang Village, Wumeiyang Village, Mifengling Village, Meiyang Village, Daju Village and Tongshan Village.	Longquan Township Water Supply Station	Longquan Township Water Supply Station
L5	The First Batch of Sewage Disposal Project in Decentralized Villages in Longquan	Short List	Sewage collection and disposal project will be performed in 14 decentralized villages	Longquan Township Water Supply Station	Longquan Township Water Supply Station
L6	The Second Batch of Sewage Disposal Project in Decentralized Villages in Longquan	Long List	Sewage collection and disposal project will be performed in 78 decentralized villages	Longquan Township Water Supply Station	Longquan Township Water Supply Station

1.7	Distributed Rural Sewage Treatment Project in Longquan	Short LIst	Perfect the water supply and drainage facilities in Hecun, Songqu, Xiaohuangnan, Shuita, Dasai, Jibian and Shagnwu.	Longquan Township Water Supply Station	Longquan Township Water Supply Station
1.8	Distributed Rural Sewage Treatment Project in Longquan	Long List	Perfect water supply and drainage facilities in 63 distributed villages.	Longquan Water Supply and Drainage Company	Longquan Township Water Supply Station
1.9	Lane and Alley Projects in Longquan	Short List	Perfect the water supply and drainage project in 124 places of lanes and alleys.	Longquan Water Supply and Drainage Company	Longquan Construction Bureau

1.2.2 Source of fund

Gross investment of this investment is about RMB 2.46324 billion, including a loan worth USD 200 million from the World Bank and other supporting funds of each county (city).

The Project is implemented in two stages: the first stage includes 16 subprojects in four counties (cities), namely the short list projects in the Report; the second stage is framework project. The long list projects listed in the Report are the projects finishing environmental impact assessment in this stage; if the projects change in the future, relevant security policy shall be implemented according to the framework documents.

The first stage includes 16 subprojects in four counties (cities); the gross investment is RMB 1,162.13 million, including a loan of USD 95.39 million from the World Bank.

The second stage is framework project; the gross investment is RMB 1,267.11 million, including a loan of USD 99.61 million from the World Bank.

1.3 Basis of Compilation

1.3.1 Laws, Regulations and Rules

(1) *Environmental Protection Law of the People's Republic of China* (December, 1989);
(2) *Law of the People's Republic of China on Prevention and Control of Water Pollution* (February, 2008 Revision);
(3) *Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution* (September, 2000);
(4) *Law of the People's Republic of China on Prevention and Control of Pollution from Environmental Noise* (October, 1996);
(5) *Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste* (April, 2005);
(6) *Law of the People's Republic of China on Environment Impact Assessment* (October, 2003);
(7) *Land Administration Law of the People's Republic of China* (October, 1998);
(8) *Law of the People's Republic of China on Water and Soil Conservation* (March 1, 2011);
(9) *Highway Law of the People's Republic of China* (July, 1997);
(10) *Law of the People's Republic of China on the Protection of Wildlife* (August, 2004);
(11) *Regulations of the People's Republic of China on Wild Plants Protection* (September, 1996);
(12) *Regulations on the Protection of Basic Farmland,* No. 257 Decree by the State Council (December, 1998);

(13) *Regulations on the Administration of Construction Project Environmental Protection* (No. 253 Decree by State Council);
(14) *Catalogue for the Classified Administration of Environmental Impact Assessment for Construction Projects* by the Ministry of Environmental Protection, October, 2008;
(15) *The Decision of the State Council on Implementing the Scientific Development Perspective to Strengthen Environmental Protection* (February, 2006, GF [2005] No. 39)
(16) *Provisional Measures on Public Participation in Environmental Impact Assessment*, State Environmental Protection Administration, February, 2006;
(17) *Notifications on Further Strengthening Environmental Impacts Assessment Management and Prevent Environmental Risks* (Ministry of Environment Protection [2012, No. 77]), July 3, 2012;
(18) *Notifications on Practically Strengthening the Management of Risks Prevention and Strict Environmental Impacts Assessment* (HF [2012, No. 98]), August 8, 2012;
(19) *Management Methods on Environmental Protection of Construction Projects in Zhejiang Province*, October 25, 2011;
(20) Regulations for the Control of Air Pollution in Zhejiang Province, September 1, 2003;
(21) *Regulations on Prevention and Control of Solid Waste Pollution in Zhejiang Province*, June 1, 2006;
(22) *Management Methods on the Supervision of Environmental Pollution in Zhejiang Province*, July 13, 2006;
(23) *Notifications on Further Strengthening Pollutants Discharge Reduction Works by the People's Government* of Zhejiang Province (ZHF [2007] No.34), June, 11, 2007;
(24) *Management Methods on Emission Reduction of Total Amount of Main Pollutants in Zhejiang Province (on trial)* (ZHF [2007] No.57), June, 26, 2008;
(25) *Implementation Opinions on Practically Strengthening the Participation of the Public in Environmental Impact Assessment of Construction Projects* (ZHF [2008] No.55), November 6, 2008;
(26) *Notifications on Further Strengthening the Management of Environmental Impact Assessment* (ZHF [2007] No.11), February 14, 2007;
(27) *Several Opinions from the General Office of People's Government of Zhejiang Province on the Further Perfection of the Examination and Approval Systems of Environmental Impact Assessment* (ZZBF [2008] No. 59), September 16, 2009;
(28) *Notifications on Further Specify the Environmental Supervision Works of Construction Projects* (ZHF [2009] NO. 80), November 18, 2009;
(29) *Management Methods on Key Ecological Public-welfare Forests in Zhejiang Province (on trail)* (January 18, 2005);
(30) The Notification to Print and Publish *Implementation Plans for Experimental Works of Environmental Supervision of Construction Project in Zhejiang Province* (ZHF [2012] No. 41), May 10, 2012.

1.3.2 Security Policies of World Bank and Conditions Involved

Securities Policies of World Bank	Does it involve?	Introduction
Environmental Assessment	Yes	Environmental Impact Assessment is of Class B.

(OP, BP and GP4.01)		
Natural Habitat (OP/BP4.04)	No	As for project construction that will be executed in villages and accumulation areas in market towns, where human activities are frequent, with relatively sufficient natural interference, no endangered and rare species are found.
Cultural Heritage Protection (OP4.11)	No	No cultural relic protection site exists within the scope of the project construction, but *the Disposal Procedure in case of Cultural Relics Discovery* shall be applied.
Involuntary Inhabitant Resettlement (OP/BP4.12)	Yes	The immigration action plan and social evaluation of the project are formulated and compiled by Hehai University.
Dam Safety (OP/BP4.37)	Yes	The project construction in AnJi County and Longquan City includes the rebuilding and expanding of existed water plant and the water supply of newly-built water plants. Nine reservoirs and dams in the water resource are involved, including four in AnJi City and five in Longquan City, meeting the dam security assurance policy OP4.37 of World Bank. Dam security has been finished by security specialists employed by World Bank.
Ethnic Minorities (0P4.10)	No	Project construction does not involve ethnic minorities.
Diseases and Pests Management (GP4.09)	No	
Forestry (OP/GP4.36)	No	
Projects at Disputed Regions (OP/BP/GP7.60)	No	
Projects on International Waterways (OP/BP/GP7.50)	No	

1.3.3 Main technical specifications, technical standards and technical materials

(1) T*echnical Guide for Environmental Impact Assessment* (General Principles), HJ2.1-2011;
(2) T*echnical Guide for Environmental Impact Assessment* (Acoustic Environment), HJ2.4-2009;
(3) *Technical Guide for Environmental Impact Assessment* (Atmospheric Environment), HJ2.2-2008;
(4) *Technical Guide for Environmental Impact Assessment* (Surface Water Environment) HJ/T 2.3-93;
(5) *Technical Guide for Environmental Impact Assessment* (Ground Water Environment) HJ610-2011;
(6) *Technical Guide for Environmental Impact Assessment* (Ecological Environment), HJ19-2011;
(7) *Technical Guide for Environmental Risk Assessment on Construction Project* (HJ/T169-2004);
(8) *Technical Specifications to Determinate the Suitable Areas for Environmental Noise of Urban Area*, GB/T15190-94;
(9) *Technical Methods for Making Local Emission Standard of Air Pollutants* (GB/T13201-91), 1991;
(10) *The Notification on Printing and Publishing Policies of Urban Sewage*

Disposal and Pollution Prevention and Control Technologies (JC [2000] No.124 document by MOC, SEPA, MOST, etc.), June, 2000;
(11) *Classification Scheme of the Water Environment Functional Areas at the Water Functional Areas in Zhejiang Province*, by Zhejiang Water Resources Department and Environmental Protection Bureau, April, 2006;
(12) Project Construction and Investment Guideline for Rural Drinking Water Source Environment Protection, by Environmental Protection Bureau;
(13) Guidelines on Project Construction and Investment for Rural Sewage Treatment, by Ministry of Environmental Protection;

1.3.4 Project file

(1) Zhejiang Rural Domestic Sewage Treatment System and Drinking Water Project in Using World Bank Loan-Feasibility Study Report of Subproject of Tiantai Area, Feasibility Study Report of Subproject of AnJi Area, Feasibility Study Report of Subproject of Fuyang Area, and Feasibility Study Report of Subproject of Longquan Area; Architectural Design & Research Institute of Ningbo University, Xicheng Architecture Design Institute of Zhejiang Province, Urban and Rural Planning and Design Institute of Zhejiang Province, etc.;

(2) Overall Report of Zhejiang Rural Domestic Sewage Treatment System and Drinking Water Project on Environmental Influence in Using World Bank Loan, Hydro China Huadong Engineering Corporation and Zhejiang Prov. Development Planning & Research Institute;

(3) Environmental impact report and environmental management plan of the subprojects.

1.4 Environmental Impact Assessment

1.4.1 Preparation of Environmental Impact Report

Based on the requirements of *Law of the People's Republic of China on Environmental Impact Assessment, Regulations on the Administration of Environmental Protection of Construction Projects* (Order No. 253 of the State Council), Notification on *Enhancing the Management of Environmental Impact Assessment on IFC Loan Construction Projects* (HJ No.: [324] File) and *Manipulation Policy of EA (OP4.01)* of World Bank, the Environmental Impact Assessment (EIA) report of various subprojects is prepared and completed by Zhejiang Huanke Environmental Consulting Co., Ltd., Zhejiang Sunda Environmental Protection Co., Ltd. and Zhejiang Bohua Environmental Technology&Engineering Co., Ltd. Based on the EIA report of various subprojects, Zhejiang Huanke Environmental Consulting Co., Ltd. complies and completes the *Overall Report of Zhejiang Rural Domestic Sewage Treatment System and Drinking Water Project on Environmental Influence in Using World Bank Loan* and the environmental management plan. *Environmental Impact Report* and the *Overall Report* of all subprojects are submitted to the assessment team of World Bank for review. Completion status of *Environmental Impact Report* of various subprojects is shown in Table 1.4-1.

Table 1.4-1 Completion Status of Environmental Impact Statement of Various Subprojects

No	Project Name	Environmental Impact Assessment Unit	Environmental Impact Assessment Qualification	Remarks
	Subproject of AnJi area			
A1	The Perfection Project of Water Supply and Drainage Facilities in Tianzihu Area	Zhejiang Huanke Environmental Consulting Co., Ltd.	National EIP Certificate: Class A No. 2003	
A2	Perfection Project of Water Supply and Drainage Facilities in Meixi Area			
A3	The Perfection Project of Water Supply and Drainage Facilities in Tianhuangping Area			
A4	Perfection Project of Water Supply and Drainage Facilities in Banshan Area			
A5	Perfection project of water supply and drainage facilities in Xiaofeng			
A6	Expansion Project of AnJi Urban Sewage Disposal Plant			
A7	AnJi Scattered Rural Sewage Treatment System (Short List)			
A8	AnJi Scattered Rural Sewage Treatment System (Long List)			
	Subproject of Fuyang area			
F1	The Fuyang City Sewage Treatment Project Phase IV	Zhejiang Huanke Environmental Consulting Co., Ltd.	National EIP Certificate: Class A, No. 2003	
F2	Reconstruction project of joint water supply and drainage pipe net for rural area of Xindeng Town, Fuyang City			Fuyang Municipal Environmental Protection Bureau has conducted the approval via FHXS (2013) No. 655.
F3	Fuyang City Longyang Sewage Disposal Project			
F4	Reconstruction project of joint water supply and drainage pipe net for rural area of Dayuan Town, Fuyang City			Fuyang Municipal Environmental Protection Bureau has conducted the approval via FHXS (2013) No. 654.
F5	Reconstruction project of joint water supply and drainage pipe net for rural area of Changkou Town, Fuyang City			Fuyang Municipal Environmental Protection Bureau has conducted the approval via FHXS (2013) No. 653.
F6	Sewage Interruption Pipeline Construction Project in Rural Areas in Fuyang			Fuyang Municipal Environmental Protection Bureau has conducted the approval via FHXS

No	Project Name	Environmental Impact Assessment Unit	Environmental Impact Assessment Qualification	Remarks
				(2013) No. 652.
F7	Sewage Disposal Project in Decentralized Villages in Fuyang			
F8	Trial Project of Sewage Interception Piping for Rural Domestic Sewage in Fuyang City (The Second Batch)			
F9	Trial Project of Scattered Rural Sewage Treatment System in Fuyang City (The Second Batch)			
	Subproject of Tiantai area			
T1	Improvement project of water supply and drainage system for cities and villages in the north central district of Tiantai Basin	Zhejiang Huanke Environmental Consulting Co., Ltd.	National EIP Certificate: Class A, No. 2003	
T2	Improvement project of water supply and drainage system for villages in eastern district of Tiantai Basin			
T3	Improvement project of water supply and drainage system for villages in eastern district of Tiantai Basin			
T4	Perfection Project of Water Supply and Drainage System for Decentralized Villages in Tiantai Basin (Short List)			
T5	Perfection Project of Water Supply and Drainage System for Decentralized Villages in Tiantai Basin (Long List)			
	Subproject of Longquan Area			
L1	Perfection Project of Water Supply and Drainage Facilities for Urban Areas in Longquan	Zhejiang Bohua Environmental Technology&Engineering Co., Ltd.	National EIP Certificate: Class B No. 2036	Longquan Municipal Environmental Protection Bureau has conducted the approval via LHP [2013] No. 92 on December 12, 2013.
L2	Improvement project of lanes and alleys in Longquan			
L3	Promotion Project of Water Supply and Drainage Facilities in Anren Town	Zhejiang Sunda Environmental Protection Co., Ltd.	China EIA Certificate: Class B, No.	Longquan Municipal Environmental Protection Bureau has conducted the approval via LHP [2013] No. 64 on December 12, 2013.
L4	Promotion Project of Water Supply and Drainage			

No	Project Name	Environmental Impact Assessment Unit	Environmental Impact Assessment Qualification	Remarks
	Facilities in Badu Town		2027	
L5	The First Batch of Sewage Disposal Project in Decentralized Villages in Longquan	Zhejiang Sunda Environmental Protection Co., Ltd.		Longquan Municipal Environmental Protection Bureau has conducted the approval via LHP [2013] No. 65 on on September 23, 2013 and Longquan LHP [2013] No. 93 on December 13, 2013.
L6	The Second Batch of Sewage Disposal Project in Decentralized Villages in Longquan			

1.4.2 Class (grade) of environmental impact assessment

Based on the dividing principle of environmental impact assessment class in Notification on Enhancing the Management of Environmental Impact Assessment on IFC Loan Construction Projects (HJ No. [324] File) and Manipulation Policy of EA (OP4.01) of World Bank, and the confirmation of World Bank, the EIA class of this project is Class B.

Based on *the relevant assessment grading principle in the Technical Guide for Environmental Impact Assessment*, and the pollution factor, environmental impact degree and regional environmental function features of various subprojects, the EIA grade of various subprojects is shown in Table 1.4-2.

Table 1.4-2 Assessment Grade Lists of Various Subprojects

Serial No.	Environmental Factor	Grading
1	Surface Water	The surface water assessment grade of projects of the Phase IV Project of Fuyang City Sewage Disposal Plant and Meixi Sewage Disposal Plant is Grade II, and that of other subprojects is Grade III.
2	Atmosphere	Screen3 estimation mode is based to estimate the result, the atmosphere assessment grade of the Phase IV Project of Fuyang City Sewage Disposal Plant is Grade II, and that of other subprojects is Grade III.
3	Noise	Noise assessment grade of various subprojects is Grade II.
4	Ecological Environment	Areas of various subprojects are less than 2km, and located at the general region, and its environment assessment grade is Grade III.

1.5 Evaluation Content and Emphasis

Main content of Zhejiang rural domestic sewage treatment system and drinking water project construction includes market town sewage disposal plant, rural scattered sewage treatment system, sewage collection pipe network, water supply network, water supply plant, etc., and the evaluation content and emphasis of various types of subprojects are shown in Table 1.5-1.

Table 1.5-1 Evaluation Content and Emphasis of Various Types of Subprojects

Item Type	Evaluation Content	Evaluation Focus
Sewage Disposal Plant and Supporting Sewage Pipe Network Project	① Investigate the pollution source status of the project area; collect and monitor the environmental quality condition of the area, and evaluate the present environment quality condition. ② Analyze ad evaluate the project site selection, pipe network construction and sewage treatment process by building period and operation period, find out the pollution source and the discharge of pollutant, and analyze the reliability of selected process in view of environmental protection. ③ Forecast and analyze the favorable and unfavorable influence of construction and operation period on surface water, air, ecology, acoustic environment and other aspects. ④ Propose measures and plan on slowing down the unfavorable influence based on the requirement on environmental target and management of the project influencing area. ⑤ Draw up the environmental management, monitoring and training plan.	(1) Sewage treatment project running on water environment improvement and positive benefit of social environment. (2) Environmental impact assessment on unorganized emission of malodorous gas in sewage disposal plants. (3) Influence of sewage discharge on receiving water. (4) Measures for environmental impact mitigation.

Item Type	Evaluation Content	Evaluation Focus
	⑥ Disclose information and consult with the public, and collect and reflect the public advice. ⑦ Water environmental impact analysis on the Phase IV Project of Fuyang City Sewage Disposal Plant.	
Water Supply Project and Supporting Pipe Network Project	① Collect, monitor and investigate the environmental quality condition of project influencing area and evaluate the present environment quality condition. ② Analyze and forecast the influence of construction and operation period on air, acoustic environment and social environment, and propose relevant mitigation measures. ③ Draw up environmental management and monitoring plan content. ④ Disclose information and consult with the public, and collect the public advice on the project.	Analyze adverse effect analysis of project construction and operation on environment and take relevant ecological protection and pollution control measures.
Rural Scattered Sewage Treatment Project	① Full make use of the existing environmental status data and analogy survey data, and carry out the environmental status monitoring work based on the principle of "supplement what is short". ② Carry out the environmental impact assessment as per the proposed site of sewage treatment project and trend of sewage collection pipeline and combining the survey result of environmental status, environmental functional district planning and environmental sensitive sites. ③ Analyze the positive benefit of sewage treatment on surface water. ④ Analyze the exhaust gas pollution source of the project and the atmospheric environmental impact. ⑤ Put forward environmental protection measures based on the environmental impact analysis result. ⑥ Disclose information and consult with the public, and do well in public participation and survey.	(1) Carry out environmental status monitoring work. (2) Analyze the positive benefit. (3) Put forward environmental protection measures. (4) Do well in public participation and survey.
Pipe Network Project	① Collect, monitor and investigate the environmental quality condition of project influencing area and evaluate the present environment quality condition. ② Analyze and forecast the influence of project construction period on air, acoustic environment and social environment, and propose relevant mitigation measures and plan on adverse effects. ③ Draw up environmental management and monitoring plan content. ④ Disclose information and consult with the public, and collect the public advice on the project.	Analyze adverse effects of project construction period on environment and take relevant pollution control measures.

1.6 Evaluation Criterion and Environmental Protection Objectives

1.6.1 Sewage discharge standard in market towns

In 2006, the former State Environmental Protection Administration also issued a modification list of the *Discharge Standard of Pollutants for Municipal Sewage Disposal Plant*, where it points out that as for water yielded by urban sewage disposal plants to be discharged into key national and provincial river basins, lakes, reservoirs and other enclosed and semi-closed waters, the Class IA standards will be implemented and that when such water is to be discharged into the Class III

functional water of surface waters in GB3838 (except for limited drinking water source protection area and swimming area) and the Class II functional water of seawater in GB3097, it will carry out the Class IB standards.

The Notice to *Print and Publish the "Twelve-Five" Planning about Prevention and Control of Water Pollution of the Qiantang River Basin* by Zhejiang Environmental Protection Department and Zhejiang Provincial Development and Reform Commission specifies that water yield by all urban sewage disposal plants inside the basin will implement the Class 1A emission standards.

Based on above regulations, this project to newly build, renovate and expand sewage disposal stations and plants in market town will be carried out in accordance with the following discharge standards:

1. AnJi at the Taihu Basin: AnJi Urban Sewage Disposal Plant and Meixi Sewage Disposal Plant will follow the Class 1A standards in Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant.

2. Fuyang at the Qiantang River Basin: the project fourth phase of Fuyang Sewage Disposal Plant will perform the Class 1A standards in Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant and at present, there is another 80000t/d sewage plant, undergoing upgrading and reconstruction together with it, to improve from Class 1B to 1A. Fuyang Longyang Sewage Station is situated at the upper reaches of the Yanshiling reservoir and it follows the Class 1A standards in Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant.

3. Tiantai at the Jiaojiang River Basin: Tiantai Cangshan Sewage Disposal Plant performs the Class 1B standards in Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant.

4. Longquan at the Ou River Basin: sewage disposal stations at Chatian, Xiaomei, Lanju, Anren, Badu and other market towns all locate at the headwater region of the Ou River and the Class 1B standards in Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant shall be complied with.

Table 1.6-1: Standard Unit for Pollution Discharge in Urban Sewage Disposal Plants: mg/l, except for pH.

Contamination Factor	pH	COD	BOD5	SS	NH3-N*	Petroleum	TP
Class I standard (A standard)	6-9	50	10	10	5(8)	1	0.5
Class I standard (A standard)	6-9	60	20	20	8(15)	3	1
Contamination Factor	TN	Total mercury	Total cadmium	Sexavalence Chromium	Total arsenic	Total lead	Total copper
Class I standard (A standard)	15	0.001	0.01	0.05	0.1	0.1	0.5
Class I standard (A standard)	20	0.001	0.01	0.05	0.1	0.1	0.5
Contamination Factor	Total zinc	LAS	Fecal Coliform				
Class I standard (A standard)	1.0	0.5	1000 pieces/L				
Class I standard (A standard)	1.0	1	10,000 pieces/L				

1.6.2 Sewage discharge requirements of scattered sewage disposal stations in the rural area

1. Rural sewage treatment system construction adopts the treatment process of simple process and

convenient operation and maintenance.

2. For the villages out of the water source protection area, the rural domestic sewage shall be discharged through proper process treatment. The following limiting value requirements of pollutant shall be met: CODCr≤100mg/1, BOD5≤30mg/1, TN≤25mg/1 and SS≤30mg/1. When the villages are located near the functional areas of Class III surface water, the outlet water can't discharged directed to the nearby functional water body, but shall be discharged into the local rural ponds, channels and farmland system to form water cycle.

3. The domestic sewage in the water source protection area shall not be discharged after treatment, but shall be treated and diffused through land percolation treatment system.

① The water quality, before entering land percolation treatment system, shall be treated and meet the following pollutant index limit: CODCr ≤ 100mg/L, BOD5 ≤ 30mg/L, NH3-N ≤ 25mg/L, SS ≤ 30mg/L

② Land percolation treatment system shall be designed by selecting proper hydraulic loading and area loading according to the nature of soil. The distance between the border of percolation treatment system and the earth surface water shall be over 50m; the pipeline set of land percolation system shall exceed 1m over the ground water level. If the ground water depth is less than 1m, soil piling methods shall be adopted to make the pipeline set exceed 1m over ground water level.

③ Land percolation treatment system shall monitor the treatment effects. After the finishing of sewage treatment facilities in various water source protection areas, well shall be dug in the place of 10m on the upstream of land percolation treatment field and 50m on the downstream of the percolation treatment system border, in order to monitor the ground water quality. The ground water quality of monitoring well shall meet the Class III standard of *Quality Standard for Ground Water* (GB14848-93). If the background value of original ground water can't meet the Class III standard, the ground water quality at the downstream of the land percolation treatment field shall not exceed the background value of ground water quality at the upstream of monitoring well.

4. Rural domestic sewage water used for farmland irrigation and fishery industry shall meet the regulations in *Standard for Irrigation Water Quality (*GB5084-2005*)* and Water Quality Standard for Fisheries (GB11607-89). The recycling water used for ornamental sight water (riverway) shall meet the requirement regulated in the current national standard: The *Reuse of Urban Recycling Water-Water Quality Standard for Scenic Environment Use* (GB/T18921-2002).

1.6.3 Other principal environmental standards

1. Environmental Quality Standard for Noise

The Class 4a, 2 and 1 *standard in Quality Standard for Acoustic Environment* (GB3096-2008) shall be respectively followed for acoustic environment qualities by each subproject and refer to Table 1.6-2 for details.

Noise limits for various sewage disposal plants (stations), water supply factories, sewage (water supply) pumping stations shall respectively observe the Class 4a, 2 and

1 *standard in Emission Standard for Industrial Enterprise Noise in Field* (GB12348-2008) and refer to Table 1.6-3 for details.
During the construction period, *Construction Field Standard for Environmental Noise Emission* (GB12523-2011) is adopted, as shown in Table 1.6-4.

Table 1.6-2 *Quality Standards for Acoustic Environment* (GB3096-2008) Unit: dB (A)

Category	Daytime	Night	Basis
1	55	45	Quality Standard for Acoustic Environment GB3096-2008
2	60	50	
3	65	55	
4a	70	55	

Table 1.6-3 *Emission Standards for Industrial Enterprise Noise in Field* (GB12348-2008) Unit: dB (A)

Category	Daytime	Night
1	55	45
2	60	50
3	65	55
4	70	55

Table 1.6 *Construction Field Emission of Environmental Noise Within Factory Bound* (GB12523-2011) Unit: dB (A)

Daytime	Night
70	55

2. Environmental quality standard for surface water

Quality standards for surface water environment shall follow the Class II and III standards in Quality Standard for Surface Water Environment (GB3838-2002), and refer to Table 1.6-5 for details.
Quality standards for ground water environment shall abide by the Class III standards in Quality Standard for Ground Water (GB/T 14848-93), and refer to Table 1.6-6 for details.

Table 1.6-5 Quality Standards for Surface Water Environment (GB3838-2002) unit: mg/L, except for pH

Items on Water Quality	Class II standard	Class III standard
CODcr	15	20
CODMn≤	4	6
DO≥	6	5
BOD5	3	4
pH	6～9	
NH3-N	0.5	1.0
TP	0.1	0.2
Petroleum	0.05	0.05
LAS	0.2	0.2
TN	0.5	1.0
Volatile Phenol	0.002	0.005
Fluoride	1.0	1.0
Mercury	0.00005	0.0001

Table 1.6-6 Quality Standard for Ground Water (GB/T 14848-93)

Item	Class III standard limits	Item	Class III standard limits
pH	6.5~8.5	Nitrite (in N)	≤0.02
CODMn	≤3.0	Nitrate (in N)	≤20
NH3-N	≤0.2	Volatile Phenol	≤0.002

Chloride	≤250	Sulfate	≤250
Copper	≤1.0	Sexavalence Chromium	≤0.05
Arsenic	≤0.05	Lead	≤0.05
Fecal Coliform	≤20		

3. Ambient air quality standard

Quality standard for ambient air shall abide by the Class II standard in Ambient Air Quality Standard (GB3095-2012) and NH3, H2S and other special pollutants shall comply with the maximum concentration limit about hazardous substances in the air of the residential district under *Hygienic Standards for the Design of Industrial Enterprises* (TJ36-79); please refer to Table 1.6-7 for details.

As for standards on odor pollutants producing by sewage disposal plants, it needs to be executed complying with the *Discharge Standard of Pollutants for Municipal Sewage Disposal Plant* (GB18918-2002); refer to Table 1.6-8 for details.

Table 1.6-7 Ambient Air Quality Standards

Name of Pollutant	Obtain time	Standard Concentration Limit (mg/m³)		Basis
		Class I	Class II	
Sulfur Dioxide (NO_2) (NO_2)	Hourly average	0.15	0.50	*Ambient Air Quality Standard* (GB3095-2012)
	Daily Average	0.05	0.15	
	Annual Average	0.02	0.06	
Nitrogen Dioxide (NO_2)	Hourly average	0.240	0.20	
	Daily Average	0.08	0.08	
	Annual Average	0.04	0.04	
Total Suspended Particulates (TSP)	Daily Average	0.12	0.30	
	Annual Average	0.08	0.20	
Inhalable Particle (PM_{10})	Daily Average	0.05	0.15	
	Annual Average	0.04	0.07	
H_2S	Once	0.01		*Hygienic Standards for the Design of Industrial Enterprises* (TJ36-79)
NH_3	Once	0.20		

Table 1.6-8 *Discharge Standards of Pollutants for Municipal Sewage Disposal Plant* (GB18918-2002)

Maximum Allowable Concentration of Exhaust Emission in Field (Edge of Protected Zone)

Serial No.	Index	Class II standard
1	Ammonia	1.5（mg/m3）
2	Hydrogen Sulfide	0.06（mg/m3）
3	Odor Concentration (Non-dimensional)	20

1.6.4 Environmental protection object of subprojects

Environmental protection object of various subprojects is shown in Table 1.6-9.

Villages relevant to the distributed sewage treatment of source of drinking water protection area of subprojects are shown in Table 1.6-10.

Villages relevant to the distributed sewage treatment of Class II water body of

subprojects are shown in Table 1.6-11

Table 1.6-9 The List of Major Environmental Protection Objects of Each Subproject

<table>
<tr><th>No.</th><th>Project Name</th><th>Major Environmental Protection Objectives</th></tr>
<tr><td></td><td>AnJi Area</td><td></td></tr>
<tr><td>A1</td><td>The Perfection Project of Water Supply and Drainage Facilities in Tianzihu Area</td><td>1. Seven villages along the pipeline, including Liangpeng Village, Gaoyu Village, Nanbeihu Village Xigang Village, Xiaoyun Village, Zhangzhi Village and Guyuan Village.</td></tr>
<tr><td>A2</td><td>Perfection Project of Water Supply and Drainage Facilities in Meixi Area</td><td>1. Water quality of West Tiaoxi Stream;
2. Yangqiao Village 121m away on the east of Gaoyu Water Plant and Gangxi Village 200m away on the west;
3. Lujia Village 30m away on the southwest of the water supply pump station;
4. Shizijian Village 130m away on the southeast of Meixi Sewage Disposal Plant;
5. Caotan Village 125m away on the south of 1# sewage lifting pump station and Longkou Village 66m away on the north;
6. Meixi Village at 85m away from the south of 2# sewage lift pump station;
7. Nineteen villages along the pipe network include Meixi Mark Town as well as Jiazi village, Meixi Village, Longkou Village, Jingwan Village, Huaguang Village, Banqiao Village, Shilong Village, Xiaoshu Village, Dushantou Village, Luxi Village, Hongmiao Village, Zhangwan Village, Xiaoxikou Village, Macun Village, Xilong Village, Houhe Village, Xucunwan Village, Xinfeng Village and Huangdu Village.</td></tr>
<tr><td>A3</td><td>The Perfection Project of Water Supply and Drainage Facilities in Tianhuangping Area</td><td>1. Eleven villages along the pipe network include Bimen Village, Xiaquan Village, Gangkou Village, Lingfeng Village, Henglu Village, Shanhe Village, Yucun Village, Maji Village, Jingcun Village, Yinkeng Village and Baishuiwan Village.</td></tr>
<tr><td>A4</td><td>Perfection Project of Water Supply and Drainage Facilities in Banshan Area</td><td>1. Dahouwu Village 97m away on the southwest of and 156m away on the north of Banshan Water Plant
2. Ten villages along the pipe network, including Xiaoyuan Village, Kangshan Village, Shuanghe Village, Changle Community, Wushansi Village, Jiqingqiao Village, Hehuatang Village, Yinwan Village, Sanguan Village and Zhaojiashang Village.</td></tr>
<tr><td>A5</td><td>Perfection project of water supply and drainage facilities in Xiaofeng</td><td>1. The 21 administrative villages (communities) along the pipeline include Xiaofeng Market Town Area (Xiaofeng Community, Chengbei Community, Dongshan Community), Shiguqiao Village, Zhuguxi Village, Chiwu Village, Fushi Village, Zhugenqian Village, Guanyinqiao Village, Luosifang Village, Banshanchang Village, Liuzhuang Village, Heluxi Village, Dazhuyuan Village, Jianshan Village, Hengshanwu Village, Luocun Village, Shangshu Village, Tiangai Village, Liujiatang Village and Wanmu Village.</td></tr>
<tr><td>A6</td><td>Expansion Project of AnJi Urban Sewage Disposal Plant</td><td>1. Water quality of West Tiaoxi Stream;
2. Yingjiatan Village 180m away on the south of the sewage disposal plant, Hehuatang Village 155m away on the northwest and 240m away on the east, and Gaoqiao Village 650m away on the west. 1. Water quality of West Tiaoxi Stream.</td></tr>
<tr><td>A7</td><td>Sewage Disposal System in Decentralized Villages in AnJi</td><td>1. Quality of discharged sewage in villages.
2. Nineteen villages are covered by engineering construction including, Jingxi Village, Changlingai Village, Hongmiao Village, Gaojiatang Village, Houhe Village, Shangshugan Village, Zhangcun Village, Dali Village, Majia Village, Tangshe Village, Xiaoxikou Village, Panxi Village, Majianong Village, Wucun Village, Zhangwu Village, Yuhua Village, Hanggai Village, Xilong Village and Jingwu Village.</td></tr>
<tr><td></td><td>Fuyang Area</td><td></td></tr>
<tr><td>F1</td><td>The Fuyang City Sewage Treatment Project Phase IV</td><td>1. The Fuchun River is the water body to absorb pollutants and main protective objects include intakes of Fuyang Jiangbei Water Plant, Fuyang Jiangnan Water Plant, Zhoupu Water Plant, Yuanpu Water Plant, Xiaoshan Nanpian Water Plant, Xiaoshan Xuxian Water Plant, Jiuxi Water Plant and other surface waters; refer to Figure 1.6-1 for detailed distribution information.
<table>
<tr><th>Name of Sensitive Sites</th><th>Functions of the Water Areas</th><th>Location Corresponding</th><th>Discharge Outlet From discharge</th></tr>
</table>
</td></tr>
</table>

No.	**Project Name**	Major Environmental Protection Objectives

		with Discharge Outlets in Phase IV	outlet (km)
Intake of Fuyang Jiangbei Water Plant	Decentralized domestic drinking water with the water quality of Class II, secondary water source protection area	Upstream	4.5
Intake of Fuyang Jiangnan Water Plant	Decentralized domestic drinking water with the water quality of Class II, secondary water source protection area	Upstream	6.8
Intake of Zhoupu Water Plant	Class II water protection area	Downstream	12.8
Intake of Zhoupu Water Plant	Class II water protection area	Downstream	16.8
Intake of Xiaoshan Nanpian Water Plant	Class II water protection area	Downstream	16.6
Intake of Xiaoshan Xuxian Water Plant	Class II water protection area	Downstream	17.4
Intake of Jiuxi Water Plant	Class II water protection area	Downstream	26
Confluence of Dayuan River and Fuchun River	Interface of decentralized drinking water of Class II in quality, Grade II water source protection area and Class III multifunctional area.	Downstream	4.5
Confluence of Xianpu River and Fuchun River	Interface of decentralized drinking water of Class II in quality, Grade II water source protection area and Class III multifunctional area.	Upstream	4.0

2. Refer to the following Table and Attached Figure 1.6-2 for details about residential areas and schools around the sewage disposal plants.

Name of Sensitive Sites	Scale	Direction	Distance from the Plant (m)
Minfeng (Jilongshan) Village	1339 households with 4460 people	N	311
Huashu (Huanggongwang) Village	750 households with 2593 people	NE	1771
Fuchunjiang Village	1347 households with 4800 people	SE	468
The First Primary School of Dongzhou	400 persons	N	313
Xinsha Village	258 households with 960 persons	S	1698
Dongxinmin Village	264 households with 980 persons	W	1121
West-suburb Peninsula in Hangzhou	400 households with 1400 persons	W	322

<table>
<tr><th>No.</th><th>Project Name</th><th>Major Environmental Protection Objectives</th></tr>
<tr><td>F2</td><td>Reconstruction project of joint water supply and drainage pipe net for rural area of Xindeng Town, Fuyang City</td><td>1. The project involves in seven administrative villages, including Tashan Village, Gonghe Village, Bingxian Village, Shuangxi Village, NAnJin Village, Chengzhuang Village, Songxi Village
2. Refer to the following table for water quality of Luzhu River, the water body absorbing pollutants from the Xindeng Sewage Disposal Plant and surrounding residents in Fuyang.
<table>
<tr><th>Environment Factor</th><th>Protection Object</th><th>Direction</th><th>Distance from the Plant (m)</th><th>Distance to the Source of Pollution (m)</th><th>Function/Scale</th></tr>
<tr><td rowspan="8">Ambient air, Ambient Noise</td><td rowspan="3">Shuangta Village</td><td>N</td><td>120</td><td>186</td><td>About one household with four persons in the nearest settlement</td></tr>
<tr><td>W</td><td>150</td><td>208</td><td>About four households with 16 persons in the settlement</td></tr>
<tr><td>N</td><td>About 1800</td><td>About 1866</td><td>About 12 households in the residential area with 48 persons</td></tr>
<tr><td>Xiachaichang Village</td><td>EN</td><td>About 1000</td><td>About 1090</td><td>About 24 households in the residential area with 96 persons</td></tr>
<tr><td>Wokou Village</td><td>S</td><td>About 1800</td><td>About 1880</td><td>About 13 households in the residential area with 46 persons</td></tr>
<tr><td>Guanting Village, Luzhu Town</td><td>WS</td><td>600</td><td>690</td><td>About 76 households in the residential area with 300 persons</td></tr>
<tr><td>Tangjia Village, Xindeng Town</td><td>SE</td><td>About 2200</td><td>About 2300</td><td>About 24 households in the residential area with 84 persons</td></tr>
<tr><td>Water Environment</td><td>Luzhu River</td><td>S</td><td>300</td><td>—</td><td>Class III water quality, Multi-functional area</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Project Name</th><th>Major Environmental Protection Objectives</th></tr>
<tr><td>F3</td><td>Fuyang City Longyang Sewage Disposal Project</td><td>
1. Please refer to the following table for details about Gexi River, the water body absorbing pollutants.
<table>
<tr><th>protectedobject</th><th>Positional relation with this project</th><th>Location</th><th>Controlling target</th></tr>
<tr><td>Yanshiling Reservoir</td><td>Downstream</td><td>3.6km</td><td>Class II</td></tr>
<tr><td>Gexi River</td><td>Water body absorbing pollutants</td><td>From the source (Zhanglinwu) to Yanshiling Reservoir</td><td>Class II</td></tr>
</table>
2. Refer to the following table for villages around the sewage disposal plant, including Chenlin Village, Mujiawu Village, FAnJia Village and Dongqiao Town Kindergartner.
<table>
<tr><th>Name of Sensitive Sites</th><th>Structure</th><th>Distance</th><th>Orientation Relative to Structures</th></tr>
<tr><td rowspan="2">Chenlin Village (Totally 71 households with a total population of 186)</td><td>To the north boundary</td><td>260</td><td rowspan="2">North</td></tr>
<tr><td>to pre-treatment structure</td><td>285</td></tr>
<tr><td rowspan="2">FAnJia Village (Totally 23 households with a total population of 62)</td><td>To the south boundary</td><td>900</td><td rowspan="2">South</td></tr>
<tr><td>to pre-treatment structure</td><td>915</td></tr>
<tr><td rowspan="2">Mujiawu Village (Totally 42 households with a total population of 120)</td><td>To the north boundary</td><td>680</td><td rowspan="2">North</td></tr>
<tr><td>to pre-treatment structure</td><td>705</td></tr>
<tr><td rowspan="2">Dongqiao Town Kindergartner (Equipped with 34 faculty members and 108 children)</td><td>To the north boundary</td><td>320</td><td rowspan="2">North</td></tr>
<tr><td>To pre-treatment structure</td><td>335</td></tr>
</table>
</td></tr>
<tr><td>F4</td><td>Perfection project of joint water supply and drainage pipe net for rural area of Dayuan Town, Fuyang City</td><td>1. The project involves in Dayuan Village (merged by the original Yongqing Village, Pantang Village, Pudong Village, Xialang Village and Wangxian Village) and Tingshan Village (merged by the original Dongsheng Village, Tayan Village, Zhenlong Village and Tingshan Village).
2. Water quality of Dayuan River, the water body absorbing pollutants from Dayuan Sewage Disposal Plant in Fuyang.</td></tr>
<tr><td>F5</td><td>Perfection project of joint water supply and drainage pipe net for rural area of Changkou Town, Fuyang City</td><td>1. Changkou Village and Yesheng Village in Changkou Town
2. Water quality of Huyuan River</td></tr>
<tr><td>F6</td><td>Sewage Interruption Pipeline Construction Project in Rural Areas in Fuyang</td><td>1. The project is totally related with eight administrative villages, including Huanggongwang Village and Jilongshan Village in Dongzhou Subdistrict,, Qiufeng Village and Sanqiao Village in Fuchun Subdistrict, Gaoqiao village, Shouxiang Village and Xinchang Village in Yinhu Subdistrict and Dongqiao Village in Dongqiao Town.</td></tr>
<tr><td>F7</td><td>Sewage Disposal Project in Decentralized Villages in Fuyang (The First Batch)</td><td>1. Water quality of Baiyang River, Nanxin River and Taiyuan River, water bodies absorbing pollutants
2. Hongzhuang Village in Subdistrict Yinhu, Pengjia Village in Wanshi Town and Yankou Village in Dayuan Town</td></tr>
<tr><td></td><td>Tiantai Area</td><td></td></tr>
<tr><td>T1</td><td>Improvement project of water supply and drainage system for cities and villages in the north central district of Tiantai Basin</td><td>Thirty nine villages along the pipeline and the tertiary protection area as well as perimeter protection zone of Tiantaishan Scenic Area, which the pipelines have passed through.</td></tr>
<tr><td>T2</td><td>Improvement project of water supply and drainage system for villages in eastern district of Tiantai Basin</td><td>1. Water quality of Cangshandao River, the water body absorbing pollutants
2. Residential areas surrounding Cangshan Sewage Disposal Plant (including Yushan Village, Shishan Village, Xiaaoqiu Village, Hu’an Village and Xili Village).</td></tr>
</table>

<table>
<tr><th>No.</th><th>Project Name</th><th>Major Environmental Protection Objectives</th></tr>
<tr><td></td><td></td><td>3. Thirty five villages along the pipeline, such as Wubai Village</td></tr>
<tr><td>T3</td><td>Improvement project of water supply and drainage system for villages in eastern district of Tiantai Basin</td><td>Forty two villages along the pipeline, such as Bajiaoting Village, and the Shifeng Stream, a drinking water source protected area.</td></tr>
<tr><td>T4</td><td>Improvement project of water supply and drainage system for decentralized villages in Tiantai Basin</td><td>1. Quality of water body for sewage discharge in rural areas: Zhangjiatong Village and Hanyan Village locate in the primary drinking water protection area of Shifeng River and Shuangxi Village locates in the primary drinking water protected area of Bai River
2. Beixiazheng Village, Zhangjiatong Village, Jiujiuzhe Village, Shuangxi Village and Hanyan Village locate in the tertiary protection area or the perimeter protection zone of Tiantaishan Scenic Area.
3. The project construction involves in 49 villages such as An’gu Village.</td></tr>
<tr><td></td><td>Longquan Area</td><td></td></tr>
<tr><td>L1</td><td>Improvement project of water supply and drainage facilities for urban areas in Longquan (including projects of lanes and alleys)</td><td>1. Water quality of Longquan River</td></tr>
<tr><td>L3</td><td>Promotion Project of Water Supply and Drainage Facilities in Anren Town</td><td>1. Water quality of Anren River
2. Refer to the following table for details about residential areas such as the Huangshixuan Village around the sewage plant.
<table>
<tr><th>Item</th><th>Protected object</th><th>Orientation</th><th>Closest distance (m) from boundaries of the project</th><th>Scale</th></tr>
<tr><td>Atmosphere</td><td>Huangshixuan Village</td><td>W</td><td>350</td><td>6 households</td></tr>
<tr><td>Surface Water</td><td>Water body absorbing pollutants: Anren River</td><td>/</td><td>15m</td><td>Medium River</td></tr>
</table></td></tr>
<tr><td>L4</td><td>Promotion Project of Water Supply and Drainage Facilities in BaduTown</td><td>1. Water quality of Badu River, the tributary of Longquan River
2. Refer to the following table for details about four settlements such as Xiaogao Village and Badusi Village near the sewage disposal plant.
<table>
<tr><th>Item</th><th>Protected object</th><th>Orientation</th><th>Closest distance (m) from boundaries of the project</th><th>Scale</th></tr>
<tr><td rowspan="2">Atmosphere</td><td>Xiaogao Natural Village</td><td>NE</td><td>350</td><td>5 households</td></tr>
<tr><td>Badu Sicun Village</td><td>SW</td><td>500</td><td>12 households</td></tr>
<tr><td>Surface Water</td><td>Water body absorbing pollutants: Badu River</td><td>/</td><td>15m</td><td>Medium River</td></tr>
</table></td></tr>
<tr><td>L5, L6</td><td>Sewage Disposal Project in Decentralized Villages in Longquan</td><td>1. Water quality of Xiaomei River and Longquan River
2. Refer to the following table for details about residential areas such as Chasan Village near the Chatian Sewage Plant.
<table>
<tr><th>Item</th><th>Protected object</th><th>Orientation</th><th>Closest distance (m) from boundaries of the project</th><th>Scale</th></tr>
<tr><td rowspan="2">Atmosphere, Noise</td><td rowspan="2">Chasan Village</td><td>E</td><td>55</td><td>14 households</td></tr>
<tr><td>S</td><td>35</td><td>2 households</td></tr>
</table></td></tr>
</table>

No.	**Project Name**	Major Environmental Protection Objectives

Surface Water	Water body absorbing pollutants: Xiaomei River	/	3m	Medium River

3. Refer to the following table for details about residential areas such as Xiaomei Sicun Village, Chenshankeng Village and Wudunliao Village near Xiaomei Sewage Plant.

Item	Protected object	Orientation	Closest distance (m) from boundaries of the project	Scale
Atmosphere	Xiaomei Sicun Village	SE	500	36 households
	Chenshankeng Natural Village	SW	400	8 households
	Wudunliao Natural Village	W	210	23 households
Surface Water	Water body absorbing pollutants: Xiaomei River	/	10m	brook

4. Refer to the following table for details about residential areas such as Wumeiyang Village near Lanju Sewage Plant.

Item	protectedobject	Orientation	Closest distance (m) from boundaries of the project	Scale
Atmosphere, Noise	Wumeiyang Village	SE	500	6 households
		W	300	26 households
Surface Water	Yuzhang River	/	10m	Medium River

5 Decentralized villages for sewage disposal including Zhuanghe Village, Shangwu Village, Jibian Village, Songqu Village, Xiaohuangnan Village, Shuita Village and Dazhai Village

Table 1.6-10: Villages Relevant to the Distributed Sewage Treatment of Source of Drinking Water Protection Area of Subprojects

NO.	Projected	Affixed Township and Town	Corresponding Water Source Protection Area Name	Corresponding Environmental Function Zone	Water Quality Objective of Corresponding Water Environment Function Zone	Population (number)	Daily Sewage Amount (m^3)	The Relationship Between the Village and The Water Conservation District	Distance Between the Treatment Terminal and the Water Source of Protection Area	The Adopted Treatment Processing and Tail Water Discharge
1	Houhe Village	Xilong Township in An'ji County	Chenjiadun drinking water conservation district	Class I drinking water conservation district	Class III	430	28	Part of the village is within the range of land protection, and the distance between the	1160m	Anaerobic filter + constructed wetlands + land permeation, discharging into the

								sewage intercept pipe of the project and the ground water intaking point of Chenjiadun is about 1130m		nearby farmland irrigation channel
2	Jingwu Village	Zhangwu Town in An'ji County	Dahekou drinking water conservation district	Class I drinking water conservation district	Class II	1320	84	Part of the village is within the range of land protection, with the nearest part being adjacent to the Dahekou during water conservation district.	The feasible study doesn't confirm the position	Anaerobic filter + aerobiotic combination process + constructed wetlands Tail water shall be discharged into the nearby farmland irrigation channel after treatment, and the outlet shall be 50m outside of functional water body.
3	Zhangjiatong Village	Jietou Town in Tiantai County	Shifengxi Tiantai drinking water source district	Class I drinking water conservation district	Class II	1260	90	The village is within the water conservation	The specific position of the treatment terminal isn't	Process: Anaerobic filter + biological

								district.	confirmed, but the position shall be over 50m from the Shifegnxi, being constructed out of the drinking water conservation district.	trickling filter + constructed wetlands + land treatment, being discharged into the nearby farmland irrigation channel
4	Shuangxi Village	Sitou Town in Tiantai County	Baixi Ninghai Source water conservation district	Class I drinking water conservation district	Class I	450	30	The village is within the range of land protection	The treatment terminal is within the drinking water conservation district, being about 50m from the Tianfengkeng and about 4.5km from the upstream of Huanglong reservoir.	Process: Anaerobic filter + biological trickling filter + constructed wetlands + land treatment, being discharged into the nearby farmland irrigation channel
5	Hanyan Village	Longxi Township in Tiantai County	Shifengxi Tiantai drinking water conservation district	Class I drinking water conservation district	Class II	924	65	The village is within the water conservation district.	The specific position of the treatment terminal isn't confirmed, but the position shall be over 50m	Process: Anaerobic filter + biological trickling filter + constructed wetlands +

									from the Shifegnxi, being constructed out of the drinking water conservation district.	land treatment, being discharged into the nearby farmland irrigation channel

Table 1.6-11: Villages Relevant to the Distributed Sewage Treatment of Class II Water Body of Subprojects

No.	Village Name	Affixed Township and Town	Population (Number)	Pollutant-holding Water Condition	Water Quality Objectives	Tail Water Discharge and Treatment Process
1	Xinzhong Village	Pingqiao Town in Tiantai County	1451	Pollutant-holding water body is Wuyanxi Branch, which will ultimately enter Shifengxi drinking water conservation district, being 2.5km away from Shifengxi.	Class II	Process: Anaerobic filter + biological trickling filter + constructed wetlands + land treatment, being discharged into the nearby farmland irrigation channel
2	Jiuzhe Village	Jietou Town in Tiantai County	928	Pollutant-holding water body is Chashanxi, which will ultimately enter Shifengxi drinking water conservation district, being 6.7km away from Shifengxi.	Class II	Process: Anaerobic filter + biological trickling filter + constructed wetlands + land treatment, being discharged into the nearby farmland irrigation channel
3	Minggong Village	Hongchou Town in Tiantai County	1275	Pollutant-holding water body is Class II water quality multifunctional district of Cangshan Daoxi	Class II	Process: Anaerobic filter + biological trickling filter + constructed wetlands + land treatment, being discharged into the nearby farmland irrigation channel
4	Xiawu Village	Sanzhou Township in Tiantai County	1131	Pollutant-holding water body is 3.3km away from Xinchang Menxi Reservoir	Class II	Anaerobic filter + constructed wetlands + land treatment, being discharged into the nearby farmland irrigation channel
5	Jingxi Village	Baofu Town in An'ji County	447	Pollutant-holding water body is Xishaoxi Branch, being located in the outside of Laoshikan drinking water conservation district, and 3.3km away from Laoshikan	Class II	Anaerobic filter + constructed wetlands, being discharged into the nearby farmland irrigation channel

				Reservoir, 0.14km away from Luojiafei Reservoir. The village is adjacent to the both sides of Xishaoxi Branch, being 100m away from Xishaoxi Branch.		
6	Changlingai Village	Meixi Town in An'ji County	1175	The village is adjacent to both sides of Xishaoxi, and the pollutant-holding water body is Xishaoxi Branch.	Class II	Anaerobic filter + biological trickling filter + constructed wetlands, being discharged into the nearby farmland irrigation channel
7	Shangshugan Village	Ganshan Township in An'ji County	384	Village is 20m away from the north bank of Xishaoxi Branch, and the pollutant-holding water body is Xishaoxi Branch.	Class II	Anaerobic filter + constructed wetlands, being discharged into the nearby farmland irrigation channel
8	Zhangcun Village	Zhangcun Town in An'ji County	3028	Village is adjacent to the both sides of Xishaoxi Branch, and the pollutant-holding water body is Xishaoxi Branch.	Class II	Anaerobic filter + aerobiotic combination process + constructed wetlands, being discharged into the nearby farmland irrigation channel
9	Tangshe Village	Hanggai Town in An'ji County	749	Village is adjacent to the east bank of Xishaoxi Branch, and the pollutant-holding water body is Xishaoxi Branch.	Class II	Anaerobic filter + biological trickling filter + constructed wetlands, being discharged into the nearby farmland irrigation channel
10	Panxi Village	Hanggai Town in An'ji County	950	Village is about 25m away from the northeast bank of Xishaoxi Branch.	Class II	Anaerobic filter + aerobiotic combination process + constructed wetlands, being discharged into the nearby farmland irrigation channel
11	Wucun Village	Hanggai Town in An'ji County	756	Village is adjacent to the east bank of Xishaoxi Branch, and the pollutant-holding water body is Xishaoxi Branch.	Class I	Anaerobic filter + biological trickling filter + constructed wetlands, being discharged into the nearby farmland irrigation channel
12	Hanggai Village	Hanggai Town in An'ji County	1136	Village is about 440m away from the south bank of Xishaoxi Branch, and the pollutant-holding water body is Xishaoxi Branch.	Class II	Anaerobic filter + aerobiotic combination process + constructed wetlands, being discharged into the nearby farmland irrigation channel
13	Zhangwu Village	Zhangwu Town in An'ji County	2089	Village is adjacent to the both sides of Xishaoxi Branch, and the pollutant-holding water body is Xishaoxi Branch.	Class II	Anaerobic filter + aerobiotic combination process + constructed wetlands, being discharged into the nearby farmland irrigation channel
14	Yuhua Village	Zhangwu Town in An'ji	448	Village is about 200m in the	Class II	Anaerobic filter + constructed

		County		southwest of Xishaoxi Branch, being 2.8km away from the Dahekou drinking water conservation district, and the pollutant-holding water body is Xishaoxi Branch.		wetlands, being discharged into the nearby farmland irrigation channel
15	Songqu Village	Badu Town in Longquan City	2013	The pollutant-holding water body is Xishaoxi Branch, being 2.5km away from Baduxi.	Class II	Anaerobic - constructed wetlands, being discharged into the nearby farmland irrigation channel
16	Shuita	Zhulong Town in Longquan City	260	The pollutant-holding water body is Shuitaxi Branch, being 7km away from Zhuxi.	Class II	Anaerobic - constructed wetlands, being discharged into the nearby farmland irrigation channel
17	Dasai	Lanju Township in Longquan City	908	The pollutant-holding water body is Dasai Branch, being 6km away from Longquanxi.	Class II	Anaerobic - constructed wetlands, being discharged into the nearby farmland irrigation channel
18	Pengjia Village	Wanshi Town in Fuyang City	2665	The pollutant-holding water body is Gexi Branch, being 4.2km away from Gexi.	Class II	Process: anaerobic - constructed wetlands, being discharged into the nearby farmland irrigation channel

1.7 Assessment Principles and Methods

(1) Meet the requirement of construction project environmental protection management of the national and local environmental protection departments and industry competent departments, and conform to the requirement of Notification on *Enhancing the Management of Environmental Impact Assessment on IFC Loan Construction Projects of our state* and the environmental impact assessment of the World Bank;

(2) Based on the features of project environmental impact, make the main environmental elements and pollution factors as the evaluation object, highlight the evaluation on key protection object, and pay attention to the analysis on up-to-standard release and total quantity control;

(3) Adopt the means of combination of analogy survey, data collection and analysis, etc., fully make use of the existing data, and conduct the public participation by means of forum, questionnaire survey and other methods;

(4) In view of environmental protection, make argument on the feasibility of project construction, endow the environmental impact assessment with scientificity and operability, and provide a scientific basis for the environmental protection management in project approval, design and construction.

1.8 Profile of Environmental Impact Assessment Organization

1.8.1 Project Organization Structure

Overall Report on Environmental Impact Assessment of Zhejiang Rural Sewage Treatment System and Drinking Water Project in Using World Bank Loan is mainly compiled by Zhejiang Huanke Environmental Consulting Co., Ltd. The environmental impact assessment on various subprojects is completed by Zhejiang Huanke Environmental Consulting Co., Ltd., Zhejiang Sunda Environmental Protection Co., Ltd. and Zhejiang Bohua Environmental Technology&Engineering Co., Ltd. See Table 1.4-1.

1.8.2 Introduction to chief editorial unit

Zhejiang Huanke Environmental Consulting Co., Ltd. is a wholly-owned subsidiary set by Environmental Science Research&Design Institute of Zhejiang Province based on the relevant requirement of public institution environmental impact assessment structural reform from the Ministry of Environmental Protection. This unit has the Class A certificate of Environmental Impact Assessment on Construction Project (National EIP Certificate: Class A, No. 2003) issued by the Ministry of Environmental Protection, and the scope of qualification includes: light textile and chemical fiber, chemicals, petrochemicals and medicine, metallurgy and electromechanical class, building materials and thermal power, agriculture and forestry and water conservancy, traffic, oceanographic engineering, social area and other fields with complete EIA industry covering. It is one of the four units who can bear the most industries in the national EIA units. The company also engages in the environmental protection check of marketing enterprises, environmental protection acceptance survey on ecological project completion, preparation of conservation plan of water and soil, adjustment of environmental functional district planning, enterprise (region) pollution treatment and acceptance and evaluation report, and other environmental protection consulting business. There are 170 staffs, in which there are 58 registered EIA engineers, 16 professor senior engineers and senior engineers and

59 engineers with strong technical strength.

The company has borne the environmental impact assessment work of most infrastructure construction projects and main industrial construction projects in Zhejiang, won a good reputation from the Ministry of Environmental Protection, Zhejiang Provincial Environmental Protection Bureau, various competent departments of municipal environmental protection and the Owner unit regarding excellent work achievement, and has been awarded with honorary titles of “The National Environmental Protection Advanced Collective” and “The National Advanced Unit of Environmental Impact Assessment on Construction Project”. It is a standing council unit of EIA branch of China Association of Environmental Protection Industry currently.

With the management idea of “Exquisite Technique, Superb Service, Outstanding Management and Classic Performance”, the company will be dedicated to offering superior environmental protection technology consulting service for the society, and strives to contribute the construction of “Ecological Zhejiang” actively.

2 Environmental Overview of Project Influencing Area

2.1 Environmental Overview of Zhejiang Area

2.1.1 Overview of natural environment

Zhejiang Province locates on the south wing of Yangtze River Delta in the southeast coastal region in China, facing the East China Sea in east, contacting Fujian in south, connecting with Anhui and Jiangxi in west and bordering on Shanghai and Jiangsu in north. Qiantang River—the largest river in the territory is called as River due to its circuitous river, and also called as Zhejiang; the province is named with river and shortened for "Zhe". There are 54,426,900 permanent resident populations in the whole province, which is one of the provinces with smallest area and largest population density nationwide.

Both of the straight-line distance of east to west and south to north is about 450km, and the area of the land occupies 1.06% of the nation. Zhejiang administers 11 prefecture-level cities of Hangzhou, Ningbo, Wenzhou, Shaoxing, Huzhou, Jiaxing, Jinhua, Quzhou, Zhoushan, Taizhou and Lishui, in which Hangzhou and Ningbo (municipalities with independent planning status) are deputy provincial cities, and there are 11 provincially administered municipalities; it is subdivided into 90 county administrative regions, including 32 municipal districts, 22 county-level cities, 35 counties and 1 autonomous county. It is again subdivided into Township administrative regions, which reached 1516 by the end of 2007, including 754 towns, 457 townships (including 14 national townships) and 304 subdistricts.

With long history and glorious culture, Zhejiang is one of birthplaces of ancient Chinese civilization. As early as 50000 years ago at the Old Stone Age, there were hominid-Jiande Humans in activity in Zhejiang; there is Hemudu Culture with 7000 years of history, Majiabang culture with 6000 years of history and Liangzhu culture with 5000 years of history within the territory. It is called as "The Prefecture of Silk", "The Land of Abundance" and "The State of Cultural Relic".

Geology of Zhejiang province is Huaxia arched area, which is the eastern transition zone of two tectonic zones of Qinling Mountains and Nanling Mountains, its tentonic characteristic overall takes Jiangshan-Shaoxing fracture as the boundary, and it is divided into Northwest Zhejiang and Southeast Zhejiang. Formation development of Northwest Zhejiang is complete, compact linear fold structure is the structural feature, and with vertical and horizontal fault development, argillaceous limestone, shale, sandstone, etc. are the main constituents; the exposed mountain stratum of Southeast Zhejiang include Proterozoic metamorphic rocks and Mesozoic volcanic rock series, the main structure is fault structure and volcanic structure, and nearly the entire surface is covered by rhyolite, tuffaceous conglomerate, granite and other volcanic series.

The terrain of Zhejiang province is high in the southwest and low in the northeast, and inclined from the southwest to northeast, showing a stair decline. Most part of the southwest are mountains and steep mountains over ten thousand meters, and the average main peak is over 1,500m, wherein, Huangmaojian Peak located in Longquan is 1,929m high, and is the highest peak of the whole province. Hills and mountains are the main terrain, and occupy 70.4% of the total area of the whole province. Hills are the main form in the central part, and large and small basins are strewn at random and distributed among hills and mountains. The northeast part is alluvial and deposited plain with plain terrain, deep soil and dense river network. Some mountain chains straightly reach the East China Sea, and peaks emerged form peninsula and

island.

The total length of Zhejiang coastline is 2253.7km, there are 2,161 islands along the coast, and the shallow-sea continental shelf is 222,700sq.km.. Affected by East Asian monsoon, the winter and summer prevailing wind direction has an obvious change, and the rainfall has a clear seasonal variation in Zhejiang. The overall features of Zhejiang climate are remarkable monsoon, clear four seasons, moderate yearly temperature, lighter, rich rain, wet air, synchronous change in rain and hot, diverse climatic resource s and various weather disasters. The annual average temperature of Zhejiang is 15~18℃, the extreme maximum temperature is 33~43℃, and the extreme minimum temperature is -2.2~-17.4℃; the average annual rainfall is 980~2000mm and the annual average sunshine time is 1710~2100h in the whole province.

2.1.2 Social and economic conditions

By the end of 2011, the total output value of the whole Zhejiang province was RMB 3231.885 billion, increasing by 9.0% over the same period of last year, wherein, the primary industry, the secondary industry and the tertiary industry are respectively RMB 158.304 billion increasing by 3.6%, RMB 1655.558 billion increasing by 9.1% and RMB 1418.023 billion increasing by 9.4%, and the industrial structure is 4.9:51.2:43.9; the Per Capita GDP is RMB 59,249, increasing by 7.1%; the disposable income of towners is RMB 30,971 and the per capita net income of rural residents is RMB 13,071.

The total output value in the project area is RMB 92.595 billion, in which RMB 7.833 billion is the primary industry, RMB 10.969 billion is the secondary industry and RMB 8.861 billion is the tertiary industry, and the three industrial structure is 8.46:54.39:37.15; the Per Capita GDP is RMB 46,535, the disposable income of towners is RMB 27,438 and the per capita net income of rural residents is RMB 12,316, which are all lower than the average level of the whole province. In the four project counties and cities, the total output value in Fuyang City is the highest with RMB 49.11 billion; the total output value in Longquan City is the lowest with RMB 7.548 billion. The social and economic development condition of Zhejiang and four project counties and cities is shown in Table 2.1-1 in details.

Table 2.1-1 List of Main Indexes of Social and Economic Development of Various Counties and Cities in the Project Area (2011)

Index		Zhejiang Province	Project Area	AnJi County	Fuyang City	Tiantai County	Longquan City
Gross Regional Domestic Product (RMB hundred million)		32318.85	925.95	222.01	491.1	137.16	75.68
Primary Industry	Output (RMB hundred million)	1583.04	78.33	23.71	33.2	10.82	10.6
	Specific Gravity （%）	4.9	8.46	10.7	6.7	7.89	14.0
Secondary Industry	Output (RMB hundred million)	16555.58	109.69	109.69	297.2	62.09	34.68
	Specific Gravity （%）	51.2	54.39	49.4	60.5	45.27	45.8

Tertiary Industry	Output (RMB hundred million)	14180.23	88.61	88.61	160.7	64.25	30.41
	Specific Gravity （%）	43.9	37.15	39.9	32.8	46.84	40.2
Per Capita Production (RMB)		59249	46535	48402 3	75319	23589	26163
Disposable Income of towners (Yuan)		30971	27438	28679	29250	24912	24904
Per Capita Net Income of Rural Residents (Yuan)		13071	12316	14152	15369	10158	8025

2.1.3 Environmental quality conditions

Based on the environmental conditions bulletin of Zhejiang province in 2012, all localities and departments of the whole province in 2012 tightly embraced the decision and deployment of provincial Party committee and provincial government, insisted on ecological province construction strategy, made solid progress in ecological civilization construction and fully preserve the safety of environment, thus gaining an outstanding performance in energy conservation and emission reduction. In 2012, the reduction rate of unit GDP energy consumption was 6.1%, the emission reduction ratio of chemical oxygen demand, ammonia nitrogen, sulfur dioxide and oxynitride is respectively 3.92%, 2.73%, 5.48% and 5.86%, and all the emission reduction target of four main pollutants is over fulfilled.

The “Three Cleaning Actions” plan (cleaning water source, cleaning air and cleaning soil) is accelerated, the whole provincial environmental quality continues to appear a trend of steady but good-oriented, section with surface water quality reaching over Class III reaches 64.3%, the control rate of decentralized drinking water source above county level is 86.7%, the rate of urban air quality above county level reaching Class II standard is 98.6%, and the urban ratio above county with regional environment noise lower than 55dB reaches over 75%. The environment status index continues to the national front rank.

The overall water quality of the whole provincial river trunk stream is basically good, and different levels of pollution are still existed in part of tributary and local reaches flowing through cities and towns. Aojiang River, canal and plain river network are still severely polluted, eutrophication is existed in part of lakes to certain degree, and mesotropher is the main form of the reservoir. The main water pollution indexes are petroleum, ammonia nitrogen, total phosphorus, etc. Based on the statistics of 221 provincial control section monitoring results, section with water quality reaching or exceeding Class III standard of surface water environmental quality accounts for 64.3% (wherein, 6.8% for Class I, 27.6% for Class II and 29.9% for Class III), Class IV accounts for 17.2% and Class V and inferior Class V account for 18.5%.

The seriation of eight river systems and canals from large to small as per the section percent of water quality reaching or exceeding Class III standard is: Ou River, Feiyun River, Tiaoxi Stream, Cao’e River, Qiantang River, Yong River, Canal, Jiaojiang River and Aojiang River.

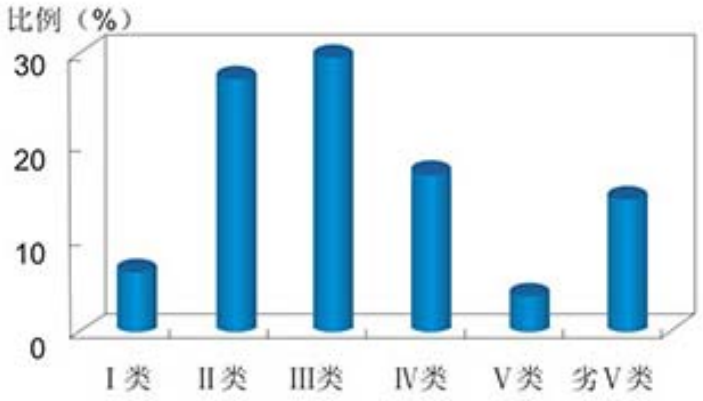


Fig. 2.1-1 Surface Water Quality of Zhejiang Province in 2012

图 2.1-2 Conditions of Zhejiang River Systems Reaching or Exceeding Class III Standard in 2012

Qiantang River: section of Class I~III water accounts for 76.6%, the main polluted reaches are Jinhua River, Dongyang River, NAnJiang River, Wuyi River and Pujiang section of Puyang River in Jinhua City, and the main pollution parameters are ammonia nitrogen, total phosphorus and petroleum.

Jiaojiang River: section of Class I~III water accounts for 36.4%, the main polluted reaches are main stream, Lingjiang River, downstream of Yongning River, downstream of Shifeng Stream, NAnJiang River, Wuyi River and Pujiang section of Puyang River, and the main pollution parameter is petroleum.

Ou River: Class I~III water quality, without obvious polluted reaches.

Tiaoxi Stream: section of Class I~III water accounts for 94.1%, Changxing port is slightly polluted, and the pollution parameter is petroleum.

Taihu Basin: Class II~inferior Class V water quality, in which section of Class II and III accounts for 43.2%, Class IV accounts for 15.9%, and Class V and inferior Class V accounts for 40.9%; six sections surrounding Lake Taihu are excellent in water quality, which all meet the functional demand.

2.2 Environmental Profile of AnJi County Area

2.2.1 Overview of natural environment

1. Geographic position

Located in the northwest part of Zhejiang province, AnJi County lies between the northern latitude of 30°23′-30°53′and the east longitude of 119°24′-119°53′,

bordering on Ningguo and Guangde County of Anhui Province in the west, next to Changxing County in the north, linking Deqing County and Wuxing District, Huzhou City in the east and adjacent to Yuhang District, Hangzhou City and Lin'an City in the south. See Fig. 2.1-4 for the details.

2. Landform

There are many hills and mountains in AnJi County, wherein, 11.5% is mountains, 50% is hills, 13.1% is downland and 25.4% is plain. The south, east and west part is the branch range of Tianmu Mountains, and the north and central part is downland and plain. It is a "dustpan shape" radial basin with terrain rise in the southwest and southeast, low and sunken in the central and east, ringed on three sides by mountains and opening facing northeastward.

Fig. 2.1-3 Location of Four Counties in the River System of Zhejiang Province

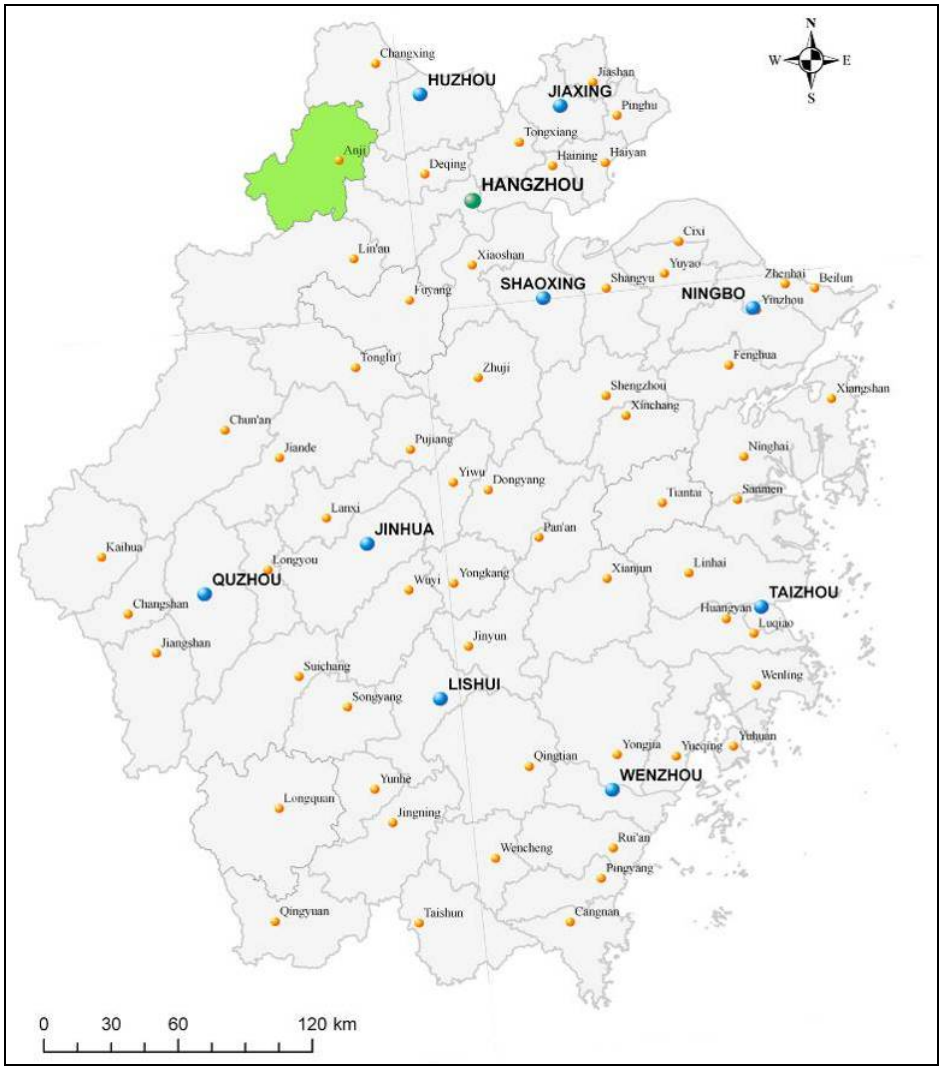


Fig. 2.2-1 Location Plan of AnJi in Zhejiang Province

3. Climatic and meteorological features

AnJi County belongs to the monsoon region of south rim of mid-latitude northern subtropics with moderate climate, abundant rainwater, adequate light and clear four seasons. The annual average temperature is 12~16℃, yearly average rainfall is 1,509mm and the annual average sunshine duration is 1,980~2,050h. The general climatic features are: rapid warming in spring, frequent high temperature in summer, early coming of chill in autumn and much severe cold in winter.

4. Soil characteristics

There are too many soil types in the whole county, which are divided into 5 great soil groups, 11 subgenera, 46 soil genuses and 65 soil species. In the 5 great soil groups, the area of red earth is the largest with 67.48%, yellow earth takes up 10.04%, endodynamorphic soil 2.29%, paddy soil 18.24% and moisture soil 1.95%.

2.2.2 The social environment profiles

1. Social and economic profile of AnJi County

The total output value in 2012 was RMB 24.523 billion, increasing by 9.5% over the

same period of last year as per the comparable price. Therein, the value added of the primary industry was RMB2.538 billion increasing by 2.3%, the same of the secondary industry was RMB11.939 billion increasing by 11.0% and that of the tertiary industry was RMB10.048 billion, increasing by 9.4%. Calculated as per the registered population, the Per Capita GDP is RMB 53,380, increasing by 9.3% and converted into $ 8,456. The value added structure of the tertiary industry is adjusted to 10.3:48.7:41.0 from 10.7:49.4:39.9 of the last year.

The yearly gross output of agriculture, forestry, animal husbandry and fishery realizes RMB 3.784 billion. Therein, the output value of agriculture is RMB 2.383 billion, that of forestry is RMB 0.912 billion, that of animal husbandry is RMB 0.273 billion and that of fishery is RMB 0.171 billion. The yearly seeded area of grain is 25,500 hectares; that of industrial crop is 14,900 hectares, wherein the area of rapeseed is 3,087 hectares, that of vegetables is 6,700 hectares, and that of flowers and nursery stock is 1,813 hectares. The yearly yield of grain is 148,800t, that of rapeseed is 6,200t, and that of silkworm cocoon is 1,877t; the marketable fattened stock of fowl is 2,808,900, and that of live pigs is 93,600 heads; the output of aquatic products is 12,200t.

2. Water supply and discharge problem of AnJi County

1) Water source problem

Water source problems facing villages and small towns of AnJi area mainly include 2 types:

(1) Due to the gathering of population within the area, the water demand quantity within the scope of decentralized water supply service increases year by year, which causes the insufficient water quantity in the original water sources. To solve this problem, the new water source is in need of finding to supplement. Water supply project in Meixi area is to solve this problem.

(2) The new water supply way needs to be found additionally due to the pollution threat of the original water source. Water supply project in Tianhuangping area is to solve this problem. Daxi Village at the upstream of Pancun Reservoir—the water source of Tianhuangping area is the famous tourist attraction of AnJi County, and there are a large amount of happy farmhouses, drifts and other leisure tourism facilities built around it, which affects the water quality of Pancun Reservoir to certain degree. Due to the need of tourist economy development, it is hard to divide the Pancun Reservoir into the water conservation district, the source water quality is greatly affected by seasonality, and therefore, the new water supply way shall be found for water supply of Tianhuangping.

2) Inadequate water supply capacity of existing water plant within the area

With the increase of water demand within the service scope, the water supply capacity of existing water plant cannot meet the requirement of planning.

3) Inadequate treatment capacity of existing sewage disposal plant within the area

The existing treatment capacity of Meixi Sewage Disposal Plant and AnJi County Sewage Disposal Plant cannot meet the sewage quantity demand of the planning year, and expanding construction is needed. Meanwhile, upgrading and reconstruction are needed for the original sewage treatment process in AnJi Urban Sewage Disposal Plant based on the requirement of environmental protection.

4) Water supply and drainage pipes with the area are in need of perfecting

To fully exert the role of existing water plant and sewage disposal plant, the infrastructure construction of water supply and drainage pipes within the area shall be further perfected. Through the construction of regional rural joint water supply and drainage facilities, the water supply and drainage pipes of municipal administration and the internal village are perfected; through expanding the the service scope of municipal decentralized processing facilities to the rural areas around the market town, the rural and urban water supply and drainage facilities are integrated.

5) The sanitary conditions need to be improved for villages incapable of enjoying the service of municipal infrastructure.

As for villages far from the central market town, it is common to directly discharge the domestic sewage without treatment, the drainage system in villages is disordered, and safety water supply has not been realized in a part of villages. Through the construction of scattered rural sewage treatment project, a set of continual water supply and drainage system is established for villages with project implementation, and the hygienic conditions of villages are improved; via the simple terminal sewage treatment measures to treat the rural domestic sewage, pollution to the surrounding water from villages is reduced.

2.2.3 Current environment quality condition of the project area

1. Environmental quality survey and evaluation on surface water

The conventional water quality monitoring data between 2012 and 2013 of sections such as Chaitanbu section, West Tiaoxi Stream Dipu section, Zhili monitoring section, Jingwan section, Baishuiwan section, Liangpeng section, Wufengshan section, Banshanchang section and Liujiaqiao section and water quality monitoring results in 2012 of water plant sources—Fushi Reservoir and Tianzigang Reservoir are collected for environmental impact assessment.

(1) Ammonia nitrogen and total phosphorus indexes of West Tiaoxi Stream Dipu section can reach the standard in other months except for January and February exceeding the Class III *standard in Environmental Quality of Surface Water* (GB3838-2002).

(2)The conventional monitoring results of Fushi Reservoir in 2012 (see Attached Table 2.2-1 for details) could satisfy the Class II water quality standards, the indexes including dissolved oxygen, permanganate, BOD_5, ammonia nitrogen, total phosphorus, total nitrogen, copper, zinc, fluoride, selenium, arsenic, mercury, cadmium, hexavalent chromium, lead, cyanide, volatile phenol, petroleum, anionic surfactant, sulfate, chloride, nitrate nitrogen, iron and manganese, which are satisfactory for the project limits requirements to be regarded as domestic drinking water.

(3)All conventional monitoring indexes of Tianzigang Reservoir in 2012 (see Attached Table 2.2-2 for details) could satisfy the Class II and III water quality standards, including total hardness (calculated by CaCO3), chloride, sulfate, total dissolved solids, nitrate, nitrite, ammonia nitrogen, total phosphorus, total nitrogen, Volatile Phenol, anionic surfactant, chemical oxygen demand, fluoride, arsenic, iron, manganese, copper, zinc, cadmium, lead, chrome, mercury, total number of bacteria and total coliform group and it is satisfactory for the project limits requirements to be regarded as domestic drinking water.

AnJi water function and water environmental functional zoning diagram is shown in Fig. 2.2-2.

Surface water monitoring section diagram of AnJi area is shown in Fig. 2.2-3.

2. Survey and evaluation on the status of atmospheric environment

Based on 2012 atmosphere routine monitoring data of Chengdong conventional monitoring point in AnJi County environmental monitor station, the specifics are shown in the Attached Table 2.2-3.

It can be seen from the monitoring results that the daily average concentration range of SO2 is 0.011~0.025mg/m³, that of NO2 is 0.010~0.042mg/m³, and that of PM10 is 0.064~0.099mg/m³ in Chengdong monitoring point of AnJi County, all of which are lower than the limit value of Grade II standard in Ambient Air Quality Standards (GB3095-2012), and the status of ambient air quality in the project area is relatively good.

3. Monitoring and Evaluation of Noise Environment Conditions

The stationing monitoring is done for sewage disposal plant, water plant, pump station surrounding and villages of subproject of AnJi area during environmental impact assessment, and the monitoring result is shown in Table 2.2-1 and Attached Table 2.2-4 in details.

In general, the quality of acoustic environment of the place where the AnJi subproject locates is relatively perfect and can reaches relevant standard limits requirements in Quality Standard for Acoustic Environment (GB3096-2008).

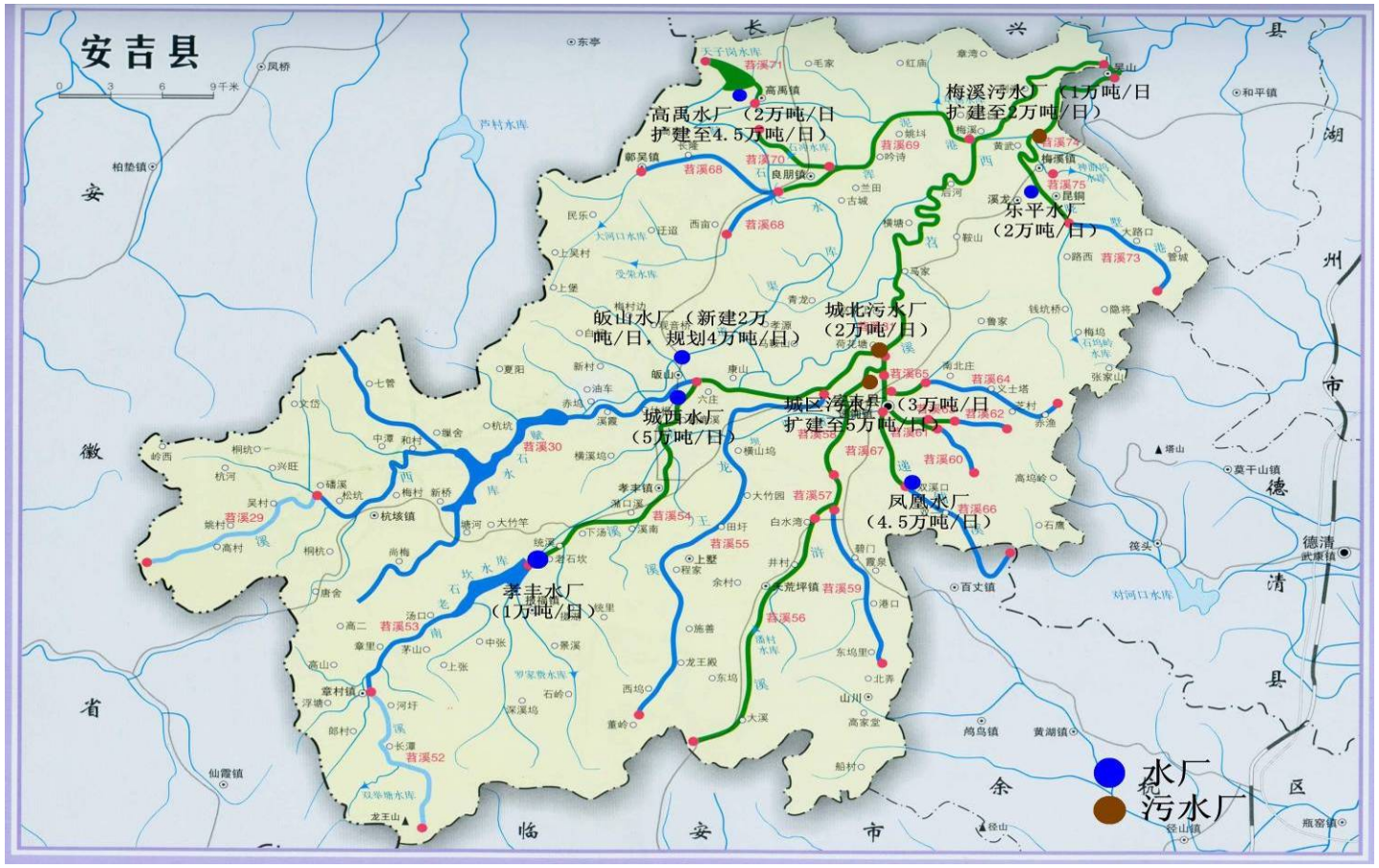


Fig. 2.2-2 Water Function and Water Environmental Functional Zoning Diagram in AnJi County

Table 2.2-1 List of Noise Status Monitoring Stationing and Monitoring Result

Serial No.	Subproject Name	Monitoring Location	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
1	AnJi Urban Sewage Disposal Plant	8 monitoring points are set, namely 2 points are separately set around the field.	>Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The noise level of the field of AnJi Chengxi Sewage Disposal Plant at the day and night lives up to the Class II standard of Emission Standard for Industrial Enterprise Noise in Field (GB12348-2008), and the acoustic environment are good in quality.
2	Banshan Water Plant	Set a position on the east, south, west and north of the field of water plant, with 4 positions in total.	>Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The noise monitoring value of various fields of Banshan water plant located land parcel is 49.4dB~53.5dB in the day, and the night noise is 41.2dB~47.2dB, both of which meet the limit value of Class II standard in Quality Standard for Acoustic Environment (GB3096-2008), and the acoustic environment is good in quality.
3	Gaoyu Water Plant	Set a position on the east, south, west and north of the field of water plant, with 4 positions in total.	>Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The noise monitoring value of various fields of Gaoyu Water Plant located land parcel is 44.5dB~53.4dB in the day, and is 41.2dB~47.2dB at night, both of which meet the limit value of Class II standard in Quality Standard for Acoustic Environment (GB3096-2008), and the acoustic environment is good in quality.
4	Meixi Sewage Disposal Plant	Set a position on the east, south, west and north of the field of water plant, with 4 positions in total.	>Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The noise monitoring value of various fields of Meixi Sewage Disposal Plant located land parcel is 47.4dB~54.4dB in the day, and the night noise is 45.2dB~48.7dB, both of which meet the limit value of Class II standard in Quality Standard for Acoustic Environment (GB3096-2008), and the acoustic environment is good in quality.
5	Water pumping station of Gaoyu Water Plant, 2# sewage lift pump station and 1# sewage lift pump station	Set a position on the east, south, west and north of the pump station.	>Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The four pump station fields of water pumping station of Gaoyu Water Plant, 2# sewage lift pump station, 1# sewage lift pump station and subproject water pumping station of Tianzihu area meet the limit value (55dB in the day and 45dB at night) of Class I standard in Quality Standard for Acoustic Environment (GB3096-2008), and the acoustic environment is good in quality.
6	Subproject Water Pumping Station of Tianzihu Area	Set a position on the east, south, west and north of the pump station, with 4 positions in total.	>Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	

2.3 Regional Environment Profile of Fuyang City

2.3.1 Overview of natural environment

1. Geographic position

Fuyang City is located in the west of Zhejiang Province, with the geographic coordinates: east longitude 119°25′-120°19.5′, northern latitude 29°44′45"-30°11′58.5" (the central position: east longitude 119°57′, northern latitude 30°03′). It borders on Xiaoshan District of Hangzhou City in the east, connects Zhuji City in the south, being adjoint to Tonglu County in the west and Lin'an City, Yuhang District and Xihu District in the north. The territory of the city is 68.67km long from east to west, and 50.37km wide from south to north. It covers a total area of 1831sq. m. Fuchun River flows through the center and the No.320 State Highway runs across the whole territory.

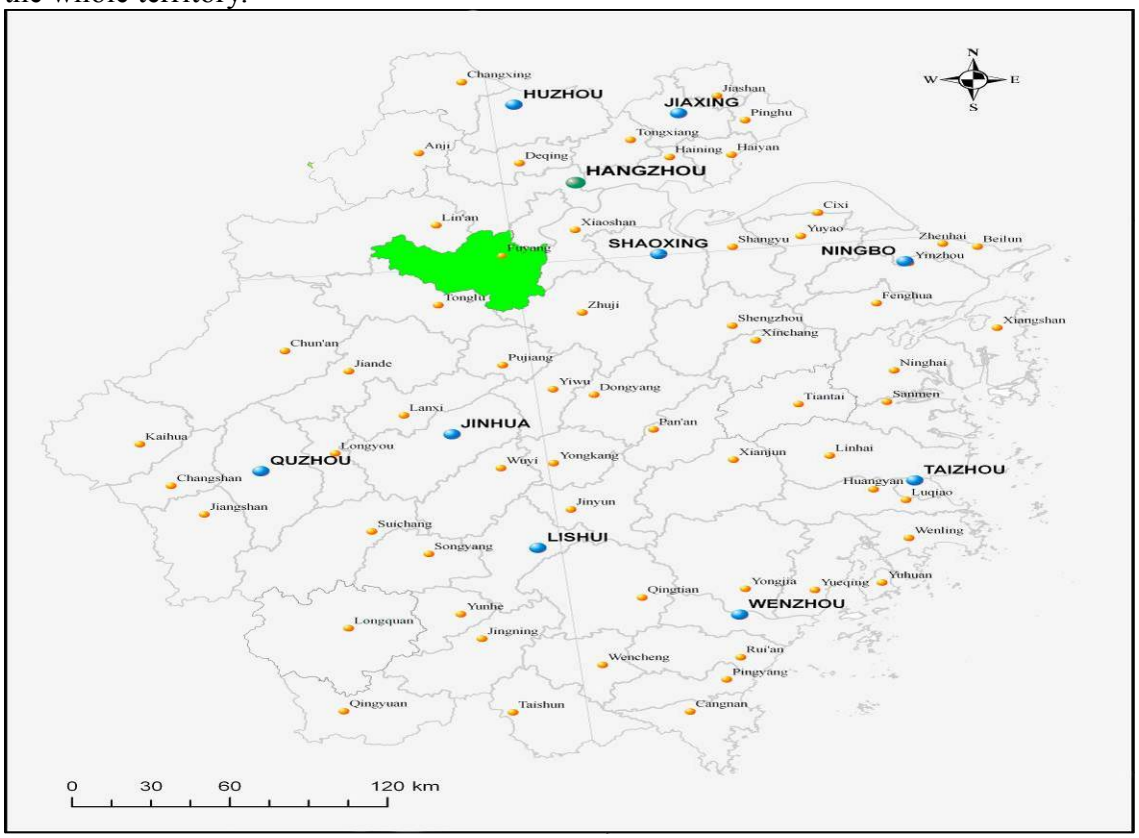


Fig. 2.3-1 Position of Fuyang in Zhejiang Province

2. Landform

Located at the mountain area of northern Zhejiang, the terrain of Fuyang City is primary hills and low mountains, with part being the plain of small area as the major agricultural cultivation area. The rest regions are big in terrain undulation and complicated in geologic structure. As located at the hilly land, the entire Fuyang City has a complicated watershed and multiple seasonal streams in the mountain area which generally features big peak discharge during wet season rainstorm and no water during dry season. For the water supply engineering, the selection of water source is generally three types: reservoir water, spring water or stream converging water, according to the geomorphologic characteristics.

3. Climatic and meteorological features

Belonging to the subtropical monsoon climate, Fuyang City has four distinctive seasons, a moderate climate and abundant rainfall. The annual average temperature is 16.3℃, the average rainfall over the years is 1480mm, the climate changes a lot within one year and the season change is obvious: as controlled by the Siberian cold high in winter, the climate is cold and dry, the monthly average temperature from December to February of the next year is between 3-6℃, the average monthly rainfall is 50-80mm and the rainfall of the season only accounts for about 15% of the whole year; the high pressure in the north gradually decays and the warm and wet airflow in the south gradually becomes stronger in spring: the cold air mass meets the warm air mass, which sometimes advance and sometimes retreat to form the frontal rain, commonly known as “plum rains”, with long rain time and wet air. The monthly average temperature from March to May is between 10-20℃, the average monthly rainfall is 130-200mm and the rainfall of the season accounts for about 32% of the whole year; as controlled by Pacific high pressure in summer, the climate is hot, the monthly average temperature from June to August is between 24-29℃, the average monthly rainfall is 140-200mm and the rainfall of the season accounts for about 33% of the whole year. There are frequent rainstorms from late May to early July, causing the flood. There is frequent long drought from July to August to cause drying up of the mountain stream and brook; in autumn, the original warm and wet airflow is forced to lift because the cold air of the north gradually heads south, the weather conditions being stable. However, there is sometimes the influence of the typhoon in August and September to bring about heavy rains causing the flood. The monthly average temperature from September to November is between 12-24℃, the average monthly rainfall is 60-190mm and the rainfall of the season accounts for about 20% of the whole year.

4. Hydrology of Fuchun River

(1) Profile of Fuchun River

As the constituent reach of Qiantang River, Fuchun River flows from the northeast of Meicheng through Wushitan to Qililong Gorge and flows out the gorge at Lucibu; after including Fenshui River on the left at Tonglu County, it successively includes Luzhu River, Xinqiao River on the left, Huyuan River, Dayuan Stream on the right and flows via Fuyang to Wenjiayan into the estuary section of Qiantang River. The total length of Fuchun River is 102km, including a length of 52km (from the outlet of Luzhu River bordering on Tonglu to 1250m downstream Yan’e Mountain of Changlingtou of Fuyang bordering on Xiaoshan) inside Fuyang. Limited by the mountains on both banks and the bed material, over the years, the reaches above Guanshan Mountain near Fuyang City have small watercourse erosion amount and small bending coefficient, which are of microbend reaches. The regions above Tangjiabu which has hard terranes are cut to gorge, such as Tangjiabu Gorge, making the watercourse feature rhizoma nelumbinis shape, the narrow valley with rapid water and the wide valley with lots of beaches. There is a shoal formed by sedimentation of the silt of coarse particle and incoming sediment from the sea area at the watercourses under Fuyang City because of the suddenly broadening after the narrowing of the Guanshan Mountain cross section and the damming effect of the big curve of Wenjiayan, which gradually develops to branching river pattern. The shoal moved down and merged into the bank before the 1960s, for example, Minzhu Shoal merged into Dongzhou, Chang’an Shoal continuously expanded and merged into small shoals, causing the watercourse tributary arm to reduce and the water flow to flow back the channel. Since 1960, the branching river regime has gradually become stable because

of construction of reservoir of Xin'an River and decrease of incoming sediment of the water basin.

Fuyang reach of Fuchun River is the tidal reach based on the flood effect, with a total length of 52km and river width of 700-1000m of this watercourse. All rivers inside Fuyang City belong to the river system of Fuchun River. In addition to Fuchun River mainstream, the major tributaries are Luzhu River, Huyuan River, Shangli Stream, Longmen Stream, Qingyun River Mouth, Xinqiao River, Dayuan Stream, Yushan Stream, Xiaoyuan Stream, Changlv Stream, namely "one river and ten streams".

The engineering reach is located downstream the clamping mouth of Fuyang Guanshan Mountain. After exiting the clamping mouth of Fuyang Guanshan Mountain, Fuchun River becomes broader in the surface which makes the upstream sand gravels and other material of coarse particle liable to stay here to form many shoals. There are Dongzhou Island, Xinsha Island and Chang'an Shoal and other shoals distributing at the reach about 26km from Fuyang to Wenjiayan. The largest shoal is Dongzhou Island downstream Fuyang, with a length of 10km, the maximum width of 3.5km, and an area of about 24km2; the second largest is Chang'an Shoal, with a length of 5km, the maximum width of 2km, and an area of about 6km2; Xinsha Island is about 3.9km long, with the maximum width of 1.5km and an area of about 4km2. These shoals are relatively large in scale with coarse particles at the bottom and relatively fine particles at the top, which are generally stable and only change with the water regimen during great flood. The middle branch (north branch of Xinsha and south branch of Dongzhou) of the engineering reach is Fuchun River main stream which has a slightly curved watercourse, with top connecting to the clamping mouth of Guanshan Mountain and bottom connecting to Lingqiao~Lishan Curves, being in a reversed "S" shape and 400-700m in river width; its upstream and downstream nodes, the clamping mouth of Guanshan Mountain and Lingqiao~Lishan Curves, have been relatively stable for over 40 years, while the main channel of the reaches between the upstream and downstream nodes occurs with swings to a certain extend under different runoff conditions because of flow path divergence. The south branch (of Xinsha) is about 5km long with the river width of only about 200-400m, however, its included angle with flow direction of main flow of flood tide and ebb tide is large and the distributary is smaller than middle branch. The north branch is branch of Dongzhou (also called Baihe River, referred to as "north branch of Dongzhou"), with a length of about 12.5km and a general river surface width of 250-300m and was blocked in 1975.

(2) Runoff

Before the construction of Fuchun River Hydropower Station, the runoff control station of main stream of Qiantang River was Lucibu Station, with a control area of about 31300km². The runoffs of the main stream are subject to the discharged flow of the hydropower station after the completion and power generation of Fuchun River Hydropower Station in December, 1968. The measured runoff characteristics of Lucibu Station (Fuchun River Hydropower Station) are as shown in Table 2.3-1.

Table 2.3-1 Flow Characteristics of Lucibu (Fuchun River Hydropower Station)

Hydrometric Station

Item	Numerical Value	Term
Average Annual Discharge	952m3/s	1932-2007
Maximum Average Annual Discharge	1704m3/s	1954
Minimum Average Annual	411m3/s	1979

Discharge		
Maximum Peak Discharge	29000m3/s	June22, 1955
Minimum Low Water Discharge	15.4m3/s	August 22, 1934
Average Annual Discharge	30 billion m3	1932-2007

② The periodicity and inhomogeneity of flow distribution. There is interannual continuous abundant water, low water periodic change. The runoffs had relatively low water in the 1960s, 1980s and the first decade of 21st century except 1983; and the runoffs had relatively abundant water in the 1950s and 1970s and 1990s. There is flood season and dry season change within one year. The runoff volume during 4 months of flood season (March to June or April to July) accounts for about 61.3% of the whole year; the greater flood volume generated in one rainstorm can account for 30-40% of the runoff volume of the whole year.

③ The influence of the construction of the upstream reservoir is obvious. Xin'an River Reservoir is the largest reservoir built in Qiantang River Basin, with a rainwater harvesting area of 10,404km2 accounting for 1/3 of that of Lucibu Station, and with a capacity of 17.8 billion m^3. Built in 1960 for water storage, Xin'an River Reservoir is a multi-year regulating storage reservoir. The flow of 40-260m^3/s can be added after minimum 30-90 days of average flow regulation for the multi-year average case (i.e., 50% frequency), which has a very obvious effect on improving the low water runoff; for the 70%-90% relatively low flow, 100-200m^3/s can be added after 30-90 days of average flow regulation. The flow distribution during one year tended to be even after the construction of the reservoir; the runoff volume is reduced by 20.6% during March to July Meixun period while being increased by 22.3% during dry season.

④ The great flood of Qiantang River main stream is mainly caused by plum rains (accounting for 88%), mainly happening in April to late June for 3-7 days, the flow process being mainly the multi-peak type; the downstream tributaries such as Puyang River and Cao'e River are mainly caused by typhoon rainstorm, mainly happening in July to September for short time, the flow process being mainly the sharp thin single-peak type.

⑤ Generally, the greater river upstream runoff volume, the stronger the dilution effect of the river, the better downstream water quality; the smaller runoff volume, the poorer water quality; as a result, it is the low water discharge that water environment research cares much about. Taken the driest month in the 12 months of every year as the specimen to carry out guarantee rate statistic analysis of the discharged flow of the driest month of Fuchun River Hydropower Station from 1969 to the present, the respective average flow of the driest month with 10%, 25%, 50%, 75% and 90% guarantee rate is 520, 425, 330, 250 and 173m3/s.

According to Code of Practice for Computation on Allowable Permitted Assimilative Capacity of Water Bodies (SL348-2006), it shall use the average flow of the driest month with 90% guarantee as the design flow to compute the assimilative capacity and limited pollution discharge amount of water bodies; the discharged flow of the driest month with 90% guarantee rate of Fuchun River Hydropower Station is 173m3/s.

(3) Tide

Located at the river section of Qiantang River estuary, Fuyang reach mainly functions as runoff, but the reach under Fuchun River Hydropower Station where Fuyang reach is located is tidal reach which still is affected by the tide. High water level is close to runoff: high in flood season, low in dry season, with a great amplitude of variation; the low water level is relevant to runoff and close to Qiantang River estuary sandbar:

high in Meiyu flood period, rapidly lowering after Meiyu flood period; during low water and spring tide in autumn and winter, low water level gradually rises with the slow rise of sandbar. The statistical result of multi-year tide characteristics of the engineering region please sees Table 2.3-2.

Table 2.3-2 Statistical Table of Tide Characteristics of The Engineering Reach
Unit: m

Hydrologic station / Item	Fuyang	Wenjiayan	Sluice gate
Mean high tide	4.52	4.42	4.42
Mean low tide	4.06	3.95	3.86
Mean tide range	0.46	0.47	0.56
Historical maximum tide level	9.94(1997/7/11)	8.17(1997/7/11)	8.02(1997/8/19)
Historical minimum tide level	1.79(1989/8/14)	1.19(1954/8/11)	1.15(1954/8/10)
Historical extreme tide range	2.77(1994/8/22)	3.17(1954/8/17)	3.69(2002/9/8)

Note: The statistical information of Fuyang Station is from 1957 to 2007, and that of other stations is from 1953 to 2007.

5. Seismic intensity

The earthquake magnitude of Fuyang City is small with low intensity, unapparent activity cycle, so Fuyang City belongs to the relatively stable region. The new tectonic movement of this region is not strong; the basic earthquake fortification intensity of the engineering location is 6 degree according to the Earthquake Intensity Zoning Map of China.

6. Soil characteristics

The soil type of the Qiantang River Basin can be divided into red earth, yellow earth, yellow brown earth, mountain meadow soil, purple soil, limestone soil, skeleton soil, moisture soil, saline soil and paddy soil.

2. 3.2 The social environment profiles

1. Social economy profile of Fuyang City

Fuyang City governs 4 subdistricts, 15 towns, 6 townships (Fuchun Subdistrict, Dongzhou Subdistrict, Chunjiang Subdistrict, Lushan Subdistrict; Gaoqiao Town, Shouxiang Town, Changkou Town, Chang'an Town, Wanshi Town, Dongqiao Town, Xukou Town, Xindeng Town, Luzhu Town, Lingqiao Town, Dayuan Town, Changlv Town, Longmen Town, Lishan Town, Yongchang Town; Huanshan Township, Huyuan Township, Shangguan Township, Yushan Township, Chunjian Township, Xintong Township), 276 administrative villages, 23 communities (neighborhood committees). The registered population of Fuyang City in 2012 is 632,200.

The gross regional domestic product (GDP) of the city in 2012 is RMB 54.14 billion, with an increase of 8.7%. Therein, the added value of the primary industry is RMB 3.59 billion, with an increase of 2.6%, and that of the secondary industry is RMB 32.50 billion, with an increase of 9.3%, and that of the tertiary industry is RMB 18.05 billion, with an increase of 8.6%.

The general budgetary revenue of local governments totals RMB 7.847 billion, with an increase of 1.7% over the last year. Therein, the local financial revenue is RMB 4.201 billion, with an increase of 2.6%. The general budget expenditure of the local

finance of the whole year is RMB 4.80 billion, with an increase of 2.4%.
The gross output value of farming, forestry, animal husbandry and fishery of the whole year is RMB 5.07 billion, with an increase of 8.1%. Therein, the value of agricultural production is RMB 2.80 billion, with an increase of 7.8%; the value of forestry production is RMB 0.73 billion, with an increase of 8.6%; the value of animal husbandry production is RMB 1.20 billion, with an increase of 8.1%; the value of fishery production is RMB 0.3 billion, with an increase of 7.1%. The grain acreage is 347,000 mu (about 23133 ha), with a decline of 0.6%. The grain output is 148,000 tons, with a decline of 0.8%. The meat production such as pork, beef, mutton and poultry is 52,734 tons, the egg production is 10,116 tons and silkworm cocoon production is 2,064 tons.
The annual invested fund for beautiful village construction project called"Fuchun Shanju" is RMB 454.47 million and 10 boutique villages named"Beautiful Villages of Fuchun Shanju" have been built. Rectification of 30 municipal key villages has been completed. 16,169 peasants have been trained and 2,477 have completed transferred employment. Engineering construction of drinking water of 19 villages has been implemented, fund of RMB 36.5 million has been invested for each level and the water supplies of 31,400 persons have been solved.

2.3.3 Investigation and evaluation of present environment quality condition of project location

1. Environmental quality survey and evaluation on surface water

The rivers near the Fuyang subproject location such as Fuchun River, Gexi River, Songxi River, Luzhu River, Dayuan River and Nanxin River have been monitored and the routine monitoring data of Fuchun River has been collected in the environmental evaluation; please see Table 2.3-3 and Attached Table 2.3-1 to Table 2.3-2 for specific details.
The monitoring results show that the COD and ammonia nitrogen of Gexi River near the project location have exceeded the standard and cannot meet the functional requirements of the current class II water; TN, NH_3-N, BOD_5 and COD_{Mn} of Songxi River, Luzhu River and other rivers have exceeded the standard, which is mainly caused by the regional domestic sewage directly discharged into the surface water; the current water quality of the cross sections from Fuchun River Fuyang Bridge to Ling Bridge cannot meet the objective requirements of class III water quality, the factors exceeding the standard mainly consist of fecal coliform, permanganate index, total phosphorus and petroleum pollutants which are mainly caused by the discharged pollutants of the drainage of its own basin. COD, DO, TN, NH_3-N, T and petroleum in Dayuanxi River cause relatively serious pollution of current water quality of surface waters in the region.
Generally speaking, rivers where the project locates are affected from the pollutants discharged along the rivers, water quality exceeds the standards at different levels, which can no longer satisfy the requirements on water functional areas, and the water quality is poor.

2. Survey and evaluation on the status of atmospheric environment

Please see Table 2.3-4 for the monitoring results of the regional ambient air status of Fuyang subproject.
The monitoring results show that concentration of both ammonia and hydrogen sulfide in the region of Fuyang subproject location can reach the maximum

acceptable concentration of hazardous substance in the air of the residential areas according to *the Hygienic Standards for the Design of Industrial Enterprises* (TJ36-79), while that of PM10, SO2 and NO2 can meet the Class II *standards in Ambient Air Quality Standards* (GB3095-2012). All in all, ambient air quality in the region is relatively satisfactory.

3. Monitoring and Evaluation of Noise Environment Conditions

Please see Table 2.3-5 and Attached Table 2.3-3 for the monitoring results of noise status of the proposed place of Fuyang subproject.

The monitoring results show that, except that the east and the west boundaries of the Longyang Sewage Disposal Plant can not meet the Class 1 standard at day time as required in *Environmental Quality Standard for Noise* at daytime, and that the south, west and north boundaries can not meet the Class 1 standard at night, noise level round the clock of other proposed places for Fuyang subproject can all meet the Class 2 and 4a standards in *Environmental Quality Standard for Noise* (GB3096-2008). All in all, regional acoustic environment is relatively good.

4. Investigation and evaluation of groundwater environmental status

Please see Table 2.3-6 and Attached Table 2.3-4 for the monitoring results of regional groundwater status of Fuyang subproject.

The monitoring results show that except that fecal coliform in groundwater nearby the Xindeng Sewage Disposal Plant exceeds the Class III standard in Quality Standard for Ground Water (GB/T14848-93), other indexes are up to standards; and that each and every monitoring index at the gauging point for groundwater of other regions is able to meet the Class III standard in Quality Standard for Ground Water (GB/T14848-93). As a whole, the quality of the regional groundwater environment is relatively good.

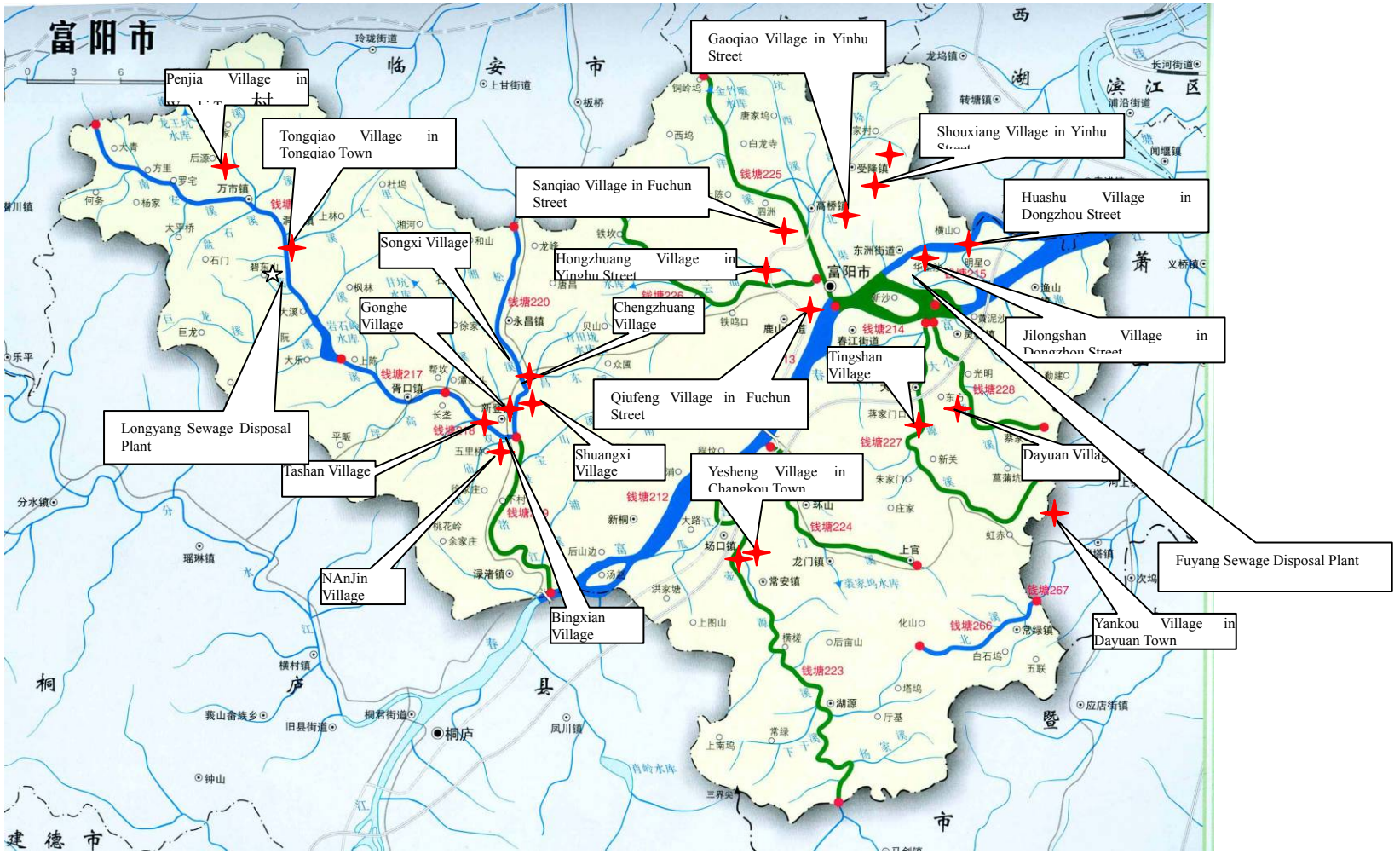


Figure 2.3-2 Block plan of the water function and water environmental function of Fuyang City

Table 2.3-3 Table for Monitoring Distribution Points and Monitoring Results of Surface Water Status of Fuyang Subproject Region

Serial No.	Subproject Name	Monitoring section	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
1	Longyang Sewage Disposal Plant	2 cross sections: 500m upstream of the outlet of Longyang Sewage Disposal Plant, intersection of Gexi River and Yanshiling Reservoir.	pH value, CODMN, DO, NH3-N, petroleum type, LAS, BOD5, TN, TP, volatile phenol, fluoride and mercury	Each cross section is monitored twice a day, respectively in each morning and afternoon of July 27, July 28, 2013.	COD_{Mn} of the monitored cross section at 500m upstream of the discharge outlet of Longyang Sewage Disposal Plant can reach class III standard of *Environmental Quality Standards for Surface Water* (GB3838-2002), the four indexes of DO, BOD5, total nitrogen and petroleum type cannot meet the standard, and other indexes can meet class II standard; in the water quality indexes of the monitored cross section of the intersection of Gexi River and Yanshiling Reservoir, pH, LAS, TP, volatile phenol and fluoride can meet class II standard of *Environmental Quality Standards for Surface Water* (GB3838-2002), and the major factor exceeding the standard is COD_{Mn}. Gexi River has the ordinary water quality, which can no longer meet the functional requirements of the current class II water.
2	Renovation engineering project of water supply and drainage pipe network of Xindeng Zhenji Town of Fuyang City	4 cross sections: 1# is 500m upstream of the discharge outlet of Xindeng Sewage Disposal Plant, 2# is the intersection of Songxi River and Luzhu River, 3# is the intersection of Xinpu River and Luzhu River, and 4# is the cross section of Songxi River.	pH value, CODMN, DO, NH3-N, petroleum type, LAS, BOD5, TN, TP, volatile phenol, fluoride and mercury	Each cross section is monitored twice a day, respectively in each morning and afternoon of July 27, July 28, 2013.	1. The major factor exceeding the standard in the monitored cross section of 500m upstream of the discharge outlet of Xindeng Sewage Disposal Plant is TN, and the rest monitored factors all meet class III standard of *Environmental Quality Standards for Surface Water* (GB3838-2002); 2. The major factors exceeding the standard in the monitored cross section of the intersection of Songxi River and Luzhu River are TN and NH_3-N, and the rest monitored factors all meet class III standard of Environmental Quality Standards for Surface Water (GB3838-2002); 3. The major factors exceeding the standard in the monitored cross section of the intersection of Songxi River and Luzhu River are TN and NH_3-N, and the rest monitored factors all meet class III standard of *Environmental Quality Standards for Surface Water* (GB3838-2002); 4. The major factors exceeding the standard in the monitored cross section of Songxi River are TN, BOD5

Serial No.	Subproject Name	Monitoring section	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
					and COD_{Mn}, and the rest monitored factors all meet class II standard. Therefore, the monitoring results of the current state show that the current surface water quality has been heavily polluted, the major exceeding factors being TN, NH_3-N, BOD5 and COD_{Mn}, which is mainly caused by the regional domestic sewage directly discharged into the surface water.
3	Project Phase IV of Fuyang Sewage Disposal Plant	6 conventional cross sections in the upstream and downstream of Fuchun River: Zhakou cross section, Zhaixi cross section, Fuyang cross section, Qingjiangkou cross section, Zhongbu cross section and Lingqiao cross section.	pH, dissolved oxygen, permanganate index, ammonia nitrogen, petroleum, LAS, BOD5, total phosphorus, volatile phenol, fluoride, mercury, hexavalent chromium, copper, zinc, total hardness, sulfate, arsenic, chloride, odor and taste, fecal coliform, etc.	Routine data of the latest three years (2010-2012)	According to Protective *Function Zoning of the Surface Water Environment of Zhejiang Province*, Zhakou cross section of Fuchun River and Lingqiao cross section belong to class III water environment functional zones, and Zhaixi cross section, Fuyang cross section, Qingjiangkou cross section and Zhongbu cross section belong to class II water environment functional zones. 1. Zhakou cross section: fecal coliform exceeds the standard, the water quality fails to meet the standard requirement of class III water quality, and fecal coliform belongs to class IV. 2. Zhaixi cross section: fecal coliform and total phosphorus exceed the standards, the water quality fails to meet the standard requirement of class II water quality, fecal coliform belongs to class III, and total phosphorus belongs to class III. 3. Fuyang cross section: the water quality meets the standard requirement of class II water quality. 4. Qingjiangkou cross section: fecal coliform exceeds the standard, the water quality fails to meet the standard requirement of class II water quality and fecal coliform belongs to class III. 5. Lingqiao cross section: fecal coliform and permanganate index exceed the standard, the water quality fails to meet the standard requirement of class III water quality, fecal coliform belongs to class IV and permanganate index belongs to class IV. 6. Zhongbu cross section: fecal coliform and permanganate index exceed the standard, the water quality fails to meet the standard requirement of class II water quality, fecal

Serial No.	Subproject Name	Monitoring section	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
					coliform belongs to class III and permanganate index belongs to class III. The current water quality of the cross sections from Fuchun River Fuyang Bridge to Lingqiao cannot meet the objective requirements of class III water quality, the factors exceeding the standard mainly being fecal coliform, permanganate index, total phosphorus and petroleum pollutants. The reason causing the current water quality to exceed the standard is mainly the discharged pollutants from the drainage of its own basin, including the pollutants brought by the upland water and the discharge of the surface source and point source of both banks of this reach.
4	Renovation engineering project of water supply and drainage pipe network of Dayuan Zhenji Town of Fuyang City	4 cross sections have been set in the regional surface waters of Fuchun River and Dayuan River: 1# is 500m upstream of the discharge outlet of Dayuan Sewage Disposal Plant, 2# is the discharge outlet of Dayuan Sewage Disposal Plant, 3# is the connect cross section of Qiantang 214 and Qiantang 215, and 4# is the cross section of Dayuan River.	pH value, CODMn, DO, NH3-N, petroleum, LAS, BOD5, TN, TP, volatile phenol, anionic surfactant, fluoride, mercury and total phosphorus.	Each cross section is monitored twice a day, respectively in each morning and afternoon of July 27, July 28, 2013.	The major factors exceeding the standard in each monitored cross section are COD, DO, TN, NH_3-N, TP and petroleum; the current surface water quality of the region has been greatly polluted, which is mainly caused by the regional domestic sewage directly discharged into the surface water.
5	Demonstration system of sewage disposal of decentralized villages of Fuyang City	The cross section of the intersection of Nanxin River and Gexi River, the cross section 500m upstream of the discharge outlet of Yinhu Subdistrict Hongzhuang Village Sewage Disposal Station, the cross section 500m upstream of the discharge	pH, BOD5, CODMn, NH3-N, petroleum, LAS, TN, TP and volatile phenol	Each cross section is monitored twice a day, respectively in each morning and afternoon of July 27, July 28, 2013.	1. The water quality of the monitored cross section of the intersection of Nanxin River and Gexi River exceeds the class II standard of *Environmental Quality Standards for Surface Water* (GB3838-2002), the major factors exceeding the standard being BOD5 and NH3-N; 2. The water quality of the monitored cross section 500m upstream of the discharge outlet of Yinhu Subdistrict Hongzhuang Village Sewage Disposal Station exceeded the class III standard of *Environmental Quality Standards for Surface Water* (GB3838-2002), the major factor exceeding

Serial No.	Subproject Name	Monitoring section	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
		outlet Yankou Village Sewage Disposal Station of Dayuan Town and the cross section of the intersection of Dayuan River and Fuchun River			the standard being COD_{Mn}; 3. Each monitored factor of the monitored cross section 500m upstream of the discharge outlet of Dayuan Town Yankou Village Sewage Disposal Station all meets class III standard; 4. Each monitored factor of the monitored cross section of the intersection of Dayuan River and Fuchun River all meets class III standard. Generally, the current surface water quality of the intersection of Dayuan River and Fuchun River has been seriously polluted, and the water environment near the rest projects has good conditions, with each monitored factor all meeting the standard or individual water quality factor slightly exceeding the standard.

Table 2.3-4 Table for Monitoring Distribution Points and Monitoring Results of Atmospheric Status of Fuyang Subproject Region

Serial No.	Subproject Name	Monitoring Location	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
1	Longyang Sewage Disposal Plant	Mujiawu Village, FAnJia village and Chenlin village	Ammonia, sulfureted hydrogen and odor concentration	From July 27 to August 2, 2013 Continuously monitoring for 7 days, monitoring the hour value, 4 times a day	Ammonia and sulfureted hydrogen concentration of each monitoring point can reach the maximum allowable concentration of hazardous substance in the atmosphere of the residential area stipulated in *the Hygienic Standards for the Design of Industrial Enterprises* (TJ36-79), the ambient air quality in the region being good.
2	Renovation engineering project of water supply and drainage pipe network of Xindeng Zhenji Town of Fuyang City	Upwind direction 1, downwind direction 2 and downwind direction 3 of Xindeng Sewage Disposal Plant	Ammonia, sulfureted hydrogen and odor concentration	From July 27 to August 2, 2013 Continuously monitoring for 7 days, monitoring the hour value, 4 times a day	The one-time concentration mean value of H2S and NH3 of each monitoring point is lower than the maximum allowable concentration of hazardous substance in the atmosphere of the residential area stipulated in the TJ36-79 *Hygienic Standards for the Design of Industrial Enterprises*, the ambient air quality being good.
3	Phase IV of Fuyang Sewage Disposal Plant	5 monitoring points of ambient air are set: east of plant boundary of 1# project site, south of plant boundary of 2# project site, west of plant boundary of 3# project site, north of plant boundary of 4# project site and 5# Minfeng (Jilongshan) Village	Ammonia and hydrogen sulfide	Carried out in July 2013 Continuously monitoring for 7 days, monitoring the hour value, 4 times a day	The one-time concentration value of NH3 of the 5 monitoring points of project phase IV of Fuyang Sewage Disposal Plant is lower than 0.01mg/m³, and the one-time concentration value of NH2 is lower than 0.001mg/m³, both meeting the requirement of the maximum allowable concentration of hazardous substance in the atmosphere of the residential area stipulated in the *Hygienic Standards for the Design of Industrial Enterprises* (TJ36-79), the ambient air quality of the proposed place of the project being good.
4	Renovation engineering project of water supply and drainage pipe network of Dayuan Zhenji Town of Fuyang City	3 monitoring points are respectively located at 1 at the upwind direction, and 2 at the downwind direction of Dayuan Sewage Disposal Plant	NH3, H2S and odor concentration	Continuously monitoring for 7 days from July 27 to August 2, 2013, 4 times a day	The one-time concentration value of H2S and NH3 is lower than the maximum allowable concentration of hazardous substance in the atmosphere of the residential area stipulated in the TJ36-79 *Hygienic Standards for the Design of Industrial Enterprises*, the ambient air

Serial No.	Subproject Name	Monitoring Location	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
					quality in the region being good.
5	Demonstration system of sewage disposal of decentralized villages of Fuyang City	One monitoring point is set in Hongzhuang Village Yinhu Subdistrict, one in Pengjia Village Wanshi Town and one in Yankou Village Dayuan Town.	PM10, SO2, NO2, H2S and NH3	Continuously monitoring for 7 days from July 27 to August 2, 2013	PM10, SO2, NO2 concentration of each monitoring point meets the Class II *standard of Ambient Air Quality Standards* (GB3095-2012). The one-time concentration mean value of H2S and NH3 of each monitoring point is lower than the maximum allowable concentration of hazardous substance in the atmosphere of the residential area stipulated in the TJ36-79 *Hygienic Standards for the Design of Industrial Enterprises*, the ambient air quality being good.
6	Demonstration project of sewage interception pipeline for rural sewage of Fuyang City	2 monitoring points are set in Dongqiao Village and Huanggongwang Village	PM10, SO2 and NO2	Continuously monitoring for 7 days from July 27 to August 2, 2013	The daily average concentration of PM10, SO2, NO2 of the project region meets the Class II *standard of Ambient Air Quality Standards* (GB3095-2012), the overall ambient air quality of the project region being able to meet the class II functional zone of ambient air quality.

Table 2.3-5 Table for Monitoring Distribution Points and Monitoring Results of Noise Status of Fuyang

Serial No.	Subproject Name	Monitoring Location	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
1	Longyang Sewage Disposal Plant	4 monitoring points are set, namely, one point is separately set around the 4 boundaries.	Leq dB(A)	Carried out on July 28, 2013 With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	East and west boundaries of Longyang Sewage Disposal Plant fail to meet class 1 standard of *Environmental Quality Standard for Noise* in the day, and south, west and north boundaries of the plant fail to meet class 1 standard at night.
2	Renovation engineering project of water supply and drainage pipe network of Xindeng Zhenji Town of Fuyang City	Five points in total including those in east, south, west, north of the plant boundary respectively, as well as one in the sensitive point Shuangta Village.	Leq dB(A)	Carried out on August 2, 2013 With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The current noise state of the plant boundary of Xindeng Sewage Disposal Plant meets the class 2 standard of *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality being good.
3	The Fuyang Sewage Disposal Plant Project Phase IV	4 Monitoring points are set in the plant boundary of the plant site.	Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The periphery of Fuyang Sewage Disposal Plant meets the class 2 and class 4 standard of *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality being good.
4	Renovation engineering project of water supply and drainage pipe network of Dayuan Zhenji Town of Fuyang City	One is in Dayuan Village and one in Tingshan Village respectively, there are two in total.	Leq dB(A)	August 2, 2013, with 1 day of monitoring, 1 time respectively in the day and at night.	The current acoustic environment state of the project engineering region meets the class 2 standard of *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality being good.
5	Demonstration system of sewage disposal of decentralized villages of Fuyang City	Hongzhuang Village Yinhu Subdistrict and 4 plant boundaries of sewage disposal station; Pengjia Village Wanshi Town and 4 plant	Leq dB(A)	August 2, 2013, with 1 day of monitoring, 1 time respectively in the day and at night.	The day and night noise levels of all the monitoring points can meet the class 2 functional zone standard requirements of *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality being good.

		boundaries of sewage disposal station; Yankou Village Dayuan Town and 4 plant boundaries of sewage disposal station.			
6	Demonstration project of sewage interception pipeline for rural sewage of Fuyang City	One is in Qiufeng Village, Sanqiao Village, Huanggongwang Village, Jilongshan Village, Gaoqiao Village, Shouxiang Village, Xinchang Village and Dongqiao Village Respectively; there are 8 monitoring points in total.	Leq dB(A)	August 2, 2013, with 1 day of monitoring, 1 time respectively in the day and at night.	The day and night noise levels of all the monitoring points can meet the class 2 functional zone standard requirements of *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality being good.

Table 2.3-6 Table for Monitoring Distribution Points and Monitoring Results of Ground Water Status of Fuyang Subproject Region

Serial No.	Subproject Name	Monitoring section	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
1	Longyang Sewage Disposal Plant	3 monitoring points for ground water: 1. 500m upstream of the project, 2. the project location, 3. 500m downstream of the project.	pH value, ammonia nitrogen, LAS, arsenic, mercury, lead, zinc, copper, cadmium and hexavalent chromium	Monitor one time on July 28, 2013	Each water quality index of the 3 monitoring points for ground water near Longyang Sewage Disposal Plant can meet the class III standard of *Quality Standard for Ground Water* (GB/T14848-93), the ground water quality of the evaluated region being good.
2	Renovation engineering project of water supply and drainage pipe network of Xindeng Zhenji Town of Fuyang City	3 inspection well points are set respectively at 500m upstream of the project (Guanting Village), boundary of the project location, 500m downstream of the project (Shuangta Village).	pH value, CODcr, NH_3-N, petroleum, LAS, BOD5, TN, TP, Hg, As, Pb, Cd, Zn2+, Cu2+, Cr6+, fecal coliform.	Monitor one time on July 28, 2013	Fecal coliform index in the ground water indexes in the region near Xindeng Sewage Disposal Plant exceeds class III standard of *Quality Standard for Ground Water* (GB/T14848-93), the ground water of the region being polluted, which is mainly caused by the regional domestic sewage permeated into the ground water.
3	The Fuyang Sewage Disposal Plant Project Phase IV	3 monitoring points for groundwater environment are set respectively at 500m upstream of the project, the project location, and 500m downstream of the project.	pH, CODCr, ammonia nitrogen, LAS, BOD5, total phosphorus, mercury, arsenic, lead, cadmium, zinc, copper, hexavalent chromium and fecal coliform	Monitor one time on July 28, 2013	pH, COD_{Cr} NH_3-N, LAS, BOD_5, TP, arsenic, lead, hexavalent chromium, mercury, chrome, copper of the three monitoring points all meet class I standard and can meet class II standard; zinc meets class I in 1# and 3# monitoring points, and meets class II in 2# monitoring point; all the projects meet class III water quality standard of the ground water.
4	Renovation engineering project of water supply and drainage pipe network of Dayuan Zhenji	500m upstream of the project (Dayuan Village), boundary of the project location (Dayuan Village), 500m downstream of the project (Tingshan Village)	pH value, CODcr, NH3-N, petroleum, LAS, BOD5, TN, TP, Hg, As, Pb, Cd, Zn2+, Cu2+, Cr6+, fecal coliform.	Monitor one time on July 28, 2013	Fecal coliform index in the ground water indexes in the region near Xindeng Sewage Disposal Plant exceeded category III standard of *Quality Standard for Ground Water* (GB/T 14848-93), the ground water of the region being polluted, mainly because the regional domestic wastewater permeating into the ground water.

Serial No.	Subproject Name	Monitoring section	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
	Town of Fuyang City				
5	Demonstration system of sewage disposal of decentralized villages of Fuyang City	500m upstream, the proposed site, 500m downstream of Sewage Disposal Plant of Hongzhuang Village; 500m upstream, the proposed site, 500m downstream of the discharge outlet of Sewage Disposal Plant of Yankou Village; 500m upstream, the proposed site, 500m downstream of Sewage Disposal Plant of Pengjia Village.	pH value, CODcr, NH3-N, petroleum, LAS, BOD5, TN, TP, Hg, As, Pb, Cd, Zn2+, Cu2+, Cr6+, fecal coliform.	Monitor one time on August 1, 2013	All test indexes of the monitoring point for the ground water of the project can meet category III standard of *Quality Standard for Ground Water* (GB/T 14848-93), the ground water quality of the region of the project being good.
6	Demonstration project of sewage interception pipeline for rural sewage of Fuyang City	500m upstream of Dongqiao Village, location of Dongqiao Village, 500m downstream of Dongqiao Village	pH value, CODcr, ammonia nitrogen, petroleum, LAS, TN, TP, arsenic, mercury, lead, zinc, copper, hexavalent chromium, fecal coliform.	Monitor one time on July 28, 2013	Each water quality index of the monitoring points for ground water of Dongqiao Village can reach category III standard of *Quality Standard for Ground Water* (GB/T 14848-93), the ground water quality of the evaluated region being good.

2.4 Regional environment profile of Tiantai County

2. 4.1 Overview of natural environment

1. Geographic position

Located at the Middle East part of Zhejiang Province and northwest part of Taizhou City, Tiantai County is named because of Tiantai Mountain. It connects Ninghai, Sanmen in the east, borders on Pan'an in the west, is close to Xianju, Linhai in the north and borders on Xinchang in the north. It is located between northern latitude 28° 57′ 02″ -29° 20′ 39″ and east longitude 120° 41′ 24″ -121° 15′ 46″. The whole county is 54.7km long from east to west, 33.5km wide from south to north, with a total area of 1,432km.

Tiantai County is 222km away from the provincial capital Hangzhou City, 138km away from Ningbo and 106km away from Jiaojiang, the municipal capital of Taizhou City. It is located in the intersection of Taizhou, Nongbo, Shaoxing and Jinhua, with national road, provincial road and county road, township toad being criss-cross, "Shangsan" (Shangyu to Sanmen) expressway running through the territory: the transportation is very convenient.

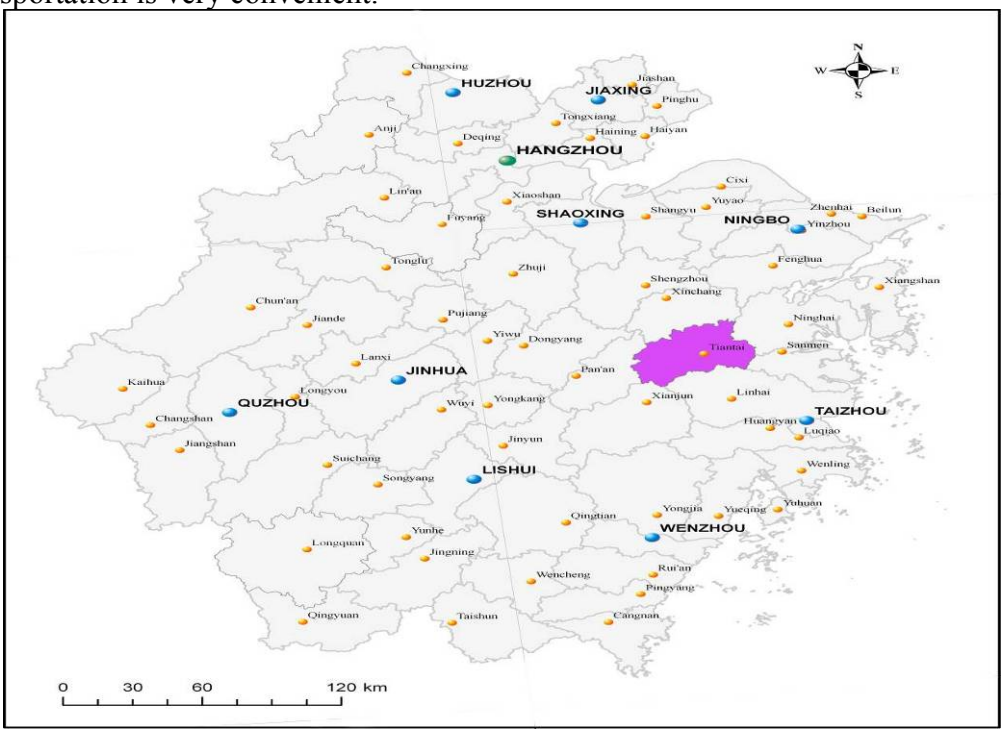


Fig. 2.4-1 Tiantai's Position in Zhejiang Province

2. Landform

Belonging to the hilly and mountain area of east Zhejiang, the whole terrain of Tiantai County is higher in northeast, northwest and southwest, inclining towards east and southeast. There are 21 mountain peaks over 1000m in the county. The valley plain of Shifeng River in the middle has gently sloping terrain, with the altitude between 50-100m, and with some low hills. In the whole county, the low and medium mountains with the altitude over 500m account for 26.8% of the total area, the hills with the altitude below 500m account for 51.5% of the total area, valley plain accounts for 21.7% of the total area; in the total area, cultivated land accounts for 12.7%, water area accounts for 5.2%: constituting the land combination of "eighty percent of mountain, five percent of water and fifteen percent of field".

The geologic structure of Tiantai County belongs to Huaxia table of Zhejiang and Fujian, mainly consisting of tuff, basalt, granitoid intrusion, rhyolite and other igneous rock which account for over 3/4 of the entire county area and mainly distribute at the relatively high mountains such as North Mountain, South Mountain, Baihe, Jietou, etc.. The secondary is the sedimentary rock of amaranth gravel stratum, accounting for 1/4 of the entire county area, mainly distributing at the north side of Tiantai Basin, the area from Baihe Town to Chicheng Mountain and the area from Baihe Town to Tunqiao.

3. Climatic and meteorological features

Tiantai County belongs to middle subtropical monsoon climatic region. The climatic characteristics are four distinctive seasons, abundant rainfall, and adequate heat. The climate is of certain basin climate because the mountains surround the periphery, the middle is low and flat, and the water region climate characteristics are obvious.

The temperature in spring (March 28-May 27) takes on wave-like uplift, the rainfall increases, the wind direction changes a lot and the weather is uncertain; for summer (May 28-September 27), the “Meiyu” (plum rain) happen in the early summer, it is sunny and hot with few rainfall in midsummer, and there is frequently fierce wind and thunderstorm in July, August and September as impacted by typhoon; for autumn (September 28-November 27), the early autumn is overcast and rainy, after mid-autumn, it has the “clear and crisp autumn climate”; winter (November 28 -March 27 of the next year) is sunny and cold. The coldest month is January and the hottest month is July. The wind direction is regular: westerly northwest wind for September to February of the next year, easterly southeast wind for March to August.

The average meteorological characteristics over the years: air pressure: 1009.2hPa, temperature: 14.5℃, sunshine: 1993.3h, annual total radiation: 112.0kcal/cm2, amount of precipitation: 1450mm, evaporation capacity: 1420.2mm, vapor pressure: 17.0 millibar, relative humidity: 79%, wind speed: 3.0m/s.

The meteorological characteristics are somewhat different because of the impact of landform: the average temperature over the years of the basin valley with the altitude below 200m is higher than that of the mountainous area with the altitude over 800m while the average precipitation and precipitation day of the mountainous area is more than that of the basin.

4. Hydrography

The total area of the water area of Tiantai County is 50.78km2, and there are 120 big and small brooks. The brooks inside the territory distribute and belong to the five water systems of Jiaojiang River, Cao’e River, Baixi River, Qingxi River and Haiyou River, all belonging to mountainous brooks, featuring short source, rapid flow, big fall and multiple tributaries, etc.

Jiaojiang River water system: originating from the south foot of Dapan Mountain of Pan’an County, Shifeng River enters the boundary from Jietou Town, flows through Longxi Township, Jietou Town, Pingqiao Town and other town and township from west to east, then flows southward to Fuxi Subdistrict Tangling Xiawan Village and exits the boundary to enter Linhai City, and after confluence with Yong’an River in SAnJiang Village, it is called Lingjiang River, and after the confluence of Lingjiang River and Yongning River, it is called Jiaojiang River. The main stream of Shifeng River is 132.7km long, including 68.5km in Tiantai territory. The area of the whole drainage basin is 1,610km², including 1,111.54km² in Tiantai territory. Shifeng River has five tributaries including Cangshan River, Sanmao River, Xiaoxikeng River, Cui’ao River Leima River.

Cao’e River: the respective main stream of Lingshang River, Wanma River, Cisheng

River is 7.5 km, 3.8 km, 10.8km long in the territory, the respective drainage area is 30.6 km^2., 20.8 km2, 62km^2.

Baixi River water system: the respective main stream of Datong River, Tianfengkeng is 12.3 km, 13.5km long in the territory, the respective drainage area is 75.5 km^2., 40.2km^2.

Qingxi River water system: Yongxi River belongs to Qingxi River water system in Tiantai County territory, the main stream in the territory is 18km long, and the drainage area is 81km^2..

Haiyou River water system: Jiexi River belongs to Haiyou River water system in Tiantai County territory, which is between the two counties of Tiantai and Sanmen; the main stream in the territory is 8.8km long and the drainage area is 24.6km^2.

Table 2.4-1 Characteristics Table of the Major Rivers in Tiantai County

water system	River name		Drainage area (km^2)	Main stream length (km)	river fall (m)	average flow rate (m^3/s)
Jiaojiang River	Shifeng River (in the territory of this county)		1111.54	68.5	686	
	Shifeng Stream tributary	Xiaoxikeng River	85.3	20.1	574	1.66
		Huangshui River	49.7	16.0	768	0.98
		Chashan River	39.7	12.7	441	0.60
		Leima River	75.0	19.2	487	1.01
		Baxi River	45.0	13.3	291	0.65
		Wangli River, Wuyan River	69.0	13.9	330	0.99
		Daoxi River	33.8	10.5	105	0.46
		Cui'ao River	91.7	29.4	635	1.46
		Sanmao River	157.5	26.5	245	2.29
		Xiaofa River	29.3	14.0	365	0.40
		Luoxi River	46.3	15.7	703	0.63
		Cangshan River	163.0	22.0	512	3.36
		Dadan River	40.0	16.5	316	0.57
		Other streams				
Cao'e River	Lingshang River		30.6	7.5	150	0.25
	Wanma River		20.1	3.8	300	0.28
	Cisheng River		62.0	10.8	480	0.94
Baixi River	Jinshun River		40.2	13.5	580	0.67
	Datong River		75.5	12.3	800	1.78
Qingxi River	Yongxi River		81.0	18.0	800	1.72
Haiyou Habor	Jiexi River		23.4	8.8	120	0.41

5. Scenic Spots of Tiantai Mountain

Featuring "miraculous and beautiful landscape, the source of Buddhism and Taoism", Tiantai Mountain scenic spot is the mountain-type national key scenic spot with main functions of sightseeing, holiday relaxation, religious pilgrimage and scientific culture activities.

The total area of the scenic spot is 131.75km², with the core protection scope (special class, class one and class two protection zone) area of 56.02 km, the class three protection zone of 75.73 km² and peripheral protection zone area of 154.47 km².

The subproject of Tiantai County mainly involves with the Class III protection zone and peripheral protection zone of Tiantai Mountain scenic spot. The relevant protection requirements:

Class three protection zone: ① Orderly control of each construction and facility and coordination with scenery environment② Focusing on recovery, cultivation, tending, conservation and maintenance of the forest and vegetation, water source and water and soil, rare and endangered creature in the scenic spot③ Control of population size ④Prohibiting for cutting into the mountain for quarrying and deforestation, illegal fishing and hunting

The peripheral protection zone: ① Focusing on vegetation protection and landscape cultivation to form the landscape environment coordinating with the peripheral scenic spots②Prohibiting for planning and construction of the project and facility with pollution or environmental protection not reaching the standard; Reasonably leading the economy for harmonious development

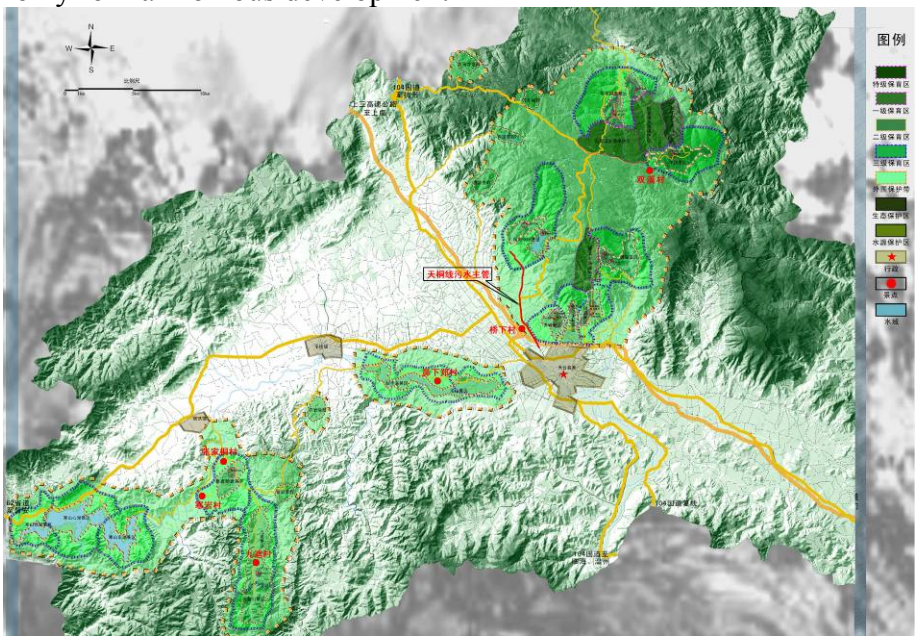


Fig. 2.4-2 Planning Map of Scenic Spot of Tiantai Mountain

Table 2.4-2 Table for Relationship between the Engineering and Scenic Spot of Tiantai Mountain

Location	Subproject Name	Relation with the engineering position	Main protection requirements
Chicheng Subdistrict	North Central Area	The main sewage pipe of Tiantong Line is 4.5km, located at the peripheral protection zone of Chicheng scenic spot and the class three protection zone and peripheral protection zone of Qiongtai Tongbai scenic spot, not involving with the scenic spot. Therein, the area of merged village-Qiaoxia Village is located at the peripheral protection zone of Chicheng scenic spot.	Class III protection zone: ① Orderly control of each construction and facility and coordination with scenery environment ② Focusing on recovery, cultivation, tending, conservation and maintenance of the forest and vegetation, water source and water and soil, rare and endangered creature in the scenic spot ③ Control of population size④Prohibiting for cutting into the mountain for quarrying and deforestation, illegal fishing and hunting Peripheral protection zone: ① Focusing on vegetation protection and landscape cultivation to form the landscape environment coordinating with the peripheral scenic spots ②Prohibiting for planning and construction of the project and facility with pollution or environmental protection not reaching the standard; reasonably leading the economy for harmonious development
Bixiazheng Village of Shifeng Subdistrict	Decentralized type	Located at the Class III protection zone of Shifeng scenic spot, not involving with scenic spots	
Jietou Town Jiuzhe Village	Decentralized type	Located at the class three protection zone of Jiuzhe scenic spot, not involving with scenic spots	
Shiliang Town Shuangxi Village	Decentralized type	Located at the Class III protection zone of Huading scenic spot, not involving with scenic spots	
Longxi Township Hanyan Village	Decentralized type	Located at the class three protection zone of Hanyan Mingyan scenic spot, not involving with scenic spots	

2. 4.2 The social environment profiles

1. Social economy profile of Tiantai County

According to the statistical information of 2010, the population at the end of 2010 was 581600, the population density was 408 persons/km², and the GDP was RMB 11.862 billion (price of the year): the primary industry with RMB 1.009 billion, the secondary industry with RMB 5.267 billion, the tertiary industry with RMB 5.586 billion.

Since the reform and opening up, the market economy of Tiantai County has been rapidly developing; especially as the opening of Shangsan Expressway and reconstruction and expansion of 104 national road, 62, 60 provincial road, the infrastructure has been continuously improved, science and education, culture, sanitation, industry and agriculture, commerce and other causes have taken on good development momentum, and the living standard of urban and rural people has been continuously enhanced.

2. Current Water Supply State of Tiantai County

1) Current state of water facility

Currently, the water supply system of Tiantai County territory consists of county water supply system and independent town and township water supply system, featuring 7 water plants with the scale over 1,000m³/d, and the design total water supply capacity of 14.3m³/d. Therein, the design capacity of Chengguan Water Plant is 100000m³/d for the water supply of three subdistricts of the urban area; the design capacity of Pingqiao Water Plant: 5000m³/d, of Jietou Water Plant: 1500m³/d, of Baihe Water Plant 10000m³/d, of Tantou Water Plant: 10000m³/d, of Hongsan Water Plant: 1500m³/d, of Shiliang Water Plant: 1000m³/d, respectively for the water supply of Pingqiao Town, Jietou Town, Baihe Town, Tantou Town, Hongchou Town, Sanhe Town, Shiliang Town and other major town and township. Please see Fig. 2.4-3 for distribution of each water supply plant.

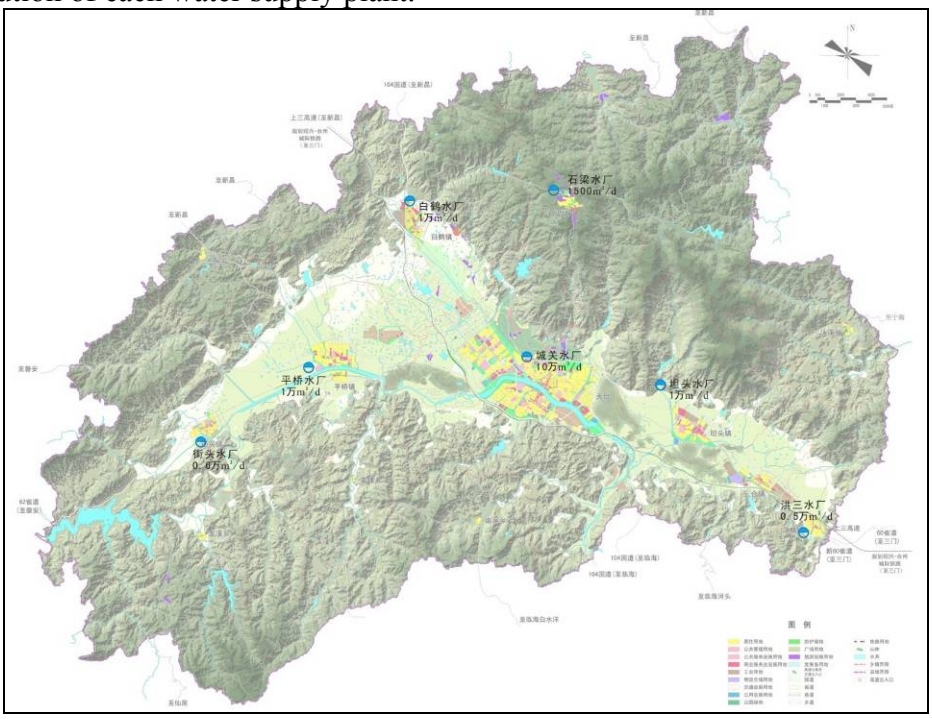


Fig. 2.4-3 Current State of Water Supply System of Tiantai County

Table 2.4-3 Summary Table of Current State of Water Plants of Tiantai County Territory

Water plant name	Design scale (ten thousand m³/d)	practical scale (ten thousand m³/d)	Water Source	Service Scope	Ownership
Chengguan Water Plant	10.0	5.3 (The second stage being extended)	Huanglong Reservoir, Lishimen Reservoir (north main canal)	County and surrounding villages	State-owned
Pingqiao Water Plant	1.0	0.5	Floodplain ground water of Shifeng River (floodplain ground water of upstream of Wuyan River)	Pingqiao Town and surrounding villages	Collective ownership (purchased)
Jietou Water Plant	0.6	0.15	Leima River	Jietou Town	Private
Baihe Water	1.0	0.9	Baxianyuan Small Hilly Pond,	Part area of Baihe Town,	Private

Plant			Tongkeng River Reservoir	Pingqiao Town and Shifeng Subdistrict	
Tantou Water Plant	1.0	0.15	Limin Reservoir	Tantou Town	Private
Hongsan Water Plant	0.5	0.52	Banyansi Reservoir	Hongchou Town and Sanhe Town	Private
Shiliang Water Plant	0.1	0.015	Liangchuangtang Reservoir	Shiliang Town	Private

2) Major problems of water supply of urban and rural areas

The water supply reliability of part pipelines of the urban area is reduced because the pipelines were constructed early which are relatively small with high leakage and damage rate and are difficult for daily maintenance.

The water plant of each town and township is small in scale and is scattered, causing low assurance rate of water in-taking and shortage of water supply. At the same time, the process of the water plant lags behind; its water treatment facility is simple: only some with filter, while others only with chemicals feed, failing to reach the nation's relevant drinking water standard, with insufficient water pressure for water supply of the water plant. Lots of the villages, especially the villages in the mountain, have no concentrated water supply system. Aging, disrepair, severe evaporating, emitting, dripping or leaking phenomena are general problems of water supply pipeline of the rural residents.

3. Current water drainage state of the urban and rural areas

Tiantai County has carried out construction of sewage disposal facility since 2006 in order to improve the urban water quality environment, build ecological and livable city and enhance the sustainable development ability of the economy; currently, there are 2 sewage disposal plants: Sewage Disposal Plant of Tiantai County (40000m³/d), Pingqiao Sewage disposal Plant (5000m³/d) and 7 sewage disposal plants of town level: Tantou Sewage Disposal Station (300m/d), Sanhe Sewage Disposal Station (300m/d), Hongchou Sewage Disposal Station (300m/d), Jietou Sewage Disposal Station (300m/d), Baihe Sewage Disposal Station (200m/d), Shiliang Sewage Disposal Station (200m/d). Please see Fig. 2.4-4 for the distribution of each sewage disposal plant (station).

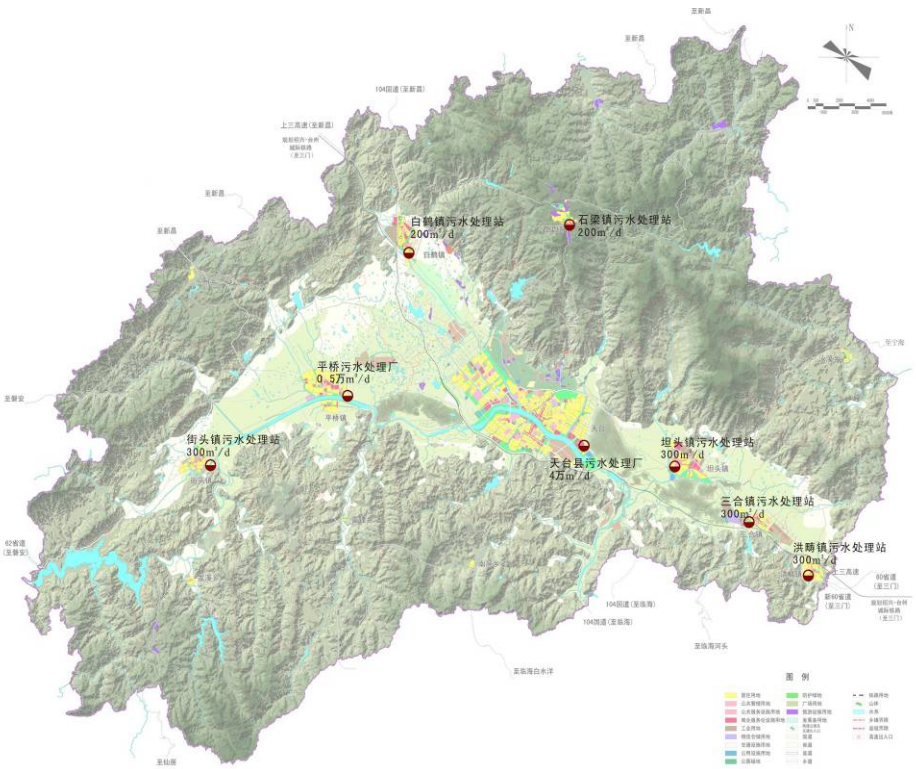


Fig. 2.4-4 The Current State of the Sewage Disposal System of Tiantai County

There are 399 villages which have been constructed with sewage disposal facility in the 597 villages of the whole county; and multiple sewage disposal facilities and technologies have been adopted, such as anaerobic treatment, constructed wetlands, A/O, bio-contact oxidation, etc. The treatment scale is between 30m³/d-200m³/d and the water outlet standard adopts category I, II standard of *Integrated Wastewater Discharge Standard* (GB8978-1996) and some powered facilities adopt level I standard B of *Discharge Standard of Pollutants for Municipal Sewage Disposal Plant* (GB18918-2002).

The pipe networks of most treatment facilities failed to fully extent to the household due to the limited construction fund, causing the current low sewage collection rate and failure to fully play the role of sewage disposal station.

Table 2.4-4 Table of Sewage Disposal Station of Each Town and Township of Tiantai County

Sewage disposal plant (station)	Disposal process	operation ability	Service Scope
Sewage Disposal Plant of Tiantai County	A^2O	40000 tons/day	Tiantai urban area
Sewage Disposal Plant of Pingqiao Town	A^2O	5000 tons/day	Pingqiao Township
Sewage Disposal Station of Baihe Town	biofilm process	200 tons/day	Baihe Township
Sewage Disposal Station of Shiliang Town	biofilm process	200 tons/day	Shiliang Township
Sewage Disposal Station of Jietou Town	biofilm process	300 tons/day	Jietou Township
Sewage Disposal Station of Sanhe Town < 0} {0>A/O<}100{>A/O	A/O	300 tons/day	Sanhe Township
Sewage disposal Station of Hongchou Town	A/O	300 tons/day	Hongchou Township
Sewage disposal Station of Jietou Town	biofilm process	300 tons/day	Tantou Township

The sewage disposal system of Tiantai County consists of county sewage disposal system, town and township sewage disposal system and rural sewage disposal system: the sewage disposal capacity of the county is insufficient and the pipe network construction is not in place; the construction of sewage disposal system of town and township severely lags behind, the sewage disposal level is limited with low treatment rate and the running state is not going well. The low coverage rate of the rural sewage disposal facility, the low construction standard of the current facility and the lack of the later management and maintenance cause part of the sewage disposal facilities to be discarded, severe damage of the pipe networks and failure to reach the expected treatment results, which need to be improved and transformed.

2. 4.3 Current environment quality condition of the project area

1. Environmental quality survey and evaluation on surface water

According to analysis of surface water monitoring in Tiantai County in 2012, it is obvious that overall water quality of Tiantai County expresses certain decreasing trends and partial sections are seriously polluted, especially quality of the lower reaches of the Shifeng River, which is out of limits. Pollution characteristic of the water body is organic and major pollution factors include TP, ammonia nitrogen, permanganate index and BOD, etc.

There are 9 monitoring sections totally in Tiantai County, seven of which satisfying the Class II water quality standards, accounting for 77.8%, the other two that meeting the Class III standards, occupying 22.2%. There are 9 stations conforming to the water functional requirements according to the function zoning requirements, accounting for 100%; the average rate of reaching the standard of the routine monitoring station for surface water of Tiantai County in 2012 was 100%. In comparison with last year, there is one more Class II, and Class III station is the same as last year; the water quality category of Renmin Bridge Station is improved from Class III to Class II. If accounted according to reach length: the length of the reach

with water quality of Class II in the surface water of the entire county is 130.2km, accounting for 85.95 % and the length of the reach with water quality of Class III is 21.3km , accounting for 14.05%.

Shifeng River basin of Tiantai County is divided into two functional zones taking Shifeng Sixth Bridge as the boundary. The upstream is the concentrated domestic drinking water source, with 3 monitoring stations. The total length of the reach is 81.7km; Qianshan, Tiantai Water Plant, Lishimen Water Intaking Station reached Class II water quality standard in 2012, rising or falling inordinately compared to that of the last year. Zhexi River outlet in the downstream to the territory exit is the key landscape functional zone with 2 monitoring stations, the total length of the reach being 17km. Shiling and Xiangyan were of Class III water quality in 2012; both stations can meet the water quality requirement of the functional zone.

Sanmao River tributary of Tiantai County was of Class II water quality in 2012, conforming to the requirements of the functional zone. 7.4km upstream of Zhexi River conformed to Class II water quality requirement in 2012, and the category of water quality of 4.3km downstream rose to category II in 2012 from Class III in 2011, meeting the water functional requirements. Water quality of Luoxi River in 2012 was of Class II water quality, meeting the requirements of the functional zone.

Two intersecting cross sections of Tiantai County was carried out water quality monitoring as per 1 time/month, respectively being Lishimen Reservoir station for upstream territory entry cross section and Baibu Station for downstream territory exit cross section. Accounted by single index exceeding the standard for the average annual value of 2012, there were totally 24 times, including 16 times of reaching the standard, the rate of reaching the standard being 66.7%; Baibu Station for downstream territory exit cross section had ammonia nitrogen exceeding the standard and reaching IV, V standard in March, April, May, June, July, August, October and November.

There were 4 monitoring stations for drinking water source of Tiantai County in 2012 and the monitoring cross section was accounted by single index exceeding the standard for the average annual value: the 4 stations all conforming to Class II standard for water quality evaluation standard of drinking water source, the rate of reaching the standard being 100%. All stations conformed to the water functional requirements according to the function zoning requirements, the rate of reaching the standard being 100%. The rate of reaching the standard of the average annual value of the 4 stations for drinking water source of Tiantai County in 2012 was 100%.

2. Survey and evaluation on the status of atmospheric environment

According to the routine monitoring points of Environmental Monitoring Station of Tiantai County in Tiantai Experiment Middle School and environmental protection building of Tiantai County, the monitoring results please see Attached Table 2.4-1.

According to the monitoring results, SO2, NO2, PM10 concentration of each monitoring point was relatively small, meeting the category II standard requirements of *Ambient Air Quality Standards* (GB3095-2012), the regional ambient air quality being good.

3. Monitoring and Evaluation of Noise Environment Conditions

Environmental Monitoring Station of Tiantai County carried out monitoring on the current noise state in the sensitive point of the project location in order to understand

the current noise state of the region of Tiantai County Cangshan Sewage Disposal Plant; the monitoring results please see Attached Table 2.4-2.

From the monitoring results, the noise value scope of each plant boundary in the day is 50.1-51.5dB and the noise value scope in the night is 40.2-43.7dB, the noise of each plant boundary in the day and night conforming to Class I standard in GB3096-2008 Environmental Quality Standard for Noise.

4. Investigation and evaluation of groundwater environmental status

Environmental Monitoring Station of Tiantai County carried out monitoring on the ground water environment of the proposed region of Cangshan Sewage Disposal Plant in order to understand the current ground water environmental state of the proposed region of the project; the monitoring results statistic please see Attached Table 2.4-3.

Fecal coliform index in the ground water indexes in the region near Xindeng Sewage Disposal Plant exceeded Class III standard of *Quality Standard for Ground Water* (GB/T 14848-93), the ground water of the region being polluted, mainly because the regional domestic wastewater permeating into the ground water.

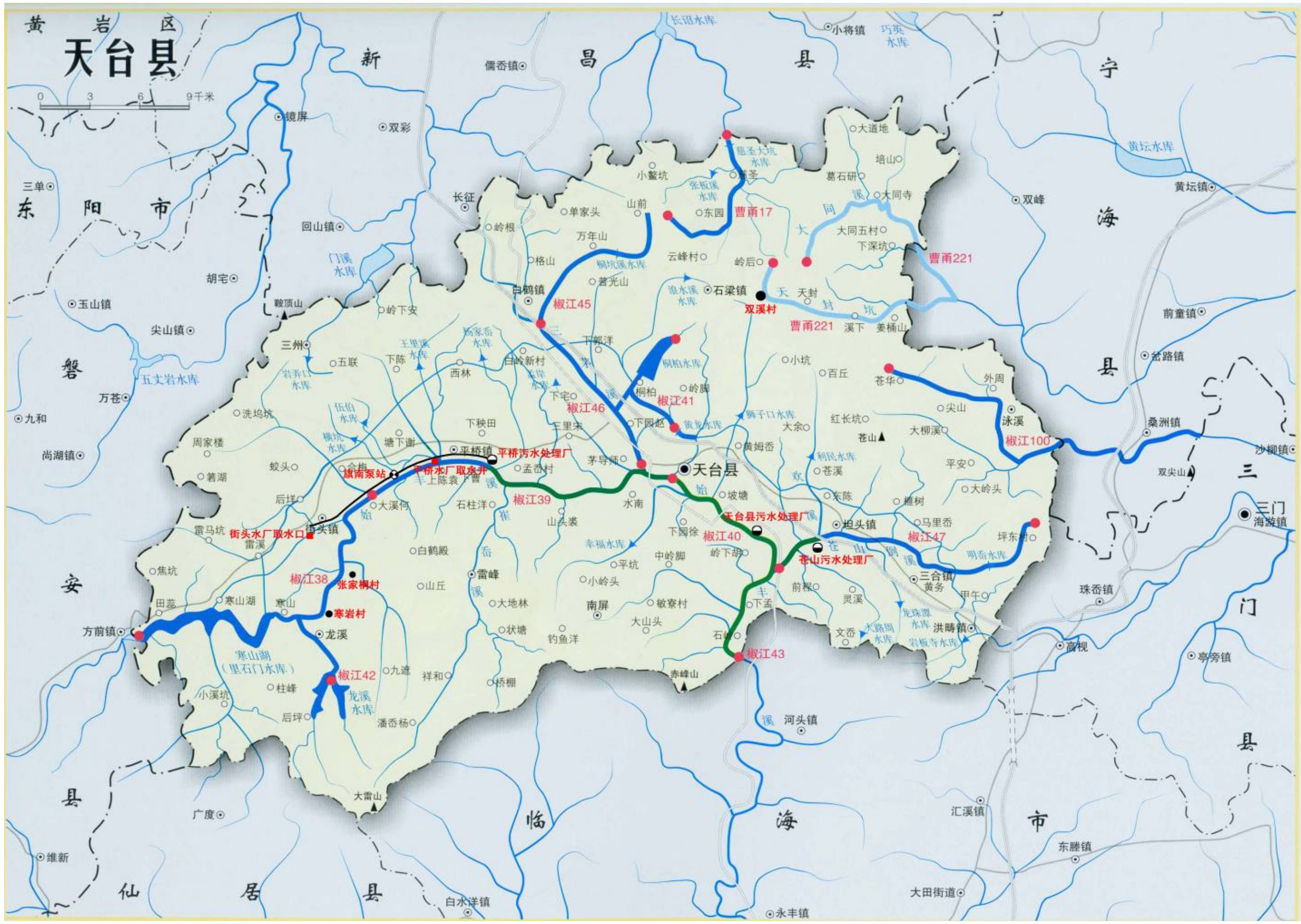


Fig. 2.4-4 Zoning Plan of the Water Function and Water Environment Function of Tiantai County

2.5 Regional environment profile of Longquan City

2. 5.1 Overview of natural environment

1. Geographic position

Located in southwest Zhejiang in the boundary of Zhejiang and Fujian, Longquan City is close to Yunhe, Jingning County in the east, connects Qingyuan County in the south, borders on the two counties of Suichang, Songyang in the north and borders on Pucheng County of Fujian Province in the west; it is located between east longitude 118° 43′ -119° 25′ and northern latitude 27° 43′ -28° 21′ , with the city center 400km away from Hangzhou City, 130km away from Lishui City, being the only county-level city exceeding 2 million population in the boundary of Zhejiang and Fujian. Having long been renowned as “a sea of forest of south Zhejiang”, Longquan City has been the passage for people of Wenzhou, Jinhua, Lishui to enter Fujiang and Jiangxi since the ancient times; it is the city in the border of Zhejiang and Fujiang and is also the source of Oujiang River, Minjiang River and Qiantang River. The city territory is 70.25km wide from east to west, 70.8km long from south to north, with a total area of about 3,059km² and a total population of 284500. Longyuan Subdistrict where Longquan City government lies is the political, economic, cultural and information center of Longquan City and is located at both banks of Oujiang River where Longquan River and Jinyan River converges, with Longquan City passing through the urban area.

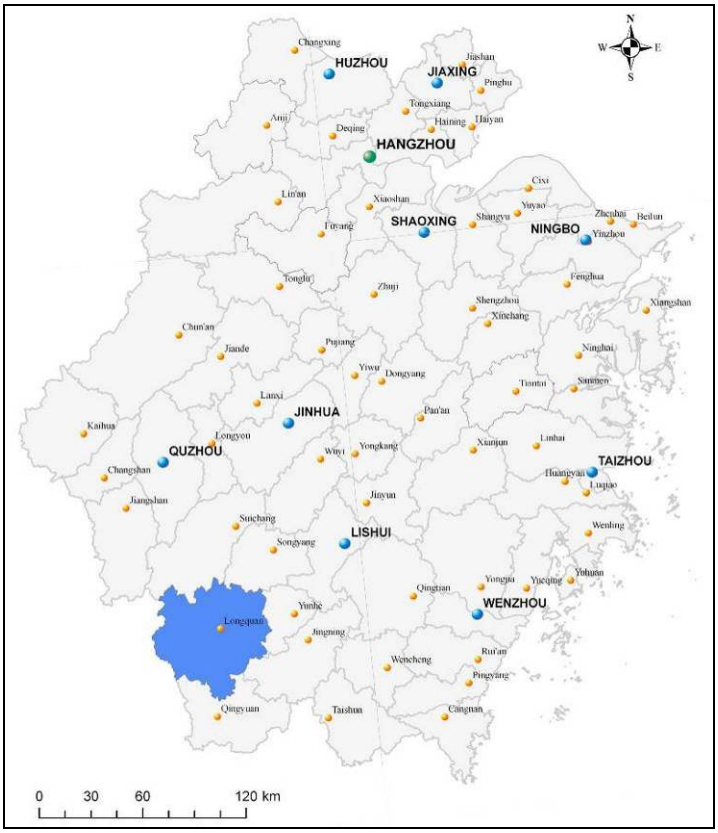


Fig. 2.5-1 Position of Longquan in Zhejiang Province

2. Landform

In earth’s structure, Longquan City lies in the uplifted region of Chencai-Suichang in Huaxia fold zone of east Zhejiang. The foundation of the region consists of

pre-Devonian Chencai Group metamorphic series and had been in the state of uplifting during the entire upper Paleozoic after Caledonian movement until been covered by the rather thick continental facies volcanic rocks in late Jurassic epoch of Mesozoic. Its exposed stratum and lithology are pre-Devonian Chencai Group metamorphic series consisting of schist, gneiss and marble.

As affected by the geologic structure and the lifting of neotectonics, Longquan is one of the mountainous landforms with the highest altitude in our province: there are 12 mountains with the altitude over 1500m, over 700 mountains with the altitude over 1000m, the terrain is high in the southwest and low in the northeast; Longquan River flows from southwest to northeast, passing through the whole territory and dividing landform of Longquan into two parts: Xianxialing Mountains in the northwest, the main peak is Qiulong Mountain between Longquan and Suichang, with the an altitude of 1734m; Donggong Mountains in the southeast, the main peak is Huangmaojian, the main peak of Fengyang Mountain inside the territory of Longquan, with an altitude of 1929m, being the highest mountain of Zhejiang. The middle is the small basin valleys of different sizes in Longquan River basin, such as Anren, Longyuan, Chatian, Xiaomei, Badu, etc., the area of the largest basin valley being Longyuan, with an area of 3.5km². In addition, there are still tracts of lands of gentle slope, such as Shangtian, Xiatian of Longnan, Fengyang Lake, Fengyang Temple of Fengyang Mountain, Taiping Lake of Anren, Pingtian of Pingnan Town, Zhuxi of Zhulong Town, etc. According to statistics, in the landform inside the territory, low and middle mountains account for 69.17% of the total area, hills and plateaus account for 27.92%, valley plains account for 2.91%, therefore there is a saying of “ninety percent of mountain, five percent of water and five percent of field”.

3. Climatic and meteorological features

(1) Statistics of meteorological elements

Located in the middle subtropical monsoon climatic region, Longquan City’s general climatic features are warm and wet, with four distinctive seasons. Accounted according to the measured data of Longquan Meteorological Station, the average temperature over the years is 17.6℃, the monthly mean maximum temperature is 34.2℃, the monthly mean minimum temperature is 2.4℃, the extreme maximum temperature is 40.7℃ (August 8, 1966), the extreme minimum temperature is -8.5℃ (December 26, 1973), the average evaporation capacity is 1403.7mm (observed value from evaporating dish with a diameter of 20cm), the average wind velocity is 1.4m/s, the average maximum wind velocity is 11.7m/s, and the measured maximum wind velocity is 17.0m/s. Please see Table 2.5-1 for Meteorological characteristics of Longquan Station.

Table 2.5-1 Table for Meteorological Characteristics of Longquan

Month / Factor	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
Mean monthly temperature (℃)	6.6	8.1	12.2	17.8	21.8	24.6	27.7	27.2	24.0	19.0	13.6	8.2	17.
Extreme maximum temperature (℃)	27.4	28.8	32.6	35.0	37.9	37.9	39.9	40.7	38.5	35.0	31.2	28.6	40.7

Month / Factor	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
Extreme minimum temperature (℃)	-7.3	-6.0	-4.7	1.9	6.9	11.0	18.6	15.6	8.2	0	-3.2	-8.5	-8.5
Average vapor pressure (hpa)	7.7	8.8	11.6	16.2	21.0	25.5	28.6	27.8	23.7	17.2	12.2	8.6	17.4
Average relative humidity (%)	78	79	80	79	80	83	7	79	80	78	78	77	79
average evaporation capacity (mm)	53.6	56.0	79.9	111.4	134.5	141.2	214.7	202.6	149.2	118.6	82.5	59.5	1404
Average wind speed (m / s)	1.5	1.7	1.6	1.4	1.3	1.2	1.4	1.4	1.5	1.6	1.5	1.3	1.4
Maximum wind speed (m/s)	10.0	13.0	10.0	11.7	13.7	13.0	13.3	15.0	17.0	11.0	10.3	10.0	17.0

(2) Climate and rainfall characteristics

Longquan City belongs to subtropical monsoon climatic region and as affected by Southeast Asia monsoon, its climate is moderate, with four distinctive seasons, abundant rainfall and adequate sunlight; the average rainfall over the years in the territory is 1864mm and the rainfall in the drainage basin is mainly spring rain, plum rains and typhoon rain; in spring, the south and north warm and cold airflows meet here to form frontal rain, called as “spring rain”; in late spring and early summer, as controlled by the Pacific subtropical high pressure airflow, the cyclone movement is frequent with relatively big rainfall and sometimes the rainstorm; the weather in late summer is sunny and hot and as affected by typhoon, there is typhoon rain; the rainfall of the four months from March to June (spring rain and plum rains) is generally about 1000mm, about 60% of the total rainfall of the year; June has the biggest rainfall, generally accounting for 20% of the total rainfall of the year.

The period from October to January of the next year has less rainfall: the rainfall of these four months only accounts for about 13% of the total rainfall of the year; the flood of this drainage basin mostly happens in Meiyu flood period (April 16-July 15), only in a certain year, the flood happens in typhoon flood period (July 16-October 15); the maximum 24h rainfall as measured by Longquan Station is 215.7mm (June 25, 1970), and the maximum three-day rainfall is 315.1mm (June 19-June 21, 1956).

Additionally, there are multiple mountains with high peaks in the drainage basin in Longquan City and the warm and wet airflow is forced to rise after being stopped by the high mountain and it forms the orographic rain after cooling; in winter, as controlled by the Siberian cold high, the weather is mainly sunny and there is cold wave formed when the cold air heads southward, with relatively less rain and snow.

4. Seismic intensity

Located at the border of Zhejiang, Fujian and Jiangxi in southwest Zhejiang, Longquan City has the geographical coordinates of northern latitude 27°42'-28¡ã20', east longitude 118°42'-119°25', 70.25km in wide from east to west, 70.80km long from south to north, with a total area of 3059km2. The surface layer of Longquan City is artificially filled and buried soil and cultivated soil, and the second layer is loam layer with the general bearing capacity over 10t/m²; the thickness of the above two layers are between 0-4m. The third layer with the depth of 4-11m is sand and pebble, with the medium-coarse sand mixed with pebble and the bearing capacity over 30t/m². Below the third layer, there are generally the igneous rock weathered layer, tuff, granite layer. There were no big earthquake in the history of Longquan City and the seismic basic intensity is degree 6.

5. Soil characteristics

There are four types of soil in Longquan: mountain yellow earth, red earth, moisture soil and paddy soil. 10 subgroups, 50 soil genera, 67 soil species The total area of the soil is about 4.55 million mu. Therein, the mountain yellow earth accounts for 38.32% of the total area, mainly distributing on the mountain with an altitude over 800m; red earth accounts for 50.1%, widely distributing on the low mountain and hills with an altitude below 750-800m; moisture soil accounts for 0.32%, distributing on the bottomland, terrace along the bank of brook, accounting for 0.35% of the dry land area; paddy soil accounts for 10.26%, mainly distributing on the valley, ridged land, plateaus and the river valley flat land along the stream between the altitude of 150-1200m, being the major soil type for cultivated land.

6. Hydrography

Longquan River, the upstream of Oujiang River which is the second longest river of Zhejiang, passes through the whole territory and is 125km long in the territory with a drainage area of 2,560 km². The source of Oujiang River originates from the southwest foot of Guomaojian (an altitude of 1170.5m) inside Baishanzu National Nature Reserve of Fengyang Mountain of Zhejiang Province in the border of the two counties of Longquan and Qingyuan. As affected by the mountains strike and geologic structure, Longquan River takes on arborization water system, with 15 tributaries falling into, the main tributaries being: Xiaomei River (main stream), Yuzhang River, Badu River, Jinxi River, Baiyun River, Anren River, Dagui River, etc. There are strange and special mountains, cliffs and precipices, “V”-shaped valleys, riverbed with boulders, rushing currents, dangerous shoals and falls along the banks of these tributaries; the water floods in March and reaches the highest in June; as mainly controlled by the plum rains, the flow process of these tributaries takes on single peak type, and tributaries are of mountain stream river.

There are abundant runoffs of Longquan River, while the sand content is not big, the annual average sand content between 0.1-0.2kg/m³. The degree of mineralization of the river water is low, with the average total ion concentration between 30-50mg/L: it is of extremely low mineralized water. The total hardness is between 0.085-0.892 milligram equivalent/L: it is of extremely soft water and the pH is between 6.8-7.0of neutral water. Besides, Piyun Mountain in northwest of Longquan, is 1675m in altitude, being one of the three river watersheds of Zhejiang and Fujian. The water of north slope falls into Zhuxi River, becoming the source of Wuxi River which is the tributary of Qiantang River; the water of west slope falls into Songxi River of Pucheng and then into Minjiang River via Baoxi River, becoming one source of Minjiang River; the water of south slope falls into Longquan River of upstream of Oujiang river via Badu River, therefore, Piyun Mountain becomes the “top of three rivers”.

The drainage area above Longquan Longyuan Subdistrict is 1,440 km², the slope is 6.32‰-0.97‰, the riverbed is 40-150m wide and all are covered by sand and pebble. The average flow over the years of the monitoring point of Longquan City Hydrologic Station is 88.06m³/s, the driest daily, monthly average flow with 90% assurance rate is 1.93m³/s and 7.48m³/s. The drainage basin of Longquan River has good vegetation, good conservation of water and soil and is of the river with less sand.

Located at the northwest of Longyuan Town, Longquan City, Yanzhang River is the tributary of Longquan River which is the main stream of Oujiang River; originating

from Dafeng'ao, Yanzhang River flows via Yanzhang Township and falls into Longxi River at Gongtou Village, with a total length of 24km, drainage area of 132.0km², the average runoff volume over the years being 2.23m³/s and there are two cascade hydropower stations developed in the drainage basin. The damsite of Yanzhang River I Hydropower Station (Lingjiao Hydropower Station) is located at 7km downstream of Zhengzhuang Village; over the reservoir dam site, the water-collecting area is 53.61km², water diversion area is 55.34km² and the total capacity of reservoir is 11.43 million m³. The reach is 11.89km long, the average slope of the watercourse is 26.53‰, the installed capacity is 2×10000kW and the annual energy output is 41.07 million kW.h. The total water-collection area over the dam site of Yanzhang River II Hydropower Station is 131.96km², the capacity of reservoir is 212500m³, the installed capacity is 2×3500kW, and the average electric energy over the years is 14.53 million kW.h. Yanzhang Level-II Hydropower Station can offer water source for Longquan Water Plant; there is flood regulation reservoir constructed in the Level-I Hydropower Station mainly for flood control and power generation and Level-II Hydropower Station for power generation and water supply at the same time.

As a tributary of Yanzhang River, Jinxi River originates from Shiziyuan'ao, flows via Jinxi Town and falls into Yanzhang River in Gongtou Village and then into Longquan River. The total length is 21.1km, the drainage area is 97.07km², the average runoff volume over the years is 1.7m³/s, and the total average annual runoff volume over the years is 5.3618 million m³; there is lead zinc ore sewage of Longquan in the upstream of Jinxi River, the water quality being polluted by the sewage discharge.

Jinshuitan Hydropower Station is mainly for power generation, accompanied with the comprehensive functions of municipal water, flood control, irrigation, shipping, fishery, etc. From the reservoir area, sailing upstream over 60km to Longquan City Wutan, vessel of 30 tonnages can navigate here. The water-collecting area of the reservoir is 2,761km, the average rainfall over the years is 1838.8mm and the annual runoff volume is 3.15 billion m³. The check flood level of the reservoir is 192.7m, the design flood level is 190.29m, the normal water level is 184.0m and the dead water level is 164.0m. Total storage capacity is 1.393 billion m3 The water surface area of the reservoir at normal water level is 34.3m², the capacity of reservoir is 1.04 billion m³ and the dead reservoir capacity is 0.487 billion m³.

2. 5.2 The social environment profiles

1. Social economy profile of Longquan City

Located at the border of Zhejiang, Fujian and Jiangxi in southwest Zhejiang, Longquan City is close to Wenzhou Economic Development Zone in the east, borders on Fujian Wuyi Mountain Scenic Resort District in the west, and has been long known as "thoroughfare for entering Fujian from Ouwu", "post-horse thoroughfare and key link for traveling merchant".

Longquan was set as a county in Qianyuan 2nd year (759) of Tang Dynasty; it has a long history, beautiful scenery, abundant natural resources, gathering talents and is the renowned as the capital of celadon, region of treasured sword, the birthplace for world mushroom production and "First Home of Chinese Lucid Ganoderma", and also praised as "good Longquan in the ten counties of Chuzhou". The whole city is 3059km2 in area, with a population of 312000, governs four subdistricts, eight towns, seven townships, 442 administrative villages, and is the second largest county-level city of Zhejiang Province in area. The State Council approved Longquan City to upgrade county to city in December 1990.

The GDP in 2012 was RMB 8.57 billion, up 10.7%, wherein the added value of primary, secondary and tertiary industry respectively was RMB 1.15 billion, 40.6 billion and 3.36 billion, up 3.7%, 15.2%, 8.0%; proportion adjustment of the three industries was 13.4:47.4:39.2; gross industrial output value was RMB 17.59 billion, up 23.2%; investment in the fixed assets was RMB 5.31 billion, up 28.4%; gross output value of agriculture was RMB 1.82 billion, up 9.6%; gross income of tourism was RMB 1.15 billion, up 45.9%; total retail sales of consumer goods was RMB 3.15 billion, up 18.0%; self-support gross export was USD 0.20 billion, down 1.6%; general financial revenue was RMB 0.76 billion, local financial revenue was RMB 0.46 billion, up respectively 12.9% and 13.6%; average annual disposable income of city and town residents was RMB 27,930, rural per capita net income was 9,127, up respectively 12.1% and 13.7%; registered urban unemployment rate was 3.27%; natural population growth rate was 4.63‰; annual program objective of energy conservation and emission reduction has been completed, and ecological index kept 99 and above. The industrial pattern of the modern agriculture based on bamboo, tea, fungus and vegetable, the peculiar industry based on auto air conditioner parts, bamboo and wood products, celadon and treasured sword, metallic material and agriculture products processing and the modern service industry based on cultural and creative tourism has taken initial shape. The leading role of industry has been established. The enterprises above designated size in the three competitive industries of auto air conditioner parts, metalwork, engineering machinery have completed the output value of totally RMB 7.45 billion in 2012, the year-on-year growth being 24.4%, accounting for 58.8% of the total industrial output in the industrial enterprises above designated size of the whole city; the industrial output of celadon and treasured sword was RMB 2.01 billion, the year-on-year growth being 32.5%. 5 enterprises with annual value of production over RMB hundred million, 32 enterprises above designated size were added, 5 inefficient enterprises were enhanced. There were 5 national high-tech enterprises, 2 research centers of provincial high and new tech enterprises, and 25 high-tech products added; successfully 2 projects were listed in National Torch Plan, 5 projects were listed in National Innovation Fund and 7 projects were listed in the Key Project of Provincial Science and Technology Major Projects and the Service Platform for Technical Innovation of Auto Air Conditioner Industry of Longquan of Zhejiang Province was successfully listed in the provincial major sci-tech innovation platform; there were respectively 2 Zhejiang Province famous-brand products, Zhejiang Province famous trademarks; and Chuangxin Air Conditioner has become the first “Export Brand-name Enterprise of Zhejiang Province”. The development project of mild slope of low mountain and hills of 2.34km2 was made as the key point to together promote the relocation of the blocks such as Wantou, Lutian, Yonghe, Pingshanling Second Stage and complete policies processing of industrial land 2758mu, commencement of construction 2140mu and land leveling 1360mu. Steady development of agricultural economy The construction plan of “2315” modern agricultural park shall be fully implemented, the two provincial modern agriculture (forestry) comprehensive areas of Lanju, Badu shall be focused for construction, and also the leading industry demonstration area of high mountain vegetable, industry demonstration area of high mountain vegetable and leading industry demonstration area of reservoir area fishery, 15 industrial boutique parks of bamboo, tea, fungus and vegetable, etc. 16 food production functional zones of 13000mu were built, grain acreage of 242000mu were completed, with the total output of 97000 tons and output value of RMB 0.28 billion. 45000mu base of

“millions of efficient bamboo forest demonstration project” was built, and output value of bamboo industry of RMB 1.4 billion was achieved, the year-on-year growth being 16.5%; 6000mu special tea base was newly constructed, with the output of 600 tons and our city became the “nationwide ten ecological tea production county”; 11 safety demonstration bases for export quality of edible fungus and 20 intensive mushroom-stick processing plants were built; Zhejiang Province local standard for production technology of Longquan lucid ganoderma was formulated and the first provincial export safety demonstration area of edible fungus was built; the vegetable base of security type of 1150mu was built and vegetable sown area of 93000mu was completed; respectively 2 national, provincial standard demonstration sites for livestock breeding with the animal husbandry output value of RMB 0.2 billion, the year-on-year growth being 7.3%. 1 provincial key agricultural key leading enterprise, 3 provincial demonstrative cooperatives were added. The fixed-asset investment of service industry of the whole year was RMB 3.5 billion, the year-on-year growth being 36%; the value added of service industry was RMB 3.36 billion, the year-on-year growth being 8.0%. Celadon Cultural and Creative Base (centralized area of service industry), Liuzu Temple Buddhist Cultural Park, transportation logistics center, collecting and distribution center for special agriculture products logistics and other service industry projects were accelerated the construction. The industrial development platform layout of “one garden, two bases, two parks, two scenic spots” was accelerated to take shape; celadon and treasured sword park was listed in the first provincial key cultural industrial parks; 1 enterprise of culture industry with annual value of production over RMB100 million, 4 enterprises over RMB 50 million, 4 enterprises above designated size were added. 2.3 million person-times of domestic and overseas tourists were received in the whole year with the general income of tourism of RMB 1.15 billion, the year-on-year growth respectively being 41.4% and 45.9%. Longquan Mountain Scenic Spot was restored to be opening to the outside world; Piyun Mountain Scenic Spot 1st Stage, drift project of Dasai Lake were started for construction; Celadon Town of China, Chongren Temple and other projects were being orderly advanced; Shimalong Great Canyon Scenic Spot, Angshan Buddhism Cultural Tourist Area and other project were successfully signed; Baiyunyan 3A Scenic Spot, the provincial industrial tourism demonstration spot of Piyun Celadon Cultural Park were created; the activity of “rural roam” was greatly advanced, and “glamorous Longquan” tourism promotion series activity was carried out; economic development program of ecological leisure health maintenance (old-age care) was formulated and issued.

2. Water supply and drainage problems of Longquan City

1 ） Inadequate water supply capacity of existing water plant within the area

The water supply capacity of the current water plant cannot meet the requirements of the future planning with the water demand increase in the scope of services, therefore, it needs to expand the original water plants. The water supply projects of Anren, Badu, Longquan urban area are to solve this problem.

2) Lack of sewage disposal plant in Anren, Badu

There are currently no sewage disposal plants in Anren, Badu and the domestic sewage of the town is discharged to the watercourse through combined pipe duct after simple treatment via septic-tank, polluting the water body. This project is to build sewage disposal plants in Anren, Badu to solve the sewage disposal problem of the local residents.

3) Lagging construction of water supply and drainage network

Chengdong block in the future planning of Longquan urban area still lacks matching water supply and drainage pipeline. The connecting rate of sewage pipeline to household is low in old urban area and the domestic sewage of many residents is directly discharged or penetrating into the underground after simple treatment via septic-tank, which causes pollution on water body and ground water; the water supply pipelines of the old urban area are mainly old reinforced concrete water supply pipe and galvanized steel pipe, causing the severe leakage and damage of water supply pipe network. The water supply and drainage facility improvement project of Longquan City urban area will match the corresponding water supply and drainage pipeline for Chengdong block of Longquan urban area; Linong Alley project will implement sewage connecting to the household, improvement of water drainage pipe duct, water supply pipeline transformation and other content in Longquan old urban area.

The current water supply and drainage pipe network of Anren, Badu severely lags behind. The water supply pipe is old and the pipe network has high leakage and damage rate; except the drainage pipeline in the newly constructed community, the drainage pipeline of most of the water drainage of the open trench and closed conduit along the road in town is not systematic. The water supply and drainage facility improvement project for Anren and Badu will be matched with the corresponding water supply and drainage pipe for improvement.

4）The sanitary conditions need to be improved for villages incapable of enjoying the service of municipal infrastructure.

As for villages far from the central market town, it is common to directly discharge the domestic sewage without treatment, the drainage system in villages is disordered, and safety water supply has not been realized in a part of villages. Through the construction of scattered rural sewage treatment project, a set of continuable water supply and drainage system is established for villages with project implementation, and the hygienic conditions of villages are improved; via the simple terminal sewage treatment measures to treat the rural domestic sewage, pollution to the surrounding water from villages is reduced.

2. 5.3 Current environment quality condition of the project area

1. Environmental quality survey and evaluation on surface water

Water quality monitoring results of Longquan River, Anren River, Badu River, Yanzhang River, Zhulong River, Xiaomei River near the location of Longquan Subproject please see Table 2.5-2 and Attached Table 2.5-1. Please see Fig. 2.5-1 for monitoring distribution points.

The Longquan subproject locates at a region flowing by the Longquan River, the Anren River, the Badu River, the Yanzhang River, the Zhulong River and the Xiaomei River. Each of its monitoring indexes can reach the Class III and II water quality standards in Environmental Quality Standard for Surface Water (GB3838-2002); therefore its water environment is perfect.

2. Survey and evaluation on the status of atmospheric environment

There is one routine monitoring for atmospheric environmental quality of Longquan Environmental Monitoring Station in Longquan urban area, and the routine monitoring date of ambient air quality of Longquan urban area in 2012 please see Attached Table 2.5-2. Please see Fig. 2.5-2 monitoring points.

From the monitoring results, the daily average value, annual average value of SO2, NO2 and PM10 of the routine monitoring points for ambient air quality of Longquan

City in 2012 can meet category II functional zone requirements of Ambient Air Quality Standard (GB3095-1996), the current state of atmospheric environment of Longquan urban area being good.

3. Monitoring and Evaluation of Noise Environment Conditions

Monitoring results of current state of ambient noise of Longquan Subproject please see Table 2.5-3 and Attached Table 2.5-3. Please see Fig. 2.5-3 for monitoring distribution points.

Noise level day and night of all proposed places for the subproject in Longquan region can satisfy the Class 2, 1 and 4a standards in Environmental Quality Standard for Noise (GB3096-2008) and the region has a relatively good sound environment quality.

4. Investigation and evaluation of groundwater environmental status

According to the monitored data of the wells of Hongyang Village by Longquan Environmental Monitoring Station (please see Attached Table 2.5-4 for details), each index of the ground water of the region of Nandayang Water Plant confirmed to category III standard of Quality Standard for Ground Water (GB/T14848-1993), the ground water environment quality being good.

Fig. 2.5-2 Zoning Plan of the Water Function and Water Environment Function of Fuyang City

Table 2.5-2 Table of Monitoring Points and Monitoring Results of the Current State of Surface Water of the Region of Longquan Subproject

Serial No.	Subproject Name	Monitoring section	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
1	Water supply and drainage facility of Longquan urban area	2 cross sections: Monitored cross section of Longquan River Hydrometric Station and monitored cross section of the water-intake of Yanzhang River Nandayang Water Plant	pH, CODMN, NH_3-N, TP	Routine monitoring data from January to December 2012	Each water quality index of Longquan River can meet the Class III water quality standard of *Environmental Quality Standards for Surface Water* (GB3838-2002); each water quality index of Yanzhang River can meet the Class II water quality standard of Environmental Quality Standards for Surface Water (GB3838-2002). Generally, the current state of the water environment quality is good.
2	Water supply and drainage project of Anren Town of Longquan City	The water functional zone of Anren River is Longquan Reserve Zone of Anren River; the water environmental functional zone is the multi-functional zone, and Class II water environmental functional zone. The monitored cross section is the lower cross section of Anren Town, Anren River	pH, CODMN, NH_3-N, TP	Routine monitoring data of single month of 2012	Water quality indexes of the lower cross section of Anren Town, Anren River can meet the Class II standard requirements of *Environmental Quality Standards for Surface Water* (GB3838-2002), the current state of water environment quality being good.
3	Water supply and drainage project of Badu Town, Longquan City	Badu River, a tributary of Longquan River, its water functional zone is Longquan Reserve Zone of Badu River; the water environmental functional zone is the multi-functional zone, and Class II water environmental functional zone. The monitored cross section is Badu River Zhuyang-Badu cross section	pH, CODMN, NH_3-N, TP	Routine monitoring data of single month of 2012	Water quality indexes of the lower cross section of Anren Town, Anren River can meet the Class II standard requirements of *Environmental Quality Standards for Surface Water* (GB3838-2002), the current state of water environment quality being good.
4	Water Supply and Drainage Project of Chatian Town, Longquan City	Xiaomei River, a tributary of Longquan River, is Class III water environmental functional zone. The monitored cross section is Xiaomei River Xiaomei-Chatian cross section	pH, CODMN, NH_3-N, TP	Routine monitoring data of single month of 2012	The water quality indexes of Xiaomei River Xiaomei-Chatian cross section can respectively meet Class III standard requirements of *Environmental Quality Standards for Surface Water* (GB3838-2002), the current state of the local water environment quality being good.
5	Water supply and drainage project of Lanju Township, Longquan City	Yuzhang River, a tributary of Longquan River It uses the monitored cross section for water quality of Longquan River, the monitored cross section being Longquan River Lanju-Jianchi cross section	pH, CODMN, NH_3-N, TP	Routine monitoring data of single month of 2012	The water quality indexes of Longquan River Lanju-Jianchi cross section can respectively meet Class II standard requirements of *Environmental Quality Standards for Surface Water* (GB3838-2002), the current state of the local water environment quality being good.
6	Demonstration project of domestic sewage disposal system of decentralilzed villages of Longquan City	Longquan River Lanju-Jianchi cross section, Zhulong River cross section, Badu River Badu lower cross section are planned to be Class II water environmental functional zone; Longquan River Nanqin Bridge, Linjiang cross section and Meixi River Xiaomei-Chatian cross section are planned to be Class III water environmental functional zone.	pH, CODMN, NH_3-N, TP	Routine monitoring data of single month of 2012	The routine water quality monitoring data of Zhulong River, Longquan River and the tributaries Badu River, Xiaomei River shows that the water quality indexes can meet the corresponding Class II, III standard requirements of *Environmental Quality Standards for Surface Water* (GB3838-2002), the current state of the local water environment quality being good.

Table 2.5-3 Table of Monitoring Points and Monitoring Results of the Current State of Noise of Longquan Subproject

Serial No.	Subproject Name	Monitoring Location	Monitoring Factors	Monitoring Time and Frequency	Monitoring Results
1	Water supply and drainage facility of Longquan urban area	There are four monitoring points set in Nandayang Water Plant, namely, one point in one side of the plant boundary.	Leq dB(A)	Carried out on March 25, 2013 With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The noise value of the periphery of Nandayang Water Plant in the day is between 53.1-56.9dB (A), the noise value in the night between 46.3-47.8dB (A), conforming to Class 2 standard in *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality of the proposed site of the project being good.
2	Water supply and drainage project of Anren Town of Longquan City	There are respectively four monitoring points set in Anren Sewage Plant and Water Supply Plant, namely, one point in one side of the plant boundary. 1 point set in Huangshixuan Village	Leq dB(A)	Carried out in 2013 With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The measured noise value of the peripheral boundaries and pipe networks of Anren Town Water Supply and Drainage Plant can meet category 2 *standard in Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality of the location of the project being good.
3	Water supply and drainage project of Badu Town, Longquan City	There are respectively four monitoring points set in Anren Sewage Plant and Water Supply Plant, namely, one point in one side of the plant boundary. 2 points set in Xiaogao Village and Badu Fourth Village	Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The measured noise value of the peripheral boundaries and pipe networks of Anren Town Water Supply and Drainage Plant can meet Class 2 standard in *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality of the location of the project being good.
4	Water Supply and Drainage Project of Chatian Town, Longquan City	There are respectively four monitoring points set in Anren Sewage Plant and Water Supply Plant, namely, one point in one side of the plant boundary. 2 points set Chatian First Village and Chatian Third Village	Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The measured noise value of the peripheral boundaries and pipe networks of Anren Town Water Supply and Drainage Plant can meet Class 2 and 4a standard in *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality of the location of the project being good.
5	Water supply and drainage project of Lanju Township, Longquan City	There are respectively four monitoring points set in Anren Sewage Plant and Water Supply Plant, namely, one point in one side of the plant boundary. 2 points set in Yuzhang Village and Wumeiyang Village	Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The measured noise value of the peripheral boundaries and pipe networks of Anren Town Water Supply and Drainage Plant can meet Class 2 and 4a standard in *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality of the location of the project being good.
6	Water supply and drainage project of Xiaomei Town, Longquan City	There are respectively four monitoring points set in Anren Sewage Plant and Water Supply Plant, namely, one point in one side of the plant boundary. 2 points set in Xiaomei First Village and Xiaomei Fourth Village	Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The measured noise value of the peripheral boundaries and pipe networks of Anren Town Water Supply and Drainage Plant can meet Class 2 standard in *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality of the location of the project being good.
7	Demonstration project of domestic sewage disposal system of decentralized villages of Longquan City	5 noise monitoring points are set in the peripheral boundaries and pipe networks along the pipeline range of the sewage disposal system project of Hecun Village of Xijie Subdistrict at random.	Leq dB(A)	With 1 day of monitoring, 1 time of monitoring is done separately at the day and night.	The noise monitoring value of the peripheral boundaries and along the pipeline range of the sewage disposal system project of Hecun Village of Xijie Subdistrict can meet class 1 standard in *Environmental Quality Standard for Noise* (GB3096-2008), the acoustic environment quality of the location of the project being good.

3. Overview of Project

3.1 Engineering profile of the subproject in AnJi region

3.1.1 Project constitute

There are totally 8 subprojects in AnJi County region, including connecting sewage system engineering of 6 regional villages of Tianzihu, Meixi, Guishan, Xiaofeng, Chengqu, Tianhuangping, 2 scattered rural sewage disposal system engineering consisting with the package of 34 scattered villages, please see Table 1.2-1 for details.

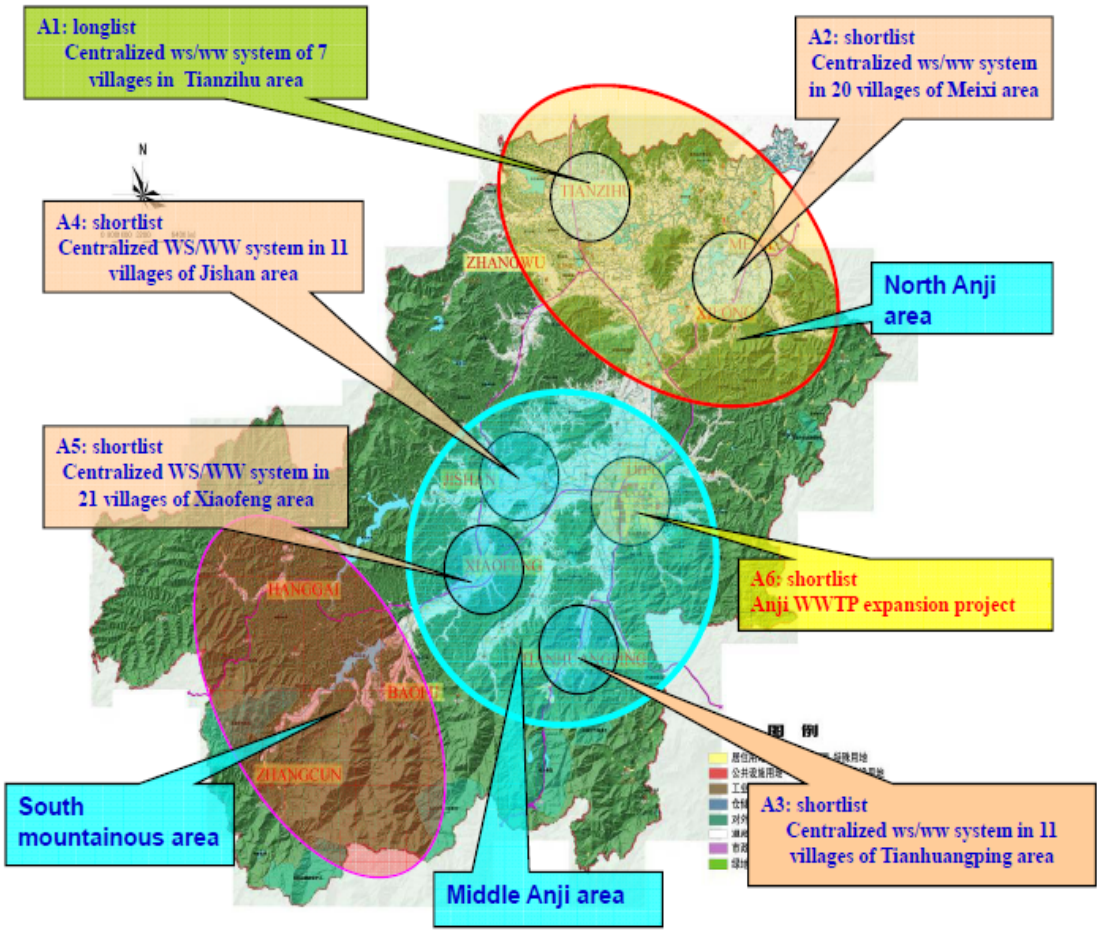


Fig. 3.1-1 Location Plan of Connecting Sewage System Engineering of 6 Regional Villages of AnJi

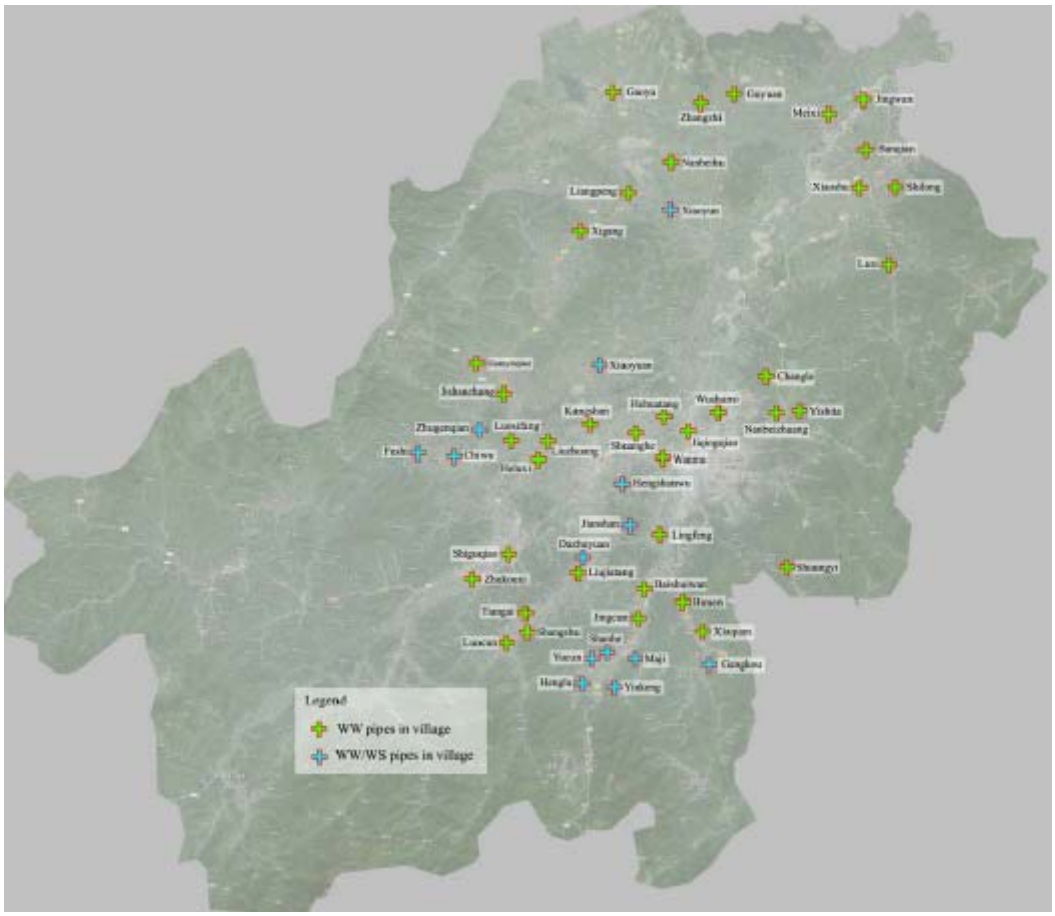


Fig. 3.1-2 Location Plan of Villages with Pipelines of AnJi

3.1.2 The perfection project of water supply and drainage facilities in Tianzi Lake region

The perfection project of water supply and drainage facilities in Tianzi Lake region:

(1) New construction of 35km distributing pipe line and 45km sewage pipe network.

(2) The drinking water engineering will be executed in four villages, including Xigang Village, Xiaoyun Village, Zhangzhi Village and Guyuan Village, regional decentralized water supply pervasion will be improved and old pipe network in the region will be renovated and expanded.

(3) Sewage produced by neighborhood Liangpeng Village, Gaoyu Village, Nanbeihu Village, Xigang Village, Xiaoyun Village, Zhangzhi Village and Guyuan Village will be discharged into the Tianzihu Sewage Treatment Station primarily, in association with decentralized processing.

Please see Fig. 3.1-1 for the layout of water drainage pipe network of AnJi Tianzi Lake region; please see Fig. 3.1-2 for the layout of water supply pipe network of AnJi Tianzi Lake region.

3.1.3 Perfection project of water supply and drainage facilities in Meixi River region

The water supply and drainage infrastructure improvement engineering of Meixi River region is mainly for improvement of the water supply and drainage pipe network of Meixi town region and extension of the water supply and drainage pipe network towards the surrounding rural areas to form integrated engineering of the regional water supply and drainage.

Engineering construction content: extension of Gaoyu Water Plant from 20,000m³/d to 45,000m³/d, new construction of 38km distributing pipe line for water supply; new construction of 32km sewage pipe network, extension of Meixi Sewage Plant from 10,000m³/d to 20,000m³/d.

The sewage interruption pipeline construction project will be performed in Mexi market town areas, and other ten villages, including Jiazi village, Meixi Village, Longkou Village, Jingwan Village, Huaguang Village, Banqiao Village, Shilong Village, Xiaoye Village, Dushantou Village and Luxi Village.

1. Extension engineering of Gaoyu Water Plant

The first-stage engineering of Gaoyu Water Purification Plant is the water purification plant taking Tianziling Reservoir as the water source, the recent design daily water supply capacity is 20000m³/d and the floor area of the water plant is 1.605ha.

The regional water supply scheme takes the united water supply scheme by Leping Water Plant and Gaoyu Water Plant and Gaoyu Water Plant is to be extended from 20000m³/d to 45000m³/d. The water supply pipe extends from Xiaonan Line to Meixi Service Area and connects Leping Water Plant. Basing on the current scope of service, the water supply region extends to the upstream Luxi Village. Pipe network transformation in the current service area, especially the old town area shall be carried out to reduce leakage and damage rate. The feed pump station is located at 30m northeast Lujia Village, with a scale of 1000t/d.

Currently, Tianzigang Reservoir is the water-intake source of Gaoyu Water Plant (20000m³/d) and via Fushi Channel; Fushi Reservoir can deliver water to the plant with a capacity of 3m³/s: the water supply source has the sufficient supportability.

The technological process of Gaoyu Water Purification Plant is “stabilized pressure well→static mixing→folded-plate reaction tank→horizontal sedimentation tank→even-granular filter”.

2. Meixi Sewage Disposal Plant

Anxi County Meixi Town Sewage disposal Plant is located at the northwest corner of Xiaoshu Group of Meixi Town of AnJi County, with a scale of daily sewage disposal of 10000t and the outlet water quality reaching level I standard A of Discharge *Standard of Pollutants for Municipal Sewage Disposal Plant (GB18918-2002)*, the outlet water being discharged to Xishao River.

Meixi Sewage Plant of this engineering is to be extended from 10000m³/d to 20000m³/d; the sewage in north region of Xishao River shall be pumped to sewage disposal plant, with the pressurized water transmission pipe of DN400-3.5km; therein, 1# sewage lift pump station is located at 66m south of Longkou Village, with a scale of 1000t/d, 2# sewage lift pump station is located at 85m north of Meixi Village, with a scale of 10000t/d. The sewage disposal plant after extension still uses the original MSBR treatment process and the tail water discharge implements level I standard A of Discharge *Standard of Pollutants for Municipal Sewage Disposal Plant* (GB18918-2002).

The sewage discharge outlet uses the current outlet of the first-stage engineering of Meixi Sewage Plant, which is located at the upstream of agricultural filling pump station about 400m downstream of New Meixi Bridge of Xishao River and uses bank side inundation release manner for discharge.

Please see Fig. 3.1-3 for construction schematic drawing of water supply system of AnJi Meixi region; please see Fig. 3.1-4 for construction schematic drawing of water drainage system of AnJi Meixi River region.

3.1.4 The perfection project of water supply and drainage facilities in Tianhuangping region

The water supply and drainage infrastructure improvement engineering of Tianhuangping region includes 2 parts:

(1) The newly-built booster pump station for water supply will cover 13,000m3/d; 23km of water distribution pipelines will be newly constructed; the newly-built sewage pump station will cover 5,500 m3/d; and 47km of drain pipes will be newly constructed.

(2) The sewage interception pipeline construction project will be performed in 11 villages, including Bimen Village, Xiaquan Village, Lingfeng Village, Henglu Village, Shanhe Village, Yucun Village, Maji Village, Jingcun Village, Yinkeng Village, Baishuiwan Village and Gangkou Village.

(3) New acquired land of the engineering: this project needs temporarily acquired land of 35.33mu, the floor area of pump station (including water supply and sewage) of 3,783m², and the floor area of high position pool of 470m ² due to pipeline construction.

1. Water supply system

The regional water supply scheme takes Fenghuang Water Plant as the water supply source and sets water supply booster pump station in Lingfeng Village to supply water to the region from high and low subregions. Water supply pipe network of low subregion meets the water supply of elevation settlements below 70m and the high subregion supplies water for settlements between 70-140m using the branch pipe pressure reducing mode.

2. Drainage system

Sewage of the 11 villages inside the service area is uniformly treated to be delivered to the sewage disposal plant in the urban area. Construction of sewage interception pipeline main pipe d200-2.0km, d300-14.0km, d400-2.6km, d500-4.5km, d600-4.0km

Please see Fig. 3.1-5 for construction schematic drawing of water supply system of AnJi Tianhuangping; please see Fig. 3.1-6 for construction schematic drawing of water drainage system of AnJi Tianhuangoing.

3.1.5 The perfection project of water supply and drainage facilities in Banshan region

The water supply and drainage infrastructure improvement engineering of Banshan region includes (1) new construction of 16km water supply raw water pipeline, water supply plant 20000m3/d; new construction of 12km distribution pipe; new construction of 14km drainage pipe. (2) The sewage interception pipeline construction project will be performed in 11 villages, including Xiaoyuan Village, Kangshan Village, Shuanghe Village, Changle Community, Wushansi Village, Jiqingqiao Village, Hehuatang Village, Yinwan Village, Sanguan Village and Zhaojiashang Village.

1. Water supply system

The regional water supply scheme takes Fushi Reservoir as the water supply source and will newly build 20000m³/d water purification plant in Xiaoyuan Village and distributes water to the region along the main roads by gravity and forms looped network with the current water supply pipe network in the region. The water pressure for supplying water to the region is 65m.

The water purification process uses folded-plate reaction---inclined tubing sedimentation--air-water backwashing filter.

2. Drainage system

In the service area of this project, the construction of the sewage main pipe is almost

completed and the sewage of the villages around the main pipe is discharged to Chengbei Sewage Disposal Plant; taking the current pipe network as the basic frame, the sewage pipe network sets sewage interception main pipe along Xixi. Entering the current D1200 sewage main pipe of Lingfeng North Road to Chengbei Sewage Disposal Plant The scale of Chengbei Sewage Disposal Plant is 20000m³/d, which can meet the treatment requirements of recent sewage of the region.

Please see Fig. 3.1-7 for construction schematic drawing of water supply system of AnJi Banshan region; please see Fig. 3.1-8 for construction schematic drawing of water drainage system of AnJi Banshan region.

3.1.6 The perfection project of water supply and drainage facilities in Xiaofeng region

The water supply and drainage infrastructure improvement engineering of Xiaofeng region includes (1) improvement of the water supply and drainage pipe network of Xiaofeng town area and pavement of the regional water supply and drainage main pipe to main settlements of each village of project. New construction of 47km water supply and distribution pipe; new construction of 47km drainage pipe (2) The sewage interruption pipeline construction project will be performed in 22 administrative villages (communities), including Xiaofeng Market Town Region (Xiaofeng Community, Chengbei Community, Dongshan Community), Shiguqiao Village, Zhuguxi Village, Chiwu Village, Fushi Village, Zhugenqian Village, Guanyinqiao Village, Luosifang Village, Banshanchang Village, Liuzhuang Village, Heluxi Village, Dazhuyuan Village, Jianshan Village, Hengshanwu Village, Luocun Village, Shangshu Village, Tiangai Village, Liujiatang Village, Wanmu Village.

1. Water supply scheme

The regional water supply scheme makes Chengxi Water Plant be responsible for the water supply of rural area with ground elevation below 40m, and Xiaofeng Water Plant be responsible for area with ground elevation above 40m in the region. The gravity water supply of Xiaofeng Water Plant supplies water to villages of Luosifang block, and Dazhuyuan block along the main roads (12 provincial road, 11 provincial road, Liupeng Line) with new construction of 30.8km water distribution main pipe; therein, Jianshan, Zhugen, Dazhuyuan, Chiwu, Fushi still uses mountain spring water. Water supply house connection engineering is implemented and pressure reducing and stabilizing valve is set before the user’s water meter in the water supply range of Xiaofeng Water Plant.

2. Drainage system

The drainage system of Xiaofeng region is considered to be the rain, sewage confluence system to mainly collect the domestic sewage and the initial rainwater of the crowded area. Sewage of each village is uniformly delivered to the sewage disposal plant of the urban area.

Please see Fig. 3.1-9 for construction schematic drawing of water supply system of AnJi Xiaofeng region; please see Fig. 3.1-10 for construction schematic drawing of water drainage system of AnJi Xiaofeng region.

3.1.7 Expansion project of AnJi Urban Sewage Disposal Plant

The extension engineering of the sewage disposal plant in AnJi urban area includes (1) Construction of 11km distribution pipe network and implementation of water supply house connection engineering in Jianshan, Zhugen, Dazhuyuan, Chiwu, Fushi; (2) Improvement of the water supply and drainage pipe network in AnJi urban area, and pavement of the regional water supply and drainage main pipe to main settlements of each village of project; new construction of 29km sewage pipe network, extension of

AnJi Sewage disposal Plant from 30,000m³/d to 50,000m³/d and transformation of current sewage plant. (3) The sewage interception pipeline construction project will be performed in 4 villages, including Shuangyi Village, Shuangxikou Village, Nanbeizhuang Village, and Yishita Village.

Water supply scheme

The only DN5000 water supply main pipe in the east of the urban area at Tianmu Road severely restricts the water supply capacity of Fenghuang Water Plant and also affects the pressure of water supply of the east region, therefore it designs to add one DN600 water supply pipe along Chengdong Road to ensure the water supply capacity of the region.

2. Drainage system

The sewage is concentrated to the sewage disposal plant of the urban area for treatment: the pipelines separately extending to the villages of the south, east region along Shuangyi Road, Dihong Road, Tongshan River. The sewage disposal plant of the urban area is extended from 30000 tons to 50000 tons, and sewage lift pump station is set at Jichang Road and the sewage that cannot be promptly treated by the sewage disposal plant of the urban area shall be delivered to Chengbei Sewage Disposal Plant.

The sewage disposal plant of the urban area was built in 2001, using the process of SBR+sand leach, besides collecting the sewage from the central area of the county, also collecting the sewage from Xiaofeng town area and the surrounding villages along the pipe in the west. The scale of the sewage disposal plant of the urban area is 30000m³/d with the daily average inflow reaching 2.88m³/d.

This design transforms the original 30000 SBR treatment process to A2/O treatment process because the current equipment of the sewage disposal plant of the urban area is aging, and the specific transformation measure: new construction of two round peripheral in/out secondary sedimentation tanks at the end part of SBR and transformation of the current SBR to anaerobic aeration zone. The sewage disposal capacity is to be improved to 50000 tons/day while the current 30000 tons/day is being transformed. Sand filter is to be added to A2O process subsequently to ensure the sewage to be discharged after meeting level one standard A of *Discharge Standard of Pollutants for Municipal Sewage Disposal Plant.*

Please see Fig. 3.1-11 for construction schematic drawing of water supply system of AnJi urban area; please see Fig. 3.1-12 for construction schematic drawing of water drainage system of AnJi urban area.

3.1.8 Disposal engineering of the scattered villages of AnJi

The treatment system of rural domestic sewage of AnJi County involves with 34 villages, 9384 serviced households, and 31920 serviced populations, please see Table 3.1-1 for details. The design content of the engineering includes domestic sewage collecting system, treatment terminal, water supply system of tap water as well as the Low Impact Development (LID) system for solving pollution of the initial rainwater and village surface source, etc.

Table 3.1-1 Table for decentralized villages of AnJi for sewage disposal

Serial No.	Villages and towns	Administrative village	Rural household quantity (household)	Population	Category
shortlist					
1	Baofu Town	Jingxi Village	139	447	Decentralized village
2	Meixi Town	Changlingai Village	341	1175	Decentralized village

Serial No.	Villages and towns	Administrative village	Rural household quantity (household)	Population	Category
3	Meixi Town	Hongmiao Village	300	1050	Decentralized village
4	Shanchuan Town	Gaojiatang Village	81	262	Decentralized village
5	Xilong Township	Houhe Village	118	418	Decentralized village
6	Guishan Township	Shangshugan Village	114	384	Decentralized village
7	Zhangcun Town	Zhangcun Village	421	1135	Decentralized village
8	Shanchuan Town	Dali Village	123	392	Decentralized village
9	Dipu Town	Majia Village	400	1401	Decentralized village
10	Hanggai Town	Tangshe Village	214	749	Decentralized village
11	Meixi Town	Xiaoxikou Village	695	2432	Decentralized village
12	Hanggai Town	Panxi Village	299	950	Decentralized village
13	Shanchuan Town	Majianong Village	73	298	Decentralized village
14	Hanggai Town	Wucun Village	216	756	Decentralized village
15	Zhangwu Town	Zhangwu Village	597	2089	Decentralized village
16	Zhangwu Town	Yuhua Village	128	448	Decentralized village
17	Hanggai Town	Hanggai Village	320	1136	Decentralized village
18	Xilong Township	Xilong Village	398	1393	Decentralized village
19	Zhangwu Town	Jingwu Village	367	1284	Decentralized village
Subtotal			5344	18198	
longlist					
20	Hanggai Town	Xinshangtang Village	280	906	Decentralized village
21	Zhangcun Town	Changtan Village	182	639	Decentralized village
22	Xilong Township	Huangdu Village	77	236	Decentralized village
23	Zhangcun Town	Hegan Village	209	713	Decentralized village
24	Zhangcun Town	Gaoshan Village	260	910	Decentralized village
25	Shangshu Township	Shiruan Village	250	762	Decentralized village
26	Baofu Town	Penghu Village	296	917	Decentralized village
27	Baofu Town	Baofu Village	298	978	Decentralized village
28	Dipu Town	Lujia Village	214	735	Decentralized village
29	Dipu Town	Ancheng Village	806	2820	Decentralized village
30	Dipu Town	Anshan Village	217	761	Decentralized village

Serial No.	Villages and towns	Administrative village	Rural household quantity (household)	Population	Category
31	Shanchuan Town	Shanchuan Village	141	496	Decentralized village
32	Xiaofeng Town	Baiyang Village	198	706	Decentralized village
33	Zhangwu Town	Minle Village	262	917	Decentralized village
34	Zhangwu Town	Shangwu Village	350	1225	Decentralized village
Subtotal			4040	13722	
Total			9384	31920	

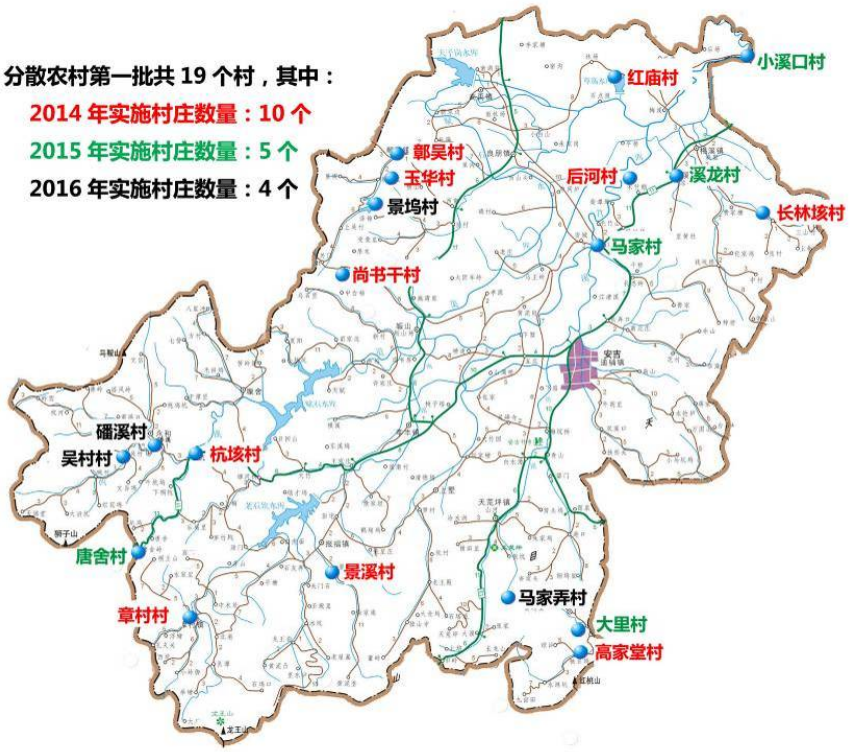


Fig. 3.1-3 Location Plan of Decentralized Villages of AnJi County for Sewage Disposal

3.2 Profile of subproject of Fuyang region

3.2.1 Project component and scale

The total number of subprojects to be performed in Fuyang Area is 9, consisting of the Fuyang sewage treatment project Phase IV, the construction project of joint water supply and drainage facilities in four rural market towns, i.e. Xindeng Town, Dayuang Town, Changkou Town and Longyang Town, two packaged sewage treatment projects in 19 decentralized villages and two packaged sewage interruption pipeline construction projects in 41 villages.

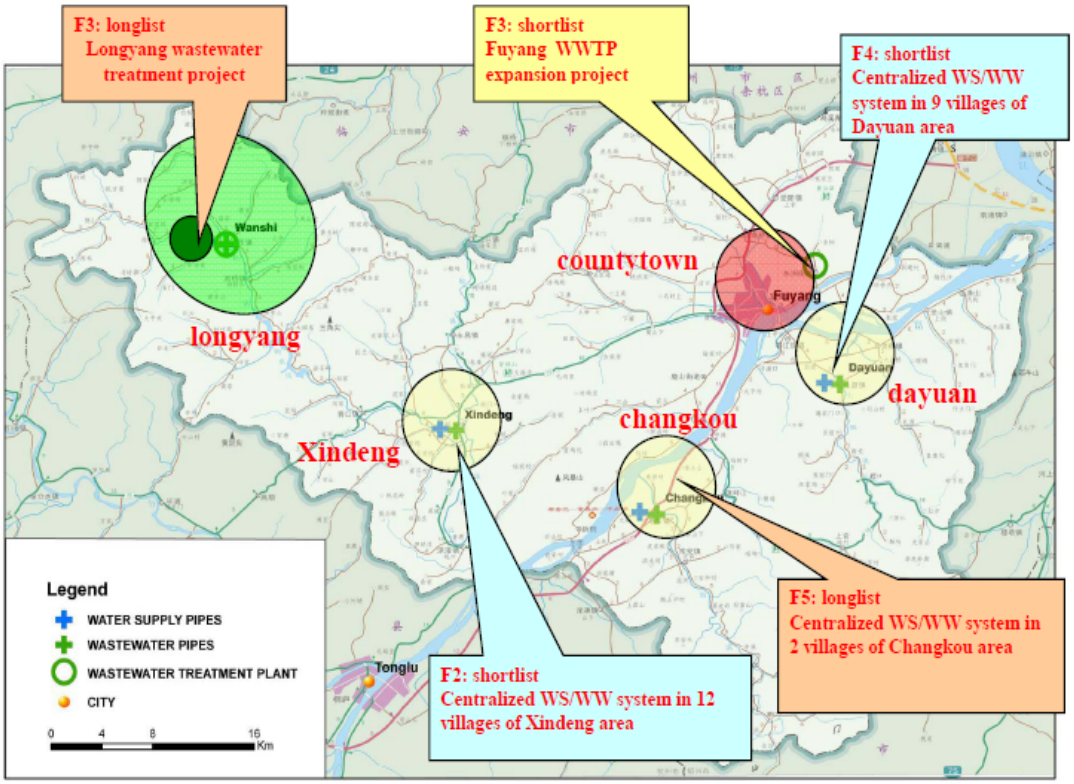


Figure 3.2- 1: Village Joint in four towns of Fuyang and Location Plan of Fuyang Sewage Project Phase IV

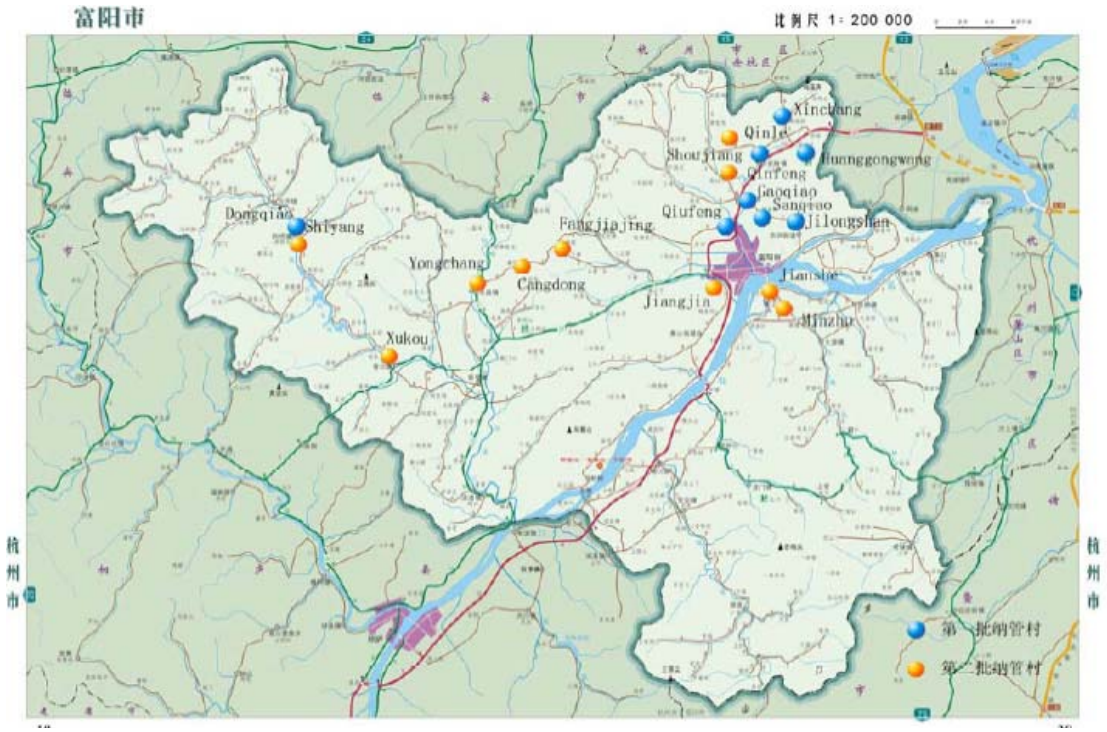


Figure 3.2- 2: Location Plan of Sewage Interception Pipeline in Villages of Fuyang (18 administrative villages and 41 natural villages)

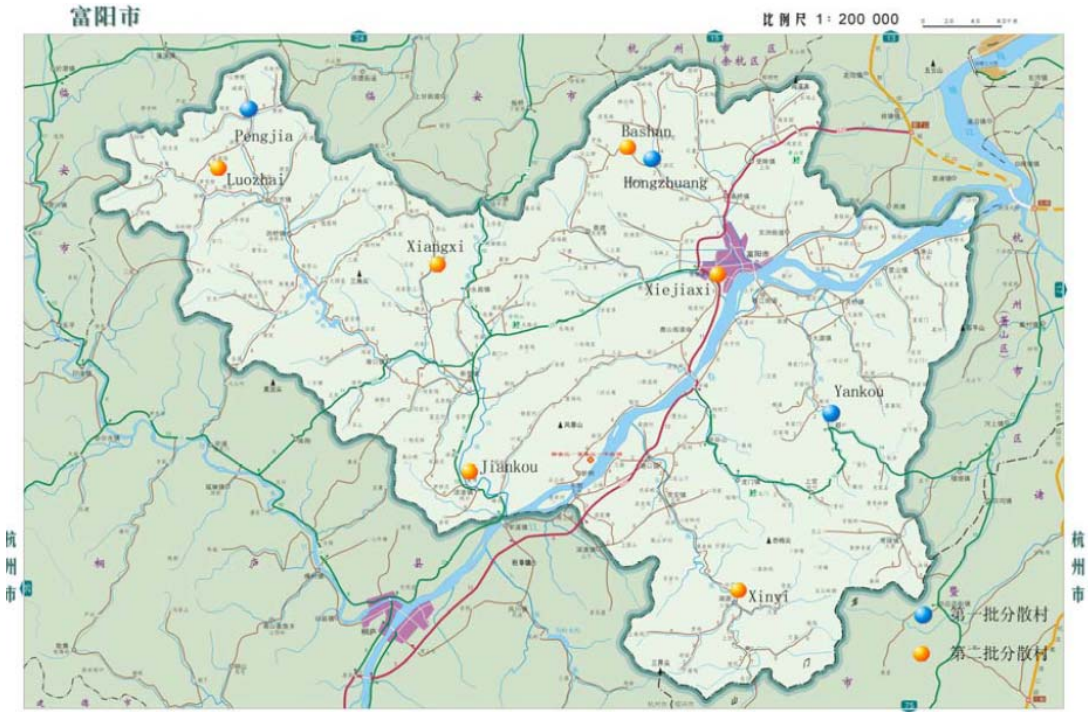


Figure 3.2- 3: Location Plan of Fuyang Decentralized Sewage Disposal Plants in Rural Areas (9 administrative villages and 19 natural villages)

3.2.2 Profile of sewage disposal engineering of Longyang of Fuyang City

1. Geographic position: Dongqiao Town of Fuyang City

2. Scope of service: sewage collecting system, pipe connecting to house, sewage main pipe in Wanshi Town, Dongqiao Town

3. Contents and scale of the project construction

One sewage disposal plant and collecting system of sewage pipe network are to be added; the total length of sewage collecting pipeline is 13.7km and the treatment scale of the sewage disposal plant will be 1,000 m^3/d till 2020.

4. Effluent quality

Gexi River is to intercept sewage, located at the upstream of main water-intake source of Fuyang of Fuchun River; the water functional zone is required to be of Class II; 3.6km downstream of the discharge outlet is Yangshiling Reservoir which is the backup water source of Fuyang City and is planned to be constructed with the water supply project of Xindeng Water Plant.

The tail water discharge implements level I standard A of Discharge Standard of Pollutants for Municipal Sewage Disposal PlantGB18918-2002.

5. Process Technology

The engineering uses A2/O process, therein, O zone uses catalytic oxidation process and he technological process of "grilling+adjustment+biochemistry+filtration+disinfection".

6. Pipeline scheme

Sewage collecting system: center the highest 75.5m elevation, separately arrange sewage pipeline in the direction of south, north

Northward: lead two sewage pipes westward at the elevations of relative low point 69.0m and relative low point 73.7m; after confluence at the southeast corner of the central primary school of the town, these two sewage pipes extend southward to current Jigeng Road and deliver the sewage eastward to the elevation of the lowest point 63.0m of the town area near Xugao Line. Pipe diameter DN300

Southward: set sewage pipeline along the longitudinal slope of the road which extends eastward at the intersection of Xugao Line and Ximen Road and converges with the above pipelines at the elevation of the lowest point 63.0m. Pipe diameter DN300

Sewage delivery system: after confluence at the elevation of the lowest point 63.0m, set an inverted siphon to pass through Gexi River and arrange sewage delivery main pipe at the southwest bank of Gexi River for delivery of the sewage southward to the proposed site. Sewage delivery pipe diameter is DN400, and the total length of the delivery pipe is about 3.1km (excluding house connection pipe).

8. Project occupied land

This engineering includes sewage pipeline and sewage disposal station which has the permanently acquired land of 7.28mu (including site access road). The land used by pipeline construction is 14.9mu.

3.2.3 General of modification project of water supply and drainage pipeline network of market town of Xindeng county of Fuyang city

1. Geographic position

The rural market town center of Xindeng county (including Tashan village, Gonghe village, Bingxian village, Shuangxi village, NAnJin village, Chengzhuang village and Songxi village.

2. Water drainage system and goal

The water drainage system adopts the division system.
The newly built sewage collection pipeline network in the market town of Xindeng county is finally accessed into the existing Dayuan Sewage Disposal Plant, and the water effluent quality of the sewage disposal plant is in accordance with the first-class A standard of water pollutant discharge of *Standard of Pollutant Discharge of Urban Sewage Disposal Plant* (GB18918 2002). After built, the recent sewage collection rate in the market town can reach more than 60%, and the future sewage collection rate can reach more than 70%.

3. Construction Content

The modification of water supply pipeline network contains Tashan village, Gonghe village, Bingxian village, Shuangxi village, NAnJin village, Chengzhuang village and Songxi village.
One part of water supply main pipe is modified, or the water supply branch or service pipe is modified or built, so as to realize the function of one user with one meter. The De300-De25 water supply pipeline is 70.3km in total length, and adopts the nodular cast-iron pipe, PE pipe or steel pipe. A new sewage pipeline network collecting system is built, the DC100-DN400 sewage pipeline is 70.4km in total length, the DB225 or above pipeline adopts the HDPE dual-wall corrugated pipe, the DB225 or below pipeline adopts the PVC-U water drain pipe, and the inverted siphon pipe adopts the PE pipe. The new rainwater pipeline is 1.9km in total length, and adopts the HDPE dual-wall corrugated pipe.

4. The scheme of water-supply system

The sewage collecting pipe is generally arranged as follows:

① Tashan village, Gonghe village, Bingxian village and Shuangxi village: The DN300 sewage collecting main pipe is arranged along the urban city river west road to the south and north sides, one part of the main pipe is paved and connected to the DN400 sewage pipe of Factory road to the north, and one part of the main pipe is paved and connected to the DN1000 sewage main pipe of Xinxing road to the south. There are three sewage collecting main pipes along the Gonghebei road, the north section is paved and connected to the DN400 sewage pipe of Factory road to the north, the middle section is collected to the DN1000 sewage main pipe of No.23 provincial highway to the east, and the south section is paved and connected to the DN1000 sewage main pipe of Xinxing road to the south. The DN300 sewage main pipe of Shuangxi village is paved and connected the DN1000 sewage main pipe of No.23 provincial highway to from west to east.

② NAnJing village: The DN300 sewage collecting pipe is paved to the south end of NAnJing Bridge from south to north according to the terrain condition, and is paved and connected to the DN1200 sewage main pipe at the south end of Gexi bridge along the existing farmland of Gexi and the Dengchengnan road.

③ Songxi village (Xinyan, Junyan and Zaoshan): The DN300 sewage collecting main pipe is connected to the DN600 sewage main pipe of No.23 provincial highway from north to south and from east to west. The other sewage branch pipes are nearby connected with the sewage main pipe of No.23 provincial highway according to the terrain conditions.

5. Process design of water supply pipeline network

The project involves the modification and new construction of part of water distributing main pipe, water distributing branch pipes and service pipes. The origin point of the water distributing branch pipe is connected with the DN600 water

distributing main pipe at the crossing part of No.05 provincial highway and No.23 provincial highway, and is laid along the No.23 provincial highway- Dengchengbei road - Dengchengnan road – NAnJing bridge (Gexi), and the end point is connected with the DN600 water distributing main pipe at the crossing part of Dengchengnan road and No.23 provincial highway. The old water distributing branch pipes and service pipes of old urban areas of Xindeng county are modified (including Tashan village, Gonghe village, Bingxian village and Shuangxi village), and NAnJing village (Nansi) are modified, so as to realize the function of one user with one meter.

6. The scheme of water-supply system

The design is only applicable to the rainwater pipe for the Tashan road and Xincheng street lacking the rainwater collection system, and is arranged as follows: the DN300-DN400 rainwater branch pipe of Tashan road is connected to the rainwater main pipe of Xinxing road; the DN300-DN400 rainwater branch pipe of Xincheng street is nearly connected with the water body, and the rest part is connected with the rainwater main pipe of Xinxing road.

Refer to Fig. 3.2-1 for the layout plan of sewage pipeline network of market town of Xindeng county of Fuyang city.

3.2.4 Modification Project of Water Supply and Drainage Pipeline Network of Market Town of Dayuan County of Fuyang City

1. Location

The project is located at Dayuan county of Fuyang city, and mainly provides services for the center of market town of Dayuan, including Dayuan village (Yongqing, Pantang, Pudong, Xialang, and Wangxian) and Tingshan village (Dongsheng, Tayan, Zhanlong and Tingshan).

2. Water drainage system and goal

The water drainage system adopts the division system.

The newly built sewage collecting pipeline network of market town of Dayuan county is finally connected to the existing Dayuan sewage disposal plant. After built, the sewage collecting rate in the market town would reach 60% by 2020, 70% by 2025, and 80% by 2030.

3. Water supply goal

The construction of water supply pipeline mainly includes the replacement of old water distributing pipes, branch pipes and service pipes, and the general meter system is changed into one user with one meter. A little amount of villages with self spring water is connected to the municipal running water. After built, the water supply popularizing rate in the market town can reach 100%.

4. Construction Content

One part of water supply main pipe is modified, or the water supply branch or service pipe is modified or built, so as to realize the function of one user with one meter.

(1) The water supply branch pipe and service pipe are replaced, and the water distributing pipe and service pipe of Zhenlong village, Pudong village, Wangxian village and Tingshan village are newly built, so as to realize the function of one user with one meter. The DN300-De32 water supply pipeline is 30.1 in total length. The De32-De110 pipe adopts the PE pipe, and the DN300 pipe adopts the nodular cast-iron pipe.

(2) New sewage pipeline network collecting system The DN400-DN110 water drainage pipeline is 67.67km in total length, the DN225-DN400 pipe adopts the HDPE dual-wall corrugated pipe, and the DN110-DN160 pipe adopts the PVC-U

water drainage pipe.
Refer to Fig. 3.2-2 for the layout plan of sewage pipeline network of market town of Dayuan county of Fuyang city.

3.2.5 Trial project of sewage interception piping for rural domestic waste in Fuyang City (the first batch)

1. Construction site and construction content

The construction site is located at Qiufeng village and Sanqiao village of Fuchun Street, Huanggongwang village and Jilongshan village of Dongzhou Street, Gaoqiao village, Shoujiang village and Xinchang village of Yinhu Street, and Dongqiao village of Dongqiao county.
The construction content includes connecting the sewage collecting pipeline network into the Fuyang sewage disposal plant, including Qiufeng village and Sanqiao village of Fuchun street, Huanggongwang village and Jilongshan village of Dongzhou street, and Gaoqiao village, Shoujiang village and Xinchang village of Yinhu street; connecting the sewage collecting pipeline network into the Fuyang sewage disposal plant, including and Dongqiao village; paving the DN200-300 HDPE dual-wall corrugated pipe with length of 56km, the DN150 UPVC water drainage pipe with the length of 106km and accessory facilities, and 7,491 cleaning septic tanks.

2. Layout of sewage pipeline networks

(1) Layout of sewage pipeline network of Huanggongwang village
The sewage intercepting pipe incorporating range of Huanggongwang village only refers to the Huashu natural village, and the main sewage drainage pipe can be connected to the municipal sewage drainage main pipe under Jiangbindong road through gravity flow.

(2) Layout of sewage pipeline network of Jilongshan village
There is no uniformly built sewage intercepting pipe in the Jilongshan village, the scope includes the whole village, and the main sewage intercepting pipe can be connected to the municipal sewage drainage main pipes under Golf road and Jiangbindong road through gravity flow.

(3) Layout of sewage pipeline network of Qiufeng village
There is no uniformly built sewage intercepting pipeline network in the village, the sewage intercepting pipe incorporating scope includes the whole village (except the villa area), and the main sewage intercepting pipe can be connected to the municipal sewage drainage main pipes under No.23 provincial highway through gravity flow.

(4) Layout of sewage pipeline network of Sanqiao village
There is no uniformly built sewage intercepting pipeline network in the village, the scope includes the whole village, and the main sewage intercepting pipe can be connected to the municipal sewage drainage main pipes under Gongyuanxi road or Yucaixi road through gravity flow.

(5) Layout of sewage pipeline network of Shoujiang village
There is one uniformly planned and built new residential district at the southwest of Dashuxia village, and the sewage drainage pipeline network has been built. The rest is the rural houses distributed at each natural village, without pipe incorporating. The main sewage drainage pipe can be connected to the municipal sewage drainage main pipes under No.320 highway or Yanxi road.

(6) Layout of sewage pipeline network of Xinchang village
There are uniformly planned and built new residential distributes respectively at the north part and southeast part, i.e. Mingcuilanwan and Qingzhulanting, and the sewage

drainage pipeline networks have been built. The rest is the rural houses distributed at each natural village, without pipe incorporating. The main sewage drainage pipe can be connected to the municipal sewage drainage main pipes under No.320 provincial highway through gravity flow.

(7) Layout of sewage pipeline network of Sanqiao village

The Caihongyuandu and Wenxinyuan residential districts have been built with the sewage drainage pipeline networks. The rest is the rural houses distributed at each natural village, without pipe incorporating. The new main sewage drainage pipe can be connected to the municipal sewage drainage main pipes under Golf road, Gaoqiaoxi road, Jinqiaobei road, Xinqiaoxin road, etc.

(8) Layout of sewage pipeline network of Sanqiao village

There is no municipal sewage drainage pipe to pass through the villages, and the sewage in the pipe incorporated into the Dongqiao village is connected to the Longyang sewage disposal plant to treat.

3.2.6Trial project of scattered rural sewage disposal system in Fuyang City (the first batch)

1. Construction Site

The Fuyang city has three administrative viliages and six natural villages under its juridicaiton, i.e. Yinhu street – Hongzhuang village (including Wulin village and Hongzhuang village), Wanshi county – Pengjia village (including Hongjia, Pengjia and Zhuyuan), and Dayuan County – Yankou village.

2. Layout of sewage pipeline networks

(1) Layout of sewage pipeline of Hongzhuang village

The five of ten natural villages of Hongzhuang village (including Wulin village and Hongzhuang village), i.e. Hongshiwu, Shuiwu, Bailongwu and Zhongxin (Shanghongzhuang and Xiahongzhuang), have completed the sewage intercepting pipeline incorporating, and respectively built the anaerobic sewage disposal tanks, there are 250 pipe incorporating families, the current conditions of the anaerobic sewage disposal tanks run well, the water effluent quality can reach the first-class standard in Integrated Sewage Drainage Standard (GB 8978-1996), and the current condition is maintained.

In the rest five natural villages, there are 78 families in Chakou, 25 families in Chikengwu, 98 families in Hengshan, 125 families in Jinshali, and 74 families in Yangjiaban. The Hengshan, Jinshali and Yangjiaban are adjacent with each other, and are sutiable for uniformly paving the sewage drainpipe main pipe, Chakou and Chikengwu are far away from these three villages, are respectively located at the north part and southwest part of village, with relative little population, and the pipe incorporating is not performed recently.

Hengshan, Jinshali and Yangjiaban are connected from south to north, with the terrain from high to low, and the sewage drainage main pipe is uniformly laid. The vacant land of south part of Yangjiaban is built with a sewage station, with 237 pipe incorporating families.

(2) Layout of sewage pipeline of Pengjia village

The clear population dense areas of Pengjia village (including Hongjia, Pengjia and Zhuyuan) include Pengjia and Hongjia, there are 282 families capable of being connected into the sewage station of Pengjia district, and 140 families capable of being connected to the sewage station of Hongjia district. The uniform sewage main pipe gathers the sewage of two villages to the sewage disposal station, and the scale of sewage disposal station is 150t/d.

(3) Layout of sewage pipeline of Yankou village

The Yankou village utilizes the sewage drainage main pipe which has been built along Dayuanxi, the living sewage capable of flowing into the incorporating pipe at the two banks of Dayuan river are all accessed, there are about 425 families with proper pipe incorporating condition in the village, and the pipe incorporating sewage amount is 150t/d. The sewage station is located at the demolition land of papermaking factory at the entry of village.

3. Sewage disposal technology

The scales of sewage disposal stations of Hongzhuang village, Pengjia village and Yankou village are respectively 100t/d, 150t/d and 150t/d, and according to the practical condition of each village, the following process is adopted.

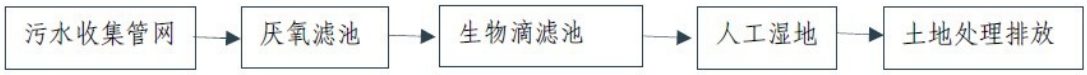


Figure 3.2-4 Flowchart of Sewage Disposal Process of Hongzhuang Village, Pengjia Village and Yankou Village.

3.2.7 Fuyang sewage phase IV modification project

1. Construction Scale of the Project

The Fuyang sewage disposal plant is located at the north bank of Fuchun River, at the northwest corner of Jiangbindong road and Golf road.

The additional sewage disposal scale is 60,000m³/d, the planning medication amount is 80,000m³/d, the land occupation area of new factory is 4.09hm², and the water effluent standard of phase IV project can reach the class-A standard of *Standard of Pollutant Discharge of Urban Sewage disposal Plant* (GB18918 -2002).

2. Scopes of services

The Fuyang sewage disposal plant is mainly used for containing the sewages from Jiangbei Gaoqiao – Shouijang area, Gaojiaoyuan area, Fuchun area, Dongzhou area and Lushan area, with the planned sewage amount of 140,000m³/d.

3. Sewage disposal technology

The treatment scale of original phase 1 oxidizing trench is 20,000m³/d, and the treatment scales of phase II and phase III oxidizing trenches are respectively 30,000m³/d. After the water effluent standard is raised to the class-A standard, the treatment scale of original phase 1 oxidizing trench is reduced to 18,000m³/d, and the treatment scales of phase II and phase III oxidizing trenches are respectively reduced to 21,000m³/d. Meanwhile, the original phase 1 oxidizing trench is further modified, and is additionally equipped with the anaerobic reaction tank with biological phosphate removal function, the original surface aerator equipment is replaced, and the water intake point and submersible pusher are added. The phase II and phase III oxidizing trenches are modified, the water intake point and submersible pusher are added, and the denitrifying effect is improved through prolonging the denitrification remaining time.

The phase IV project adopts the multi-mode A/A/O treatment process.

4. Disinfection process

The ultraviolet disinfection process is adopted, and the center radioactive wavelength of ultraviolet lamp is 253.7nm.

5. Discharge outlet

The phase IV project and the phase III project share one discharge port, the tail water discharge adopts the river center discharge, and the river discharge pipe extends into the river from the 100m upstream of Dongzhoubeizhi intercepting dam.

Refer to Figure 3.2_3 for the plan layout of Fuyang Sewage Disposal Plant and phase

IV project factory. Refer to Figure 3.2_3 for the schematic of discharge port of Fuyang Sewage Disposal Plant.

3.3 General of Longquan city subproject

3.3.1 Project component and scale

Nine subprojects in total are to be executed in Longquan, including the perfection project of water supply and drainage infrastructure of urban areas, the improvement project of lanes and alleys of urban areas, the perfection project of connection water supply and drainage infrastructure in An'ren, Badu, Xiaomei, Lanju and Zhatian villages, and two rural sewage treatment projects constructed in two phases

3.3.2 Improvement project of water supply and drainage facilities of Longquan city

1. Construction Content

The Nandayang water plant has built a new 25,000m³/d conventional treatment facility, and modified the existing 30,000m³/d facility into the 25,000m³/d facility, and the total scale of expanded water plant is 50,000m³/d. A new 50,000m³/d wastewater and sludge treatment facility, a water supply pipeline network of Chengdong area with the length of 3.91m, the sewage collecting pipeline with the length of 4.43km, and the rainwater drainage pipe channel with the length of 4.11km are built.

2. Nandayang Water Plant

The Nandayang Water Plant has built a new reaction and settlement tank with the scale of 25,000t/d, and a clean water tank at the lower part; a new sand filtering tank with scale of 25,000t/d; a new anti-flushing room with scale of 50,000t/d; a new wastewater adjusting tank with scale of 50,000t/d; a wastewater adjusting tank and a sludge adjusting tank with scale of 50,000t/d; a new sludge concentration tank with scale of 50,000t/d; and a new dewatering machine room with scale of 50,000t/d. After the above facilities are built and normally run, the existing facilities are modified, mainly including replacing stainless steel folding plate, sludge suction machine, sludge discharge valve, etc. of existing reaction tank; replacing quartz sand, filtering head, filtering plate and complete valve of existing filtering tank, and modifying gas and water anti-flushing filtering tank; adjusting and replacing existing water delivery pump, water pump, valve, etc.; and gradually replacing the existing medicine adding room, and adding water quality on-line monitoring system, automatic control system, and central control system.

3. Design of water supply pipeline network project

The project includes the DN300 water distributing pipeline at the extending section of Dongcha Road, DN200 water distributing pipeline at Jiangbinbei Road, DN200-DN300 water distributing pipelines at the extending sections of Bianhe road, Housha Road, and Hualou road, etc. Refer to Fig. 3.3-2 for the layout of water supply pipeline network.

4. Design of water supply pipeline network project

The project includes the d1000 sewage main pipes at Dongcha Road, Hualou Street and Jiangbinbei Road, d300 collecting branch pipes at the extending sections of Bianhe Road of Jiangbinbei Road, Housha Road and Hualou Street, d800 sewage main pipes for containing sewage after the Xinan Sewage Disposal Plant is modified into the sewage lifting pump station, etc.

5. Design of water supply pipeline network project

The project is going to build the rainwater main pipe while the road is built, and the rainwater main pipe is respectively connected with the built water drainage main channel and Longquanxi, including 1.5×3.2m rainwater main channel at Hualou

Street, d600-d1500 rainwater main pipes at Bianhe Road, Housha Road, Dongcha Road, Xianliang Road, Jiangbinbei Road, etc.

Refer to Fig. 3.3-1 for the plan of Nandayang water plant of Longquan City. Refer to Fig. 3.3-2 for the layout of urban water supply pipeline network of Longquan City. Refer to Fig. 3.3-3 for the layout of urban sewage pipeline network of Longquan City. Refer to Fig. 3.3-4 for the layout of urban rainwater pipeline network of Longquan City.

3.3.3 Improvement project of water supply and drainage facilities of lanes and alleys of Longquan City

The project is used for rebuilding the old and damaged water supply pipelines of rainwater and sewage separating systems of lanes and alleys, and restoring the roads, so as to realize the effects of pavement hardening, cable sequencing, clean environments, district decoration, attractive landscapes, and clean walls.

The lane and alley project mainly includes 130 modifications of lanes and alleys of center urban area, with 99,297m2 of modification area, profit population of 60,335, and 21,041 families.

Lanes and alleys project mainly includes the reconstruction of 124 lanes and alleys in the central city, coving an area of 99297m^2.

Table 3.3-1 Table of Modification Project of Lanes and Alleys

Serial No.	Name	Modication area (m2)
1	East Huancheng Road (old)	1990
2	Donghou street	1705
3	Xialin Road (No.80 Longxiang Road)	1157
4	Xialin Road (Chenhuigao to Jihong)	196
5	Xialin Road (Donghou Street to No.80)	463
6	Back gate of Yucai	219
7	Connected building house of old pharmaceutical factory	3402
8	Improvement of east district	11700
9	In front of Yanku gate	150
10	Shizhumu	165
11	Qixingtan	1422
12	Modification of Dongcha road (Longxiang Road to Huangchengdong Road)	2760
13	East section of Beihe Street	872
14	North section of Guancang Lane	208
15	Dormitory of land bureau and materials bureau (side lane of national land bureau)	300
16	In front of dormitory gate of science commission (in front of dormitory gate of construction bank)	129
17	Yuanding building of Cangsong Road	1000
18	Path opposite to Lingyuan Road	342
19	Water ditch outside the fence wall of Jinleyuan District	56
20	Eastern end of Xianliang building	47
21	Flower garden of Lingyuan Road to Furenmiao	134
22	Modification of north side of agriculture trade phase II project	3737
23	Modification of water supply pipeline of Zhongshanzhong Road (Xinhua Street to Cangsong Road)	2280
24	Between No.22 and No.18 buildings of Dayang District	110
25	Between No.12 and No.33 buildings of Dayang district	487
26	No.9 buildings of Dayang District, cover plates of ditches at south and north sides	60
27	Pedestrain way of south side of Dayang District	1300
28	Water leakage of community activity room	40

Serial No.	Name	Modication area (m2)
29	Pavement of No.1 building of Dayang District	100
30	Qigan Lane	240
31	Shuijing Lane	200
32	Modification project of No.8 Huajing Building	400
33	Longteng District	800
34	Modification of Wulishixuan	150
35	Qingfeng Road	100
36	Aisle of No.243 of Qingdongsan Road	264
37	Middle aisle of connected building house of Bacun Village	1161
38	No.125 to No.150 of Beishan Road	556
39	Passage of back gate of Jinxiangyuan District	320
40	Passage of east side of No.8 to No.18 buildings of Dongjing District	364
41	Flower bed between of No.8 to No.17 buildings of Dongjing District	330
42	Flower bed between of No.8 to No.17 buildings of Dongjing District	441
43	Flower bed between of No.8 to No.17 buildings of Dongjing district	882
44	Greening belt besides pedestrian way of south side of Zhongshannan Road	418
45	Crossing part of Chengdongsi road and Beishan Road	845
46	Pedestrian way opposite to eastern end of No.10 building of Dongjing District	100
47	No.19 of Huanchengdong Road	200
48	Pedestrain ways at both sides of the Huanchengdong Road (north of Dazhuanpan)	1900
49	Improvement of alleys of Yicun Village	1000
50	Pedestrain way at the crossing part of Hualou Street and East Huancheng Road	180
51	Modification of water supply pipeline of East Huancheng Road (Dongcha Road to Zhongshan Road)	5520
52	Jinshi District	7647
53	East side and back lane of Xieshi injury department	410
54	East Nandaqiao Lane	263
55	In front of agricultural material district	200
56	Branch road of north side of vocational school	750
57	Jiuchang lane	2856
58	Near West Nandaqiao Lane	96
59	West lane of Red Cross Hospital	158
60	Second lane of west side of Red Cross Hospital	224
61	Crossing lane of Jianchi Road and Nanda Bridge	205
62	Taxia drainage ditches	150
63	Environmental Monitor Station	88
64	Improvement of water supply and drainage of West Jianchi Road (Gingyuan Road to Jianchuan Street)	5520
65	Pavement of west lane of Agricultural Bank	30
66	Front lane of No.156 gate of Nanqin Road	544
67	In front of feed company and Shuiyang power station	389
68	West lane of No.159 of Jianchi Road	292
69	Front lane of No.18 gate of Nanqin 1st lane	150
70	Empty land of east side of old Finance Bureau	575
71	Xibianban Road of Jianmu Road	2000
72	Nanqin Road	1900
73	Dormitory of Agricultural Machinery Plant	80

Serial No.	Name	Modication area (m2)
74	South gate of Pharmaceutical Factory	487
75	Lane between No.46 and No.48 of West Jianchi Road	300
76	Improvement of water supply and drainage of Jianchixi Road (Huanchengxi Road to Gongyuan Road)	5580
77	Nanqin Road (west side of Youth Research Institute)	800
78	West Huancheng Road (504 dormitory)	622
79	Original Jianchi Road (beside the river)	1200
80	Modification of Jianchiting Road	200
81	Dormitory of Tool Factory	1200
82	Qingcibaojian Industrial Zone (south gate of Pharmaceutical Factory)	1200
83	Modification of sewage pipe of South Jiangbin Road (Huanchengxi Road to Qingcibaojian Industrial Zone)	3300
84	Improvement of water supply and drainage of old No.53 provincial highway (Dongda Bridge to Housha Road)	8100
85	Lane between No.13 and No.25 of Gongtou	119
86	Opposite lane of No.38 of Gongtou (the old man activity room)	165
87	Empty land in front of No.25 of Gongtou	13
88	No.25 of Gongtou to front of Gongtoou kindergarten	160
89	Opposite lane of No.94 of Gongtou to river side	357
90	No.54 of Gongtou	45
91	Lanes of No.98 and No.99 of Gongtou	349
92	No.43 to No.54 of Gongtou	39
93	No.8 to No.10 of Fenghuang Road	93
94	Section along the gate of No.10 of Fenghuang Road	40
95	No.100 lane of Gongtou	2856
96	Shentong Lane	210
97	Lixin Road	432
98	Shuijing Lane	135
99	Lao lane	75
100	Hechang Lane	60
101	Xitang Lane	84
102	Shanchang Lane	244
103	Side lane of old Sports Commission	15
104	Side lane of Awu Restaurant	300
105	Side lane of General Union	320
106	Side lane of Education Bureau	200
107	No.158 Beihe Street (Wahaha)	118
108	Behind Houlou Hotel	60
109	Fengxiang Lane	335
110	Wenhua Road (No.5, No.7 and No.9)	80
111	Bank of Xixin River (north)	595
112	No.71, No.72 and No.73 of XiyanRroad	50
113	Jilin Lane	350
114	The front of gate of No.15 Taoyuan road	144
115	Dormitary of ICBC of Taoyuan Road	17
116	Empty land of east side of local police station of Xi Street	100
117	Before No.3 building of Power Plant Dormitrary of Taoyuan Road	219
118	North part and east part of Labor Bureau	120
119	Bailongmiaobian Lane	634
120	Extending section of Fengxiang Lane	224
121	Ximensi Lane	1318
122	Wenhua Road	859
123	Datian Lane	304

Serial No.	Name	Modication area (m2)
124	Beihe Street	1303
125	Xi Street (Piyunqiao to Zhenxishe)	1750
126	Xi Street (Zhenxishe to Ximensi)	1085
127	Xi Street (Ximensi to Gongyuan road)	1996
128	Modification of Yunshui Channel	1075
129	Improvement of water supply and drainage of North Jiangbin Road	4422
130	Improvement of water supply and drainage of Gongyuan Road	1824
131	Total	99297

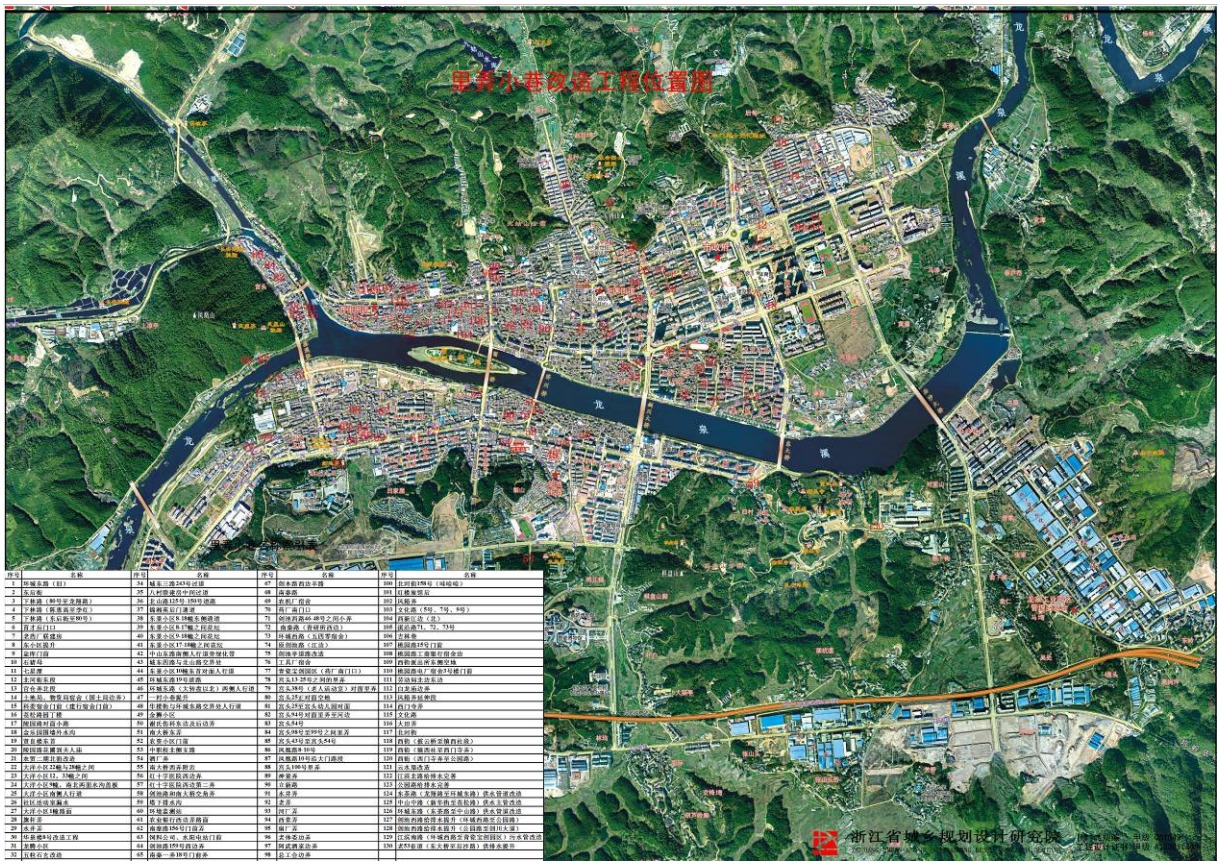


Figure 3.3- 1: Arrangement Diagram of Renovation Project of Lanes and Alleys

3.3.4 Promotion project of water supply and drainage facilities separately in Anren Town

3.3.4.1 Anren Water Plant

1. Location and scale

The Anren water supply treatment plant is located at the south side of existing running water plant of Anren county and the east side of Dachi road, the scale is 5,500m3/d, the expansion scale is 4,000m3/d, and the scale of original running water plant is 1,500m3/d (for continuous use).

2. Water supply treatment process

The water intake source comes from Huangpikeng.

The water plant adopts the disposal process of water intake – pipeline mixer – plate folding flocculation tank – inclined pipe settlement tank – D filtering tank – ClO disinfection – water effluent, and the water effluent quality is in accordance with Sanitation *Standard of Living Drinking Water* (GB5749-2006).

3. Layout of water supply pipeline network

The water distributing pipeline network is 8.24km in length, the DN400 water supply pipe is connected from the water supply plant, the water is conveyed along the Anyu line, then the pipe passes through the river, is laid along the anti-flood dyke, is connected to the Houhe street to arrange along the Houhe street, is respectively connected to the No.2 road of Dongyuan district and provincial highway, replaces the original water supply pipeline under the Anyu line, and is connected with the DN200 water conveying pipe of water supply plant, to form the loop network.

Refer to Figure 3.3-5 for the layout of Anren Water Plant of Longquan city.

Refer to Figure 3.3-6 for the layout of water supply pipeline network of Anren town of Longquan city.

3.3.4.2 Anren Sewage Disposal Plant

The sewage disposal plant is located at the south side of Anren Stream bridge of Lilong highway, and the empty land of East Side of Anren Stream. The design scale of sewage disposal plant is 1,800m/d, the biological rotary disc treatment process is adopted, i.e. rought grid + adjusting tank + fine grid + rotary flow sand settlement + biological rotary disc + secondary settlement tank + ultraviolet disinfection, the treated tail water reaching the standard is drained into the Anren Stream, the bank drainage type is adopted, and the water effluent quality is in accordance with the first-class B standard of *Standard of Pollutant Discharge of Urban Sewage disposal Plant* (GB18918 -2002).

The water collecting pipeline network is 5.87m in length. In the Xidong industrial zone, the sewage on the way is collected along the Houhe street, the sewage of districts at the two sides of provincial highway is collected to access into No.2 road and No.3 road of Xidong industrial zone, and finally the sewage is drained into the planning sewage disposal plant. In the Xixi industrial zone, the sewage is intercepted at the crossing part of Anyu line and provincial highway, and is gathered into the sewage disposal plant, the pipeline is laid along the Anxi road, the sewage on the way is collected, and accessed into the Zonger road of industrial zone, and finally the sewage is drained into the planning sewage plant of Xidong industrial zone after passing through river.

Refer to Figure 3.3-7 for the layout of water supply pipeline network of Anren town of Longquan city.

Refer to Figure 3.3-8 for the layout of Anren Sewage Disposal Station of Longquan city.

3.3.5 Promotion project of water supply and drainage facilities separately in Badu Town

3.3.5.1 Badu water plant

1. Location and scale

The Badu Water Plant is located at the Jintian village of Zhuyang of Badu town. The east side of Badu running water plant is not used at present. The scale of water plant is 4,000m3/d.

2. Water supply treatment process

The water intake source comes from the Zhuyang reservoir.

The water plant adopts the disposal process of water intake – pipeline mixer – plate folding flocculation tank – inclined pipe settlement tank – D filtering tank – ClO disinfection – water effluent, and the water effluent quality is in accordance with Sanitation *Standard of Living Drinking Water* (GB5749-2006).

3. Layout of water supply pipeline network

The total length of new pipeline network is 11,377m, and the original DN250 water

effluent pipe is maintained and used as the water supply main pipe at the north bank of Badu Stream. A new DN400 water supply pipe is built, passes to the Huicun village of Zhangfu, and runs along the bridge to the south bank of Badu Stream, to serve as the main water supply main of old urban district. The two water supply main pipes in north and south are communicated into a ring shape through a water supply pipe which is laid along the current bridge.

Refer to Figure 3.3-9 for the layout of Anren Water Plant of Longquan city.

Refer to Figure 3.3-10 for the layout of water supply pipeline network of Badu town of Longquan city.

3.3.5.2 Badu Sewage Disposal Plant

The Badu sewage plant is located at the Xiaogao village of south side of Badu Stream, which services farmland and the temporary factory of Longquan Concrete Co., Ltd now.

The design scale of sewage disposal plant is 1,300m³/d, the biological rotary disc treatment process is adopted, i.e. rought grid + adjusting tank + fine grid + rotary flow sand settlement + biological rotary disc + secondary settlement tank + ultraviolet disinfection, the treated tailwater reaching the standard is drained into the Anren Stream, the bank drainage type is adopted, and the water effluent quality is in accordance with the first-class B standard of *Standard of Pollutant Discharge of Urban Sewage disposal Plant* (GB18918 -2002).

The length of new pipeline network is 7614m, the sewage intercepting main pipes are paid under the old No.328 provincial highway and along the north side, the overflow weirs are arranged in the gathering channel on the way, the current gathering pipe channel is subject to flow intercepting at the intersection, and the sewage in south and north directions is intercepted.

Refer to Figure 3.3-11 for the layout of Anren Sewage Disposal Station of Longquan city.

Refer to Figure 3.3-12 for the layout of water supply pipeline network of Badu town of Longquan city.

3.3.6 The first batch of sewage disposal project in decentralized villages in Longquan city

The first batch of dispersive rural sewage disposal project of Longquan city includes 14 villages, 4,036 service families, 14,500 service persons, and total investment of RMB 35,160,000.

Figure 3.3- 2: Location Plan of the First Batch of Sewage Disposal Project in Decentralized Villages of Longquan

3.3.6.1 Dispersive rural treatment

Refer to Table 3.3-2 for the names of 7 decentralized rural sewage disposal villages and treatment processes.

Table 3.3-2 First Batch of Decentralized Rural Sewage disposal of Longquan City

Serial No.	villages and towns subdistrict	Name of Village	Total household numbers	Registered population	Permanent resident population (Registered population+ Permanent resident population flow)	To-be-built facilities	Disposal process
						Scale of sewage disposal station (t)	
1	Xijie	Hecun Village	203	616	958	70	Anaerobic+artificial wetland
2	Badu	Songqv Channel	289	1010	1250	70	Anaerobic+artificial wetland
3	Zhulong	water tower	110	400	500	50	Anaerobic+artificial wetland
4	Lanju	Dasai	300	908	1380	110	Anaerobic+artificial wetland
5	Tashi	Jibian	375	1190	2090	130	Anaerobic+artificial wetland
6	Tashi	Shangwu					Anaerobic+artificial wetland
7	Shangyang	Xiaohuangnan	280	886	1210	100	Anaerobic+artificial wetland

Refer to Fig.3.3-13 for the pipeline network collection of Hecun village of Longquan city. Refer to Fig. 3.3-14 for the pipeline network collection of Songqv village of Longquan city. Refer to Fig. 3.3-15 for the pipeline network collection of

Xiaohuangnan village of Longquan city. Refer to Fig. 3.3-16 for the pipeline network collection of Shuita village of Longquan city. Refer to Fig. 3.3-17 for the pipeline network collection of Dasai village of Longquan city. Refer to Fig. 3.3-18 for the pipeline network collection of Jibian and Shangwu villages of Longquan city.

3.3.6.2 Merging disposal project of Xiaomei region

The merging area of Xiaomei consists of Meiyi village, Meier village, Meisan village, Meisi village, Luozhuang village, Huangnan village and Maoshantou village, and the number of serviced persons is 7,000. The design content mainly includes: 1) new building of small decentralized water supply plant, water supply of continuous areas to 7 villages, and improvement of water supply pipeline network system in villages. 2) new building of small sewage disposal station, and decentralized collection and treatment of sewages from Meiyi village, Meier village, Meisan village and Meisi village through modifiying and newly building the water drainage pipeline. 3) The Luozhuang village and Huangnan village have built the dispersive rural sewage disposal systems in 2012. As the Maoshantou village has far distance, and the located at the downstream of the whole continuous area, the dispersive treatment system may be independently built for the sewage.

1. Xiaomei Water Plant

The Xiaomei water plant is located at the small hill of north part of Xiaomei township, with the scale of 3,000 m^3/d.

The water diversion pipeline starts from the water intake port of Dameitan, is paved along the legs of Shangmei village and Damei village, crosses the Dameixi at the Dameikou village in the inverted siphon water through method, and then reaches the water supply plant along the current road, with the total length of 3650m.

The water plant adopts the conventional mixed condensing + settlement + filtering + disinfection process, and the water effluent quality is in accordance with Sanitation *Standard of Living Drinking Water* (GB5749-2006).

The water distributing pipeline network flows out of the water plant by gravity, passes through the S229 national highway, supplies to Dameikou village, Damei village, Shangmei Village and Gaojitou Village by DN200 pipes to north, supplies to Yanqing Road, Meixi Road and Meizhong Road by the DN250 loop network to south, and supplies to Luozhuang Village, Huangnan Village, Maoshantou village and Banbianyue village by the DN200 pipe at Meixi road (north of Meizhong Road). The water of Meiyi village, Meier village, Meisan village and Meisi village is supplied by the township pipeline network.

Refer to Fig. 3.3-19 for the layout of water supply pipeline network of Xiaomei town of Longquan city.

2. Xiaomei Sewage Disposal Plant

The Xiaomei sewage plant is located at the northeast side of Xiaomei Stream bridge, the elevation is 307m, and the plant is installed in the slight north part of center of collection range, and at the lower point of collection range, so the gravity type sewage collection is realized.

The design scale is 600m^3/d, the biological contact oxidizing method and secondary biochemical treatment process is adopted, the tailwater of sewage disposal plant is drained into Xiaomei Stream, and the water effluent quality is in accordance with the first-class B standard of *Standard of Pollutant Discharge of Urban Sewage Disposal Plant* (GB18918 -2002).

The original water drainage open channels of Xiaomei street and Yanqing road are remained. The DN300 water drainage collecting main pipe collects along the Houmenshan road, Meinan road, Meizhong road, Baozhong road, Meibei road, No.54 provincial highway, Yanqing road, etc. from east to west, one part of DN300-400

pipes runs along the Meixi road (one part crossing river) from south to north, one part of DN300 pipe runs along the Meixi road (one part crossing river) from north to south to collect into the DN400 main pipe, and then the sewage is incorporated into the sewage disposal plant.

Refer to Fig. 3.3-20 for the layout of water supply pipeline network of Xiaomei town of Longquan city.

3.3.7 The first batch of sewage disposal project in decentralized villages in Longquan

3.3.7.1 Decentralized rural treatment

Refer to Table 3.3-3 for the names of 63 dispersive rural sewage disposal villages and disposal processes.

Table 3.3-3 First Batch of Decentralized Rural Sewage disposal of Longquan City

Serial No.	villages and towns subdistrict	Name of Village	Total household numbers	Registered Population	Permanent resident population (Registered population+ Permanent resident population flow)	To-be-built facilities	Disposal process
						Scale of sewage disposal station (t)	
1	Chatian	Yutou	131	462	578	50	Anaerobic+artificial wetland
2	Xiaomei	Xiaomeikou	181	617	771	50	Anaerobic+artificial wetland
3	Xiaomei	Maoshantou	172	559	699	50	Anaerobic+artificial wetland
4	Shangyang	Mudaikou	341	1079	1349	110	Anaerobic+artificial wetland
5	Anren	Huangnilin g	128	490	613	50	Anaerobic+artificial wetland
6	Jinxi	Xiaozhuan g	170	600	750	50	Anaerobic+artificial wetland
7	Jinxi	Shangjin	297	1057	1321	110	Anaerobic+artificial wetland
8	Pingnan	Shanshuge n	159	537	671	50	Anaerobic+artificial wetland
9	Zhulong	Longxing	266	915	1144	70	Anaerobic+artificial wetland
10	Lanju	Xianren	204	753	941	70	Anaerobic+artificial wetland
11	Lanju	Guanpuyan g	225	746	933	70	Anaerobic+artificial wetland
12	Tashi	ShAnJikou	160	551	689	50	Anaerobic+artificial wetland
13	Baoxi	Xitou	275	987	1234	100	Anaerobic+artificial wetland
14	Baoxi	jebel	238	883	1104	100	Anaerobic+artificial wetland
15	Baoxi	Baogeng	256	872	1090	100	Anaerobic+artificial wetland
16	Longnan	Dazhuang	173	648	810	70	Anaerobic+artificial wetland
17	Longnan	Jiaoyang	349	1058	1323	100	Anaerobic+artificial wetland
18	Daotai	Licun	142	495	619	50	Anaerobic+artificial wetland
19	Yanzhang	Dailing	210	692	865	70	Anaerobic+artificial wetland
20	Yanzhang	Zhengzhua ng	154	576	720	50	Anaerobic+artificial wetland
21	Yanzhang	Kengyuand	154	484	605	50	Anaerobic+artificial

Serial No.	villages and towns subdistrict	Name of Village	Total household numbers	Registered Population	Permanent resident population (Registered population+ Permanent resident population flow)	To-be-built facilities	Disposal process
						Scale of sewage disposal station (t)	
1	Chatian	Yutou	131	462	578	50	Anaerobic+artificial wetland
		i					wetland
22	Chengbei	Heli	145	486	608	50	Anaerobic+artificial wetland
23	Chengbei	Dongshu	190	668	835	70	Anaerobic+artificial wetland
24	Daotai	Daotai	100	351	439	50	Anaerobic+artificial wetland
25	Zhuyang	Gold field	198	740	925	70	Anaerobic+artificial wetland
26	Longyuan	Lingkun	126	485	606	50	Anaerobic+artificial wetland
27	Longyuan	Baimu	156	557	696	49	Anaerobic+artificial wetland
28	Xijie	Xincha	155	560	700	50	Anaerobic+artificial wetland
29	Xijie	Yanhou	94	323	404	50	Anaerobic+artificial wetland
30	Anren	Hujianxia	142	468	585	50	Anaerobic+artificial wetland
31	Anren	Jishantou	125	469	586	50	Anaerobic+artificial wetland
32	Shangyang	Wudulou	287	1008	1260	100	Anaerobic+artificial wetland
33	Jinxi	Xiaozhuang	140	500	625	50	Anaerobic+artificial wetland
34	Jinxi	Shangjin	297	1057	1321	100	Anaerobic+artificial wetland
35	Jinxi	Lingshang	283	1006	1258	90	Anaerobic+artificial wetland
36	Jinxi	Huangyong	205	691	864	80	Anaerobic+artificial wetland
37	Pingnan	Hengkengtou	115	393	491	50	Anaerobic+artificial wetland
38	Pingnan	Ruizhuyang	120	431	539	50	Anaerobic+artificial wetland
39	Pingnan	Nanxikou	133	498	623	50	Anaerobic+artificial wetland
40	Pingnan	Zhoudai	109	404	505	50	Anaerobic+artificial wetland
41	Lanju	rivers	55	214	268	50	Anaerobic+artificial wetland
42	Longnan	Yangwei	370	1165	1456	100	Anaerobic+artificial wetland
43	Longnan	Xiatian	249	914	1143	80	Anaerobic+artificial wetland
44	Longnan	Dicun	194	700	875	60	Anaerobic+artificial wetland
45	Longnan	Shangtian	172	667	834	60	Anaerobic+artificial wetland
46	Longnan	Shuangxi	99	371	464	50	Anaerobic+artificial wetland
47	Longnan	Huangwandai	179	638	798	60	Anaerobic+artificial wetland
48	Chengbei	Huangzhuangqiao	68	230	288	50	Anaerobic+artificial wetland
49	Nongzhengcun	Sixteen villages	3168	12032	15040	1036 (pipe incorporating)	Incorporation to urban sewage disposal plant

Figure 3.3- 3: Location Plan of the Second Batch of Sewage Disposal Project in Decentralized Villages of Longquan

3.3.7.2 Treatment project of merging area of Zhatian

There are a new 3,000m³/d Zhatian county water plant, a 500m³/d sewage plant, a 2.65km raw water pipeline, a 5.6km water supply pipeline and a 15.4km sewage pipeline.

1. Scopes of services

The recent service scope of water supply and drainage project of Zhatian county (2020) includes eight administrative villages in the county range. Refer to Table 3.3-4.

Table 3.3-4 Recent Service Scope of Water Supply and Draiange Project of Zhatian County

Village	Villager teams	Total households(household)
Zhayi village	6	171
Zhaer village	6	174
Chasan Village	8	170
Xixi village	5	140
Xiayu village	3	114
Xikou village	8	248
Chenshan village	4	95
Donghuang village	2	65
Total	42	1177

2. Water Plant of Zhatian County

The Zhatian county water plant is located at the west of Zheneng longquan biomass power generation project, the site elevation is 300m, and the scale of water plant is 3,000 m³/d.

The water supply source of Zhatian water plant comes from the branch pipe of water diversion project of Ruiyang reservoir, and the water diversion port is selected at the

crossing part of No.1 tunnel and No.2 tunnel of water diversion project. The water plant adopts the conventional mixed condensing + settlement + filtering + disinfection process, and the water effluent quality is in accordance with Sanitation *Standard of Living Drinking Water* (GB5749-2006).

The water distributing pipeline network comes from the water plant by gravity, is connected to the Zhatian street along Shan road, reaches the Yuelai road, and passes through Yandongdong road, YAnJiangxi Road, Yuelai bridge and Xincheng bridge, to form the DN250 loop network. The water of Xikou village is supplied by the DN115 pipe which extends along the YAnJiangxi road to north, the water of Chenhuang village is supplied by the D100 pipe which extends along the YAnJiang road to north, the water of Chenshan village is supplied by the D100 pipe which extends from the Zhatian street, and the water of Jinyu industrial zone of southwest area is supplied by the DN200 pipe which extends along the YAnJiangdong road to south. However, the terrain of Jinyu industrial zone is higher, the self flowing supply pressure of the water plant is not enough, and the industrial zone should implement self pressurizing.

Refer to Fig. 3.3-21 for the layout of water supply pipeline network of Zhatian water plant of Longquan city

3. Zhatian Sewage Disposal Plant

The Zhatian sewage disposal plant is located at the crossing part of Yuelai bridge and S229 provincial highway, the design scale is 500 m^3/d, the DN300 water drainage collecting pipe runs along the Xinyuan road, Xinju road and Yuelai road from south to north, collects along the Yuelaibei road from north to south, passes through the river along the Yuelai bridge, gathers into the DN400 main pipe, runs along the S229 provincial highway from west to easy, and is connected into the sewage disposal plant.

The Zhatian sewage disposal plant adopts the biological contact oxidizing method and secondary biochemical treatment process, and the water effluent quality is in accordance with the first-class B standard of *Standard of Pollutant Discharge of Urban Sewage disposal Plant* (GB18918 -2002).

3.3.7.3 Treatment project of merging area of Lanju township

There are a new 3,000m^3/d Zhatian county water plant, a 500m^3/d sewage plant, a 1.7km raw water pipeline, a 8.1km water supply pipeline and a 12.9km sewage pipeline.

1. Scopes of services

The recent service scope of water supply and drainage project of Zhatian county (2020) includes eight administrative villages in the county range. Refer to Table 3.3-5.

Table 3.3-5 Recent Service Scope of Water Supply and Drainage Project of Lanju Township

Vallage	Villager teams	Total households (household)	Total number in 2012
Mifengling	10	213	694
Meiyang	11	195	710
Yuzhang	15	329	1227
Dawang	11	315	969
Wumeiyang	5	149	491
macrosis	17	261	996
Tongshan	16	468	1616
Total	85	1930	6703

2. Lanju Water Plant

The Lanju water plant is located at the small hill of the east side of township

government, the elevation is 300.0m, and the scale of water plant is 3,000 m³/d.
The water diversion port is selected at the crossing part of No.7 tunnel and No.8 tunnel of Ruiyang water diversion project, and the elevation of Yellow Sea is 249.0m.
The water plant adopts the conventional mixed condensing + settlement + filtering + disinfection process, and the water effluent quality is in accordance with Sanitation Standard of Living Drinking Water (GB5749-2006).
Refer to Fig. 3.3-22 for the layout of Lanju water plant of Longquan city.
Refer to Fig. 3.3-23 for the layout of Lanju water supply pipeline network of Longquan city.

3. Lanju Sewage Disposal Plant

The Lanju sewage plant is located at the northeast corner of crossing part of Yuzhang road and No.229 provincial highway south planned road, the elevation is 224m, and the plant is installed in the center of collection range, adjacent with the drainage water domain and at the lower point of collection range, so the gravity type sewage collection is realized.
The design scale is 500m³/d, the biological contact oxidizing method and secondary biochemical treatment process is adopted, the tailwater of sewage disposal plant is drained into Xiaomei Stream, and the water effluent quality is in accordance with the first-class B standard of Standard of Pollutant Discharge of Urban Sewage Disposal Plant (GB18918 -2002).
The DN300 water drainage collecting main pipe runs along the Wumei road and Yuzhang road from south to north, gathers into the DN400 main pipe of Yuzhang Road, and is connected to the sewage disposal plant from south to north. The DN300-400 main pipe runs along the S229 provincial highway (one part crossing river), and the DN300 main pipe collects along the No.S229 provincial highway (one part crossing river) from west to east, and gathers into the DN400 main pipe of Yuzhang Road, and is connected into the sewage disposal plant from south to north.
Refer to Fig. 3.3-24 for the layout of Lanju water supply pipeline network of Longquan city.
Refer to Fig. 3.3-25 for the plan of Lanju sewage station of Longquan city.

3.4 Profile of Tiantai county subproject

3.4.1 Project component and scale

There are five subprojects of Tiantai county, including improvement project of rural water supply and drainage system of north center area of Tiantai basin, improvement project of rural water supply and drainage system of east area of Tiantai basin, improvement project of rural water supply and drainage system of west area of Tiantai basin, and two sewage disposal projects of 49 dispersive villages in two-phase construction.
There are 165 villages for implementing rural living sewage collecting and treatment, including 49 dispersive modes and 116 pipe incorporating mode. The decentralized sewage disposal process is determined according to the village economic development and living level and the running and maintenance management level, and the natural treatment method is used as the main method.

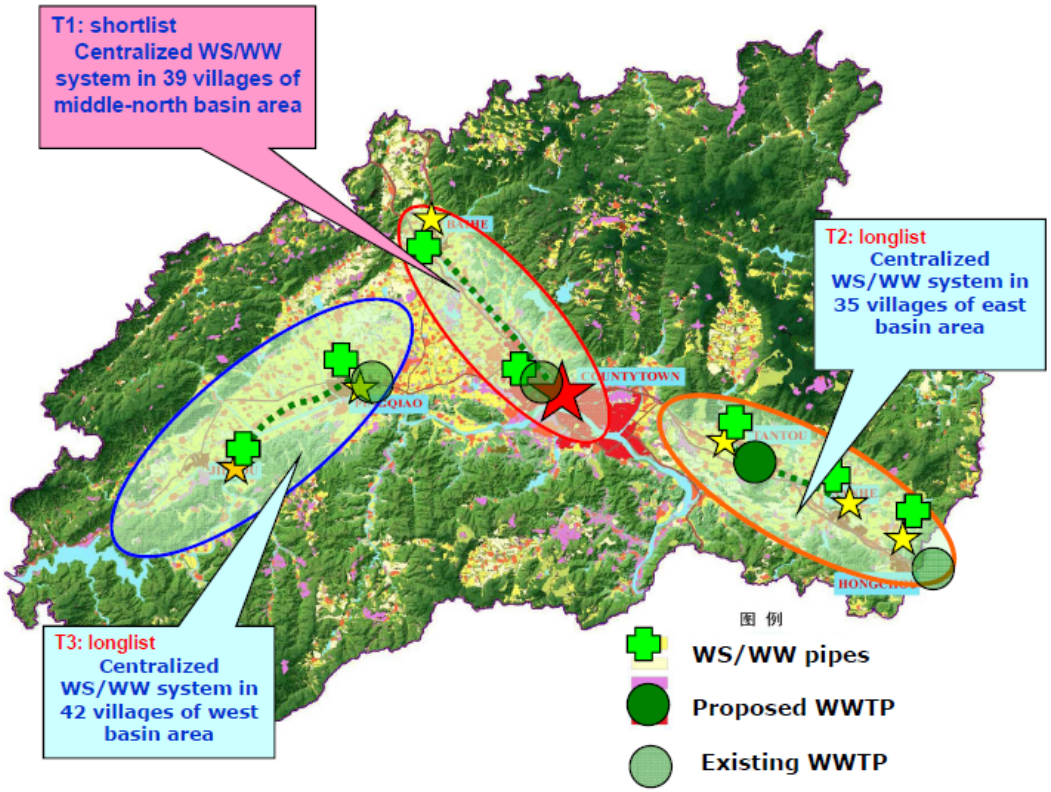


Figure 3.4- 1: Location Plan of 3 Joint Sewage Disposal Systems in Tiantai County

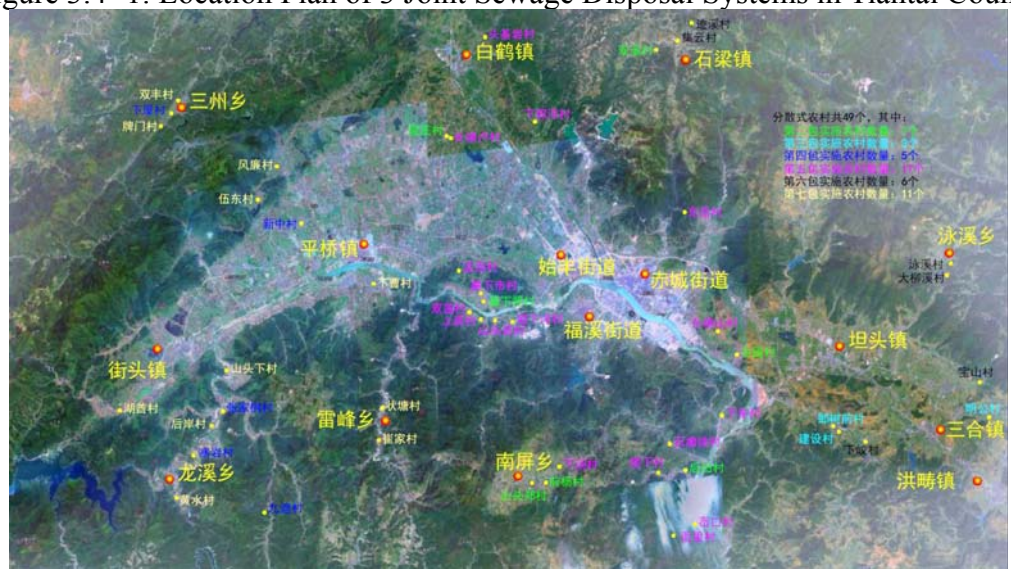


Figure 3.4- 2: Geographical Location Map of Decentralized Villages in Tiantai

3.4.2 Perfection project of water supply and drainage system for cities and villages in the north central section of of Tiantai Basin

3.4.2.1 Project scope

The planned service area range of urban and rural sewage system of north center area of Tianshan basin include 120 administrative villages, and 183,739 persons. There are 214.9km of main pipes and branch pipes in the planned service area, the 55.1km of main pipes and branch pipes have been built, and the service persons number is 90,000.

The scope and content of project includes (1) improvement of urban sewage

collecting systems (three subdistricts). New 20.5km sewage main pipe, and 60,778 service resident persons; (2) construction of living sewage collecting systems of 39 villages. 11,628 service families, and 43,372 resident persons.

Table 3.4-1 Table of Implementing Villages of North Center Area of Tiantai County and Basic Conditions

Serial No.	Name of Village	Township	Household	Current population	Population in 2020	The sewage quantity of discharge (m3/d)
1	Jiufeng Village	Chicheng Subdistrict	621	2423	2491	184.33
2	Tianyangchen Village	Chicheng Subdistrict	246	847	871	64.45
3	Potang Village	Chicheng Subdistrict	225	1043	1072	79.33
4	Lukou Village	Chicheng Subdistrict	225	1043	1072	79.33
5	Qiaoxia Village	Chicheng Subdistrict	273	856	880	65.12
6	Kengbian Village	Chicheng Subdistrict	520	1566	1610	119.13
7	Badu Village	Chicheng Subdistrict	427	1296	1332	98.59
8	Xiabaoyuan Village	Chicheng Subdistrict	155	538	553	40.93
9	Wanbaoyuan Village	Shifeng Subdistrict	448	538	553	40.92
10	Shangkeshan Village	Shifeng Subdistrict	138	688	707	52.32
11	Puqian Village	Shifeng Subdistrict	432	1436	1476	109.22
12	Wanshan Village	Shifeng Subdistrict	493	1891	1944	143.86
13	Guangtangyu Village	Shifeng Subdistrict	336	1470	1511	111.81
14	Tangxiading Village	Shifeng Subdistrict	380	1285	1321	97.75
15	Guantang Village	Shifeng Subdistrict	492	1692	1739	128.69
16	Sanlisong Village	Shifeng Subdistrict	220	659	677	50.13
17	Dalucao Village	Fuxi Subdistrict	181	1316	1353	100.12
18	Xiayu Village	Fuxi Subdistrict	212	843	867	64.16
19	Xiayuanxu Village	Fuxi Subdistrict	347	1218	1252	92.65
20	Shangwang Village	Baihe County	211	1600	1645	121.73
21	Xiagangyao Village	Baihe County	79	310	319	23.61
22	Shibanlu Village	Baihe County	321	1190	1223	90.50
23	Yu Village	Baihe County	215	772	794	58.76
24	Jingtou Village	Baihe County	110	444	456	33.74
25	Dengtou Village	Baihe	84	258	265	19.61

Serial No.	Name of Village	Township	Household	Current population	Population in 2020	The sewage quantity of discharge (m3/d)
		County				
26	Cheng Village	Baihe County	225	940	966	71.48
27	Zheguban Village	Baihe County	154	592	609	45.07
28	Xinlou Village	Baihe County	254	895	920	68.08
29	Daluxia Village	Baihe County	289	1146	1178	87.17
30	Shanmaoke Village	Baihe County	251	928	954	70.60
31	Xiaotianlou Village	Baihe County	125	463	476	35.22
32	Shangzhai Village	Baihe County	330	1384	1423	105.30
33	Xiazhai Village	Baihe County	456	1734	1783	131.94
34	Xijian Village	Baihe County	300	1122	1153	85.32
35	Hefangzhao Village	Baihe County	421	1565	1609	119.07
36	Baihedian Village	Baihe County	598	2530	2601	192.47
37	Wenxi Village	Baihe County	210	716	736	54.46
38	Wenxixin Village	Baihe County	285	883	908	67.19
39	Zhongze Village	Baihe County	339	1252	1287	95.24
Total			11628	43372	44586.62	3299.41

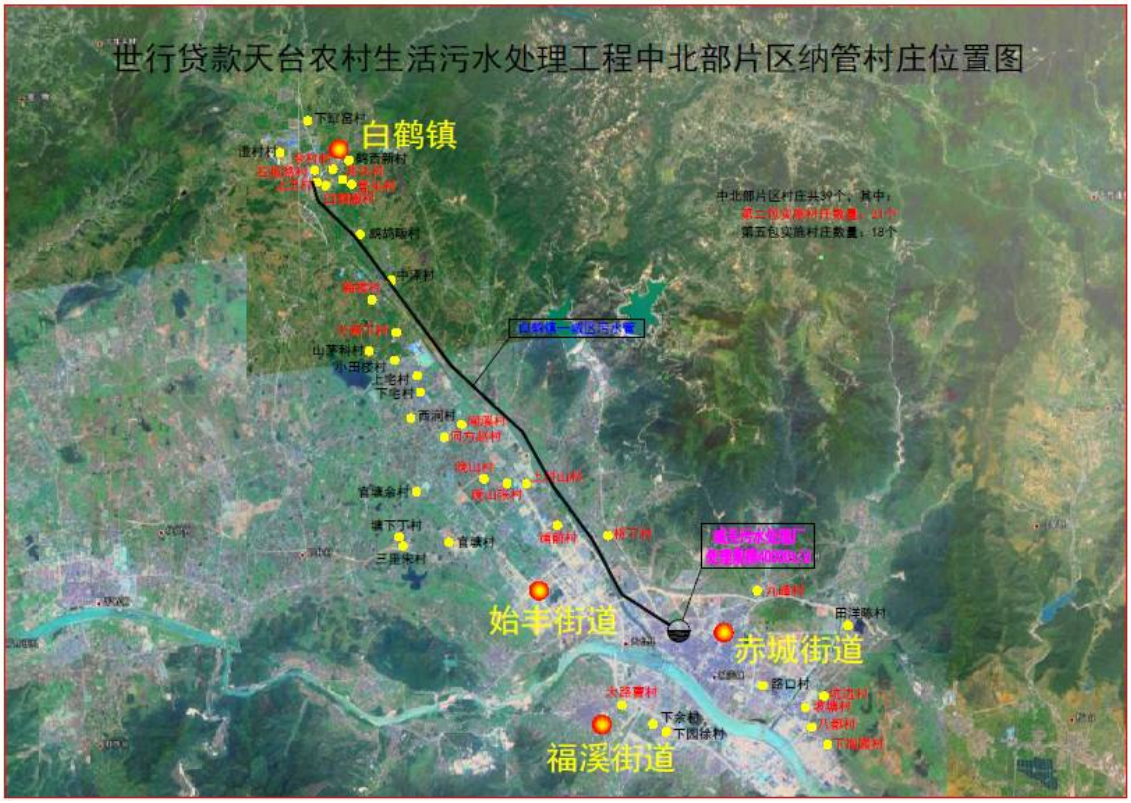


Fig. 3.4-3 Location Plan of Pipe Incorporating Villages of North Center Area of Tiantai

3.4.3 Sewage collecting system

According to the current conditions and relevant plans of sewage collecting pipeline network of Tiantai county, the sewage main pipes of Tiantong road, Tiantai Shandong road, Baer line are to be built, so as to form a perfect sewage collecting pipeline network.

1. For Tiantong road (Tongbailingjiao village-Hanshan road), the total length is about 4.4km, the pipe diameter is De315-De500, the pipe is mainly used for collecting the sewage of planned tourism collecting and distributing center, and the living sewage of residents at the two sides of road, then the sewage is drained into the built sewage pipeline network of Tiantai county from north to east, and the sewage pipe is arranged in the east greening belt of road.
2. For Baer line (No.60 provincial highway – Shifengliu bridge), the total length is about 6.6km, the pipe diameter is De315-De500, the pipe is mainly used for collecting the living sewage of residents at the two sides of Baer line, then the sewage is drained into the built sewage pipeline network of Tiantai county from north to east, and the sewage pipe is arranged in the east greening belt of road.
3. For Tiantai Shandong road (Shifenger bridge – Shifengliu bridge), the total length is about 9.5km, the pipe diameter is De315-De800, the pipe is mainly used for collecting the living sewage of residents at the two sides of Tiantai Shandong road, then the sewage is drained into the built sewage pipeline network of Tiantai county from north to east, and the sewage pipe is arranged in the greening belts of both sides of road.

3.4.4 Improvement project of water supply and drainage facilities of east area of Tiantai basin

3.4.4.1 Scope and content

The planned service area range of urban and rural sewage system of north center area of Tianshan basin include 62 administrative villages, and 10.6 persons.

The scope and content of the project includes (1) new Cangshan sewage disposal plant and water drainage main pipe. The new sewage main pipe is 10.5km, and the service resident person number is 54,000. The pipeline starts from Xiangjia village of Hongchou township, passes along No.60 provincial highway from east to west, passes through the Sanhe township to west bank of Cangshan Daoxi of Sanhe township, and reaches the to-be-built Shancun village of Tantou township. (2) To install domestic sewage pipes for 35 villages. 14718 households, and 53628 resident persons.

Table 3.4-2 Table of Implementing Villages of East Area and Basic Conditions

Serial No.	Name of Village	Township	Household	Current population persons	(2020) Population persons
1	Huan Village	Tantou Town	228	833	856
2	Wubai Village	Tantou Town	206	738	759
3	Dongchen Village	Tantou Town	941	3716	3820
4	Changcui Village	Tantou Town	141	520	535
5	Yushan Village	Tantou Town	211	780	802
6	Yanban	Tantou Town	318	973	1000

Serial No.	Name of Village	Township	Household	Current population persons	(2020) Population persons
	Village				
7	Gangfeng Village	Tantou Town	325	1030	1059
8	Xinan Village	Tantou Town	400	1633	1679
9	Bayi Village	Tantou Town	414	1264	1299
10	Paimenchen Village	Tantou Town	488	1701	1749
11	Dongheng shangzhai Village	Tantou Town	519	1746	1795
12	Dongheng xiazhai Village	Tantou Town	665	2324	2389
13	Yanxiaqiao Village	Tantou Town	267	810	833
14	Tantou Village	Tantou Town	602	2680	2755
15	Huangwuyan g Village	Tantou Town	282	920	946
16	Shishan Village	Tantou Town	203	660	678
17	Dahuangxu Village	Tantou Town	371	1205	1239
18	Xiali Village	Tantou Town	265	849	873
19	Huangwu Village	Sanhe County	1259	4632	4762
20	Yangtou Village	Sanhe County	486	1751	1800
21	Xiafang Village	Sanhe County	824	2966	3049
22	Shantouyang Village	Sanhe County	357	1284	1320
23	Tangxia Village	Sanhe County	447	1608	1653
24	Xiajianxi Village	Sanhe County	355	1492	1534
25	Daheng Village	Sanhe County	1030	3595	3696
26	Yandian Village	Sanhe County	213	744	765
27	Tangshang Village	Sanhe County	314	1248	1283
28	Xiangjia Village	Hongchou Village	223	917	943
29	Dayi Village	Hongchou Village	336	1511	1553
30	Daer Village	Hongchou Village	326	1174	1207
31	Dasan Village	Hongchou Village	346	1244	1279
32	Shiji Village	Hongchou Village	261	941	967
33	Xiyang Village	Hongchou Village	249	895	920
34	Pingyuan	Hongchou	174	626	644

Serial No.	Name of Village	Township	Household	Current population persons	(2020) Population persons
	Village	Village			
35	Xidong Village	Hongchou Village	672	2618	2691
Total			14718	53628	55131

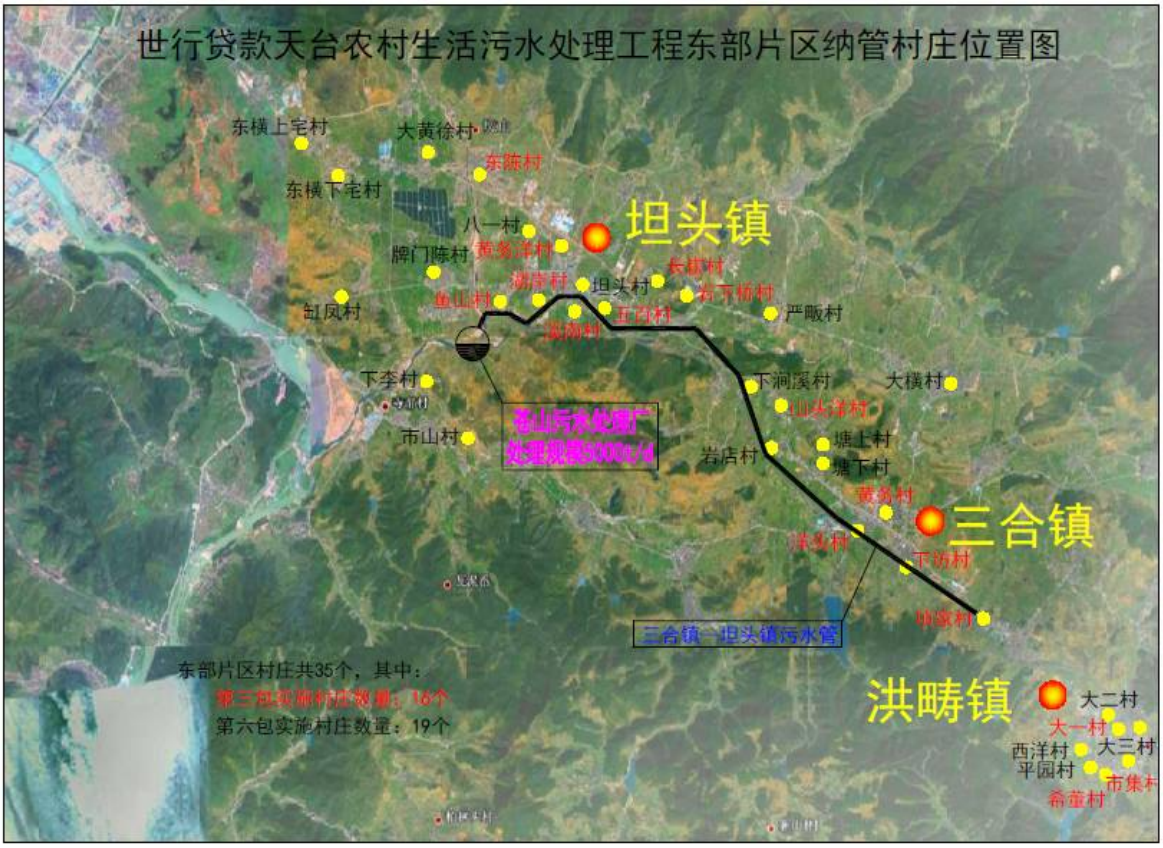


Fig. 3.4-4 Schmatic of Pipe Incorporating Villages of East Area of Tiantai

3.4.5 Cangshan Sewage Disposal Plant

The Cangshan sewage disposal plant is located at the east of Shancun village (Cangshan Daoxi) of Tantou township of Tiantai county, and south of Yushan village (Shangsan highway), the future total land occupation area is about 29,200m2 (about 43.8 mu), and the phase I land occupation area is about 10,666m2 (about 16.0 mu).

The treatment scale of sewage disposal plant is 5,000m3/d, the A2/O treatment process is adopted, the tailwater drain port is located at the east bank of Cangshan Daoxi of west side of plant, and the water effluent drainage is in accordance with the first-class B standard of Standard of Pollutant Discharge of Urban Sewage Disposal Plant (GB18918 -2002).

Refer to Fig. 3.4-1 for the plan of Cangshan sewage disposal plant of Tianshan county

3.4.6 Design of sewage collection system

There are two areas in the sewage project system of this subproject, i.e. Hongchou and Tantousanhe.

The sewage of Hongchou and Tantousanhe areas are respectively treated, the Cangshan Sewage Disposal Plant is built at the Tantousanhe area, and the Hongchou area adopts the dispersive treatment method, so as to respectively collect and treat the

self sewage.
The south-north sewage collecting pipeline is arranged in the west area of Shuangxi, and the east-west collecting main pipe passes through the Cangshan Daoxi, and then is connected with the Cangshan Sewage Disposal Plant.
The Tantousanhe sewage collecting main pipe is built in the east area of Shuangxi, and is used for collecting the sewages of Xiangjia village, Hongsan industrial area, Sanhe township and Tantou township, wherein the sewage pipeline with the length of about 5.5km and the pipe diameter of d400-d500 has been built in the Tantou township, and is connected with the Tantousanhe sewage collecting main pipe at the crossing part of Huanxi and Shangsan highway.
The sewage collecting and conveying pipeline is built in the Taidi industrial zone by self, and is connected to the Cangshan Sewage Disposal Plant.
Refer to Figure 3.4-2 for the Tantousanhe sewage collecting main pipe in Tiantai county.

3.4.7 Improvement project of water supply and drainage facilities of east area of Tiantai basin

The water drainage area of Tiantai basis uses the Jietou at the upstream of Shifengxi and the Pingqiao section as the axes, and covers the population dense areas of Jietou township and Pingqiao township, and the villages along Shifengxi and the surrounding plain villages, including part of villages of Jietou township, Pingqiao township and Baihe township. It covers the 96 administrative villages and 98,437 serviced persons.
The scope and content of the project includes (1) sewage main pipe and lifting pump station from Jianshe Jietou township to Pingqiao township; (2) To install domestic sewage pipes for 39 villages. 15,828 serviced families, and 63,577 permanent resident persons; (3) improvement of internal water supply pipelines in 14 villages, 6,653 serviced households, and 26,718 permanent resident persons; (4) construction of water supply main pipes of 41 villages, and connecting pipes between water supply pipelines in villages, 11,879 service families, and 46,154 permanent resident persons.
One sewage disposal plant has been built in the project service area, i.e. Pingqiao sewage disposal plant, the recent scale is 5,000t/d, and the future scale is 18,000t/d. The sewage of Jietou township and surrounding dispersive villages is collected by the collecting pipeline network and then is delivered to the Pingqiao sewage disposal plan to be treated. As pipeline from Jietou to Pingqiao will cross many rivers, the terrain near the Pingqiao township is flat, the flow rate requirement of sewage pipe cannot be met by gravity, and the pipe is easily blocked. Therefore, one pump for sewage lifting station is built in the midway, which is located at the Qinan village. After the sewage is lifted, the sewage is delivered to the Pingqiao sewage disposal plant, and the sewage pipe is mainly arranged in the north greening belt of Pingjiaxian street.
Refer to Fig. 3.4-3 for the layout of sewage pipeline of west area of Tiantai basin.

Table 3.4-3 Villages Implementing Water Supply Modification in West Area

Serial No.	Name of Village	Township	Household	Current population	Population in 2020
1	Xiajie Village	Pingqiao County	879	4863	4999
2	Machechen Village	Pingqiao County	101	386	397
3	Xiayangtian Village	Pingqiao County	422	1741	1790
4	Luxiaqiu Village	Pingqiao County	311	1186	1219

Serial No.	Name of Village	Township	Household	Current population	Population in 2020
5	Shizhu Village	Pingqiao County	205	814	837
6	Dongtangxia Village	Pingqiao County	162	623	640
7	Shantoupang Village	Pingqiao County	600	2321	2386
8	Hujing Village	Pingqiao County	425	1583	1627
9	Maoyang Village	Pingqiao County	320	1171	1204
10	Tunqiao Village	Pingqiao County	902	3315	3408
11	Shangpang Village	Pingqiao County	1178	4418	4542
12	Houcun Village	Pingqiao County	704	2465	2534
13	Dieshi Village	Pingqiao County	189	532	547
14	Shangbai Village	Pingqiao County	255	760	781

Table 3.4-4 Connecting Pipe Villages from Water Supply Main Pipe to Village Water Supply Pipeline in West Area

Serial No.	Name of Village	Township	Household	Current population persons	(2020) Population persons
1	Xiajie Village	Pingqiao County	879	4863	4999
2	Machechen Village	Pingqiao County	101	386	397
3	Xiayangtian Village	Pingqiao County	422	1741	1790
4	Luxiaqiu Village	Pingqiao County	311	1186	1219
5	Shizhu Village	Pingqiao County	205	814	837
6	Dongtangxia Village	Pingqiao County	162	623	640
7	Changyangxu Village	Pingqiao County	171	708	728
8	Changyang Village	Pingqiao County	298	1187	1220
9	Qianshan Village	Pingqiao County	347	1320	1357
10	Lige Village	Pingqiao County	260	1013	1041
11	Shantoupang Village	Pingqiao County	600	2321	2386
12	Zhuangqian Village	Pingqiao County	312	1294	1330
13	Maiganshan Village	Pingqiao County	398	1516	1558
14	Xinwuxia Village	Pingqiao County	210	710	730
15	Zhuanghou Village	Pingqiao County	122	514	528

Serial No.	Name of Village	Township	Household	Current population persons	(2020) Population persons
16	Hujing Village	Pingqiao County	425	1583	1627
17	Zhangsi Village	Pingqiao County	222	718	738
18	Xitouyang Village	Pingqiao County	758	2765	2842
19	Maoyang Village	Pingqiao County	320	1171	1204
20	Zhoukan Village	Pingqiao County	312	1294	1330
21	Shangpang Village	Pingqiao County	1178	4418	4542
22	Houcun Village	Pingqiao County	704	2465	2534
23	Dieshi Village	Pingqiao County	189	532	547
24	Shangbai Village	Pingqiao County	255	760	781
25	Jieyi Village	Jietou Town	336	1524	1567
26	Jieer Village	Jietou Town	270	1056	1086
27	Jiesan Village	Jietou Town	186	787	809
28	Jiesi Village	Jietou Town	220	737	758
29	Yezhai Village	Jietou Town	473	1777	1827
30	Butoujie Village	Jietou Town	247	880	905
31	Butou Village	Jietou Town	290	1057	1087
32	Chaoyang Village	Jietou Town	229	788	810
41	Qinan Village	Jietou Town	467	1646	1692
Total				46154	47446

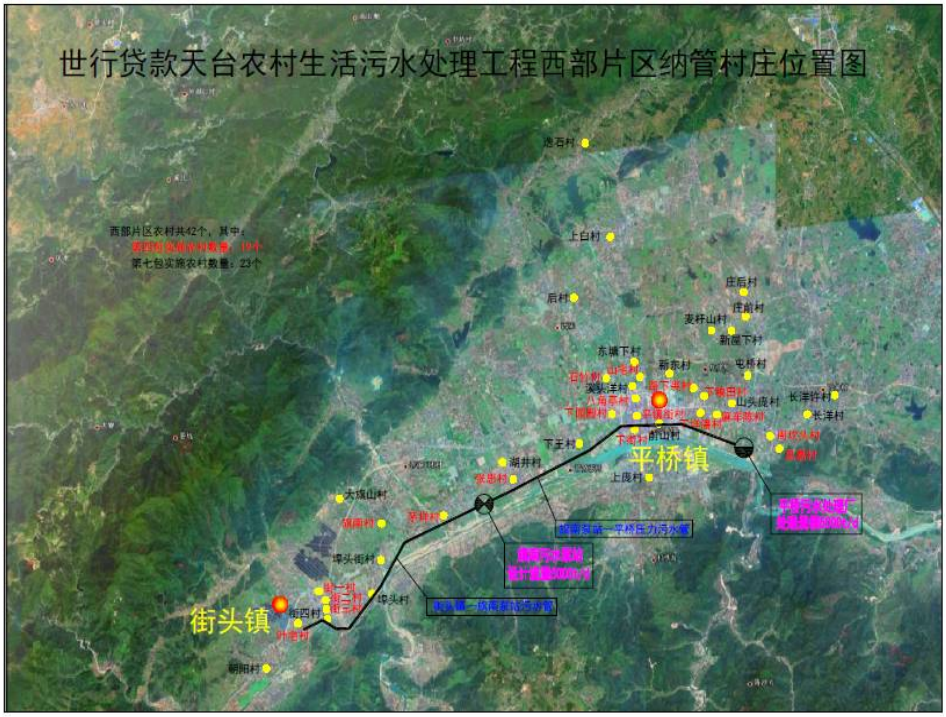


Fig. 3.4-5 Location Plan of Pipe Incorporating Villages of West Areas of Tiantai Basin

3.4.8 Decentralized rural sewage disposal project

The service scopes of decentralized sewage disposal system includes 49 villages, i.e. Shiliang township, Nanping township, Yongxi township, Leifeng township, five mountain townships of Sanzhou township, Jietou township, Baihe township, Tantou township, Sanhe township, Hongchou township, Pingqiao township, Chicheng subdistrict, Shifeng subdistrict, Fuxi subdistrict, mountain subdistrict or villages without pipe incorporating conditions.

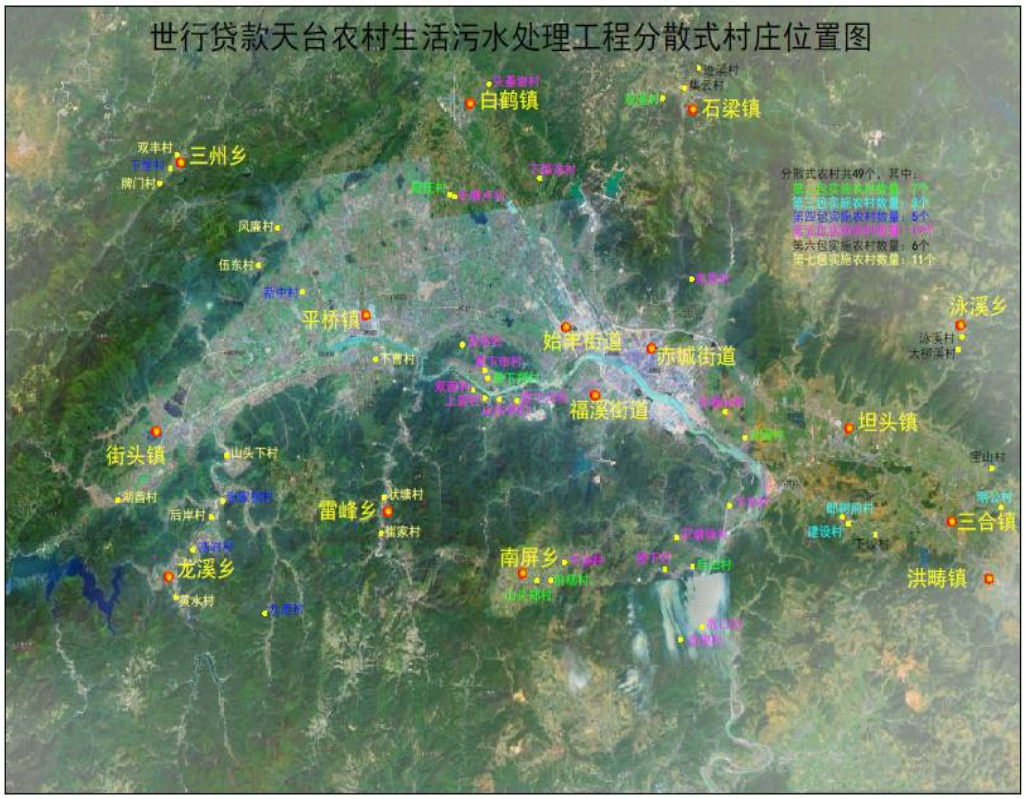


Fig. 3.4-6 Location Plan of Dispersive Sewage disposal Villages of Tiantai

Table 3.4-5 Table of First Batch of Villages in Improvement Project of Dispersive Rural Water Supply and Drainage Facilities of Tiantai Basin

Serial No.	Village: Name	Township	Household	Current population	Population in 2020	Rural Per Capita Income	Family Septic Tank	Water Utilization Conditions of Tap Water	Construction Content	Sewage Outlet
1	Angu Village	Chicheng Subdistrict	324	1135	1167	7281	Outdoor	Chengguan Water Plant	60m/d sewage disposal scale, one sewage disposal terminals, the anaerobic filtering tank + biological droplet filtering tank + artificial wetland + land seepage discharge process, 3,900m sewage pipeline, 190 UPVC access wells, 350 cleaning ports, 600m channel, and 1,200m pond.	Decentralized
2	Bixia Village Zhengcun Village	Shifeng Subdistrict	213	471	484	7412	Outdoor	Surface Water	30m³/d sewage disposal scale, one sewage disposal terminals, the anaerobic filtering tank + biological droplet filtering tank + artificial wetland + land seepage discharge process, 4,500m sewage pipeline, 170 UPVC access wells, 213 cleaning ports, LID system, village intake water supply connecting pipe, village water drinking project, 1,200m channel, and 2,000m pond.	Decentralized
3	Houtian Village	Fuxi Subdistrict	273	700	720	7025	Outdoor	Surface Water	40m³/d sewage disposal scale, one sewage disposal terminal, the anaerobic filtering tank + biological droplet filtering tank + artificial wetland + land seepage discharge process, 3000m sewage pipeline, 148 UPVC access wells, 273 cleaning ports, and 500m channel.	Decentralized
4	Xiazhuang Village	Baihe County	430	658	676	7834	Indoors, outdoors	Baihe Water Plant	40m³/d sewage disposal scale, one sewage disposal terminal, the anaerobic filtering tank + biological droplet filtering tank + artificial wetland + land seepage discharge process, 4,800m sewage pipeline, 216 UPVC access wells, 430 cleaning ports, and 1,000m channel.	Decentralized
5	Xinzhong Village	Pingqiao County	476	1451	1492	8309	Indoors, outdoors	Pingzhen Water Plant	Sewage, and 2,000m channel	Decentralized
6	Zhangjia Village Tongcun Village	Jietou Town	417	1403	1442	7722	Outdoor	Surface Water	Sewage, village intake water supply connecting pipe, village water drinking project, and 7,850m.	Decentralized
7	Jiuzhe Village	Jietou Town	266	928	954	6410	Outdoor	Surface Water	Sewage, and 5,200m channel	Decentralized
8	Langshu Village Qiancun Village	Sanhe County	295	2434	2502	7749	Indoors, outdoors	Surface Water	Sewage, 3,000m channel and 2,400m pon.	Decentralized
9	Jianshe Village	Sanhe County	336	1167	1200	7992	Indoors, outdoors	Surface Water	Sewage, 1,700m channel and 2,200m pon.	Decentralized
10	Minggong Village	Hongchou Village	318	1275	1311	8349	Indoor or outdoor	Brook water	Sewage and 500m pond.	Decentralized
11	Shuangxi Village	Shiliang Town	150	457	470	6313	20% Outdoor	Surface Water	Sewage, village intake water supply connecting pipe, in-village water drinking project, and channel of 2,000m.	Decentralized

Serial No.	Village: Name	Township	Household	Current population	Population in 2020	Rural Per Capita Income	Family Septic Tank	Water Utilization Conditions of Tap Water	Construction Content	Sewage Outlet
12	Qianyang Village	Nanping Township	678	2148	2208	8028	Most are outdoor, some are indoor	Surface Water	Sewage treatment scale of 120m3/d, two sewage treatment terminals, the anaerobic filtering tank + artificial wetland + land seepage discharge process, sewage pipeline of 7,200m, 379 UPVC inspection wells, 700 cleanouts, village intake water supply pipe, improvement of village water drinking project, channel of 1,500m, and pond of 1,000m2.	Decentralized
13	Shantou Village Zhengcun Village	Nanping Township	360	1282	1318	6931	Outdoor	Surface Water	Sewage treatment scale of 60m3/d, two sewage treatment terminals, the anaerobic filtering tank + artificial wetland + land seepage discharge process, sewage pipeline of 7,800m, 398 UPVC inspection wells, 482 cleanouts, village intake water supply pipe, in-village water drinking project, channel of 3,000m, and pond of 500m2.	Decentralized
14	Xiawucun Village (Township Point)	Sanzhou Township	286	1131	1163	6404	Indoors, outdoors	Surface Water	Sewage treatment scale of 60m3/d, one sewage treatment terminal, the anaerobic filtering tank + artificial wetland + land seepage discharge process, sewage pipeline of 7,500m, 349 UPVC inspection wells, 286 cleanouts, village intake water supply pipe, in-village water drinking project, and pond of 1,500m².	Decentralized
15	Hanyan Village	Longxi Township	343	924	950	7267	Outdoor	Surface Water	Sewage, village intake water supply connecting pipe, in-village water drinking project, channel of 3,000m, and pond of 3,000m2.	Decentralized
	Total		5165	17564	18057					

Table 3.4-6 List of The First Batch of Villages in Improvement Project of Decentralized Rural Water Supply and Drainage Facilities of Tiantai (34 Villages)

Serial No.	Name of Village	Township	Household	Current population	Population in 2020	Rural Per Capita Income	Family Septic Tank	Water Utilization Conditions of Tap Water	Construction Content	Sewage Outlet
1	Donghengshan Village	Chicheng Subdistrict	407	962	989	7239	Outdoor	Surface Water	Sewage treatment scale of 50m3/d, one sewage treatment terminal, the anaerobic filtering tank + artificial wetland + ecological pond discharge process, sewage pipeline of 4,700m, 260 UPVC inspection wells, 240 cleanouts, in-village water drinking project, channel of 1,000m, and pond of 5,000m2.	Decentralized
2	Dongao Village	Chicheng Subdistrict	84	254	261	7325	Indoors, outdoors	Self-provided	Sewage amount of 16m3/d, sewage pipeline of 1,176m, 67 UPVC inspection wells, and 84 cleanouts.	Decentralized
3	Shuanglian Village	Shifeng Subdistrict	447	1246	1281	7917	Indoor	Surface Water	Sewage, village intake water supply connecting pipe, in-village water drinking project, and pond of 2,000m2.	Decentralized
4	Shangqiu Village	Shifeng Subdistrict	102	304	313	7756	Indoors, outdoors	Self-provided	Sewage amount of 19m3/d, sewage pipeline of 1,428m, 82 UPVC inspection wells, and 102 cleanouts.	Decentralized
5	Shantouqiu Village	Shifeng Subdistrict	265	874	898	7246	Indoors, outdoors	Self-provided	Sewage amount of 55m3/d, sewage pipeline of 3,710m, 212 UPVC inspection wells, and 265 cleanouts.	Decentralized
6	Bixia City	Shifeng Subdistrict	153	445	457	7829	Indoors, outdoors	Self-provided	Sewage amount of 40m3/d, sewage pipeline of 2,142m, 122 UPVC inspection wells, and 153 cleanouts.	Decentralized
7	Meng'ao Village	Shifeng Subdistrict	202	625	643	8024	Indoors, outdoors	Baihe Water Plant	Sewage amount of 45m3/d, sewage pipeline of 2,828m, 162 UPVC inspection wells, and 202 cleanouts.	Decentralized
8	Yanxiayang Village	Shifeng Subdistrict	220	600	617	7625	Indoors, outdoors	Self-provided	Sewage amount of 42m3/d, sewage pipeline of 3,080m, 180 UPVC inspection wells, and 220 cleanouts.	Decentralized
9	Shitangxu Village	Fuxi Subdistrict	199	1543	1586	7932	Indoors, outdoors	Self-provided	Sewage amount of 100m3/d, sewage pipeline of 2,786m, 159 UPVC inspection wells, and 199 cleanouts.	Decentralized
10	Aokou Village	Fuxi Subdistrict	464	436	448	7821	Indoors, outdoors	Self-provided	Sewage amount of 30m3/d, sewage pipeline of 6,496m, 371 UPVC inspection wells, and 464 cleanouts.	Decentralized
11	Aoli Village	Fuxi Subdistrict	122	484	498	7125	Indoors, outdoors	Self-provided	Sewage amount of 30m3/d, sewage pipeline of 1,708m, 98 UPVC inspection wells, and 122 cleanouts.	Decentralized
12	Louxia Village	Fuxi Subdistrict	137	818	841	7564	Indoors, outdoors	Self-provided	Sewage amount of 60m3/d, sewage pipeline of 1,918m, 110 UPVC inspection wells, and 137 cleanouts.	Decentralized
13	Xiache Village	Fuxi Subdistrict	156	283	291	7511	Indoors, outdoors	Self-provided	Sewage amount of 20m3/d, sewage pipeline of 2,184m, 125 UPVC inspection wells, and 156 cleanouts.	Decentralized
14	Wudong Village	Pingqiao County	126	1096	1127	7797.23	Outdoor	Pingzhen Water Plant	Sewage	Decentralized
15	Fenglian Village	Pingqiao County	255	884	909	8768	Indoors, outdoors	Self-provided	Sewage amount of 65m3/d, sewage pipeline of 3,570m, 204 UPVC inspection wells, and 255 cleanouts.	Decentralized

Serial No.	Name of Village	Township	Household	Current population	Population in 2020	Rural Per Capita Income	Family Septic Tank	Water Utilization Conditions of Tap Water	Construction Content	Sewage Outlet
16	Xiacao Village	Pingqiao County	392	1359	1397	9251	Indoors, outdoors	Self-provided	Sewage amount of 90m3/d, sewage pipeline of 5,488m, 314 UPVC inspection wells, and 392 cleanouts.	Decentralized
17	Xiaguoyang Village	Baihe County	269	754	775	8957.346	Indoor	Surface Water	Sewage	Decentralized
18	Changtanglu Village	Baihe County	244	685	704	7802	Indoors, outdoors	Baihe Water Plant	Sewage amount of 45m3/d, sewage pipeline of 3,416m, 195 UPVC inspection wells, and 244 cleanouts.	Chengguan Village
19	Toujiyan Village	Baihe County	96	274	282	7654	Indoors, outdoors	Baihe Water Plant	Sewage amount of 20m3/d, sewage pipeline of 1,344m, 77 UPVC inspection wells, and 96 cleanouts.	Decentralized
20	Xiajiao Village	Sanhe County	625	2097	2156	7498.721	Indoors, outdoors	Surface Water	Sewage, village intake water supply connecting pipe, in-village water drinking project, channel of 1,700m, and pond of 2,400m2.	Decentralized
21	Baoshan Village	Sanhe County	276	794	816	7820	Indoors, outdoors	Self-provided	Sewage amount of 55m3/d, sewage pipeline of 3,864m, 221 UPVC inspection wells, and 276 cleanouts.	Decentralized
22	Houan Village	Jietou Town	344	1162	1195	8024.345	Outdoor	Surface Water	Sewage, channel of 600m and pond of 1,200m2.	Decentralized
23	Huqiu Village	Jietou Town	587	1790	1840	7326	Indoors, outdoors	Self-provided	Sewage amount of 125m3/d, sewage pipeline of 8,218m, 470 UPVC inspection wells, and 587 cleanouts.	Decentralized
24	Shantouxia Village	Jietou Town	146	447	460	7251	Indoors, outdoors	Self-provided	Sewage amount of 30m3/d, sewage pipeline of 2,044m, 117 UPVC inspection wells, and 146 cleanouts.	Decentralized
25	Jiyun Village	Shiliang Town	448	1506	1548	9139.552	20% Outdoor	Surface Water	Sewage treatment scale of 60m3/d, one sewage treatment terminal, the anaerobic filtering tank + artificial wetland + land seepage discharge process, sewage pipeline of 4,100m, 195 UPVC inspection wells, 450 cleanouts, village intake water supply pipe, in-village water drinking project, channel of 3,000m, and pond of 500m2.	Decentralized
26	Jixi Village	Shiliang Town	109	594	611	7024	Indoors, outdoors	Self-provided	Sewage amount of 37m3/d, sewage pipeline of 1,526m, 87 UPVC inspection wells, and 109 cleanouts.	Decentralized
27	Xiatang Village	Nanping Township	415	1757	1806	6567.426	Most are outdoor, some are indoor	Surface Water	Sewage, village intake water supply connecting pipe, in-village water drinking project, channel of 2,500m, and pond of 500m2.	Decentralized
28	Zhuangtang Village	Leifeng Township	456	1483	1525	6478.114	Indoors, outdoors	Surface Water	Sewage treatment scale of 100m3/d, one sewage treatment terminal, the anaerobic filtering tank + biological droplet filtering tank + artificial wetland + land seepage discharge process, sewage pipeline of 5,500m, 276 UPVC inspection wells, and 450 cleanouts.	Decentralized
29	Cuijia Village	Leifeng Township	526	1738	1787	7124	Indoors, outdoors	Self-provided	Sewage amount of 110m3/d, sewage pipeline of 7,364m, 421 UPVC inspection wells, and 526 cleanouts.	Decentralized
30	Shuangfeng Village	Sanzhou Township	188	563	579	6625.874	Indoors, outdoors	Surface Water	Sewage, village intake water supply connecting pipe, in-village water drinking project, and pond of 500m2.	Decentralized

Serial No.	Name of Village	Township	Household	Current population	Population in 2020	Rural Per Capita Income	Family Septic Tank	Water Utilization Conditions of Tap Water	Construction Content	Sewage Outlet
31	Paimen Village	Sanzhou Township	368	1186	1219	7865	Indoors, outdoors	Self-provided	Sewage amount of 70m3/d, sewage pipeline of 5,152m, 294 UPVC inspection wells, and 368 cleanouts.	Decentralized
32	Daliuxi Village	Yongxi Township	227	690	709	7855.153	Indoors, outdoors	Surface Water	Sewage treatment scale of 40m3/d, one sewage treatment terminal, the anaerobic filtering tank + artificial wetland + land seepage discharge process, sewage pipeline of 3,000m, 154 UPVC inspection wells, 230 cleanouts, village intake water supply pipe, in-village water drinking project, and channel of 1,000m.	Decentralized
33	Yongxi River	Yongxi Township	387	1372	1410	5951.557	Indoor or Outdoor	Surface Water	Sewage, village intake water supply connecting pipe, in-village water drinking project, channel of 3,000m, and pond of 3,000m2.	Decentralized
34	Huangshui Village	Longxi Township	746	2420	2488	7496.444	Outdoor	Surface Water	Sewage treatment scale of 150m3/d, one sewage treatment terminal, the anaerobic-aerobiotic combination + artificial wetland + land seepage discharge process, sewage pipeline of 8,800m, 297 UPVC inspection wells, 750 cleanouts, village intake water supply pipe, in-village water drinking project, channel of 700m, and pond of 400m2.	Decentralized
Total			10188	33525	34464					

4 Investigation of Relevant Projects

4.1 Investigation of Relevant Projects of Subprojects in AnJi Area

Refer to Table 4.1-1 for conditions of the relevant projects of subprojects in AnJi area.

Table 4.1-1 Schedule of Relevant Projects of Subprojects in AnJi Area

Subproject Name	Relevant Project		
	water plant	Water Source	Conditions of Sewage Absorbing Facilities
A1 Rural Joint Perfection Project of Water Supply and Drainage Facilities of Tianzihu Area	Gaoyu Water Plant	Tianzigang Reservoir	Tianzihu Sewage Disposal Plant
A2: Perfection Project of Water Supply and Drainage Facilities in Meixi Area	Gaoyu Water Plant	Tianzigang Reservoir	
A3: Perfection Project of Water Supply and Drainage Facilities in Tianhuangping Area	Fenghuang Water Plant	Fenghuang Reservoir	Chengbei Sewage Disposal Plant
A4: Perfection Project of Water Supply and Drainage Facilities in Banshan Area	Newly Built Banshan Water Plant	Fushi Reservoir	Chengbei Sewage Disposal Plant
A5: Perfection Project of Water Supply and Drainage Facilities in Xiaofeng Area	Chengxi Water Plant	Fushi Reservoir	Chengbei Sewage Disposal Plant
	Xiaofeng Water Plant	Laoshikan Water Plant	
A6: Expansion Project of AnJi Urban Sewage Disposal Plant	Fenghuang Water Plant	Fenghuang Reservoir	
Urban Sewage Plant, Meixi Sewage Plant, Gaoyu Sewage Plant, and Banshan Water Plant	The sludge is delivered to the incinerating furnace of AnJi Wangneng Renewable Resource Utilization Co., Ltd. to be incinerated.		

1. Xiaofeng Water Plant

The water intake source of Xiaofeng Water Plant is the Laoshikan Reservoir. The reservoir is designed in the fifty-year return period, and is checked by the five hundred-year return period, the design flood level is 123.1m, the checking flood level is 124.5m, and the dam protection flood level is 125.6m. The total reservoir capacity is 117,000,000m3, the design normal water level is 114.5m, the corresponding reservoir capacity is 42,500,000m3, and the irrigation area is 45,000mu. The water quality of reservoir belongs to Class II throughout the year.

The Xiaofeng Water Plant belongs to Urban Management Bureau of the county, and was built in 1974. In 2012, the water plant was subject to capacity expanding and modification, the inclined pipe settlement + valveless filtering tank treatment process is adopted, and the daily treatment scale is 15,000t/d (maximum). After modified, the water effluent quality of water purifying plant meets the requirement of Sanitation Standard of Living Drinking Water (GB5749-2006) in conventional detection.

2. Chengxi Water Plant

The Chengxi Water Plant was built and start water supply in 2006, and the water intake source is the Fushi Reservoir. The capacity of Fushi Reservoir is 217,000,000m3, the dam top elevation is 92.8m, the flood level in millennium return period is 90.7m, the design normal storage water level is 78.4m, the water depth is 28m, and the water quality of reservoir belongs to Class II throughout the year. The water purifying process adopts the stable flow settlement + gas and water back flushing filtering tank process. The water making capability of existing facilities is 50,000m3/d (maximum). The actual maximum daily water supply amount reaches 55,000m3/d. The water effluent quality meets the requirement of Sanitation Standard

of Living Drinking Water (GB5749-2006).

3. Fenghuang Water Plant

It aims at solving the problem of the insufficient urban water supply, and supplying water to Tianhaungpin district. The AnJi Guoyuan Water Company started to build the Fenghuang Water Plant in July 2012, with the scale of 45,000t/d (maximum). The Fenghuang Reservoir of AnJi is located at the Shuangxikou Village 2.5km away from southeast side of Dipu Township, and was built in September 2002 and impounded in July 2005. It is a medium reservoir with the function of flood prevention being primary purpose, power generation being secondary purpose, and aiming at urban water supply and improved urban landscape water consumption. The total reservoir capacity is 21,120,000m3, and the water supply amount of 95% drought years is 15,330,000m3/a. The water quality of reservoir belongs to Class II throughout the year.

The Fenghuang Water Plant is built and run by the Guoyuan Water Company, the water purifying process adopts the stable flow settlement + gas and water back flushing filtering tank process, and the water making capability is 45,000m3/d (maximum). In August 2013, as the extreme water lack in urban area, the on-going Fenghuang Water Plant supplied emergency water to the urban area. At present, the Fenghuang Water Plant has been basically completed and been in the completion acceptance phase, and is planned to put into service at the beginning of 2014. It is run together with the Chengxi Water Plant in network-connected way.

4. Chengbei Sewage Plant

The Chengbei Sewage Plant is located at the north part of Dipu Township of AnJi County, and at the crossing part of West Tiaoxi Stream and Xigang Stream, and is mainly used for collecting the living and industrial sewage from east part of Huawushan in Banshan Township and Dipu Township, and the north area of West Tiaoxi Stream.

The Phase I Project of Chengbei Sewage Plant has the daily treatment scale of 20,000t, and adopts the CAST tank + biological filtering tank process. The environment protection acceptance is passed in December 2012, and the sewage drainage permit is obtained in January 2013. The water effluent quality meets the first-class a standard of Standard of Pollutant Discharge of Urban Sewage Disposal Plant (GB18918-2002). There are 16 official staffs in the company, with three function departments, i.e. technical department, operation department, and administrative office.

Table 4.1-2 Water Inflow and Effluent Concentration of Chengbei Sewage Plant

		COD (mg/L)	BOD (mg/L)	SS (mg/L)	TN (mg/L)	N-NH3 (mg/L)	TP (mg/L)
Inflow Concentration (mg/L)	Maximum Value	550	250	300	45	35	3.5
	Minimum Value	160	50	50	15	10	0.7
	Annual Average Value	250	70	120	25	15	1.5
Effluent Concentration		≤50	≤10	≤10	≤8	≤5	≤0.5

Table 4.1-3 Water Intake Amount of Chengbei Sewage Plant in Recent Years

Item	2011	2012
Total Annual Water Intake Amount (ten thousand m³/a)	231.78	421.94
Daily Average Water Intake Amount (m3/d)	6350	11560

5. Tianzihu Sewage Plant

The Tianzihu Sewage Plant is located at the east part of Tianzihu Township, the land occupation area is about 20mu, the treatment capability is 10,000m3/d, and the A2/O + sand filtering treatment process is adopted. The phase I project has the design scale of 2,500m3/d, and was put into service in May 2009. The phase II project has the design scale of 7,500m3/d, and was put into service in October 2011.

There are 17 staffs in the sewage disposal plant, including 4 for professional technical management, 1 for chemical testing, 1 for electromechanical operation, 9 for operation and 2 for logistics; 11 staffs hold the certificates of sewage and wastewater treatment operator and chemical testing personnel. Except the management personnel, the sewage disposal plant is equipped with four shifts, i.e. operation shift, chemical testing shift, machinery repair shift, and sludge dewatering shift.

Table 4.1-4 Water Inflow and Effluent Concentration of Tianzihu Sewage Plant

Item		COD (mg/L)	BOD (mg/L)	SS (mg/L)	TN (mg/L)	N-NH3 (mg/L)	TP (mg/L)
Inflow Concentration (mg/L)	Maximum Value	450	245	300	55	40	2.5
	Minimum Value	155	50	50	15	10	0.40
	Annual Average Value	250	75	120	25	15	1.5
Effluent Concentration		≤50	≤10	≤10	≤8	≤5	≤0.5

Table 4.1-5 Water Intake Amount of Tianzihu Sewage Plant in Recent Years

Item	2009	2010	2011	2012
Total Annual Water Intake Amount (ten thousand m³/a)	31.00	67.53	85.78	166.45
Daily Average Water Intake Amount (m^3/d)	1250	1850	2350	4560

6. AnJi Wangneng Renewable Resource Utilization Co., Ltd.

After the AnJi Urban Sewage Plant, Meixi Sewage Plant, Gaoyu Water Plant and Banshan Water Plant are built, the sludge is delivered to the incinerating furnace of AnJi Wangneng Renewable Resource Utilization Co., Ltd. to be incinerated.

The AnJi Wangneng Renewable Resource Utilization Co., Ltd. is located at the Changnongkou, Changle Community, Dipu Township, AnJi County, the design scale is 100t/d; being approved by AnJi Environmental Protection Bureau (AHJ [2012] No: 501), it has finished its construction and is under the equipment debugging stage. The

formally operation will be since August 2014.

7. Overview of water intake reservoir

(1) Fushi Reservoir

The Fushi Reservoir is located at the Fushi Village 10km away from the west side of Xiaofeng Township of AnJi County, and the dam is built on the Xixi stream of West Tiaoxi Stream. The rainwater collecting area is 331km2, the total reservoir capacity is 21,800,000m3, and the normal reservoir capacity is 102,500,000m3. It is the first large-scale (II) reservoir for controlling the West Tiaoxi Stream basin water disaster. The reservoir is mainly used for flood prevention, and combines irrigation, water supply, power generation, fish farming and tourism. After the Fushi Reservoir was built in 1993 and started to pass water, the irrigation area is 122,000mu, the installation power of power station is 5,400kW, and the fish farming area of reservoir is 7,500mu.

The area of control basin of Fushi Reservoir is 331km2, which occupies 74.3% of the Xixi Stream basin area, occupies 17.5% of total area of AnJi County, and 14.6% of total area of West Tiaoxi Stream basin. After being built, the reservoir can intercept and store all flood in twenty-year return period, and is combined with the Laoshikan Reservoir, to perform the functions of intercepting flood, regulation and storage. The auxiliary project of Fushi channel was completed in 1993, and the irrigation area is expanded from 50,000mu to 122,000mu. In 1997, the water diversion project from Fushi Reservoir to Dipu Township was completed, and the water utilization for 40,000 persons in the county is ensured.

Table 4.1-6 Overview of Fushi Reservoir

Location	Safety Level	Name of Located River (Lake)	Reservoir Type	Type	Main Water Retaining Dam Type (according to materials)	Main Water Retaining Dam Type (according to structures)	Main Flood Discharge Structure Type
Xiaofeng Town	Safety Level II	West Tiaoxi Stream	Shanqiu Reservoir	Water Retaining Dam	Earth Dam	Core Wall Dam	Tunnel Type
Dam Site Controlling Basin Area (km2)	Dam Site Yearly Average Runoff Amount (ten thousand m3)	Completed in (Year)	Completed in (Month)	Adjustability of Reservoir	Project Category	Main Dam Rating	Main Dam Height (m)
331	27600	1980	6	Annual Adjustment	II	Level 2	43.2
Main Dam Length (m)	Maximum Flood Discharge Amount (m^3/s)	Elevation System	Crest Elevation	Design Flood Standard [recurrence period] (Year)	Check Flood Standard [recurrence period] (Year)	Check Flood Level (m)	Design Flood Level (m)
446	6630	Yellow Sea Vertical Datum	91.4	100	10000	89.92	87.12
Anti-flood High Water Level (m)	Normal Storage Water Level (m)	Anti-flood Control Water Level (m)	Dead Water Level (m)	Total Reservoir Capacity (ten thousand m3)	Flood Regulation Reservoir Capacity (ten thousand m3)	Anti-flood Reservoir Capacity (ten thousand m3)	Xingli Reservoir Capacity (ten thousand m3)
86.42	79.12	78.12	66.12	21800	12350	8810	7520

Dead Reservoir Capacity (ten thousand m3)	Water Surface Area Correspondi ng to Normal Storage Water Level (km2)	Critical Protection Object	Design Annual Water Supply Capacity	Water Supply Amount in 2011 (ten thousand m3)	Number of Water-intake (Nr.)	Water Supply Object	Design Area of Irrigation (10,000mu)
2730	8.17	Townships, farmlands, highways, etc.	7300	6600	1	Urban and rural life, industrial and mining enterprises, and agricultural irrigation	12.2

(2) Laoshikan Reservoir

The Laoshikan Reservoir is located at the Laoshikan Village 11km away from southwest side of Xiaofeng Township, and the dam is built at the midstream of Nanxi Stream, tributary of West Tiaoxi Stream, and is 23.20km away from the Dipu Township of AnJi County. The rainwater collecting area is 258km2, the total reservoir capacity is 11,500,000m3, and the normal reservoir capacity is 54,000,000m3. It is the second large-scale (II) reservoir for controlling the West Tiaoxi Stream water disaster. The reservoir is mainly used for flood prevention, and combines irrigation, water supply, power generation, fish farming and tourism. The anti-flood protection area is 190,000mu (90,000mu in AnJi, and 100,000mu in Changxing). Combined with the Fushi Reservoir, the anti-flood capability can be raised to twenty return period. The irrigation area is 45,000mu (the anti-flood area and irrigation area are repetitively calculated with Fushi Reservoir). The installation power of power station is 2,800kW, and the fish farming area is 4,440mu.

The controlling basin area of Laoshikan Reservoir is 258km2, which occupies 63% of the Nanxi Stream basin area (408.8km2), occupies 13.7% of total area of AnJi County, and 11.3% of West Tiaoxi Stream basin area.

There are eight parts in the Laoshikan Reservoir project, namely main dam, auxiliary dam, flood discharge gate, emergency spillway, water conveying tunnel, logway (disabled), and hydropower station.

Table 4.1-7 Overview of Laoshikan Reservoir

Location	Safety Level	Name of Located River (Lake)	Reservoir Type	Type	Main Water Retaining Dam Type (according to materials)	Main Water Retaining Dam Type (according to structures)	Main Flood Discharge Structure Type
Xiaofeng Town	Original safety level is III. After danger removal and reinforcing, the acceptance is not carried out, and the level is not determined.	Nanxi Stream	Shanqiu Reservoir	Water Retaining Dam	Earth Dam	Core Wall Dam	Bank Slope Type
Dam Site Controlling Basin Area (km2)	Dam Site Yearly Average Runoff Amount (ten thousand m3)	Completed in (Year)	Completed in (Month)	Adjustability of Reservoir	Project Category	Main Dam Rating	Main Dam Height (m)
258	22600	1983	12	Annual Adjustment	II	Level 2	36.9

Main Dam Length (m)	Maximum Flood Discharge Amount (m3/s)	Elevation System	Crest Elevation	Design Flood Standard [recurrence period] (Year)	Check Flood Standard [recurrence period] (Year)	Check Flood Level (m)	Design Flood Level (m)
560	5791	National Vertical Datum 1985	124.53	100	10000	123.53	122.29
Anti-flood High Water Level (m)	Normal Storage Water Level (m)	Anti-flood Control Water Level (m)	Dead Water Level (m)	Total Reservoir Capacity (ten thousand m3)	Flood Regulation Reservoir Capacity (ten thousand m3)	Anti-flood Reservoir Capacity (ten thousand m3)	Xingli Reservoir Capacity (ten thousand m3)
121.08	115.13	113.63	103.13	11401	6865	4645	4100
Dead Reservoir Capacity (ten thousand m3)	Water Surface Area Corresponding to Normal Storage Water Level (km2)	Critical Protection Object	Design Annual Water Supply Capacity	Water Supply Amount in 2011 (ten thousand m3)	Number of Water-intake (Nr.)	Water Supply Object	Design Area of Irrigation (10,000mu)
1300	5	Townships, industrial and mining enterprises, and farmlands	6000	4000	2	Urban and rural life, industrial and mining enterprises, and agricultural irrigation	8.86

(3) Tianzigang Reservoir

The Tianzigang Reservoir is located at the Dongyang Village of Gaoyu Township, and is 23km away from the Dipu Township, the dam is built at the upstream of Nihe River, tributary of Hunni Port, the surroundings of reservoir belong to loess hill landform, and the reservoir is built for controlling the Hunni Port basin. The water collecting area of reservoir is 25km2, the total reservoir capacity is 18,510,000m3, and the normal reservoir capacity is 9,150,000m3. The area of irrigated farmlands is 22,000mu, the anti-floor protection area is 10,000mu, the fish farming area is 2400mu, the installation power of power station is 75kW, and the water reservoir is a medium water conservancy project with comprehensive utilization of floor prevention, water supply, power generation, fish farming, etc. The reservoir shall be designed based on 100-year recurrence flood and checked based on 1000-year recurrence flood.

There are five parts in the Tianzigang Reservoir Project, namely dam, spillway, water conveying tunnel, power station and auxiliary project of irrigation area.

Table 4.1-8 Overview of Tianzigang Reservoir

Location	Safety Level	Name of Located River (Lake)	Reservoir Type	Type	Main Water Retaining Dam Type (according to materials)	Main Water Retaining Dam Type (according to structures)	Main Flood Discharge Structure Type
Gaoyu Township	Safety Level I	Hunni Port	Shanqiu Reservoir	Water Retaining Dam	Earth Dam	Sloping Core Dam	Bank Slope Type
Dam Site Controlling Basin Area (km2)	Dam Site Yearly Average Runoff Amount (ten thousand m3)	Completed in (Year)	Completed in (Month)	Adjustability of Reservoir	Project Category	Main Dam Rating	Main Dam Height (m)

23.8	1975.4	1958	4	Annual Adjustment	III	Level 3	13.75
Main Dam Length (m)	Maximum Flood Discharge Amount (m3/s)	Elevation System	Crest Elevation	Design Flood Standard [recurrence period] (Year)	Check Flood Standard [recurrence period] (Year)	Check Flood Level (m)	Design Flood Level (m)
1150	108.4	Yellow Sea Vertical Datum	27.8	100	2000	26.34	25.37
Normal Storage Water Level (m)	Anti-flood Control Water Level (m)	Dead Water Level (m)	Total Reservoir Capacity (ten thousand m3)	Flood Regulation Reservoir Capacity (ten thousand m3)	Anti-flood Reservoir Capacity (ten thousand m3)	Xingli Reservoir Capacity (ten thousand m3)	Dead Reservoir Capacity (ten thousand m3)
23.16	22.09	16.66	1801	1074.4		896.7	38.6
Water Surface Area Corresponding to Normal Storage Water Level (km2)	Critical Protection Object	Design Annual Water Supply Capacity	Water Supply Amount in 2011 (ten thousand m3)	Water Supply Object	Design Area of Irrigation (10,000mu)	/	/
2.58	Townships, farmlands and highways	1900	1600	Urban and rural life, industrial and mining enterprises, and agricultural irrigation	2.5	/	/

(5) Fenghuang Reservoir

Table 4.1-9 Overview of Fenghuang Reservoir

Location	Safety Level	Name of Located River (Lake)	Reservoir Type	Type	Main Water Retaining Dam Type (according to materials)	Main Water Retaining Dam Type (according to structures)	Main Flood Discharge Structure Type
Dipu Town	Safety Level I	Dixi Stream	Shanqiu Reservoir	Water Retaining Dam	Concrete Dam	Gravity Dam	Dam Body Type
Dam Site Controlling Basin Area (km2)	Dam Site Yearly Average Runoff Amount (ten thousand m3)	Production Settlement Population (ten thousand persons)	Moving Settlement Population (ten thousand persons)	Completed in (Year)	Completed in (Month)	Adjustability of Reservoir	Project Category
39.5	3550	0.1582	0.1582	2005	6	Pluriennial Regulation	III
Main Dam Rating	Main Dam Height (m)	Main Dam Length (m)	Maximum Flood Discharge Amount (m3/s)	Elevation System	Crest Elevation	Design Flood Standard [recurrence period] (Year)	Check Flood Standard [recurrence period] (Year)

Level 3	41.8	327.4	714	National Vertical Datum 1985	64.8	50	1000
Check Flood Level (m)	Design Flood Level (m)	Anti-flood High Water Level (m)	Normal Storage Water Level (m)	Anti-flood Control Water Level (m)	Dead Water Level (m)	Total Reservoir Capacity (ten thousand m3)	Flood Regulation Reservoir Capacity (ten thousand m3)
64.3	63.82	63.82	62	59	43	2112	731
Anti-flood Reservoir Capacity (ten thousand m3)	Xingli Reservoir Capacity (ten thousand m3)	Dead Reservoir Capacity (ten thousand m3)	Water Surface Area Corresponding to Normal Storage Water Level (km2)	Critical Protection Object	Design Annual Water Supply Capacity	Water Supply Object	/
653	1638	134	1.4	Township	1533	Urban and rural life	/

4.2 Investigation of Relevant Projects of Fuyang Area Subproject

Refer to Table 4.2-1 for the relevant projects of Fuyang Area subprojects.

Table 4.2-1 List of Relevant Projects of Fuyang Area Subproject

Subproject Name	Relevant Project
Fuyang Sewage Disposal Phase-IV Project and Longyang Sewage Disposal Plant	The sludge is delivered to the Zhejiang Qingyuan Ecological Heat and Power Co., Ltd. to be incinerated.
Rural Joint Water Supply and Drainage Facilities Perfecting Project of Xindeng Town, Fuyang City	The sewage is delivered to the Changkou Sewage Disposal Plant of Fuyang City to be treated.
Rural Joint Water Supply and Drainage Facilities Perfecting Project of Xindeng Town, Fuyang City	The sewage is delivered to the Xindeng Sewage Disposal Plant of Fuyang City to be treated.
Rural Joint Perfection Project of Water Supply and Drainage Facilities of Dayuan Town, Fuyang City	The sewage is delivered to the Dayuan Sewage Disposal Plant of Fuyang City to be treated.
Trial Project of Sewage Interception Piping for Rural Domestic Sewage in Fuyang City (The First Batch)	The sewage is respectively delivered to Longyang Sewage Disposal Plant and Fuyang Sewage Disposal Plant for treatment.

1. Introduction to Zhejiang Qingyuan Ecological Heat and Power Co., Ltd.

The Zhejiang Qingyuan Ecological Heat and Power Co., Ltd. is located in the Bayi Village of Chunjiang Papermaking Industrial Zone of Fuyang City, and the sludge incinerating phase I project of Fuyang City is carried out by Bayi Urban Integrated Sewage Treatment Co., Ltd. and Zhejiang Banqiao Paper Industry Co., Ltd. of Fuyang City, and is mainly run and maintained by the Zhejiang Qingyuan Ecological Heat and Power Co., Ltd. (subsidiary of Fuyang Banqiao Group). At present, the daily sludge treatment scale of sludge incinerating phase I project of Zhejiang Qingyuan Ecological Heat and Power Co., Ltd. is 1600t (water content of 80%), and there are three circulating fluidizing bed sludge incinerating furnaces with evaporation amount of 65t/h (two for use and one for standby) and two 12MW back pressure type machine units, being approved by Zhejiang Environmental Protection Bureau in 2007 (ZHJ [2007] No.: 60). The daily sludge treatment scale of sludge incinerating phase II project is 2400t, and there are three circulating fluidizing bed sludge incinerating furnaces with evaporation amount of 110t/h and respectively

B15MW and B25MW turbine generator units, being approved by Zhejiang Environmental Protection Bureau in 2012 (ZHJ [2012] No.: 22).. At present, the phase I project and phase II project have been completed, the phase I project has passed the environment protection acceptance in September 2011 (ZHJJ [2011] No.: 48). According to the on-line monitoring data of phase I project environment protection, the pollutant discharge concentration of waste gas treatment facility exit can reach the standard.

The treated sludge of phase II project includes the papermaking sludge of about 40 papermaking factories, the phase II project is still in the commissioning phase, and the environment protection completion acceptance is not completed.

2. Changkou Sewage Disposal Plant of Fuyang City

The Changkou Sewage Disposal Plant of Fuyang City is located at the southwest side of New No.320 national highway, and between No.10 road and No.8 road. The service scope is the whole Changkou Subdistrict, including Changkou market town, development zone, etc.

At present, the implemented scale is 10,000m3/d. The scale will be expanded to 30,000m3/d up to 2015. The future total scale reaches 85,000m3/d, and the design water effluent standard adopts the first-class A standard. The sewage disposal plant adopts A2/O process, being approved by Fuyang Environmental Protection Bureau in 2006 (FHKF [2012] No.:2).

As the infrastructure of Changkou development zone is built, and the sewage collecting pipe in the Changkou market town has not been built, after built, the sewage plant is not subject to water passing running.

3. Xindeng Sewage Disposal Plant of Fuyang City

The Xindeng Sewage Disposal Plant is located at the east side of Shuangta Village and the west side of Gexi Stream, and adopts the second-stage biochemical treatment process. The phase I design scale is 10,000m3/d, and the daily average water intake amount reaches 8,000m3/d, indicating that the plant has run under the near full-load condition. The phase II project is in the preliminary period. After expanded, the total design scale is 29,000m3/d. After standard raising and modification, the first-class B standard is raised to first-class A standard, and the service scope is Xindeng Township (market town and industrial function zone), Xukou Township (market town and industrial function zone), and Yongchang Township (market town and industrial function zone).

The project was approved by Fuyang Environmental Protection Bureau in 2007 (FHKF [2007] No.: 16), and accepted by it in 2012 (FHXY [2012] No.: 5).

Figure 4.2-1 Service Scope of Xindeng Sewage Disposal Plant

Table 4.2-2 Water Inflow and Effluent Quality Conditions of Xindeng Sewage Disposal Plant, in mg/L

Month	COD		BOD5		SS		Ammonia nitrogen		Total phosphorus	
	Inflow	Effluent	Inflow	Effluent	Inflow	Effluent	Inflow	Effluent	Inflow	Effluent
2012-1	266.6	41.8	127	4.5	77	16	8.41	0.61	2.22	0.2
2012-2	211.2	43.4	95.2	4.5	52	15	9.12	0.52	1.81	0.2
2012-3	216.2	35.4	94.9	3.7	53	14	6.61	0.52	1.51	0.16
2012-4	261	36.3	107.1	3.5	64	14	7.55	0.54	0.95	0.24
2012-5	254.9	34.1	110.5	3.4	65	14	6.55	0.53	2.56	0.19
2012-6	229.2	30.7	105.2	3.4	54	11	5.84	0.54	1.56	0.23
2012-7	201.9	34.2	94.1	3.3	49	12	10.83	0.48	1.21	0.3
2012-8	265.9	43.5	92.4	4.0	66	15	9.85	0.56	1.56	0.3
2012-9	290.4	42.3	118.7	4.1	72	14	13.58	0.41	1.31	0.41
2012-10	333.6	42.5	138.3	8.6	56	10	12.87	0.42	1.45	0.41
2012-11	323.4	42.2	121.5	4.4	65	13	5.88	0.52	1.11	0.28
2012-12	342.9	45.2	135.8	4.6	78	11	7.61	0.41	1.87	0.30
2013-1	334.5	46	138.3	4.6	95	14	8.2	0.88	1.70	0.33
2013-2	340.8	47.9	138.9	4.8	94	14	12.34	2.47	2.10	0.56
2013-3	277.3	45.2	115.8	4.3	90	13	11.51	1.10	1.38	0.46
2013-4	389.6	52.1	158.1	5.4	120	16	16.47	3.03	3.10	0.47
2013-5	306.8	51.3	125.8	4.7	95	13	11.28	0.99	1.29	0.64

4. Dayuan Sewage Disposal Plant of Fuyang City

The Dayuan Sewage Disposal Plant is located at the crossing part of Dayuan Township and Chunjiang Subdistrict of Fuyang City, the design sewage treatment scale is 100,000m3/d, and the total investment is about RMB230,000,000. The Dayuan Sewage Disposal Plant belongs to the auxiliary industrial sewage plants for the Jiangnan Subdistrict papermaking enterprise gathering area, and is under the private ownership, and the service scope is northern industrial zone of market town of Dayuan and living sewage in market town, being approved by Fuyang Environmental

Protection Bureau in 2006 (FHKF [2006] No.: 273).

The Dayuan Sewage Disposal Plant was built in July 2010, the water begun to pass through the pipeline in September 2011, the plant is commissioned in October, and the water quality has met the design and environment protection drainage requirement after being detected.

At pressure, the water intake amount of Dayuan Sewage Disposal Plant is about 50,000m3/d, each enterprise drains the pretreated sewage into the sewage plant, the water quality is stable and the effluent water meets the drainage requirement of first-class B standard. As the government gradually limits the excessive development of papermaking enterprises, many small enterprises are migrated or integrated. The actual water intake amount of sewage plant is far lower than the original design capability.

5. Overview of Fuyang Sewage Disposal Plant Project

The phase I project of Fuyang Sewage Disposal Plant was built in 2001, and the treatment scale is 20,000m3/d. The phase II expansion project has been built in 2004, and the expansion scale is 30,000m3/d. Due to the continuous increase of water amount, the phase III expansion of sewage plant was implemented in 2005, and the expansion scale is 30,000m3/d.

The phase I project has been commissioned in May 2001. In July 2001, the daily treatment amount is 20,000t/d, and then the sewage plant is formally commissioned, and has passed the environment protection acceptance. The phase II project has been commissioned in June 2002, and has passed the environment protection acceptance in March 2005. The phase III project has been commissioned in January 2006, the construction of main facilities of expansion project is basically completed in July 2007, the sewage intake commissioning is carried out, and the environment protection acceptance is not completed.

According to the monitoring results of environment protection acceptance, the discharged COD, ammonia nitrogen, total phosphorus, SS, BOD, petroleum, animal and plant oil, LAS, sulfides, hexavalent chromium, total lead, total cadmium, total arsenic, and volatile phenol of the sewage disposal plant in the monitoring process meet the first-class B standard of Standard of Pollutant Discharge of Urban Sewage Disposal Plant (GB18918 -2002).

4.3 Investigation Relevant Projects of Tiantai Area Subproject

Refer to Table 4.3-1 for the relevant projects of Tiantai area subproject.

Table 4.3-1 List of Relevant Projects of Tiantai Area Subproject

Subproject Name	Relevant Project
Perfection Project of Water Supply and Drainage Facilities of the Western Area of Tiantai Basin	The sewage is drained to the Pingqiao Sewage Disposal Plant to be treated. The water supply water plants are Jietou Township Water Plant and Pingqiao Water Plant.
Perfection Project of Water Supply and Drainage Facilities of the North Central Area of Tiantai Basin	The sewage is delivered to the Tiantai Sewage Disposal Plant to be treated.
Perfection Project of Water Supply and Drainage Facilities of the Eastern Area of Tiantai Basin	The sludge and living garbage of Cangshan Sewage Disposal Plant are delivered to the Tiantai Garbage Landfill to be treated.

1. Tiantai County Sewage Disposal Plant

The Tiantai Sewage Disposal Plant, i.e. Kaifa Xinquan Water (Tiantai) Co., Ltd., is the urban sewage disposal plant which is built by the Sinapore Kaifa Group in the BOT mode. It is mainly used for containing the urban living sewage and part of industrial sewage of Tiantai County, and the recent treatment scale is 40,000m3/d, i.e.

phase I and phase II. The Zhejiang Provincial Environmental Protection Bureau has approved on 31 March, 2003 by ZHJ [2003] No.43, and the water plant has passed the environment protection completion acceptance on 5 July, 2013 by THY [2013] No.29. Wherein, the phase I project was built at the end of 2004, and was completed in 2006 to put into service, the daily urban sewage treatment amount is 20,000m3, and the sewage treatment adopts the improved Carrousel AC oxidation ditch process. The phase II project was commenced at the end of June 2009, and was completed in 2011 to put into service, the daily urban sewage treatment amount is 20,000m3, and the sewage treatment adopts the AAO process. After reaching the first-class B *standard of Standard of Pollutant Discharge of Urban Sewage Disposal Plant* (GB18918-2002), the sewage can be drained into the Shifeng Stream. The environment and sanitation management department of Tiantai County is responsible for delivering the mechanically concentrated and dewatered sludge generated by the sewage disposal plant to the garbage landfill to be filled and treated.

The daily average sewage treatment amount is 33,000m3/d in 2012, wherein the water intake amount in high water period, which is mainly caused by non-thorough rainwater and sewage diversion, seepage of underground water, etc. Refer to Table 4.3-2 for the average water inflow and effluent quality of urban sewage disposal plant in 2012.

Figure 4.3-2 Average Water Inflow and Effluent Quality of Urban Sewage Disposal Plant in 2012

	COD	pH	NH4-N	TP
Inflow Quality	329.89	7.07	24.70	3.31
Effluent Quality	43.80	6.86	6.21	0.35

2. Pingqiao Sewage Disposal Plant

The Pingqiao Township Sewage Disposal Plant of is located at the Kantou Village of Pingtiao Township of Tiantai County, and was commenced in 2010. The Taizhou Municipal Environmental Protection Bureau has approved on November 5, 2010, by THJ [2010] No.118. The phase I project of Pingqiao Sewage Disposal Plant has the daily treatment amount of 5000 tons each day, adopts the AAO process, the water drainage port of sewage plant is the Shifeng Stream, and the water effluent quality is in accordance with first-class A standard of *Standard of Pollutant Discharge of Urban Sewage Disposal Plan*t (GB18918-2002). The tail water is delivered by the tail water drainage pipe at the north highway of Shifeng Stream, to the downstream of Class III water cross section to be drained (at the north bank of 200m downstream of Liuqiao in Tiantai urban area). The length of tail water drainage pipeline of sewage disposal plant is about 18km, and the pipe diameter is DN1200. At present, the phase I project has been completed and put into commissioning. The sludge is delivered to the garbage landfill through the sludge mechanical concentration and dewatering to be filled.

At present, the auxiliary pipeline network system of Pingqiao Sewage Disposal Plant has not been completed, and part of pipeline network is in the design and construction phase.

3. Jietou Township Water Supply Plant

There is one water plant in Pingqiao Township, i.e. Jiatou Yuquan Water Plant. The water plant is located at the leg of Jiaoshan near the crossing part of Leima Stream and Yangjia Stream, the ground elevation is about 140m, and the water plant was completed in 2006. The water plant is under the private ownership.

The water plant takes water from Leima Stream, the water is lifted by the water taking pump to the water plant, and the lift of water lifting pump is 46m. The water plant adopts the integral water purifying equipment, and the effluent water flows to

the Jietou Town area. The capacity of water purifying tank in the water tank is 500m3.

The service scope of water tank is Jieyi Village, Jieer Village, Jiesan Village, Jiesi Village, Butou Village and Chaoyang Village of Jietou Township, the current water supply scale is 1,500m3/d, and the number of persons requiring water supply is 10,000.

Table 4.3.-3 Water Supply Conditions of Jietou Water Plant for 2009-2012

Item	2009	2010	2011	2012
Water Supply Capacity (10,000 tons/year)	13	12	15	21
Water Leakage (10, 000 tons/year)	3.2	3.5	4.6	5.5
Sales of Water (10,000 tons/year)	9.8	8.5	10.4	15.5

4. Pingqiao Water Plant

There is one water plant in Pingqiao Township, i.e. Pingqiao Water Plant. The water plant is located at the Daxitang Village of west part of town, the water source comes from Shifeng Stream, and the current scale is 5,000m3/d. The total land area is 10mu, the ground elevation is 70m, and the water plant was built in 2007. The water plant is under the collective ownership of Pingqiao Township.

The water plant adopts the large-diameter well to take water, and the diameter of the large-diameter well is 10m. After disinfected, the water is subject to pressurizing to supply water. There are three pumps in the pressurizing pump room (two for use and one for standby). The lift of water pump is 0.3MPa.

The diameter of water effluent main pipe of water plant is DN400, the number of persons requiring water supply is 30,000, and the current water supply amount is 5,000m3/d.

5. Tiantai County Garbage Landfill

The sludge generated by the Pingqiao Sewage Disposal Plant, Tiantai Sewage Disposal Plant and Cangshan Sewage Disposal Plant are delivered to the Tiantai County Garbage Landfill to be sanitarily filled.

The Tiantai County Garbage Landfill is located at Geshuijiang Village of Fuxi Subdistrict, the land occupation area is 73mu, the filling capacity is 961,400m3, the filled capacity is 777,000m3, and the service life is 2005~2020. The Tiantai County Municipal Environmental Protection Bureau has approved it on 11 April, 2005 by THJ [2005] No.1.

4.4 Investigation Relevant Projects of Longquan Area Subproject

Refer to Table 4.4-1 for the relevant projects of Longquan area subproject.

Table 4.4-1 List of Relevant Projects of Longquan Area Subproject

Subproject Name	Relevant Project
It involves the improvement project of urban water supply and drainage facilities of Longquan City and the improvement project of lane and alley water supply and drainage facilities.	The Nandayang Water Plant is expanded, and the water source comes from the water diversion project of Yanzhang Stream. The sewage is drained into the Xinan Sewage Disposal Plant and Xibei Sewage Disposal Plant. The living garbage and sludge are delivered to the sanitary garbage landfill of Gaotang of Longquan City to be sanitarily filled.

1. Overview of water diversion project of Yanzhang Stream

There are two cascade power stations of Yanzhang Stream basin developed. The rainwater collecting area above the dam site of Yanzhang Level-I Hydropower Station

is 53.61km2, the rainwater collecting area of Yinjin Stream, Xiaozhuang Stream and Dagui Stream is 55.34km2, the total capacity is 11,430,000m3, the installation is 2×10000kW, and the yearly power generation amount is 41,070,000kW.h. The rainwater collecting area above the second-class power station dam site of Yanzhang is 131.96km2, the capacity is 212,500m³, the installation is 2×3500kW, and the yearly average power generation amount is 14,530,000kW.h. Yanzhang Level-II Hydropower Station can offer water source for Longquan Water Plant; there is flood regulation reservoir constructed in the Level-I Hydropower Station mainly for flood control and power generation and Level-II Hydropower Station for power generation and water supply at the same time. The normal storage water level of Yanzhangxi Reservoir is 271.75m, the power generation dead water level is 268.85m, the ground elevation of Nandayang Water Plant is 225-228m, and the highest design water level of reaction tank is 230m, so the gravity water supply can be adopted, and the energy consumption is saved.

The water diversion project of Yanzhang Stream of Longquan City is located at the southwest side of urban district, and is 1-3km away from the old urban district. The water diversion project of Yanzhang Stream of Longquan City is mainly used for supplying water to Longquan City, development of planning zones and surroundings, the main water supply target is planning zone of Longquan City, the water supply scale is 100,000m3/d, and the design flow rate of water conveying building is 1.5m3/s. The water diversion source is the reservoir of Yanzhang basin power station. The tunnel water diversion and river crossing pipeline adopts the riverbed pipe embedding type. The water is diversed from the power generation water conveying tunnel of Yanzhang Level-II Hydropower Station, passes through the Zhanshantou Tunnel with the length of 2092.5m to the upper exit of left bank of Jinxi Stream, then passes trhough the Jinxi Stream crossing pipeline with the length of 598.9m to the entrance of Fenghuangshan Tunnel, and then is connected with the Fenghuangshan Tunnel with the length of 944.8m; after passing through the exit of Fenghuangshan Tunnel, it is the cross-reach pipeline with the length of 989.8m, which is connected to the water plant along the inside of floodwall at the right bank. The total length of water diversion line is 4626m, and the pipe opening laying method is adopted in tunnels. At present, it has been built to supply water. Refer to Figure 4.4-1 for the drawing of project systems.

The Nandayang Water Plant using has adopted the Yanzhang Stream water source since 2011, according to the water quality analysis of Yanzhang Stream water source, the water quality analysis of Yanzhang Stream water source can be stably maintained to the Class II to III of surface water, and the water quality requirement of urban decentralized water supply source can be met. Meanwhile, through running in the recent two years, the effluent quality of the Nandayang Water Plant using Yanzhang Stream as water source is good, and the requirement of sanitation specification of living drinking water can be fully met, so the Nandayang Water Plant using Yanzhang Stream as the main water supply source of Longquan City is feasible.

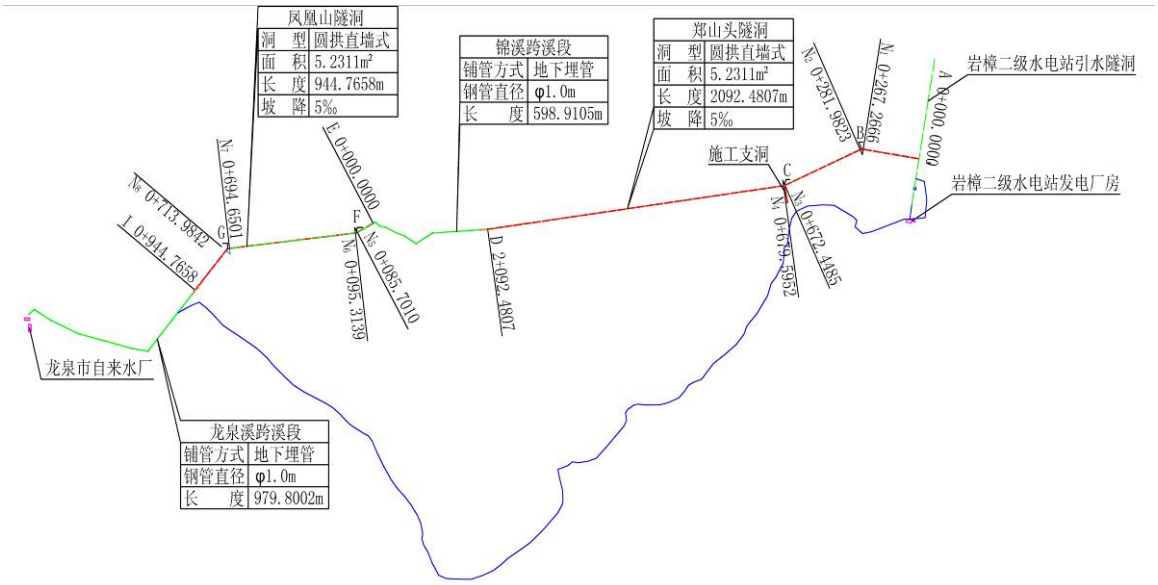


Figure 4.4-1 Plan of Water Diversion Project of Yanzhang Stream

2. Overview of sewage disposal plant

There are two urban sewage disposal plants in Longquan City, respectively Xi'nan Sewage Disposal Plant and Xibei Sewage Disposal Plant.

The Xi'nan Sewage Disposal Plant is located in the Dasha Industrial Zone, and at the south side of Xiangpi Dam on Longquan Stream. It was commenced in 2007, received water and put into service in June 2008. The total design scale of sewage disposal plant is about 10,000m3/d, the built scale is 5,000m3/d, the sewage treatment process adopts the diatomite enhanced treatment process, the water effluent quality is in accordance with the first-class B standard, and the tail water after treatment is discharged into Longquan Stream.

As the sewage collecting pipe matched with the Xi'nan Sewage Disposal Plant mainly adopts the rainwater and sewage gathering pipe, the rainwater mixing amount in rainy days is large, the water intake amount further exceeds the treatment capacity of sewage disposal plant in storm days, and then the sewage disposal plant cannot normally run in storm days. In addition, as the collected sewage is mainly the living sewage treated by the septic tank of residential district, the inflow concentration is lower.

As present, the water intake amount of the sewage disposal plant in most time is about 4,000m3/d, the water intake CODCr amount is about 40-50mg/L, the ammonia nitrogen amount is about 10-15mg/L, and the total phosphate amount is about 1-1.5mg/L. The water effluent quality is in line with the first-class B standard.

The Xi'nan Sewage Disposal Plant was built in the BT type, and will be modified into the lifting pump station in future. The existing Xinan sewage is uniformly delivered to the Xibei Sewage Disposal Plant to be treated.

The Xibei Sewage Disposal Plant is located at Shatan Village of Longyuan Subdistrict of Longquan City. It was commenced in 2009, received water and passed the engineering acceptance in 2012. The total design scale of sewage disposal plant is about 60,000m3/d, the built scale is 18,000m3/d, the sewage treatment process adopts the new-type SBR Level-II treatment process, the water effluent quality is in accordance with the first-class B standard, and the tail water after treatment is discharged into Longquan Stream.

3. Sanitary landfill of living garbage of Gaotang of Longquan City

The sanitary landfill of living garbage of Gaotang of Longquan City is located at the east part of Longquan City, Gaotang natural Village of Zengjia Village of Jianchi

Subdistrict. The landfill is built in 1996, with the total area of 148.8mu and the average daily garbage treatment amount of about 140 tons. The utilized capacity is about 30m3. At present, the modification project of sanitary landfill of living garbage of Gaotang of Longquan City is being implemented, the total investment is more than 73,919,800 yuan, the capacity of modified landfill is 1,301,000m³, and the average daily garbage treatment amount is 173.9 tons. The total service period is about 15 years (from 2012 to 2026). The project will be completed and put into service at the end of 2014. The crest elevation of main garbage dam is 323m, the dam axis is about 78m in length, and the dam crest is 4.0m in width. The horizontal anti-seepage project adopts artificial horizontal anti-seepage and single composite cushion anti-seepage system, anti-seepage material HDPE geo-textile film, and CGL bentonite composite waterproof cushion layer.

4.5 Dam Safety Investigation Related to the Project

The project construction in AnJi County and Longquan City includes the renovation and expansion on the original water plant, and the water supply of newly-built water plant. Nine reservoirs and dams are involved in the water source place, with four of them in AnJi City and Five in Longquan City. The nine reservoirs and dams, bing involved in the Dam Safety Assurance Policy OP4.37 of World Bank, can be seen Table 4.5-1 for its general conditions.

In general, the nine reservoirs and dams all have conducted dam security identification except Yanzhangxi, with Class II or Class III, and all have been conducted reinforcement and meet the requirements of the regulations. The construction quality meets the requirements of design and regulations, and possesses the conditions of re-impound. After reinforcement, the image of reservoirs improves in different degree, and the reservoirs are under normal operation according to the design being free of abnormal phenomena.

For safety management regulations and system, the project is basically perfect in regulation system. Though the implementation of regulations and systems is different for various reservoirs, they can meet the current dam safety management requirements in general.

We can deed that the nine reservoirs and dams are all under sound operation status and can be operated normally according to the design, being free from any negative influence to the project.

Table 4.5-1 Condition of Reservoirs and Dams of the Project Touching World Bank OP4.37

No.	Reservoir Name	Location	Dam Height (m)	Dam Type	Capacity ($\times 10^4 m^3$)	Affixed Project	Dam Safety Evaluation
1	Tianzigang Reservoir	AnJi City	13.75	Sloping earth dam	1801	Meixi Project/ Gaoyu Water Plant Water Source	Tianzigang Reservoir finished reinforcement in 2010 and improved image. The safety of the dam is improved significantly with sound safety management level. The reservoir can be operated normally according to the design.
2	Fenghuang Reservoir	AnJi City	41.8	Concrete gravity dam	2112	Tianhuagnping Project/ Fenghuang Water Plant Water Source	Fenghuang Reservoir is newly-built with sound image; dam design meets the regulation requirements and the construction quality meets the requirements of design and regulations. After water storage, the reservoir keeps normal operation for nearly ten years without any abnormal phenomena. Dam safety management is under sound level, and the reservoir can be operated normally according to the design.
3	Laoshikan Reservoir	AnJi City	36.9	Core earth dam	11401	Xiaofeng Project/ Xiaofeng Water Plant Water Source	Dam of Laoshikan Reservoir has finished reinforcement and has sound image after reinforcement. Management personnel being in charge of dam safety management is with multi year safety management experiences, and achieves good effect, ensuring the ten-year normal operation of the dam. Though water seepage was appeared on the both sides of the spillway gate in October 2013, the dangerous omen just appeared on partial parts and is under control, which would not influence the normal

							operation of the reservoir. The present water level of the reservoir doesn't appear abnormal phenomena after dangerous omen is controlled. And the dam can be operated normally according to the design.
4	Fushi Reservoir	AnJi City	43.2	Core earth dam	21800	Banshan Project/ Banshan Water Plant Water Source	Fushi Reservoir is under sound image, being operated normally for 30-odd years according to the design. The safety management ability and level of the reservoir dam is perfect and free from significant dangerous omen, dam deformation, or vadose abnormal phenomena. The dam is under safety operation. At present, the dam is under maintenance and renovation design, whose safety management and software and hardware design level will be further improved. The dam can be operated normally according to the design.
5	Yanzhangxi Class I	Lognquan City	53.6	Concrete arch dam	934.8	Urban Area water supply and discharge improvement project/ Nandayang water plant and water source	1) Yanzhagnxi Class I and Class II dams are operated normally for many years according to the design without any significant dangerous omen or project abnormal phenomena. 2) Yanzhagnxi Class I Dam had finished safety identification in December 2013, and buildings of the dam are all under normal operation; being indentified as Class II Dam, it shall be maintained or renovated as soon as possible and it can keep operation under controlled condition.
6	Yanzhangxi Class II	Lognquan City	8.0	Concrete gravity dam	208.2		

							Yanzhangxi Class II Power State is under operation for just 4 years and will perform safety identification on proper time afterwards. 3) at present, reservoir dam of Yanzhangxi Step Hydropower Station is with sound image without any deformation or vadose phenomena on this inspection. The analysis result of dam safety monitoring shows the dam is under sound condition, and can be operated normally according to the design. 4) Now, many dam safety inspection instrument and equipment are damaged, which is bad for dam safety management.
7	Ruiyang Class I	Lognquan City	54.5	Concrete arch dam	1066	Zhatian and Lanju Town water plant and water source	Ruiyang Class I Dam is under sound image and operates normally according to the design since putting into operation. It is free from significant dangerous omen. After reinforcement, the safety of the dam is improved. In recent years, no deformation or vadose phenomena is appeared on the dam, and the dam is under safety operation.
8	Ruiyang Class II	Lognquan City	89.35	Concrete faced rockfill dam	1795		Ruiyang Class II Dam is under sound image and operates normally according to the design since putting into operation. It is free from significant dangerous omen. After reinforcement, the safety of the dam is improved. In recent years, no deformation or vadose phenomena is appeared on the dam, and

							the dam is under safety operation.
9	Zhuyang Reservoir	Lognquan City	35.7	Concrete arch dam	315	Badu Town Zhuyang water plant and water source	Zhuyang Reservoir Dam is under sound image after reinforcement, and operates normally according to the design since putting into operation. It is free from significant dangerous omen. At present, the dame is free from any abnormal phenomena and can be operated normally according to the design. But in the site inspection, several unsafe factors are found on the site which shall be understood and eliminated by competent department and management units.

5. Evaluation of Environment Impacts and Impact Mitigation Measures

5.1 Environmental Benefit Analysis

1. Reduction of pollutant discharge amount

Up to 2020, the sewage treatment capacity of all the sub-projects add to 54,050,000 t/a, all the subprojects will reduce the discharge of COD and BOD by 12,987t/a and 5,934t/a respectively, which will greatly reduces pollutants directly discharged into natural environment and efficiently reduce the pollution.

2. Improvement of riverway water quality of important biological function area

Zhejiang is famous for water, beautiful for water and prosperous for water. Water is the source of life and the source of Zhejiang. As a coastal developed area, Zhejiang has developed its economy, but bears a huge pressure in water environment. The vast rural areas are the depth backland of cities of the whole province, and the main source of river water.

The large and medium urban drinking water of Hangzhou, Huzhou, Lishui, Taizhou, etc. in the project comes from the rural area, so the rural environment quality is improved, the rural local environment is enhanced, and the urban water source quality at the rural area is protected. The water supply and drainage facilities of AnJi area are improved to reduce the effect on the water quality of Tai lake, the sewage control of Fuyang can reduce the effect on the water quality of Hangzhou and Fuyang urban water sources, the integration of water supply and drainage facilities of Tiantai city and township can reduce the effect on the water quality of Taizhou at the downstream of Jiao River, and the integration of water supply and drainage facilities of Longquan can reduce the effect on the water source of Lishui at the downstream. The control of dispersive rural sewage in the water gathering range of drinking water source can reduce the eutrophication of the downstream reservoir, and improve the water quality of reservoir.

Through the sewage intercepting pipe incorporating and dispersive treatment, the rural environment sanitation is improved, the efficiency of the urban sewage disposal plant is improved, the amount of pollutants discharged into the riverway is reduced, the water quality of riverway is improved, and the water quality of drinking water source at the downstream area is protected.

3. Promotion of agricultural transformation

At present, comprehensive treatment on rural domestic sewage is not only the depth extension of beautiful rural construction but the topic of improving the level of beautiful rural construction.

Through the control of rural living sewage, the rural water is cleaner, the ponds become clear, the landscape of Jiangnan water towns is rebuilt, the transformation and upgrading of rural production method, living method and construction method are promoted, and a beautiful village with blue sky, clear water, green mountain, clean ground and fresh air is accelerated to build.

4. Reduction of water supply leakage amount

By newly building or expanding the water supply plant and modifying or upgrading the water supply pipeline network, the safe supply of tap water is enhanced, the water supply leakage amount is reduced, and the water supply safety and guarantee rate are provided. Up to 2020,,the water supply amount of all the subprojects will add to 24,690,000 t/a, which will reduce the water leak amount by 3,070,000t/a.

5.2 Evaluation of Environment Impacts and Mitigation Measures during Construction Period

5.2.1 Assessment on environment impacts in construction period

5.2.1.1 Environmental impact analysis during the construction period

1. Analysis on impact on water supply by living sewage of construction personnel

As the construction scale is large, and is relatively dispersive, the displacement amount of living sewage of construction personnel in each construction clamp is not high. As the living facilities of construction personnel are decentralized, if the living sewage during construction is directly drained, the neighboring water body is easily polluted. Therefore, the living sewage of construction personnel cannot be freely drained, and cannot be used for irrigating farmlands until reaching the standard. It is suggested to borrow existing living facilities from local villagers. The impact on the environment by living sewage of construction personnel is little.

2. Analysis of impact on water environment by construction sewage

The construction wastewater mainly includes rainwater and sewage (mud water) generated at the construction site, and the main pollutants include SS, COD, NH3-N, oil, etc. The rainwater and sewage flows into the water body along with the surface runoff, so the water suspensions, oil and oxygen-consuming matters are increased, thus affecting the water quality of surface water.

The mud water generated at the construction site shall be settled by the settlement tank, the upper clean liquid is discharged, and the sludge is stacked and transported out for filling. Meanwhile, the construction materials, and mechanical leaking oils may directly enter the water body, so the water suspensions, oil, etc. are increased, thus affecting the water quality of surface water. Therefore, the civilized construction shall be implemented, and the rainwater, sewage, and construction site sludge shall be collected and settled and cannot be discharged until reaching the standard.

Table 5.1-1 Reduced Pollutant Amount and Reduced Water Supply Leakage Amount for Each Subproject (2020)

No.	Subproject Name	2020 Service Population (10,000 people)	Newly Increased Number of Connected Households (household)	Annual Increase Water Supply Amount (10, 000 tons/a)	Annual Water Supply Reduction Leakage Amount (10,000tons/a)	Annual Increase of Sewage Collection Treatment Amount (10,000tons /a)	Annual Increase of COD Reduction Amount (t/a)	Annual Increase of BOD Reduction Amount (t/a)
A1	A1: Rural Joint Perfection Project of Water Supply and Drainage Facilities of Tianzihu Area	3.80	1117		50	63	126	57
A2	A2: Rural Joint Perfection Project of Water Supply and Drainage Facilities of Meixi Area	10.65	1580	760	50	405	811	365
A3	A3: Rural Joint Perfection Project of Water Supply and Drainage Facilities of Tianhuangping Area	4.70	1922			193	386	174
A4	A4: Rural Joint Perfection Project of Water Supply and Drainage Facilities of Banshan Area	7.20	1412	584		137	273	123
A5	A5: Rural Joint Perfection Project of Water Supply and Drainage Facilities of Xiaofeng Area	10.80	3143		93	187	374	168
A6	A6: Expansion Project of AnJi Urban Sewage Disposal Plant	13.50	530			284	569	256
A7	A7: The First Batch of Dispersive Rural Sewage Treatment System of AnJi	1.99	4275			47	70	33
A8	A8: The Second Batch of Dispersive Rural Sewage Treatment System of AnJi	1.13	3232			35	53	25
	Conclusion	**54**	**17209.70**	**1344.42**	**192.53**	**1351.92**	**2662.68**	**1200.26**
F1	F1: The Fuyang Sewage Treatment Project Phase-IV	39.80	–	–	–	1825	6023	2920
F2	F2: Joint Renovation Project of Water Supply and Discharge Network for Xindeng Town in Fuyang City	6.40	4020	472	61	276	552	248
F3	F3: Sewage Treatment Project of Longyang of Fuyang City	1.36	1050	–	–	40	81	36
F4	F4: Joint Renovation Project of Water Supply and Discharge Network for Dayuan Town in Fuyang City	2.75	1350	88	30	99	148	79

No.	Subproject Name	2020 Service Population (10,000 people)	Newly Increased Number of Connected Households (household)	Annual Increase Water Supply Amount (10, 000 tons/a)	Annual Water Supply Reduction Leakage Amount (10,000tons/a)	Annual Increase of Sewage Collection Treatment Amount (10,000tons /a)	Annual Increase of COD Reduction Amount (t/a)	Annual Increase of BOD Reduction Amount (t/a)
F5	F5: Joint Renovation Project of Water Supply and Discharge Network for Shichangkou Town in Fuyang City	2.01	660	74	15	82	164	74
F6	F6: The First Batch of Rural Sewage Intercepting Pipe Project of Fuyang	5.12	5780	–	–	7	15	7
F7	F7: The Second Batch of Rural Sewage Intercepting Pipe Project of Fuyang	3.77	6578			117	234	105
F8	F8: The First Batch of Dispersive Rural Sewage Treatment Project of Fuyang	0.70	1290	–	–	16	23	11
F9	F9: The Second Batch of Dispersive Rural Sewage Treatment Project of Fuyang	1.37	2789			44	66	31
	Conclusion	**63**	**23517.0**	**634.3**	**104.9**	**2505.3**	**7304.1**	**3510.5**
T1	T1: Perfection Project of Water Supply and Drainage System for Rural Areas in the North Central Area of Tiantai Basin	12.30	12000	–	–	475	902	380
T2	T2: Perfection Project of Water Supply and Drainage System for Rural Area in Eastern Section of Tiantai Basin	5.20	14800	–	–	237	451	190
T3	T2: Perfection project of water supply and drainage system for villages in western section of Tiantai Basin	6.00	16100	171	34	153	291	123
T4	T4: The First Batch of Dispersive Rural Sewage Treatment System Perfection Project of Tiantai County	1.70	5300	29	1	44	66	31
T5	T5: The Second Batch of Dispersive Rural Sewage Treatment System Perfection Project of Tiantai County	4.17	10700	66	13	71	107	50
	Conclusion	**29**	**58900**	**266**	**47.58**	**979.85**	**1815.795**	**772.4**
L1	L1: Perfection Project of Water Supply and	11.00		240		156	343	140

No.	Subproject Name	2020 Service Population (10,000 people)	Newly Increased Number of Connected Households (household)	Annual Increase Water Supply Amount (10, 000 tons/a)	Annual Water Supply Reduction Leakage Amount (10,000tons/a)	Annual Increase of Sewage Collection Treatment Amount (10,000tons /a)	Annual Increase of COD Reduction Amount (t/a)	Annual Increase of BOD Reduction Amount (t/a)
	Drainage Facilities for Urban Areas in Longquan							
L2	L2: Rural Joint Improvement Project of Water Supply and Drainage Fundamental Facilities of Zhatian Town	0.58		73		37	70	30
L3	L3: Rural Joint Improvement Project of Water Supply and Drainage Fundamental Facilities of Xiaomei Town	0.78		73		20	38	16
L4	L1: Rural Joint Improvement Project of Water Supply and Drainage Fundamental Facilities of Lanju Township	0.73		73		31	58	24
L5	L3: Promotion Project of Rural Joint Water Supply and Drainage Facilities of Anren Town	1.57		97	19	66	125	53
L6	L4: Promotion Project of Rural Joint Water Supply and Drainage Facilities of Badu Town	1.34		97	15	47	89	37
L7	L5: The First Batch of Dispersive Rural Sewage Treatment Project of Longquan	0.67	1870	73		47	70	33
L8	L6: The Second Batch of Rural Sewage System Demonstration Project	4.79	8281	146		164	245	115
L9	L2: Lanes and Alleys Project in Longquan	5.85				189	378	151
	Conclusion	**21**	**10150.40**	**872.67**	**34.38**	**755.26**	**1416.64**	**598.79**
Total		168	**109777.1**	**3117.3**	**379.4**	**5592.3**	**13199.2**	**6082.0**

5.2.2 Atmospheric environment impact analysis during the construction period

During construction, the air pollutants mainly come from the lifting dust of construction vehicles in driving, lifting dust of stacking yards, stirring lifting dust, and tail-gas of vehicles.

At the construction site, the road lifting dust of construction vehicles in driving exceed the Class II *standard of Ambient Air Quality Standard* (GB3095-2012) within the range of 80-120m in the downwind direction; the road lifting dust for transporting spoil exceeds the Class II standard of GB3095-2012 within the range of 30-60m in the downwind direction; the lifting dust of spoil stacking yard exceeds the Class-II standard of GB3095-2012 within the range of 100-150m in the downwind direction. According to the comparison and analysis of lifting dust monitoring data of construction cement and soil stirring site, at the adjacent area of cement and soil stirring station, the concentration in TSP hour at the 5m location in the downwind direction is 8.10mg/m³; the concentration in TSP hour at the 100m location in the downwind direction is 1.65mg/m³; and the 150m location has basically meet the daily average concentration of Class-II standard of GB3095-1996. Therefore, the construction lifting dust may cause certain effect on the surrounding environment of construction site boundary and construction personnel. By adopting the necessary measures, the effect on the construction lifting dust is minimized. As the effect is temporary, the effect is minimized after construction is finished.

The tail-gas generated by the construction machinery and construction vehicles during operation mainly includes NO, CO and hydrocarbons. As the discharge intensity of pollutants is little, the terrain is flat, which is favorable for the thinning and diffusion of waste gas, and the effect on the surrounding atmospheric environment is not obvious.

5.2.3 Noise impact analysis during the construction period

The noise sources of construction site are mainly various types of construction machinery, each construction phase has a large amount of machinery equipment to run on site, and the level of noise source of single equipment is 76 dB(A) to 110 dB(A). Since the construction equipment cannot be protected, the attenuation of the construction equipment along the distance during open air construction is as shown in Table 5.2-1.

During construction, the noise of construction machinery is the main noise source. Without considering the effects of houses, trees, air, etc., the maximum effect sound level can reach 70 dB (A) at the location 100m away from the construction site boundary, and reach 56 dB (A) at the location 100m away from the construction site boundary, which basically meets the requirement of day and night noise value of the building construction site boundary.

As one part of sewage treatment facility is near the noise sensitive target, certain effect on the surrounding noise environment by the construction noise is caused. To minimize the impact of noise on the surrounding noise environment during construction, the management shall be enhanced, and the noise emission of construction site boundary is ensured to meet the requirements of *Noise Emission Limit of Building Construction Site Boundary Environment* (GB12523-2011).

Table 5.2-1 Noise Attenuation of Construction Equipment, in dB(A)

Source of Noise	Noise	Noise Value at Different Distances Away from Noise Source

Name	Intensity	20m	40m	60m	80m	100m	200m	300m	500m
Air Compressor	110	84	78	74	72	70	64	60	56
Crusher	97	71	65	61	59	57	51	47	43
Excavator	83	57	51	47	45	43	37	-	-
Bulldozer	85	59	53	49	47	45	39	-	-
Loader	85	59	53	49	47	45	39	-	-
Lift	72	46	40	36	-	-	-	-	-
Winch	97	71	65	61	59	57	51	47	43
Motor Lorry	83	57	51	47	45	43	37	-	-
Crane	76	50	44	40	38	36	-	-	-
Electric Saw	90	64	58	54	52	50	44	40	36
Welding Machine	78	52	46	42	40	38	-	-	-
Grafter	80	54	48	44	42	40	34	-	-
Road Roller	84	58	52	48	46	44	38	-	-
Pile Hammer	110	84	78	74	72	70	64	60	56
Damping Rod	105	79	73	69	67	65	59	55	51
Concrete Pump	85	59	53	49	47	45	39	-	-

5.2.4 Solid waste impact analysis during the construction period

1. Analysis on environment impacts of building garbage and living garbage

The construction garbage are the construction wastes, including waste reinforced bars, package bags, building leftovers, waste bricks, etc. If the construction garbage cannot be timely treated, the urban landscape is affected, and the lifting dust would be generated under the conditions of wind and dry weather. The building garbage of the to-be-built project are common solid wastes, which do not contain harmful and toxic elements, and shall be recycled or sent to the landfill to be sanitarily backfilled and treated.

If the living garbage during construction cannot be timely treated, the mosquitoes, smelly odor and propagation diseases are generated under the condition of proper air temperature, and the adverse effect on the surrounding environment is caused. Therefore, domestic garbage shall be timely transported to designated locations as required by the sanitation department for treatment, to avoid polluting ambient environment.

2. Environment impact analysis on engineering spoil

The engineering spoil is generated by the incompletely backfilled and excavated soil in the construction process. As the constructing spots are disperse, the disposing methods for the generated spoil are different. In general, the spoil is used in the filling of nearby road or the construction of surrounding road and towns. Centralized waste slag plant isn’t set and the project has little influence on the surrounding environments.

Table 5.2-2 Earthwork Conditions of Each Subproject (Unit: 10,000 m^3)

No.	Subproject	Excavation	Filling	Spoil	Disposal of Spoil
1	Subproject of AnJi district	198.88	170.71	28.28	
	Including: AnJi Meixi, Tianzihu District			6.94	Transport the spoil to Tainyu New Village of Tianzihu and comprehensively use it in the foundation filling of the placement house project.
	AnJi Tianhuangping District			5.90	Transport the spoil to Yinkeng Village in Tianhuangping Town and comprehensively use it in the roadbed filling of highway rebuild project.
	AnJi Banshan District			5.25	The spoil will be comprehensively used in the foundation filling of roadbed construction in periphery road of Zhejiang University of Science & Technology in Science and Education District.
	AnJi Xiaofeng District			7.86	The spoil will be comprehensively used in the foundation filling of roadbed treatment in the highway reconstruction in northwest.
	Central urban network project in AnJi			2.33	The spoil will be transported to the Dipu Economic Development District being comprehensively used in t he site formation and road foundation filling in the District.
2	The First Batch of Dispersive Rural Sewage Treatment System Demonstration Project of Fuyang City	10.92	5.68	5.24	The spoil will be used for the filling of surrounding roads.
3	The First Batch of Rural Domestic Sewage Intercepting Pipe Demonstration Project of Fuyang City	32.40	24.30	8.10	The spoil will be used for the filling of surrounding roads.
4	Rural Joint Perfection Project of Water Supply and Drainage Facilities of Changkou Town in Fuyang City	13.43	10.24	3.19	The spoil will be used for the filling of surrounding roads.
5	Rural Joint Perfection Project of Water Supply and Drainage Facilities of Xindeng Town in Fuyang City	34.15	20.22	13.93	The spoil will be used for the filling of surrounding roads.
6	Rural Joint Perfection Project of Water Supply and Drainage Facilities of Dayuan	17.58	14.07	3.51	The spoil will be used for the filling of surrounding roads.

	Town in Fuyang City				
7	Fuyang Sewage Project Phase-IV	10.95	7.43	4.32	The spoil will be used for the filling of surrounding Juli Road, extension of Jincheng Road and Chunqiu North Road.
8	Sewage Treatment Project in Longyang of Fuyang	6.80	4.29	2.51	The spoil will be used for the filling of surrounding roads.

5.2.5 Analysis of traffic effects during construction period

The project includes the modification of market town district pipeline networks of four counties and cities, and the pipeline networks are generally laid along the existing road. When the roads are excavated during construction, the soil will stack, the traffic of construction site will be temporarily hindered and affected, and the vehicle passing and the traveling of neighboring residents are affected. As long as the construction unit does the maintenance and management of construction site, arrange the corresponding traffic signs and guide identifications, and make posts in advance, the temporary traffic effects are not considerable.

5.2.6 Mitigation measures for environment impacts during construction period

1. Prevention and control measures for water pollution

(1) Domestic sewage produced by construction staff shall be used for farmland irrigation or mountain forest greening when such materials satisfy certain standards upon processing, rather than randomly discharging. It is suggested to borrow existing living facilities from local villagers. The living sewage of the construction site with the pipe incorporating condition is pretreated and then is incorporated into the pipe.

(2) Muddy water from the site shall firstly be collected into settling ponds for sedimentation, to discharge the supernatant liquor, while muds left may be delivered externally for landfilling upon desiccation; or may be used as filler of the project in association with practical road greening.

(3) Storm sewage and muddy water shall be collected for sedimentation before their discharging satisfying specified standards.

2. Prevention and control measures of water and soil loss

(1) The excavation and engineering shall avoid the rainy season.

(2) Upon construction completion, temporary lands acquired shall be cleaned off and renovated, to dismantle all temporary buildings, sweep the ground, re-loosen the close-grained soils that are compacted, earth up and level up the depressions, perform greening works and lower water and soil loss to the minimum.

(3) Earthworks on the construction site shall be reasonably piled, to keep a certain distance from rivers, avoid their flowing into rivers and decreases the effects of water and soil loss on nearby rivers; around the filed for sand and stone materials shall yard straw bags to ward off sands and simple ditches shall be excavated around to lead off ponding on the site.

3. Prevention and control measures for air pollution

(1) The civilized construction shall be performed, the dust inhibiting measures of spraying water or covering yard shall be adopted at the temporary stacking part of sandstone under the conditions of easy dust lifting, such as dry weather and wind, the canvas is covered on the carriage of the automobile for carrying crushed material (maintaining vehicle sealing type transportation), the water is sprayed to the transportation line with soil pavement, and the loading or unloading of materials under the wind condition shall be minimized.

(2) The construction unit shall timely plan and treat the spoil as scheduled, the overloading is prohibited in the transportation process, the measures are adopted to avoid the soil of soil loading vehicle falling, the sludge on the wheels shall be flushed and cleaned by high pressure before the vehicle drives, and the spoil covering the road and the effect on environment cleanness are avoided.

(3) During site selection, the temporary and scattered cement mixing site shall be away from the residential district.

(4) During construction, the operation site shall adopt the barriers and fences to reduce the diffusing of lifting dust.

(5) On the construction site shall have specially assigned persons to regularly water the ground, so as to reduce the amount of raise dust, with the number for watering decided based on practical weather conditions, but generally 1-2 times per day. Should it is windy or dry; it is allowed to suitably add the times of watering.

(6) The canvas is covered on the transportation building material and building garbage vehicle, so as to reduce scattering. Meanwhile, the tires shall be flushed and cleaned by water when the vehicle enters and exits the land, and loads and unloads.

(7) The special persons shall be arranged on the construction site, to dispose, clean and stack the spoil, building garbage and building material, and the canvas is covered on the stacking site, or the water is sprayed, so as to avoid the secondary lifting dust.

3. Prevention and control measures for noise pollution

(1) The construction management is enhanced, the construction operation time is reasonably arranged, and the high-noise construction operation at night is prohibited. The layout is reasonable, and the shelters are arranged around high-noise equipment.

(2) The low-noise equipment and low-noise construction method are minimized, the advanced construction process and low-noise equipment are adopted, and the impact of noise pollution is fundamentally reduced.

(3) The management on the noise pollution source at construction site is enhanced, the metal material is lightly lifted and placed during loading and unloading, and the rough operation and artificial noise pollution are avoided.

4. Prevention and control measures for solid waste pollution

(1) Building rubbish shall be recycled or disposed of through sanitary landfills.

(2) Domestic garbage shall be timely transported to designated locations as required by the sanitation department for treatment, to avoid polluting ambient environment.

(3) Since the construction sites are disperse and engineering spoils are to be collectively packed into the waste disposal areas on each site, which, however, shall be processed with ecological afforestation to lower water and soil loss.

5. Mitigation measures for social impacts

(1) As the occupation land directly affects the grain yield of contracting farmer, it’s suggested that the impact on the tillage contracting farmer is reduced according to the relevant policies for compensation of occupation land of governments at all levels.

(2) According to the national land management method and the relevant laws, regulatiosn and policies of demolition and settlement compensation regulations, an order and complete land demolition and compensation settlement plan, and a reasonable land demolition and compensation settlement scheme are made, so as to realize unified arrangement, sufficient coordination, enough compensation, proper arrangement and no risks, and ensure the contentment of affected people, stable production of affected governmental organizations and enterprises, and no reduction of original living level of migrants. Various types of compensation amounts shall be fully paid to the demolition families or organizations, and the relevant organizations

shall not embezzle and detain the compensation amounts.

(3) During construction, the construction of existing roads would be occupied, and the traffic of existing roads is blocked, so the traffic management shall be enhanced, the vehicle transportation in the traffic peak period is stopped or reduced, so as to reduce the crowing of vehicles.

(4) If the interruption of electricity, communications, tap water, etc. may occur during construction, the coordination with relevant departments shall be made, and the affected people are informed to make preparations in advance.

6. Mitigation measures for ecological impacts

(1) Additionally install necessary temporary rainwater heads based on requirements, compact exposed grounds and try best to mitigate the flushing of rainwater to soils and lower water and soil loss.

(2) Timely cleaning or back-filling of spoil and construction waste.

(3) Upon construction completion, roads shall be hardened and open spaces greened in time, to recover and rehabilitate the vegetation.

(4) In order to reduce ecological impact on temporary construction land, it is recommended to conduct green recovery to the temporarily occupied lands.

5.3 Environment Impact Analysis and Mitigation Measures During Operating Period

5.3.1 Atmospheric environmental impact assessment and mitigation measures

See the Attached Table 5.3-1 for the summary sheet of atmospheric environmental impact assessment and mitigation measures for each subproject.

The atmospheric environmental impact during project running period mainly consists of stink waste gas emitted in sewage treatment process in all sewage disposal plants (stations), which is mostly from some reducing toxic and harmful gaseous substances produced in organic compound degradation process, and with NH3 and H2S as main ingredients, is emitted into the ambient air through hydration, aeration or self-volatilization.

NH3 and H2S are the key pollutants discharged by Meixi Sewage Disposal Plant of AnJi County, AnJi Urban Sewage Disposal Plant, the phase-IV project of Fuyang Sewage Disposal Plant, Fuyang Longyang Sewage Disposal Plant, the sewage disposal plant in Anren Township of Longquan City, the sewage disposal plant in Badu Township of Longquan City, the sewage disposal plant in Chatian Township of Longquan City, the sewage disposal plant in Lanju Township of Longquan City, the sewage disposal plant in Xiaomei Township of Longquan City and Tiantai Cangshan Sewage Disposal Plant upon calculation and prediction, and the maximum ground concentration of NH_3 and H_2S upon superposition with the background value conforms to the maximum allowable concentration of hazardous substances in ambient air of the residential areas as required in Hygienic *Standards for the Design of Industrial Enterprises* (TJ36-79). The NH_3 and H_2S momentary concentrations at sensitive spots in villages near the sewage disposal plants can also reach the standards, which have less impact on the surrounding environment.

5.3.2 Surface water environmental impact assessment and mitigation measures

See the Attached Table 5.3-2 and Attached Table 5.3-3 for the surface water environmental impact assessment and mitigation measures of each subproject.

1. Analysis on the environmental impact on Fuchun River from sewage discharge in

Fuyang Sewage Disposal Plant Phase-IV Project

The sewage treatment scale of Fuyang Sewage Disposal Plant Phase-IV Project increased by 60,000 m³/d, and upgrading and reconstruction by 80,000 m³/d, being discharged into the Qiantang River after the exit water standard reaching to the first-class A standard in Pollutants *Discharge Standards for Urban Sewage Disposal Plants* (GB18918-2002).

(1) Water-quality prediction model

The calculation model adopts the flat 2-D MIKE 21FM Model without structured grid newly developed by the Danish Hydraulic Institute. The water flow model included a continuity equation and two momentum equations:

The continuity equation is

$$\frac{\partial h}{\partial t}+\frac{\partial hu}{\partial x}+\frac{\partial hv}{\partial y}=S \quad \text{.....}$$

The momentum equation is

$$\frac{\partial hu}{\partial t}+\frac{\partial hu^2}{\partial x}+\frac{\partial huv}{\partial y}=fvh-gh\frac{\partial \eta}{\partial x}-\frac{h}{\rho_0}\frac{\partial p_a}{\partial x}-\frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial x}+\frac{\tau_{sx}}{\rho_0}-\frac{\tau_{bx}}{\rho_0}$$
$$-\frac{1}{\rho_0}\left(\frac{\partial s_{xx}}{\partial x}+\frac{\partial s_{xy}}{\partial y}\right)+\frac{\partial}{\partial x}(hT_{xx})+\frac{\partial}{\partial y}(hT_{xy})+u_sS \quad \text{.....}$$

$$\frac{\partial hv}{\partial t}+\frac{\partial huv}{\partial x}+\frac{\partial hv^2}{\partial y}=-fuh-gh\frac{\partial \eta}{\partial y}-\frac{h}{\rho_0}\frac{\partial p_a}{\partial y}-\frac{gh^2}{2\rho_0}\frac{\partial \rho}{\partial y}+\frac{\tau_{sy}}{\rho_0}-\frac{\tau_{by}}{\rho_0}$$
$$-\frac{1}{\rho_0}\left(\frac{\partial s_{yx}}{\partial x}+\frac{\partial s_{yy}}{\partial y}\right)+\frac{\partial}{\partial x}(hT_{xy})+\frac{\partial}{\partial y}(hT_{yy})+v_sS \quad \text{.....}$$

Wherein: h refers to the water level, namely, the distance from water level to a certain datum plane;

t refers to time;

u and v respectively refer to the flow velocity components in x and y directions;

g refers to gravitational acceleration;

f refers to the Coriolis Force parameter;

ρ refers to the water density;

ρ_0 refers to the reference density of water;

S_{xx}, S_{xy}, S_{yy} refers to wave radiation stress component;

P_a refers to atmospheric pressure;

τ_{sx} τ_{sy} refers to the wind stress component;

τ_{bx} τ_{by} refers to the bottom friction stress component;

T_{xx} T_{xy} T_{yy} refers to the component in viscosity term;

S refers to the source sink term.

The water-quality model includes a convection diffusion equation:

(3-4)

$$\frac{\partial C}{\partial t}+\frac{\partial uC}{\partial x}+\frac{\partial vC}{\partial y}=\frac{1}{H}\left[\frac{\partial}{\partial x}\left(D_x\frac{\partial}{\partial x}\right)+\frac{\partial}{\partial y}\left(D_y\frac{\partial}{\partial y}\right)\right]C-kC+C_sS \quad (3\text{-}4)$$

Wherein: C refers to pollutant concentration;

Cs refers to source term concentration;

k_p refers to degradation directions;

D_x refer to the diffusion coefficients in x and y directions;

(2) Generalization of calculation domain

The calculation range: the upper boundary is from the place 7km under the Zhaixi Bridge and the lower boundary is from the water gate. Meanwhile the impact of tributary inflows has also been taken into consideration in the model, and the reach boundary of the Puyang River is from Linpu Town. The whole model sets up 8096 calculating units in total, with the step-size of the smallest grid being 25m. The corresponding time step-size is 15s. See the Attached Table 5-1 for details.

(3) Calculating scheme arrangement and working condition

Scheme A (A01): Under the situation of not considering environmental background and other adjacent pollution sources, separately calculate the impact on water body from the current 80,000t/d discharge scale in different working conditions to explain the influencing scale on water environment under the current project situation;

Scheme B (B01~03): Under the situation of not considering environmental background and other adjacent pollution sources, separately calculate the impact on water body from the current 140,000t/d discharge scale in different working conditions to explain the influencing scale on water environment under the current project situation;

Scheme C: Under the situation of not considering environmental background but overlaying other adjacent pollution sources, calculate the impact on water body from the current 140,000t/d discharge scale in different working conditions to explain the interactional relationship between the project and the adjacent similar pollution source and the portion of impact on water occupied by the project;

Scheme D: Under the situation of overlaying the environmental background and other adjacent pollution sources, calculate the impact on water body from the current 140,000t/d discharge scale in normal discharging working conditions to explain the impact on water-quality reaching standards in this functional area after the project starts and size of the formed exceeding pollution zone. Since both the nitrogen and phosphorous in the water area where the project locates exceed the standards, only the COD_{Mn} index needs to be considered in the scheme calculation. According to the measured data in the almost 3 years at the water-quality stations at Zhaixi Bridge and Water Gate, the annual average concentration of the COD_{Mn} at Zhaixi Station is 2.8mg/L, the average concentration during the dry season is 3.0mg/L, and for that at the Water Gate Station and that in dry season are respectively 3.50mg/L and 3.80mg/L.

Table 5.3-1 Summary of Calculation Scheme Arrangement

Scheme No.	Sewage	Pollutant Discharge	Scheme	Remarks

	Amount (104t/d)	Concentration (mg/L)			Category	
		CODCr	NH3-N	TP		
A01 (Normal Discharge)	8	60	8	1	Increment	Separate Impact Calculation
B01 (Normal Discharge)	14	50	5	0.5	Increment	Separate Impact Calculation
B02 (Abnormal Discharge)	14	60	8	1	Increment	
B03 (Accidental Discharge)	14	380	35	5	Increment	
C01 (Normal Discharge)	14	50	5	0.5	Superposition	Overlaying the Surrounding Pollution Sources except the Background
D01 (Normal Discharge)	14	50	/	/	Superposition	Overlaying the Surrounding Pollution Sources and the Background

Note: CODCr/CODMn=2.5.

Table 5.3-2 Schedule fo Model Calculation of Main Overlaying Pollution Sources in Upstream and Downstream in Stream Segment

Serial No.	Name	Water Quantity (ten thousand t/d)	Pollutant (mg/L)		
			CODCr	NH3-N	TP
1	Chunnan Sewage Disposal Plant	14.79	52	2.7	0.10
2	Yongtai Sewage Disposal Plant	1.20	63	0.5	0.07
3	Bayi Sewage Disposal Plant	5.44	49	4.0	0.38
4	Lingqiao Sewage Disposal Plant	8.52	49	3.3	0.17
5	Dayuan Sewage Disposal Plant	5.15	53	1.6	0.16

4. Prediction results

(1) Separate increment impact of the discharge outlet of Fuyang Phase-IV

A. The “contribution value” of COD_{Mn}

During normal discharge, the envelope area of the maximum COD_{Mn} spring tide increment >1mg/L is 0.034km2, the maximum COD_{Mn} concentration increment in source region is 1.83mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.26mg/L; the maximum average value of the COD_{Mn} spring tide increment in source region is 0.97mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.21mg/L. The envelope area of the maximum COD_{Mn} neap tide increment >1mg/L is 0.034km², area >2mg/L appear locally with the area being 0.053km2, the maximum increment in source region is 3.16mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.24mg/L; the maximum average value of the COD_{Mn} neap tide increment in source region is 1.69mg/L, and the contribution value to the Class-II surface water in the downstream is 0.19mg/L. This shows that the envelope area of neap tide is larger than that of spring tide and so is the maximum, however the contribution values to the Class-II surface water functional area boundary in the

downstream respectively for neap tide and spring tide are nearly the same, with that for neap tide being slightly smaller, which is because in spring tide, the tidal power is strong and the transporting speed of pollutants is fast. The sewage discharge in Fuyang has little impact on the Class-II surface water functional area boundary in the upstream, with the COD_{Mn} increment being less than 0.01mg/L. It is generally seen that the sewage discharge during neap tide has more impact on water environment.

During abnormal discharge, the envelope area of the maximum COD_{Mn} spring tide increment >1mg/L is 0.067km2, the maximum value in source region is 2.20mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.31mg/L; the envelope area of the average value of COD_{Mn} spring tide increment >1mg/L is 0.004km2, the maximum value in source region is 1.16mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.25mg/L. The envelope area of the maximum COD_{Mn} neap tide increment >1mg/L is 0.505km2, the envelope area of the increment >2mg/L is 0.082km2, the maximum value in source region is 3.79mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.29mg/L; the envelope area of the average value of the COD_{Mn} neap tide increment is 0.045m2, the maximum value in source region is 2.02mg/L, and the contribution value to the Class-II surface water in the downstream is 0.23mg/L.

During accidental discharge, the envelope area of the maximum COD_{Mn} spring tide increment >10mg/L is 0.015km2, the envelope area of the maximum COD_{Mn} spring tide increment >5mg/L is 0.193km2, the maximum value in source region is 13.93mg/L and the contribution value to the Class-II surface water functional area boundary in the downstream is 1.96mg/L; the envelope area of the average value of COD_{Mn} spring tide increment >5mg/L is 0.015km2, the maximum value in source region is 7.33mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 1.60mg/L. The envelope area of the maximum COD_{Mn} neap tide increment >10mg/L is 0.167km2, the envelope area of the increment >5mg/L is 0.680km2, the maximum value in source region is 24.01mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 1.84mg/L; the envelope area of the average value of the COD_{Mn} neap tide increment >10mg/L is 0.007km2, the envelope area of the increment >5mg/L is 0.253km2, the maximum value in source region is 12.81mg/L, and the contribution value to the Class-II surface water in the downstream is 1.47mg/L.

B. The “contribution value” of NH_3-N

During normal discharge, the maximum NH_3-N spring tide increment in source region is 0.46mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.06mg/L. The isoline envelope area of the maximum NH3-N neap tide increment >0.5mg/L is 0.049km2, the maximum value in source region is 0.79mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.06mg/L.

During abnormal discharge, the envelope area of the maximum NH_3-N spring tide increment >0.5mg/L is 0.015km2, the maximum value in source region is 0.73mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.10mg/L. The isoline envelope area of the maximum NH_3-N neap tide increment >0.5mg/L is 0.189km2, area >1mg/L appears to a limited extent with

its envelope area being 0.019km2, the maximum value in source region is 1.26mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.10mg/L.

During accidental discharge, the envelope area of the maximum NH_3-N spring tide increment >1.5mg/L is 0.070km2, the maximum value in source region is 3.21mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.45mg/L. The isoline envelope area of the maximum NH_3-N neap tide increment >1.5mg/L is 0.462km2, the envelope area of increment >3mg/L is 0.074km2, the maximum value in source region is 5.53mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.42mg/L.

C. The "contribution value" of TP

During normal discharge, the maximum TP spring tide increment in source region is 0.05mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.006mg/L. The isoline envelope area of the maximum TP neap tide increment >0.05mg/L is 0.053km2, the maximum value in source region is 0.08mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.006mg/L.

During abnormal discharge, the envelope area of the maximum TP spring tide increment >0.05mg/L is 0.038km2, the maximum value in source region is 0.09mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.013mg/L. The isoline envelope area of the maximum TP neap tide increment >0.05mg/L is 0.317km2, area >0.1mg/L appears to a limited extent with its envelope area being 0.049km2, the maximum value in source region is 0.16mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.012mg/L.

During accidental discharge, the envelope area of the maximum TP spring tide increment >0.2mg/L is 0.085km2, the envelope area of increment >0.4mg/L is 0.085km2, the maximum value in source region is 0.46mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.065mg/L. The isoline envelope area of the maximum TP neap tide increment >0.2mg/L is 0.526km2, the envelope area of increment >0.4mg/L is 0.097km2, the maximum value in source region is 0.79mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.060mg/L.

This shows that during normal sewage discharge of 140,000t/d in Fuyang Phase-IV Project and seen from the indicators of CODMn、CODMn、TP, it has certain impact on the water environment in the water body where it exists.

(2) The increment impact on overlaying other pollution sources

It can be seen from the COD_{Mn} increment area under the two schemes of B01 and C01 that: during normal discharge at the discharge outlet in Fuyang Phase-IV Project, no pollution area more than 2mg/L appears when the maximum COD_{Mn} spring tide increment is separately impacted, and area above 2mg/L of 0.053km2 appears locally in the water body near sewage discharge outlet for the maximum neap tide increment; while after overlaying other pollutants, statistics suggest that the envelope area of the maximum COD_{Mn} spring tide increment >2mg/L in stream segment reaches to 0.011km2, and the envelope area of the maximum neap tide increment >2mg/L is

0.278km2. The pollution area in the north-branch water area of Xinsha Island has not been increased obviously, however large huge tracts of high-concentrated pollution area has newly appears in the south-branch water body. This shows that the increment of envelope area is mainly caused by the pollution source discharge in the south-branch.

Through the contrastive analysis ob the other two items of pollutant data, the conclusions for NH_3-N and TP appear similar, namely that after overlaying other pollution sources, the impact on water environment surrounding Fuyang sewage discharge outlet from other pollution sources in the area is relatively small, and the water body surrounding Fuyang sewage discharge outlet has not been overlaid to the pollution area caused by other pollution sources in the area.

(3) Calculation impact after overlaying background water-quality and other pollution sources

When the COD_{Mn} concentration in upper boundary in Zhaixi Stream is 2.80mg/L, and the discharge outlet in Fuyang Phase-IV Project discharges 140,000t/d normally (Scheme D01), the envelope area of the maximum value of COD_{Mn} spring tide >3mg/L is 1.678km2, the envelope area for that >4mg/L is 0.028km2, the maximum value in source region at the Phase-IV Project discharge outlet is 4.18mg/L, and the maximum values of Class-II surface water functional area boundaries in upstream and downstream are respectively 2.65mg/L and 3.05mg/L; the envelope area of average value of spring tide >3mg/L is 0.831km2, the maximum value in source region at the Phase-IV Project discharge outlet is 3.42mg/L, and the average values of Class-II surface water functional area boundaries in upstream and downstream are respectively 2.62mg/L and 2.94mg/L. The envelope area of the maximum COD_{Mn} neap tide >3mg/L is 2.754km2, the envelope area of that >4mg/L is 0.515km2, the envelope area of that >5mg/L is 0.093km2, the maximum value in source region at Phase-IV Project discharge outlet is 5.34mg/L, and the maximum values of Class-II surface water functional area boundaries in upstream and downstream are respectively 2.70mg/L and 3.25mg/L; the envelope area of the average value of neap tide >3mg/L is 1.596km2, the envelope area of that >4mg/L is 0.102km2, the maximum value in source region at Phase-IV Proejct discharge outlet is 4.06mg/L, and the average values of Class-II surface water functional area boundaries in upstream and downstream are respectively 2.67mg/L and 3.02mg/L. This shows that during normal sewage discharge and under the precision which can be identified by model grid, no large-area blending area exceeding 6mg/L (the upper limit for the Class-III surface water) is found surrounding Phase-IV Project discharge outlet, the boundary value in Class-II surface water functional area in upstream and downstream do not exceed 4mg/L (the upper limit for the Class-II surface water) either, and it will not damage the water quality in the functional area where it exits and the functional areas in upstream and downstream.

When the COD_{Mn} concentration in upper boundary in Zhaixi Stream is 3.00mg/L, and the discharge outlet in Fuyang Phase-IV Project discharges 140,000t/d normally, the envelope area of the maximum value of COD_{Mn} spring tide >4mg/L is 0.048km2, the maximum value in source region at Phase-IV Project discharge outlet is 4.34mg/L, and the maximum values of Class-II surface water functional area boundaries in upstream and downstream are respectively 3.03mg/L and 3.19mg/L; no area more than 4mg/L appears for average value of COD_{Mn} spring tide, and the maximum value

in source region at Phase-IV Project discharge outlet is 3.58mg/L. The envelope area of the maximum COD_{Mn} neap tide >4mg/L is 0.870km2, the envelope area of that >5mg/L is 0.113km2, the envelope area of that >6mg/L is 0.020km2, pollution area >6mg/L appear near Yongtai and Dayuan sewage discharge outlets, the maximum value in source region at Phase-IV Project discharge outlet is 5.49mg/L, and the maximum values of Class-II surface water functional area boundaries in upstream and downstream are respectively 3.08mg/L and 3.38mg/L; the envelope area of average value of neap tide >4mg/L is 0.181km2, the maximum value in source region at Phase-IV Project discharge outlet is 4.22mg/L, and the average values of Class-II surface water functional area boundaries in upstream and downstream are respectively 3.05mg/L and 3.18mg/L. This shows that during normal sewage discharge, 6mg/L (the upper limit of Class-III surface water) pollution area appears near Yongtai and Dayuan sewage discharge outlets, with area being only 0.020km2, and is not found near Phase-IV Project discharge outlet, the boundary values of Class-II surface water functional areas in upstream and downstream do not exceed 4mg/L (the upper limit of Class-II surface water) either, therefore, it will not damage the water-quality in functional areas in upstream and downstream.

(4) Impact on water environment of Fuyang Phase-IV Project upgrading and dilatation project

After the implementation of Phase-IV Project, the total discharge amounts of COD_{Mn} and NH3-N respectively have respectively increased by 0.88t/d and 0.06t/d, with the increasing rate being 46% and 9%; the total discharge amount of TP has decreased by 0.01t/d, with the decreasing rate being 13%. In order to demonstrate the general impact on surrounding water environment of the Phase-IV Project, compare the "contributions values" under normal separate discharge before and after engineering.

A. The "contribution value" of COD_{Mn}

After Phase-IV Project, the envelope area of the maximum COD_{Mn} spring tide increment >1mg/L is 0.034km2, the maximum value in source region is 1.83mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.26mg/L; the maximum average value of the COD_{Mn} spring tide increment in source region is 0.97mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.21mg/L. The envelope area of the maximum COD_{Mn} neap tide increment >1mg/L is 0.329km², area >2mg/L appear locally with the area being 0.053km2, the maximum value in source region is 3.16mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.24mg/L; the maximum average value of the COD_{Mn} neap tide increment in source region is 1.69mg/L, and the contribution value to the Class-II surface water in the downstream is 0.19mg/L.

Before Phase-IV Project, the envelope area of the maximum COD_{Mn} spring tide increment >1mg/L is 0.011km2, the maximum COD_{Mn} concentration increment in source region is 1.41mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.18mg/L; the maximum average value of the COD_{Mn} spring tide increment in source region is 0.69mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.15mg/L. The envelope area of the maximum COD_{Mn} neap tide increment >1mg/L is 0.136km², area >2mg/L appear locally with the area being 0.015km2, the maximum increment in source region is 2.71mg/L, and the

contribution value to the Class-II surface water functional area boundary in the downstream is 0.17mg/L; the maximum average value of the COD_{Mn} neap tide increment in source region is 1.31mg/L, and the contribution value to the Class-II surface water in the downstream is 0.13mg/L.

After the implementation of Phase-IV Project, though the COD_{Mn} discharge concentration has decreased from 24mg/L to 20mg/L, sewage amount has increased by 60,000t/d, and the COD_{Mn} indicator in the water body has slightly increased.

B. The "contribution value" of NH_3-N

After Phase-IV Project, the maximum NH_3-N spring tide increment in source region is 0.46mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.06mg/L. The isoline envelope area of the maximum NH3-N neap tide increment >0.5mg/L is 0.049km2, the maximum value in source region is 0.79mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.06mg/L.

Before Phase-IV Project, the maximum NH_3-N spring tide increment in source region is 0.47mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.06mg/L. The isoline envelope area of the maximum NH3-N neap tide increment >0.5mg/L is 0.046km2, the maximum value in source region is 0.90mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.06mg/L.

It can be seen that after the implementation of Phase-IV Project, though the NH_3-N discharge concentration has decreased from 8mg/L to 5mg/L, sewage amount has increased by 60,000t/d, and the NH_3-N indicator in the water body has been slightly deviated.

C. The "contribution value" of TP

After Phase-IV Project, the maximum TP spring tide increment in source region is 0.05mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.006mg/L. The isoline envelope area of the maximum TP neap tide increment >0.05mg/L is 0.053km2, the maximum value in source region is 0.08mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.006mg/L.

Before Phase-IV Project, the maximum TP spring tide increment in source region is 0.06mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.007mg/L. The isoline envelope area of the maximum TP neap tide increment >0.05mg/L is 0.086km2, the envelope area of increment >0.1mg/L is 0.004km2, the maximum value in source region is 0.11mg/L, and the contribution value to the Class-II surface water functional area boundary in the downstream is 0.007mg/L.

It can be seen that after the implementation of Phase-IV Project, the TP discharge concentration has decreased from 1mg/L to 0.5mg/L, and though the sewage amount has increased by 60,000t/d, the total TP discharge amount has been slightly decreased, and the TP indicator in the water body has slightly improved.

In conclusion, due to the relatively larger amount of increasing of CODMn discharge, the CODMn indicator in the water body has got slightly worse after the project; the increasing rate for NH3-N discharge amount after the project is relatively small, the set TP discharging amount has been decreased, and these two water-quality indicators in the water body changed a little before and after project through calculation.

Generally speaking, the Phase-IV Project implementation will not cause much impacts on the water-quality in surrounding water body.

(5) Impact on pollutant increment in main sensitive spots from Fuyang Phase-IV Upgrading and Expansion Project

All the areas connected to the functional area where discharge outlet exists are drinking water source protection areas, with many water intakes set in its upstream and downstream, and pay attention to the impact on water-quality at water intakes after sewage discharging in Fuyang Phase-IV Project. During normal discharge, due to the relatively weak tide tracing function of the stream segment, the water-quality at water intakes of Fuyang Jiangbei and Jiangnan water plants in the upstream of Fuyang Phase-IV Project sewage discharge outlet. At the lower reaches, Zhoupu Water Plant is the nearest water plant away from the discharge outlet, and the plant, during spring tide, will have the maximum incremental value about COD_{Mn}, NH3-N and TP respectively being 0.15mg/L, 0.04mg/L and 0.004mg/L, while that in the neap tide period is separately 0.12mg/L, 0.03mg/L and 0.003mg/L. Water intake from the Juxi Water Plant is the largest water intake for domestic water in Hangzhou, which, during the spring tide, has the maximum incremental value about COD_{Mn}, NH3-N and TP respectively being 0.04mg/L, 0.01mg/L and 0.001mg/L, while that in the neap tide period is separately 0.03mg/L, 0.01mg/L and0.001mg/L; therefore, the impact is relatively small.

(5) Analysis on Environmental Improvement Effect

The current sewage in Fuyang Sewage Treatment Plant is about 80-90 thousand m^3/d, being under the status of full load even over load. With the promotion of urbanization in Shoujiang, gaoqiao, lushan, dongzhou and other districts, the perfection of sewage network system, and the improvement of sewage collection rate, 60 thousand m^3/d sewage dominated by rural township and city domestic sewage will be increased. If the current scale isn't expanded, the further development of the city will be restricted. The construction and upgrading & reconstruction of the project will solve the current sewage treatment problem, improve the water quality of Fuchunjiang, perfect the water body environment and protect fish and water resources.

① Analysis on reduction of Pollutant

The project will newly-add sewage treatment scale by 60 thousand m^3/d, upgrading and reconstruction by 80 thousand m^3/d. After the project is implemented, compared with the current status, the $COD_{Cr,}$ ammonia nitrogen, TN and TP in Fuyang Sewage Treatment Plant will reduce 7519 t/a, 722.7(773.8)t/a, 912.5 t/a and 113.15 t/a respectively, and the pollution load directly discharged into the water body will reduce significantly. All of these reduced pollutants are from Beiqu and Baiyangxi which are on the upstream of the outfall, which discharge into Fuchunjiang in the form of dispersive discharging at present. The implementation of the project will be conductive to the water quality improvement of Fuchunjiang.

② Be beneficial to the further sewage pipe treatment of pollutant and water quality improvement.

With the developing and construction in this district, plenty factories and resident new villages will emerge, the newly added 60 thousand m^3/d sewage (dominated by domestic sewage of villages and towns) will surely deteriorate the water quality of Fuchunjiang and destroy the ecological environment if being discharged into the rive without disposal. Therefore, sewage intercepting pipe shall be set to reduce the water

body pollution load and reduce the influence on the downstream drinking water source of Hangzhou City.

According to the *12th Five-Year Plan of Water Pollution Control of Qiantang River Basin*, the sewage treatment plant within the district shall meet the standard of Class S in *Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant* GB GB 18918-2002 in order to further reduce the pollution, improve water body environment, and ensure the water quality safety of downstream water intaking source of Hangzhou City. At present, the Phase-I, Phase-II and Phase-III of Fuyang Sewage Treatment Plant are implemented the standard of Class B in *Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant* GB GB 18918-2002, and further improvement is urgent needed to meet the requirement of recent upgrading. The upgrading and reconstruction performed in the project will significantly reduce the discharging amount of sewage.

③ Promote the upgrading and reconstruction of sewage treatment plant in Jiangnan District

Fuyang Section of Fuchunjiang is equipped with tail water drain outlets of six sewage treatment plants, namely Fuyang City, Chunnan, Bayi, Yongtai, Lingqiao and Dayuan. The drain outlets are many in amount and strong in discharge capacity. The downstream is the most important drinking water source protection district of Hangzhou, therefore, this sewage disposal of this section is very important and shall be put great efforts in supervision, being free from furtive discharging to protect the water supply quality of the downstream. Through the implementation of the World Bank Sewage Treatment Project Phase-IV, Fuyang Government will put great efforts in improving and renovating Chunnan, Bayi, Yongtai, Linqiao and Dayuan sewage treatment plants in the south district to reduce the pollutant discharged into the Fuchunjiang.

6. Summary

① The pollutant envelope area of neap tide is larger than that of spring tide, and so is the maximum in source region, but the impact on functional area boundary in downstream of spring tide is larger than that of neap spring; meanwhile it is found that the envelope area of average value is much smaller than that of maximum value.

② At the time of normal discharging, the envelop area is 0.053km² if the maximum incremental value of COD_{Mn} during neap tide is larger than 2mg/L and its contribution value to boundaries of the functional district of the downstream Class II surface water is 0.24mg/L; when the discharge is abnormal, the envelop area is 0.082km² if the maximum incremental value of COD_{Mn} during neap tide is larger than 2mg/L and its contribution value to boundaries of the functional district of the downstream Class II surface water is 0.29mg/L; during accident discharge, the envelop area is 0.167km² if the maximum incremental value of COD_{Mn} during neap tide is larger than 10mg/L and its contribution value to boundaries of the functional district of the downstream Class II surface water is 1.84mg/L. while individual discharge, certain influence will produce to the water environment of the involved waters; normal discharge impacts the water environment at slightest, and abnormal discharge greater, accident discharge greatest. NH3-N and TP have similar disciplines.

③ It is indicated by overlaying with numerical procedures of other pollution

sources, other sources of pollution have little influences on the water environment of waters nearby the discharge outlets for the fourth phase of Fuyang project, whose sewages will not overlaid with other polluters and whose contribution value to boundaries of the Class II surface water at the upper reaches takes little proportion.

④ Upon the execution of the fourth phase of Fuyang project, emission loads of CONMn and NH3-N respectively increased by 46% and 9%, which is with a trend consistent with the predictive results about the water quality affected in the water body and the CODMn index and the NH3-N expressed certain variation in the receiving waters.

2. Other sewage disposal plants

See Attached Table 5.3-3 for water environment influence of other sewage treatment plants

Other sewage disposal plants do not have water intakes or other protected object nearby the discharge outlets. Based on predicted results, when each sewage disposal plant conducting up-to-standard discharge, some may exceed the standards nearby the discharge outlets; but after mixing and attenuation along certain distances, it is able to satisfy the functional requirements of water body absorbing pollutants, making relatively small impact on water quality in the lower reaches. Since sewage inside the service scope of the project are collected and processed, replacing the former direct discharge situations, pollutants discharged into the river are reduced and water quality will be improved.

3. Water plant

Water quality of water sources of AnJi Gaoyu Water Plant, Banshan Water Plant and Nandayang Water Plant involve in the project are stable and up to standards, which can meet water in-taking of all water plants. Therefore, the project water in-taking impact on water usage of lower reaches of the river is relatively small.

5.3.3 Environment impact assessment and mitigation measures for noise

See the Attached Table 5.3-4 for environmental impact and mitigation measures for noise for each subproject.

The noise of sewage disposal plant mainly consists of the mechanical noise produced during equipments operation including blowers in the blower room, all kinds of water pumps in sewage pump room, water extractor, solid-and-liquid separator, grit-water splitter, air compressor, etc.; The noise produced during the tap-water production process mainly comes from blowers, water pumps used in water plants, etc. most of which are air-flow noise and mechanical noise, with the noise intensity of all equipments being about 75~95dB.

Upon prediction and analysis, except for the east and north boundaries of Meixi Sewage Disposal Plant which exceed standards at night, noise level of each boundary could all live up to the Class 2 standard value (60dB) as required in Emission *Standard for Industrial Enterprise Noise in Field* (GB12348-2008); while noise level of each field of the AnJi Urban Sewage Disposal Plant can reach the Class 2 standard. As for the forth phase of Fuyang Sewage Disposal Plant, its south boundary will reach the Class 4 standards day and night; while its east, west and north boundaries are able to reach the standards in the daytime; but the east and the north boundaries at night are respectively 1.1 and 0.1 higher than the standard value. The west boundary does not exceed standards at night.

Noise levels at each boundary of the Sewage Disposal Plant of Anren County, the

Sewage Disposal Plant of Badu County, the Sewage Disposal Plant of Chatian County, the Sewage Disposal Plant of Lanju Village and the Sewage Disposal Plant of Xiaomei County in Longquan City are all up to standards.

As for Longyang Sewage Disposal Plant, except for the south boundary with a noise level exceeding 7.4dB at night and the north boundary, with a noise level exceeding 0.4dB at night, noise levels of other boundaries can all reach the Class1 standards.

Noise levels of each boundary Tiantai Cangshan Sewage Disposal Plant can satisfy the Class 1 standard requirements at day and night

Noise values at the fields of each water plant can conform to the Class 2 standard values in Emission *Standard for Industrial Enterprise Noise in Field* (GB12348-2008).

At sensitive spots, such as villages and schools, near sewage disposal plants and water plants, the day and night noise level can all reach to standards, project noise has less impact.

5.3.4 Environment impact analysis and mitigation measures for solid waste

See the Attached Table 5.3-5 for environmental impact and mitigation measures for solid waste for each subproject.

Solid wastes produced by the project mainly consist of sludge from sewage disposal plants and water plants and living garbage from the staves.

Domestic garbage will be collected and cleaned by local environmental sanitation department.

The sludge produced in Fuyang Sewage Disposal Plant Phase-IV Project and Longyang Sewage Disposal Plant shall be transported to Zhejiang Qingyuan Ecological Thermoelectricity Co., Ltd. for incineration treatment; the sludge produced in AnJi County Meixi Sewage Disposal Plant and AnJi Urban Sewage Disposal Plant shall be transported to the incinerator in AnJi Wangneng Renewable Resource Utilization Co., Ltd. for incineration treatment; the sludge produced in Tiantai Cangshan Sewage Disposal Plant shall be transported to Tiantai County Waste Landfill for backfilling; the sludge produced in the Longquan Nandayang Water Plant will be sent to Gaotang Rufuse Landfill for landfill, and the sludge produced in sewage treatment subproject in Longquan District shall be deposed by composting, the compost being used in the farmland or mountain land near the project.

The sludge generated by the centralized sewage treatment plant of the project shall be transported by the self prepared closed vehicle or that provided by local environmental health management office. The vehicles transporting the sludge shall be shelled, water proof and free from leakage. The transportation route shall select county road, provincial road and other major traffic roads, avoid environmental sensitive areas like water conservation district, places of interest, and resort districts, along with major villages along the route. The sludge transportation has light influence on surrounding environment.

Generally, the domestic refuse and sludge produced in the project has no impact on surrounding environment after efficient treatment.

5.3.5 Accumulative environmental influence of the project

The World Bank loan project covers the town and rural sewage treatment in AnJi County, Tiantai County, Fuyang City and Longquan City, which are respectively located in Taihu Basin, Jiaojiang Basin, Qiantang River Basin and Ou River Basin of Zhejiang Province. The project includes 28 subprojects, and serves 1701 thousand

populations, with many people benefit from it. After finishing, it can reduce the discharge of COD and BOD by 13199.2t/a and 6082.0t/a respectively till 2020.

For surface water environment, the accumulative environmental influence mainly reflects on the long term discharge of domestic sewage. The matter with accumulative environmental influence on the surface water is the one that can't be degraded or quickly degraded by physical, chemical and biological action in the natural, and is easily accumulated and subsided in the riverway. The waste water disposed in the project is mainly domestic sewage, whose main pollutant is organic matter that is easily degraded, doesn't include heavy metal and will not generate accumulative influence generally.

After the project is implemented, the original waste water which was directly discharged without treatment will be discharged after being disposed and reaching the standard. In general, the pollution load enters the natural environment will reduced, and the general water quality of the river will be controlled and improved. The water environment capacity will expand and the accumulative environmental influence will weaken.

As the tail water discharge of sewage treatment plant, the pollutant concentration near the discharge outlet will be relatively high which will influence the aquatic ecosystem nearby. With the reduction of kinds of aquatic organism, the amount of pollution resistance species will increase. With the improvement of general water environment, the aquatic organism will not suffer accumulative influence.

The dispersive villages of the project are located in four counties and cities with wide distribution and little quantity of wastewater effluent. The sewage is generally discharged into the nearby channel, which will not generate accumulative influence. Except Fuyang Sewage Treatment Project Phase-IV, town sewage treatment plant is with little quantity of sewage treatment, sound water quality of pollutant-holding water body, large environmental capacity. After sewage discharge, the pollutant can be effectively degraded and spread with weak accumulative influence. Fuyang Project Phase-IV will increase 60 thousand t/d treatment ability, and conduct upgrading and reconstruction on the present sewage treatment facilities. The sewage will ultimately discharge into Qiantang River, though ammonia nitrogen indexes in the sewage discharge section exceed standard without capacity, the newly-added discharge amount will have little influence on the Qiantang River. Along with the centralized treatment of sewage in the upstream villages, the upland water quality will be improved; as the gradually upgrading and reconstruction of sewage treatment plant in the district, the total pollutant discharged into the Qiantang River will be reduced, and the water quality will be improved in some degree with the accumulative influence of sewage discharge being reduced.

Table 5.3-5 Sludge Transportation Route and Surrounding Environmental Sensitive Point Distribution of Major Sewage Treatment Plant

Sewage Treatment Plant or Water Plant	Sludge Output	Transportation Organization	Sludge Transportation Vehicle	Transportation Route (Past Transportation Road)	Major Protection Objectives and Influence Analysis Along the Line
Fuyang Sewage Treatment Plant	13.8t/d	Fuyang City Water Works Co., Ltd.	Self-equipped refuse transportation vehicle	Yanjiang road -- No. 1 Bridge in Fuyang City -- Thermal Power Plant of Qingyuan in Zhejiang	Pass Zhongda Xijiao peninsula; little influence
Longyang Sewage Treatment Plant	0.8t/d	Fuyang City Water Works Co., Ltd.	Self-equipped refuse transportation vehicle	Longyang Sewage Treatment Plant – Xugao Line – S302 Provincial Road – Xinxing West Road – S305 provincial road – Xindeng Sewage Treatment Plant	Pass some villages; little influence
Cangshan Sewage Treatment Plant in Tiantai	4380t/a	Environment and Health Center of Tiantai County	5t closed truck	The Plant – along the village road to Fenglin Village in Tantou Town – complex line of 104 national road – Xiangtang Village in Chicheng steet – New 104 national road – Xiangyan Village of Fuxi Street – Original 104 national road – refuse landfill	Pass Paimenchen Village, Pingyao Village, Gangfeng Village, Xiangtang Village, Xiangyan Village and Geshuijiang Village; transportation rode are provincial road with little influence
Meixi Sewage Treatment Plant in AnJi	2.52 t/d	Self	Closed truck	305 provincial road – 201 provincial road – Wangneng Sludge	Pass Xiaoshu Village, Xilong Village, Majia Village, Changle

				Incineration Plant	Community; transportation rode are provincial road with little influence
Urban Area Sewage Treatment Plant in AnJi	6.3 t/d	Self	Closed truck	201 provincial road -- Wangneng Sludge Incineration Plant	Pass Changle Community; transportation rode are provincial road with little influence
Nandayang Water Plant in Longquan	912.5t/a	Environment and Health Center of Longquan County	Closed special transportation vehicle of refuse clear	Water Plant – drive to the south along S54 for 350m – turn east to Linling Line for about 5.8km – turn north for about 500m along the S38 – turn east for about 3.2km along the Linling Line – arrive the refuse landfill	Pass Dongling Village; little influence
Sewage Treatment Plant of Anren Town	1.6kg/d	Sludge in the sewage treatment plant will dry and compost, being used for farmland after pretreatment and meeting the soil quality standard of agricultural fertilizer, and treated as the soil conditioner or fertilizer; therefore, transportation is unnecessary.			
Sewage Treatment Plant of Badu Town	1.1kg/d				
Sewage Treatment Plant of Zhatian Town	0.5kg/d				
Sewage Treatment Plant of Lanju Township	0.5kg/d				
Sewage	0.5kg/d				

Treatment Plant of Xiaomei Town		

5.4 Environmental impact analysis of decentralized rural sewage treatment project

5.4.1 Analysis on the water environmental impact

In the decentralized rural sewage treatment project, the sewage directly discharged into stream channels existing in rural areas is discharged when it reaches to standards after treatment, which will greatly decrease pollutant discharging amount and improve the water-quality in stream channels.

Decentralized sewage treatment stations in rural areas has lower sewage treatment capacity and the discharge points are scattered in these four counties and cities; besides, ceratin sewage will be filtered by the soil infiltration system and therefore, the general effects of tail water discharged on the surface water body is extremely not obvious.

5.4.2 Atmospheric environment impact analysis

(1) Benefit analysis

After the project implementation, through measures including improving pit toilet, pollutant-interception nanotubes, sewage treatment, etc, it can decrease stink, improve rural atmospheric environment and environmental health, improve peasants' living quality and protect people's health.

(2) Analysis of negative impact

The exhaust gas pollution source in rural sewage treatment mainly consists of the foul smell emitted from the sewage system, most of which are sulfuretted hydrogen and ammonia.

The sewage treatment amount is 100t/d, and the village can almost represent the typical situation of rural sewage treatment facility. According to the analog calculation, the average H2S discharge amount in this village is 0.071kg/h, and 0.00033kg/h for NH3.

After prediction, the accounting rate for maximum NH3 ground-level concentration is 8.07%, and the maximum distance D10% for the accounting rate of 10% is 0m. With SCREEN3 Model adopted for calculation of atmospheric environmental protection distance, it comes that all villages do not need to set atmospheric environmental protection distance.

Therefore, it can be seen that the foul smell from rural sewage treatment facility has little impact on atmospheric environment.

5.4.3 Noise environment impact analysis

The noise of sewage treatment facility mainly comes from sinking pumps and blowers. After prediction, in Class-1 noise environmental functional area, being 17.8m away from the noise source in night can meet requirements for noise functional area. Therefore, the impact on noise environment will meet standard requirements as long as the sewage treatment facility is set 20m above the noise-sensitive spots (with overlaying noise background value taken into consideration).

5.4.4 Solid waste environment impact analysis

The solid waste in sewage treatment includes sediments and sludge. Considering that the sludge produced by the sewage treatment facilities in all villages is in a very small amount, it is difficult to efficiently dehydrate, with non dehydrating dominated,

meanwhile, for what is treated in project is domestic sewage which basically will not cause situations of the heavy metal in sludge exceeding standards, it is recommended to be properly used in agriculture, which will solve problems of organic fertilizers in rural areas.

5.4.5 Other impact analysis

After preliminary screening, the first batch of distributed sewage treatment villages in the four counties and cities are not in natural conservation areas and heritage conservation areas, which has no impact on natural conservation areas and heritage conservation areas.

6 Impact Assessments on Social Environment

6.1 Positive impacts

1. Improve rural sewage collecting and treatment systems and living environment.

In the four project counties and cities, although partial villages have set up sewage treatment systems, due to the relatively small capital investment in system establishment period, the small scale and backward treatment technologies, the sewage treatment effects are not that good, basically in an idle status, which does not play its due functions. While in other villages, due to being lack of sewage collecting and treatment facilities, most of the domestic sewage is discharged after simple treatment in private septic tank or directly discharged without any treatment, which caused pollution to surrounding environment to a certain extent. As shown in the questionnaire survey results, in the questionnaire survey in the four project counties and cities, those who believe that the domestic sewage in their own villages/communities account for only 36.15% of the total sample, 64.1% of the respondents believe that the domestic sewage in their own villages is directly discharged without any treatment, only 32.3% of the respondents are satisfied with the sewage collecting and treatment in their own villages, and most of the others hold a general or unsatisfying attitude to the sewage collecting and treatment situation in their villages.

The construction of this project is beneficial to improve rural sewage collecting and treatment system, improve situation of disorder discharging of domestic sewage, reduce problems of foul smell caused by direct discharge of domestic sewage, mosquito and fly breeding, etc, and greatly improve people's living environment.

2. Improve water-supply facility to meet residents' water demand

With the ever increasing of urban population in the four counties and cities, the water demand in urban areas has been increased to a large extent, and the city water-supply has to keep pace with the growing demand. As the water yield increases and water-supply coverage rate gradually increases, it is necessary to improve the water-supply capability of water plants to ensure the water supply for urban residents and water users. While the existing equipments in some water plants can not meet residents' daily water supply demands, e.g. The Nandayang Water Plant, which has been established for 11 years, with part of water-production facilities and equipments being seriously worn down and aged, can not cope with the seasonal fluctuation of the raw water in bad quality, with its water-supply capacity reaching to the upper limit. Additionally, as shown in field survey, there is part of villages where tap water has not been got through or completely got through, still using well water, lake water or river water. This part of groups has intense demand for clear water source, urgently expecting tap water to be got through. This project construction can improve urban water supply and discharge facilities and improve water supply capacity, supplying residents with qualified and clean water with stable water pressure.

(3) Be beneficial to improve the water quality in the project area, and reduce waterborne diseases

Except for a few villages whose domestic sewage is adopted in sewage disposal plants and to the village collective sewage treatment system for treatment, domestic sewage of most of the other villages is discharged into private septic tank or is directly discharged without any treatment. However, since the septic tank adopts

method of natural infiltration, sewage permeates into the ground after precipitation and digestion, which causes certain pollution to the underground water. Addtionally, since part of the village houses has no shelter for septic tank, sewage of the septic tank will be washed away by rain water in seasons with heavy rainfall, and the septic tank has no due functions at all. And the sewage overflowing will always breed large amount of mosquito, flies and bacteria which easily raise relevant diseases, such as cold fever, gastrointestinal discomfort, etc, about which villagers complain a lot.

The project construction is beneficial to reduce domestic sewage's pollution to water body, reduce the contact rate between sewage and clean water, and ensure residents' water sanitation and safety in project area, thus further improving the health situation of local people and reducing risks of diseases related to water, especially that it is much easier to catch these diseases for poor people due to the lower living quality and worse living environment.

(4) Promote economic development and create job oppotunities

The project construction will greatly improve the environment conditions in this area, further improve the city image, and optimize investment environment, improving investment quantity and quality to promote local economic development. Addtionally, the project implementation will promote to improve water resource environment, creating better conditions for opening the abundant tourist resources in the project area. And enterprise development and tourist resource exploitation can provide more jobs for local residents.

Addtionally, during the project construction and running periods, it will also provide some non-technical posts, such as construction material transportation, food and beverage services of the construction team, etc. in the construction period, and maintenance works of sewage treatment system during project running period. Through communication with project office and project proprietors, the project office will supervise the construction unit to provide job opportunities to the surplus labors in the project area and its surrounding areas in priority, especially to the disadvantaged group including women, old people and poor people.

(5) Enhance the awareness of environmental protection, and promote environmental protection

As the ever developing social economy, people's environmental sensitivity has been increasingly stronger, and the environmental awareness has been increasingly improved. The project, in one hand, can actually improve environmental infrastructures in project area, and in other hand will be beneficial to residents's environment awareness in the project area. During the project preparation period, all county project offices for all projects have issued *Project Propagandist Manual for World Bank Loan for Rural Domestic Sewage Treatment*, the Owner unit has also broadcast the project, and the design unit has explained the information disclosure and environmental protection functions of the project in field investigation, improving villagers' environment awareness subtly while informing them of the project contents. As the project being established and running, the satisfied environment protection effects will further deepen villagers' awareness of environmental protection, thus promoting the environmental protection works in rural areas.

(6) Improve the village image, and promote the implementation of "Zhejiang Provincial Beautiful Village Building Action Plan"

In 2003, Zhejiang Province started implementing the project of “Renovation of Thousand Villages Demonstrating Ten Thousand Villages” to improve villagers’ living environment. After ten years perseverance, the living conditions for farmers in Zhejiang Province have been greatly improved public service basically realizing equality between urban and rural areas. This project, as an important part of implementation of “Ecological Environment Promotion Action” in beautiful-village building, complies with the basic principles in Zhejiang Provincial Beautiful Village Building Action Plan (2011-2015). Through the project construction, the implementing villages will establish relatively complete rural domestic sewage collecting and treatment systems, and long-lasting maintenance and management mechanism, which is beneficial to continuously improve rural ecological environment, lay solid foundation to accomplish the “Beautiful Village” building target, and provide reference for the “Beautiful Village” constructions in other counties in the province, having model significance for further promotion of “Zhejiang Provincial Beautiful Village Building Action Plan”.

(7) Be beneficial to promote construction of socialism new countryside and build harmonious society

The 18th CPC National Congress had proposed to strive to develop ecological civilization construction, and build beautiful China. During the developing plans of “The 11th Five-Year Plan” and “The 12th Five-Year Plan”, it proposed to build our villages into socialism new countryside of “enhanced productive forces, higher living standards, civilized living style, an orderly and clean environment and democratic administration”, which is an important measure for greatly promoting the construction of all-round well-off society and farmers stepping into a well-off life and enjoying modernized living. To promote rural construction of “three concentrate”, realize construction of unified planning, design and supporting for public utilities in residential areas is the precondition to ensure an orderly and clean village image. The realization of managing network, concentrated purification and turning disadvantages into advantages for rural domestic sewage is beneficial to realize “clean water source, clean countryside and clean homeland” creating a graceful residential environment, promoting construction of socialism new construction, and building harmonious society.

6.2 Negative Impacts

(1) Impacts of land requisition and demolishing

The project construction involves requisition of partial land and house demolishing, wherein, collective land for permanent requisition is 121.742mu, influencing 99 households with 346 persons in total; collective land for temporary requisition is 556.698mu, influencing 257 households with 818 persons in total. The land requisition and house demolishing will cause impacts to the economic income and livelihood model of the impactd families, especially for those who are impactd by permanent land requisition and demolishing. As shown in questionnaire survey results, 92.87% of the respondents hold supportive attitude to land requisition for project construction, wherein AnJi accounts for 89.5% of its existing group, Fuyang for 90.3%, Tiantai for 98.8% and Longquan for 95.7%; about the question of the necessarity to compensate for requisition land, 66.8% of the respondents think it is necessary, wherein AnJi accounts for 78.1% of its existing group, Fuyang for 75.4%, Tiantai for 53.8%, and Longquan for 51.6%. This illustrates that although residents in

the project area has relatively high supports for land requisition for project construction, but also pay attention to land compensation.

If the willing and demands of impactd families have not been fully considered in the project implementation, failing to evaluate their losses and compensate them properly according to related national and local policies, they might thwart the project process and damage sewage treatment facilities after the project is established. Settling of affected people is one of the important safeguards for smooth and successful process of project.

(2) Interference and damage to villagers' normal life during project construction

According to the current design, the pipe networks needed to be reformed involved in the project are mainly set in roads, and mostly adopt excavation method; the newly-built pipe network also needs to be paved along roads. The project construction will inevitably cause certain impact on residents' daily production and living, e.g. cutting off or occupying part of road section will effect people and vehiclein their coming in and out; dust, noise and others will be produced during construction. Although the project construction will cause certain impact on residents' production and living, they can all show understanding for this, and they believe these impacts are temporary, while the benefits brought to the residents and villages after the project are permanent.

(3) Damages to residents' upholstery in project construction

According to surveys, the recently newly-built houses has all installed sewers when being established, and the pipe network can be directly connected in the house in case of project construction, which will not cause large damage to walls and upholstery. But for those houses not installing sewers or failing to install according to specifications, it is necessary to remold, connect and re-pave the sewage pipelines inside the house, which will inevitably cause damage to inner decoration and walls, influencing the overall indoor appearance. Most of the villagers show that they can accept that the pipe network entering house might cause damage to walls and upholstery. However there are also some villagers showing worries, hoping that it must try its best to avoid house structure and upholstery damages during project construction.

(4) The project running management costs increasing the collective economic pressure for villages with poor economic strength

After the project putting into operation, it will cause some running costs, such as electric charge and others, whose sources will be determined according to related county governmental opinions in all items. If villages need to collectively bear related costs, it will cause additional pressure to their collective economy, especially for those villages with poor collective economy in water source protection area.

(5) Payment capacity risk for disadvantaged group

As shown in survey results, the residents in project area are more willing pay water charge. In terms of payment capacity, after calculation, the current water charge (including tap water charge and sewage water charge) standards are within affordable range of normal households in project area; for poor people, since their economic income is lower or they have no income at all, collecting water charge from low-incoming families according the current water charge standards might increase the economic payment of these families, aggravating their economic pressure.

7 Alternative Option Comparisons and Selection

The demonstrative project for rural water supply and sewage system in Zhejiang involves AnJi County, Fuyang County, Longquan City and Tiantai County, with the construction contents being market town sewage-interception pipeline, decentralized rural sewage treatment, rural water supply pipe network construction, market town sewage disposal plant, environment remolding in lanes and alleys. The resolution comparison and selection in the feasibility report focus on comparison and selection of pipe material, sewage treatment technology, etc, the environmental impacts being generally the same. Therefore, in the comprehensive environment assessment, we conducted simple scheme comparison, selection and summary of centralized sewage treatment plant, and focus on "zero" resolution comparison and selection.

Since 2003, Zhejiang Province has been continuously promoting the ecological province construction, having successively carried out three times of "811" ecological environmental protection action, which fully strengthens water pollution control and water environment protection, with water quality in the whole province being generally stable and good. Meanwhile, part of river sections of the main river systems remain serious water pollution problems, with river networks in plane areas and offshore areas being seriously polluted, and the dirty, disorderly and bad situation in some river channels in rural and urban areas directly impacts people's production and living.

The demonstrative project construction for rural water supply and sewage system in Zhejiang aims at establishing demonstration for Zhejiang to develope the integration project of water supply and drainage infrastructures in rural and urban areas, developing joint construction of water supply and drainage infrastructure in rural areas and perfecting project construction demonstration, developing construction demonstration for decentralized rural water supply and discharge system in optimized villages, and innovating and establishing sustainable-running mechanism for rural water supply and discharge system, with the counties selected in project involving AnJi County in Taihu Lake drainage basin in North Zhejiang, Fuyang City in Hangzhou suburb in Qiantang River drainage basin, Tiantai County in the mountain area in mid-Zhejiang in Jiaojiang River drainage basin and Longquan City in the southern Zhejiang mountaineous area in Oujiang River drainage basie, and the involved four drainage basins being not only the key drainage basins in Zhejiang Province, but also the four river systems of the top eight river systems in Zhejiang Province.

Since some of water supply pipelines in the urban areas in the involved four counties and cities were built in early years, they are relatively small with high leaking rate, making the daily maintenance more difficult and water-supply reliability lower. Since the water plants in villages and towns are in small scale and dispersived in places, the water source has been polluted and the water amount of water source is not sufficient, the assurance rate of water taking is low and the supplied water amount is insufficient. At the same time, the process of the water plant lags behind; its water treatment facility is simple: only some with filter, while others only with chemicals feed, failing to reach the nation's relevant drinking water standard, with insufficient water pressure for water supply of the water plant. Water supply project construction in villages and towns are seriously delayed, lots of villages, especially for the villages in mountain areas basically without any decentralized watery supply system, villagers all taking underground water or pond water by themselves and seldomly conducting

water-quality examination to domestic water. There exist problems of worse water-quality, poor water supply safety and being difficult to ensure water amount. Aging, disrepair, severe evaporating, emitting, dripping or leaking phenomena are general problems of water supply pipeline of the rural residents.

The sewage pipe network systems in counties have not kept pace with county developing, and with pipe network not fully covering the whole county area, sewage has not been adopted to the pipe network of sewage disposal plants in some residential spots, with sewage being directly discharged into river channels. Since there are some pipes are in disorder positions with various pipe materials, it is common to see pipe network damaging and the permeated underground water is in large amount.

There are many villages and towns in the four counties and cities having not set sewage treatment stations, and the established sewage treatment stations in villages and towns are with poor infrastructures. The sewage pipe networks in all villages and towns are not in synchronous design, construction and putting into operation with infrastructures, making the sewage treatment capacity idle. In the situation where all villages and towns have not established complete sewage collection and treatment system, and their established sewage treatment facilities are universally operating with low efficiency, the sewage treatment rate is relatively low, and the running situation is not favorable.

Recently, rural sewage treatment facility construction is in synchronous process with “Beautiful Village” construction, rural environment remolding and other projects. Although it began to take effects, there are still lots of villages and peasant households not enjoying environmental and social benefits brought by sewage treatment due to construction process, managing and other factors. There is still a long way to go for rural sewage treatment facility construction.

Table 7-1 Summary of Scheme Comparison and Selection of Sewage Treatment Plant

Name of Sewage Treatment Plant	Comparison and Selection of Site Selection or Construction Location	Comparison and Selection of Discharge Outlet	Comparison and Selection of Treatment Processing	Comparison and Selection of Sludge Treatment
Fuyang Sewage Treatment Plant	The project is conducted on the original site, therefore, no comparison and selection scheme; the project is located at the junction of Golf Road and Yanjiang Road	Utilize the position of original discharge outlet; no scheme comparison and selection; discharge outlet is located at the south prong junction of Dongzhou in Fuchunjiang	No process scheme comparison and selection; treatment process adopts A2O.	No comparison and selection, sewage treatment adopts the method of sending to incineration plant for incineration.
Longyang Sewage Treatment Plant	Project feasible report selects four sites: (1) Dongqiao Town, on the west bank of Gexi, bing about 300m away from the south of Kindergarten of Dongqiao Town. (2) West bank of Gexi, Xujia Village Entrance of Dongqiao Town (3) East of grassland on the south end of the town, west of Xugao Line and Donghuang Line (4) Comprehensive Comparison and Selection: The position about 200m south of Scheme 1, and West of Gexi. The nearest sensitive point of Scheme 1 is the Chenlin Village on the north, being 260m on the north of Longyang Sewage Plant. Considering the influence of noise and flue gas, the sewage plant will have significant influence on the sensitive point during operation. The project involves the remove of one family in the west side, which has little social placement influence.	Considering from pipeline transportation distance, economic technology and other factor, dispersive branch discharge is unrealistic; therefore, they will be discharged into Gexi centralized.	(1) A2/o + canboard (pipe) settling pond; (2) CASS pond; (3) catalytic oxidation + canboard (pipe) settling pond. By comparing these three process characteristics, and major equipment, pond, covered areas and recent project cost, we can observe that catalytic oxidation process is with small structure volume and covered area. The equipment is easier to be operated compared with other two processes. And the left sludge amount is little. Therefore, the scheme recommends catalytic oxidation process.	No comparison and selection, sewage treatment adopts the method of sending to incineration plant for incineration.
Meixi Sewage	The project is conducted on the original site,	Discharge outlet utilizes the	Comparision and selection of	The present Changnongkou

Treatment Plant in AnJi	therefore, no comparison and selection scheme; the project is located at the northwest corner of Xiaoshu Group in Meixi Town of AnJi County	present outlet of Meixi Sewage Plant Phase-I, which is on the downstream of New Meixi Bridge in Xishaoxi (about 400m on the downstream of farmland irrigation pump station). Discharge by the methods of shore side submerging and discharging. No scheme comparison and selection.	MSBR, Orbal oxidation ditch and A^2/O: MSBR process has advantages in sludge settling performance, P remove treatment efficiency and management flexibility, and the overall investment and operation cost is lower than other process. In addition, in the Meixi Sewage treatment Plant Project of Phase-I, MSBR process was adopted. At present, it is under stable operation, and the effluent quality meets the standard. Therefore, we recommend MSBR as the ultimate treatment process of the project.	domestic refuse landfill of AnJi County is under saturation condition; therefore, the sludge will collected uniformly and sent to the incinerator of AnJi Wangneng Renewable Resources Utilization Co., Ltd. for incineration disposal.
Urban Area Sewage Treatment Plant in AnJi	The project is conducted on the original site, therefore, no comparison and selection scheme; the project is located near the Yingjiatan Village of Dipu Town, at the junction of Xigangxi and Dipuxi, and the north side of Chengbei bridge.	Utilize the present discharge outlet, and the project is located in Xuxi, utilizing the overflow discharge. No scheme comparison and selection	Comparison and selection of A^2/O, SBR and catalytic oxidation: A^2/O is has the lowest net present value for 20 years, and its process operation management is easier than SBR with advantages of simple process and easy controlled. Therefore, we recommend A^2/O process in this renovation.	The present Changnongkou domestic refuse landfill of AnJi County is under saturation condition; therefore, the sludge will collected uniformly and sent to the incinerator of AnJi Wangneng Renewable Resources Utilization Co., Ltd. for incineration disposal.
Sewage Treatment Plant of Anren	There is no comparison and selection scheme; the project is located at the space on the east of Anren Stream, which is in the	No scheme comparison and selection; discharge beside the Anren Stream	No scheme comparison and selection; adopt coarse screen regulating reservoir + fine	Comprehensive sanitary landfill, compost and other treatment schemes; adopt

Town	southeast of Anren Stream Bridge on Lilong Highway.		screen + rotational flow sand setting device + biological rotating disc process	compost treatment scheme.
Sewage Treatment Plant of Badu Town	There is no comparison and selection scheme; the project is located at Xiaogao Village in the south of Badu Stream, being the farmland and temporary plant of Longquan Concrete Co., Ltd.	No scheme comparison and selection; discharge beside the Badu Stream	No scheme comparison and selection; adopt Class II biological rotating disc treatment process	
Sewage Treatment Plant of Zhatian Town	There is no comparison and selection scheme; the project is located at the junction of Yelai Bridge and S229 provincial road	No scheme comparison and selection; the north of the plant; near Xiaomei Stream	No scheme comparison and selection; adopt Class II biological rotating disc treatment process	
Sewage Treatment Plant of Lanju Township	There is no comparison and selection scheme; the project is located at the junction of Yuzhang Road and S229 provincial road	No scheme comparison and selection; discharge beside the Yuzhang Stream	No scheme comparison and selection; adopt Class II biological rotating disc treatment process	
Sewage Treatment Plant of Xiaomei Town	There is no comparison and selection scheme; the project is located at the northeast of Xiaomei Bridge	No scheme comparison and selection; discharge beside the Xiaomei Stream	No scheme comparison and selection; adopt Class II biological rotating disc treatment process	
Sewage Treatment Plant of Cangshan	Project feasible report selects three sites: (1) southeast of the junction of Huanxi and Cangshan Daoxi; (2) Trigonum of Huanxi, Cangshan Daoxi and Highway; (3) the south of Tantou Town and the west of Cangshan Daoxi. Considering the environmental influence, preserved long term development land, rational utilization of current traffic roads, Scheme 1 is recommended.	Discharge outlet is in the Cangshan Sewage Treatment Plant, and discharge into the river; no scheme comparison and selection;	Comparison and selection of A^2/O, SBR and oxidation ditch process: A^2/O is with the advantages of simple process management, stable and reliable operation, little covered land, being suitable for the local actual condition.	Dispose by sending the sludge to Refuse Landfill of Tiantai County for sanitary landfill.

Due to being lack of systemized planning and rural collective economic strength being weak and other reasons, most of the villages have no complete sewage pipe networks. Due the incomplete pipe network, small collecting range, narrow household-connecting area the established rural sewage treatment facilities cause sewage collecting rate to be low. Due to insufficient attention paid to sewage treatment, limited investment capital, being lack of professional technicians, the established sewage treatment facilities universally lack management and maintenance with worse running situation, lots of sewage treatment facilities having not played their functions and being in an idle status.

According to *the Opinions on Overall Implementation of "System of River Leader" to Further Strengthen Water Environment Remolding* issued by Zhejiang Provincial Party Committee and the People's Government of Zhejiang Province on November 15, 2013:

1) After 5 years' endeavor, the total discharge amount of major water pollutants in the whole province has obviously decreased, the surface environment quality has been apparently improved, and the water quality in drinking water source basically reaches to standards, and garbage rive and black stink river fully disappear, with people's satisfaction being apparently enhanced. Up to 2017, the fracture section rate of Class-I and Class-II water-quality has increased 5% than that in 2012; fracture section rate of inferior Class-V water-quality has decreased by 30%; inferior Class-V water-quality disappears in the connecting fracture sections across cities and counties (cities and districts) in the top eight drainage basins, with the standard-reaching rate for water-quality of the connecting fracture sections in the whole province increasing by 5%.

2) Propose to make efforts to increase urban sewage treatment efficiency. Continue to strengthen urban sewage disposal plant construction, accelerate the construction of sewage collecting pipe network, especially for the branch pipe network, actively promote shunt of rain and sewage, block off the illegal discharge outlet in all way, and further improve urban sewage collecting rate and the load level of urban sewage disposal plants.

3) Propose to promote overall rural living pollution control. Carry out actions of "Beautiful Village", "Highway Side, Railway Side, River Side and Mountain Side and Cleaning, Greening and Beautification", "Three Remolding and One Demolishing" and "Double Cleaning" in a deep-going way to promote the overall control on rural environment. Focusing on rural living sewage and waste control, promote the joint control of rural environment in a deep-going way. Select proper living sewage treatment model according the local conditions to improve rural domestic sewage treatment efficiency. The villages near towns with proper conditions shall be actively adapted to urban sewage disposal plant for concentrated treatment. For villages which can not be adapted to urban sewage disposal plants for concentrated treatment, establish ecological sewage treatment facilities in village areas according to different village conditions, or adopt household-jointing or decentralization methods for domestic sewage treatment. Up to 2017, administrative village coverage rate of rural domestic sewage treatment has reached 90%, and the benefiting rate of farmers to above 60%.

In conclusion, there is still a long way to go for rural sewage treatment construction in Zhejiang Province. This time, Zhejiang Province utilizes the loan form World Bank to conduct rural sewage treatment and drinking water project construction in Fuyang City, AnJi County, Tiantai County and Longquan City in the four river systems, with

28 subprojects in total. From the project establishment to 2020, the sewage treatment capacity of all the sub-projects add to 54,050,000 t/a, all the subprojects will reduce the discharge of COD and BOD by 12,987t/a and 5,934t/a respectively, which will greatly reduces pollutants directly discharged into natural environment and efficiently reduce the pollution.

If the project is not implemented due to insufficient capital, the problems existing in water supply and sewage treatment system in the four counties can not be solved in a short term, and water supply safety for village residents will not gain guarantee. The domestic sewage in villages being directly discharged without any treatment will impact water environment, and the village environment sanitation can not be improved.

Therefore, it is necessary and urgent to implement the project, the demonstration function of the four counties can provide technology, running and sewage discharge standards and technical supports and demonstration for future rural sewage treatment in Zhejiang province.

8 Public Consultations and Information Disclosure

8.1 The Purpose and Form of Public Participation

8.1.1 Purpose

The rural domestic sewage treatment system and drinking water project in Zhejiang refer to transforming sanitary fittings of residents' house, land occupation and the variation of other local environment, meanwhile, the construction and operation period will bring some impact on the surrounding natural environment and social environment, thus affect directly and indirectly the work, life and learning of the public at surrounding area of the project. According to the requirement of Public Participation Interim Measures for Environment Impact Assessment (HF 2006 [No. 28]) and World Bank Environment Assessment Operation Policy (OP4.01), to carry out public participation work during environmental assessment, understand the attitude, opinion and suggestion of each enterprise and public institution, social groups and the public at the for the project, find out the response and advice of local people for the project construction, in order to provide the reference for the engineering design and construction, to make the engineering more perfect and the environmental impact assessment more comprehensive and objective.

8.1.2 Methods and work organization

The organization and implementation of public participation shall take the subproject of each county and city, the environmental assessment of subproject will consult opinions and suggestions of the residents in the project area through issuing the consulting questionnaire, discussion and random oral investigation.

During the process of accepting the commission of environment impact assessment work and preparing the environmental impact report, the environmental assessment unit of subproject shall inform the information about environment impact assessment to the public through posting announcement at site and placing the report in the reading rooms of township and village committee, which is convenient for the public to acquire the relevant information on the environment impact assessment. Also, through asking social groups and the public to fill questionnaire, interviewing and holding small forum to understand the opinion, hope and requirements of the social groups and the public for the project, fully and effectively communicate the engineering information and environmental impact of the project with the public in project area.

The representatives of the public include all levels of people, from the perspective of the cultural degree, including people of different education background; from the perspective of the occupation, including cadre, teacher, students, technician, accountant and worker, etc., the ages are varying form 18 to 70 years old.

8.2 Specific Process and Results

For the public participated negotiation process and results of each subproject, see details in Table 8.2-1. For the conditions of information disclosure, see details in Table 8.2-2.

The environmental influence report and environmental management plan of the project will has been published on the website of Environmental Science Research & Design Institute of Zhejiang Province since March 7, 2014. (http://www.zjshky.com.cn/NewsShow.aspx?id=983)

8.3 Conclusion

To sum up, all subprojects make the information public through posting announcement, and carry out twice of public consultation through interviewing, small forum and questionnaire, fully and effectively communicate the engineering information and environmental impact of the project with the public at project area. The comments proposed by the public are timely reported back to the building unit, and adopts the environmental advice. The results of the investigation show that, people of each subproject area fully understand the construction meaning, and are actively in favor of the project construction.

Table 8.2-1 Summary of Conditions of Public Consultation for Each Subproject

Subproject Name	Time	Implementing Unit	Site	Object of Consultation	Key Points	Requirements of Policies
A1 Perfection Project of Water Supply and Drainage Facilities of Tianzihu Area	The first time: September 12, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting Room of Tianzihu Township Government	The personnel of Tianzihu Township Government and the representatives of Gaoyu Village, Liangpeng Village, Nanbeihu Village and Xiaoyun Village, being totally more than 20 people.	The representatives attending the meeting expressed to support the project construction.	Public Participation Interim Measures for Environment Impact Assessment (HF 2006 [No. 28]) World Bank Environment Assessment Operation Policy (OP4.01)
	The second time: September 26, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting Room of Tianzihu Township Government	The personnel of Tianzihu Township Government and the representatives of Gaoyu Village, Liangpeng Village, Nanbeihu Village and Xiaoyun Village, being totally more than 20 people.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
A2 Perfection Project of Water Supply and Drainage Facilities in Meixi Area	The first time: September 12, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting Room of Meixi Township Government	The personnel of Meixi Township Government and the representatives of Jiazi Village, Meixi Village, Longkou Village, Jingwan Village, Xiaoshu Village and Dushantou Village, being totally more than 30 people.	The representatives attending the meeting expressed to support the project construction.	
	The second time: September 26, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting Room of Meixi Township Government	The personnel of Meixi Township Government and the representatives of Jiazi Village, Meixi Village, Longkou Village, Jingwan Village, Xiaoshu Village and Dushantou Village, being totally more than 30 people.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
A3 Perfection Project of Water Supply and Drainage Facilities in Tianhuangping Area	The first time: September 12, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting room of Tianhuangping Town Government	The personnel of Tianhuangping Town Government and the representatives of Yucun Village, Maji Village, Yinkeng Village and Baishuiwan Village, totally more than 20 persons.	The representatives attending the meeting expressed to support the project construction.	
			Meeting room of Dipu Town Government	The personnel of Dipu Town Government and the representatives of Xiaquan Village and Lingfeng Village, management committee personnel of Lingfeng Resort, totally more than 20 persons.		
	The second time: September 26, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation	Meeting room of Tianhuangping Town Government	The personnel of Tianhuangping Town Government and the representatives of Yucun Village, Maji Village, Yinkeng	The representatives attending the meeting expressed that the	

		Co., Ltd. (EIA unit)		Village and Baishuiwan Village, totally more than 20 persons.	environmental impact of the project is relatively small and supported the project construction.	
			Meeting room of Dipu Town Government	The personnel of Dipu Town Government and the representatives of Xiaquan Village and Lingfeng Village, management committee personnel of Lingfeng Resort, totally more than 20 persons.		
A4 Perfection Project of Water Supply and Drainage Facilities in Banshan Area	The first time: September 11, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting room of Banshan Town Government	The personnel of Banshan Town Government and the representatives of Xiaoyuan Village, totally more than 10 persons.	The representatives attending the meeting expressed to support the project construction.	
			Meeting room of Dipu Town Government	The personnel of Dipu Town Government and the representatives of Shuanghe Village, Changle Community, Hehuatang Village, Yinwan Village, totally more than 20 persons.		
	The second time: September 25, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting room of Banshan Town Government	The personnel of Banshan Town Government and the representatives of Xiaoyuan Village, totally more than 10 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
			Meeting room of Dipu Town Government	The personnel of Dipu Town Government and the representatives of Shuanghe Village, Changle Community, Hehuatang Village, Yinwan Village, totally more than 20 persons.		
A5 Perfection Project of Water Supply and Drainage Facilities in Xiaofeng Area	The first time: September 12~13, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting room of Dipu Town Government	The personnel of Dipu Town Government and the representatives of Liuzhuang Village, Heluxi Village, Wanmu Village, Dazhuyuan Village, and the management committee personnel of Lingfeng Resort, totally more than 30 persons.	The representatives attending the meeting expressed to support the project construction.	
			Meeting room of Shanshu Town Government	The personnel of Shanshu Town Government and the representatives of Tiangai Village, Liujiatang Village and Shangshu Village, totally more than 20 persons.		
			Meeting room of	The personnel of Xiaofeng Town		

			Xiaofeng Town Government	Government and the representatives of Chiwu Village, Fushi Village and Banshanchang Village, totally more than 20 persons.		
	The second time: September 26-27, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting room of Dipu Town Government	The personnel of Dipu Town Government and the representatives of Liuzhuang Village, Heluxi Village, Wanmu Village, Dazhuyuan Village, and the management committee personnel of Lingfeng Resort, totally more than 30 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
			Meeting room of Shanshu Town Government	The personnel of Shanshu Town Government and the representatives of Tiangai Village, Liujiatang Village and Shangshu Village, totally more than 20 persons.		
			Meeting room of Xiaofeng Town Government	The personnel of Xiaofeng Town Government and the representatives of Chiwu Village, Fushi Village and Banshanchang Village, totally more than 20 persons.		
A6 Expansion Project of AnJi Urban Sewage Disposal Plant	The first time: September 12~13, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting room of Dipu Town Government	The personnel of Dipu Town Government and the representatives of Liuzhuang Village, Heluxi Village, Wanmu Village, Dazhuyuan Village, and the management committee personnel of Lingfeng Resort, totally more than 30 persons.	The representatives attending the meeting expressed to support the project construction.	
			Meeting room of Shanshu Town Government	The personnel of Shanshu Town Government and the representatives of Tiangai Village, Liujiatang Village and Shangshu Village, totally more than 20 persons.		
			Meeting room of Xiaofeng Town Government	The personnel of Xiaofeng Town Government and the representatives of Chiwu Village, Fushi Village and Banshanchang Village, totally more than 20 persons.		
	The second time: September 26-27, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting room of Dipu Town Government	The personnel of Dipu Town Government and the representatives of Liuzhuang Village, Heluxi Village, Wanmu Village, Dazhuyuan Village, and the management committee personnel of Lingfeng Resort, totally more than 30 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project	

					construction.	
			Meeting room of Shanshu Town Government	The personnel of Shanshu Town Government and the representatives of Tiangai Village, Liujiatang Village and Shangshu Village, totally more than 20 persons.		
			Meeting room of Xiaofeng Town Government	The personnel of Xiaofeng Town Government and the representatives of Chiwu Village, Fushi Village and Banshanchang Village, totally more than 20 persons.		
A7. Sewage disposal system in decentralized rural area of AnJi	The first time: September 11, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting room of Zhangcun Town Government	The personnel of Zhangcun Town Government and the representatives of Zhangcun Village, Hegan Village; the personnel of Hanggai Town Government and the representatives of New Shangtang Village, Hanggai Village and Panxi Village, totally more than 30 persons.	The representatives attending the meeting expressed to support the project construction.	
			Meeting room of Zhangwu Town Government	The personnel of Zhangwu Town Government and the representatives of Zhangwu Village and Yuhua Village; the personnel of Shanchuan Town Government and the representatives of Dali Village and Gaojiatang Village; the personnel of Baofu Town Government and the representatives of Jingxi Village and Baofu Village, totally more than 40 persons.		
	The second time: September 25, 2013	Project office of AnJi County, Zhejiang Huanke Environment Consultation Co., Ltd. (EIA unit)	Meeting room of Zhangcun Town Government	The personnel of Zhangcun Town Government and the representatives of Zhangcun Village, Hegan Village; the personnel of Hanggai Town Government and the representatives of New Shangtang Village, Hanggai Village and Panxi Village, totally more than 30 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
			Meeting room of Zhangwu Town Government	The personnel of Zhangwu Town Government and the representatives of Zhangwu Village and Yuhua Village; the personnel of Shanchuan Town Government and the representatives of Dali Village and Gaojiatang Village; the personnel of Baofu Town Government and the representatives of Jingxi Village and Baofu Village, totally more than 40		

				persons.		
F1. Trial project of decentralized rural sewage disposal system of Fuyang City (the first batch)	The first time: July 20, 2013	Project office of Fuyang City, Fuyang Water Co., Ltd., EIA Unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Hongzhuang Village, Yinhu Subdistrict	The representatives of villagers of Hongzhuang Village, totally more than 10 persons.	The representatives attending the meeting expressed to support the project construction.	
	August 10, 2013		Pengjia Village in Wanshi Town	The representatives of villagers of Hongzhuang Village, totally more than 10 persons.		
	August 15, 2013		Yankou Village in Dayuan Town	The representatives of villagers of Yankou Village, totally more than 30 persons.		
	The second time: November 5, 2013	Project office of Fuyang City, Fuyang Water Co., Ltd., EIA Unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Hongzhuang Village, Yinhu Subdistrict	The representatives of villagers of Hongzhuang Village, totally more than 10 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
	November 12, 2013		Pengjia Village in Wanshi Town	The representatives of villagers of Hongzhuang Village, totally more than 10 persons.		
	November 19, 2013		Yankou Village in Dayuan Town	The representatives of villagers of Yankou Village, totally more than 30 persons.		
F2. Trial project of sewage interception piping for rural domestic waste in Fuyang City (the first batch)	The first time: July 25, 2013	Project office of Fuyang City, Fuyang Water Co., Ltd., EIA Unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Fuchun Subdistrict Office	The representatives of villagers of Qiufeng Village and Sanqiao Village, totally more than 10 persons.	The representatives attending the meeting expressed to support the project construction.	
	August 15, 2013		Huanggongwang Village in Dongzhou Street	The representatives of villagers of Huanggongwang Village and Jilongshan, totally more than 10 persons.		
	August 20, 2013		Meeting room of Yinhu Subdistrict	The representatives of villagers of Gaoqiao Village, Shouxiang Village and Xinchang Village, totally more than 20 persons.		
	August 25, 2013		Dongqiao Village in Dongqiao Town	The representatives of villagers of Dongqiao Village, totally more than 10 persons.		
	The second time: November 6, 2013	Project office of Fuyang City, Fuyang Water Co., Ltd., EIA Unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Fuchun Subdistrict Office	The representatives of villagers of Qiufeng Village and Sanqiao Village, totally more than 10 persons.	The representatives attending the meeting expressed that the environmental impact of the project is	

					relatively small and supported the project construction.	
	November 15, 2013		Huanggongwang Village in Dongzhou Street	The representatives of villagers of Huanggongwang Village and Jilongshan, totally more than 10 persons.		
	November 20, 2013		Meeting room of Yinhu Subdistrict	The representatives of villagers of Gaoqiao Village, Shouxiang Village and Xinchang Village, totally more than 20 persons.		
	November 27, 2013		Dongqiao Village in Dongqiao Town	The representatives of villagers of Dongqiao Village, totally more than 10 persons.		
F3. Perfection Project of Joint Water Supply and Drainage Facilities for Rural Area of Changkou Town, Fuyang City	The first time: July 16, 2013	Project office of Fuyang City, Fuyang Water Co., Ltd., EIA Unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Changkou Village of Changkou Town	The villager representatives of Changkou Village and Yesheng Village, totally more than 10 persons.	The representatives attending the meeting expressed to support the project construction.	
	The second time: November 12, 2013	Project office of Fuyang City, Fuyang Water Co., Ltd., EIA Unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Changkou Village of Changkou Town	The villager representatives of Changkou Village and Yesheng Village, totally more than 10 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
F4. Perfection Project of Joint Water Supply and Drainage Facilities for Rural Area of Xindeng Town, Fuyang City	The first time: July 21, 2013	Project office in AnJi County, EIA unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Xindeng Town Government	The personnel of Xindeng Town Government and the representatives of Tashan Village, Gonghe Village, Bingxian Village, Shuangxi Village, NAnJin Village, Chengzhuang Village and Songxi Village, totally more than 70 persons.	The representatives attending the meeting expressed to support the project construction.	
	The second time: November 24, 2013	Project office in AnJi County, EIA unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Xindeng Town Government	The personnel of Xindeng Town Government and the representatives of Tashan Village, Gonghe Village, Bingxian Village, Shuangxi Village, NAnJin Village, Chengzhuang Village and Songxi Village, totally more than 70 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
F5. Perfection Project of Joint Water Supply and Drainage Facilities for Rural Area of	The first time: July 20, 2013	Project office in AnJi County, EIA unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Dayuan Town Government	The personnel of Dayuan Town Government and the representatives of Dayuan Village and Tingshan Village, totally more than 30 persons.	The representatives attending the meeting expressed to support the project	

Dayuan Town, Fuyang City					construction.	
	The second time: November 23, 2013	Project office in AnJi County, EIA unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Dayuan Town Government	The personnel of Dayuan Town Government and the representatives of Dayuan Village and Tingshan Village, totally more than 30 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
F6. Fuyang Longyang Sewage Disposal Project	The first time: July 25, 2013	Project office in AnJi County, EIA unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Wanshi Town Government	The villager representatives are more than 10 persons.	The representatives attending the meeting expressed to support the project construction.	
	The second time: November 26, 2013	Project office in AnJi County, EIA unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Dongqiao Town Government	The villager representatives are more than 10 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
F7. The phase IV project of Fuyang Sewage Disposal Plant	The first time: July 27, 2013	Project office of Fuyang City, Fuyang Water Co., Ltd., EIA Unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Fuchun Subdistrict Office	The representatives of Fuchun Sub-district Office, Zhongda Western Suburbs Peninsula and East Xinmin Village, totally more than 30 persons.	The representatives attending the meeting expressed to support the project construction.	
	2013 年 08 月 22 日		Meeting room of Dongzhou Subdistrict	The representatives of Dongzhou Subdistrict Office, Jilongshan Village, Huanggongwang Village, Fuchunjiang Village and Xinsha Village, totally more than 40 persons.		
	The second time: November 23, 2013	Project office of Fuyang City, Fuyang Water Co., Ltd., EIA Unit Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Fuchun Subdistrict Office	The representatives of Fuchun Sub-district Office, Zhongda Western Suburbs Peninsula and East Xinmin Village, totally more than 30 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
	November 30, 2013		Meeting room of Dongzhou Subdistrict	The representatives of Dongzhou Subdistrict Office, Jilongshan Village, Huanggongwang Village, Fuchunjiang Village and Xinsha Village, totally more		

				than 40 persons.		
L1. Perfection Project of Water Supply and Drainage Facilities of Urban Area of Longquan City (including the modification project of lanes and alleys)	The first time: November 14, 2013	The project office of Longquan City, Longqian Water Supply and Discharge Co., Ltd., EIA unit Zhejiang Bohua Environment Technology & Engineering Co., Ltd.	Meeting room of office building of the Development and Reform Commission	The representatives of Nandayang Water Plant, Jianchi Subdistrict, Nandayang Community, Chengdong Community, Longquan Environmental Protection Agency and other surrounding villages and communities and the environmental experts, totally about 30 persons.	The representatives attending the meeting expressed to support the project construction.	
	The second time: November 28, 2013	The project office of Longquan City, Longqian Water Supply and Discharge Co., Ltd., EIA unit Zhejiang Bohua Environment Technology & Engineering Co., Ltd.	Meeting room of office building of the Development and Reform Commission	The representatives of Nandayang Water Plant, Jianchi Subdistrict, Nandayang Community, Chengdong Community, Longquan Environmental Protection Agency and other surrounding villages and communities and the environmental experts, totally about 30 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
	December 4, 2013		Meeting room of office building of the Development and Reform Commission	The representatives of Nandayang Water Plant, Jianchi Subdistrict, Nandayang Community, Chengdong Community, Longquan Environmental Protection Agency and other surrounding villages and communities and the environmental experts, totally about 30 persons.		
L2. Water supply and drainage project of Xiaomei Town, Longquan City	The first time: September 5, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection Co., LTD.	Meeting room of Meixi Town Government	The personnel of Xiaomei Town Government and the cadres and representatives of Meisi Village and Meisan Village, totally 8 persons.	The representatives attending the meeting expressed to support the project construction and hoped to carry out the project as soon as possible.	
	The second time: October 21, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection Co., LTD.	Meeting room of Meixi Town Government	The personnel of Xiaomei Town Government and the cadres and representatives of Meisi Village and Meisan Village, totally 10 persons.	The representatives attending the meeting expressed that the environmental impact of the project was relatively small and would fully support and coordinate the construction of the project.	
L3. Water supply and drainage project of Chatian Town,	The first time: September 6, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda	Meeting room of Chatian Town Government	The personnel of Chatian Town Government and the cadres and representatives of Chasan Village, totally	The representatives attending the meeting expressed to support	

Longquan City		Environmental Protection Co., LTD.		7 persons.	the project construction and hoped to carry out the project as soon as possible.	
	The second time: October 22, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection Co., LTD.	Meeting room of Chatian Town Government	The personnel of Chatian Town Government and the cadres and representatives of Chasan Village, totally 8 persons.	The representatives attending the meeting expressed that the environmental impact of the project was relatively small and would fully support and coordinate the construction of the project.	
L4. Water supply and drainage project of Lanju Town, Longquan City	The first time: September 9, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection Co., LTD.	Meeting room of Lanju Town Government	The personnel of Lanju Town Government and the cadres and representatives of Wumeiyang Village, totally 7 persons.	The representatives attending the meeting expressed to support the project construction and hoped to carry out the project as soon as possible.	
	The second time: October 23, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection Co., LTD.	Meeting room of Lanju Town Government	The personnel of Lanju Town Government and the cadres and representatives of Wumeiyang Village, totally 8 persons.	The representatives attending the meeting expressed that the environmental impact of the project was relatively small and would fully support and coordinate the construction of the project.	
L5. Water supply and drainage project of Badu Town, Longquan City	The first time: September 10, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection Co., LTD.	Meeting room of Badu Town Government	The personnel of Badu Town Government and the cadres and representatives of Badusi Village and Jitian Village, totally 8 persons.	The representatives attending the meeting expressed to support the project construction and hoped to carry out the project as soon as possible.	
	The second time: October 21, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection	Meeting room of Badu Town Government	The personnel of Badu Town Government and the cadres and representatives of Badusi Village and Jitian Village, totally 10 persons.	The representatives attending the meeting expressed that the environmental impact	

		Co., LTD.			of the project was relatively small and would fully support and coordinate the construction of the project.	
L6. Water supply and drainage project of Anren Town, Longquan City	The first time: November 5, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection Co., LTD.	Meeting room of Anren Town Government	The personnel of Anren Town Government and the cadres and representatives of Huangshixuan Village and Xiangbian Village, totally 7 persons.	The representatives attending the meeting expressed to support the project construction and hoped to carry out the project as soon as possible.	
	The second time: October 25, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection Co., LTD.	Meeting room of Anren Town Government	The personnel of Anren Town Government and the cadres and representatives of Huangshixuan Village and Xiangbian Village, totally 6 persons.	The representatives attending the meeting expressed that the environmental impact of the project was relatively small and would fully support and coordinate the construction of the project.	
L7. Trial project of decentralized rural domestic sewage disposal system in Longquan City, Zhejiang Province	The first time: September 12~14, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection Co., LTD.	Meeting rooms of Hecun Village, Shangwu Village, Shuita Village, Songqu Village, Xiaohuangnan Village and Dasai Village	The cadres and representatives of village committee of the Hecun Village, totally 9 persons; the cadres and representatives of village committee of the Shangwu Village and Jibian Village, totally 15 persons; the cadres and representatives of village committee of the Shuita Village, totally 9 persons; the cadres and representatives of village committee of the Songqu Village, totally 13 persons; the cadres and representatives of village committee of the Xiaohuangnan Village, totally 12 persons; the cadres and representatives of village committee of the Dasai Village, totally 6 persons;	The representatives attending the meeting expressed to support the project construction and hoped to carry out the project as soon as possible.	
	The second time: October 24~26, 2013	The project office of Longquan City, EIA unit Zhejiang Shangda Environmental Protection Co., LTD.	Meeting rooms of Hecun Village, Shangwu Village, Shuita Village, Songqu Village, Xiaohuangnan	The cadres and representatives of Hecun Village, Shangwu Village, Jibian Village, Shuita Village, Songqu Village, Xiaohuangnan Village and Dasai Village, totally about 5~20 persons.	The representatives attending the meeting expressed that the environmental impact of the project was relatively small and	

			Village and Dasai Village		would fully support and coordinate the construction of the project.	
T1. Improvement project of water supply and drainage system for villages in eastern section of Tiantai Basin	The first time: August 29, 2013	Project office of Tiantai County, Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Tantou Town Government	The personnel of Tantou Town Government and the cadres and representatives of Shishan Village, Dingli Village, Xia'aoqiu Village, Hu'an Village and Yushan Village, totally more than 50 persons.	The representatives attending the meeting expressed to support the project construction.	
			Meeting room of Hongtao Town Government	The personnel of Hongtao Town Government and the representatives of Shiji Village and Xidong Village, totally more than 20 persons.		
			Meeting rooms of Xiafang Village and Huangwu Village of Sanhe Town	The representatives of Xiafang Village and Huangwu Village, totally more than 20 persons.		
	The second time: November 28, 2013	Project office of Tiantai County, Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Tantou Town Government	The personnel of Tantou Town Government and the cadres and representatives of Shishan Village, Dingli Village, Xia'aoqiu Village, Hu'an Village and Yushan Village, totally more than 50 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
			Meeting room of Hongtao Town Government	The personnel of Hongtao Town Government and the representatives of Xiangjia Village and Xidong Village, totally more than 20 persons.		
			Meeting room of Sanhe Town Government	The personnel of Sanhe Town Government and the representatives of Xiafang Village and Huangwu Village, totally more than 20 persons.		
T2. Improvement project of water supply and drainage system for villages in eastern section of Tiantai Basin	The first time: August 29, 2013	Project office of Tiantai County, Zhejiang Huanke Environmental Consultancy Co., Ltd.	Lige Village of Pingqiao Town	The representatives of Lige Village, totally more than 20 persons	The representatives attending the meeting expressed to support the project construction.	
			Meeting room of Dongqiao Town Government	The personnel of Pingqiao Town Government and the representatives of Pingzhenjie Village and Xiajie Village, totally more than 30 persons.		

			Meeting room of Jietou Town Government	The personnel of Jietou Town Government and the representatives of Qinan Village and Yezhai, totally more than 20 persons		
	The second time: November 29, 2013	Project office of Tiantai County, Zhejiang Huanke Environmental Consultancy Co., Ltd.	Agriculture office of Jietou Town	The personnel of Jietou Town Government and the representatives of Qinan Village and Yezhai, totally more than 20 persons	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
			Meeting room of Dongqiao Town Government	The personnel of Pingqiao Town Government and the representatives of Pingzhenjie Village, Xiajie Village and Lige Village, totally more than 30 persons.		
T3. Improvement project of rural water supply and drainage system for the north central section of of Tiantai Basin	The first time: August 29, 2013	Project office of Tiantai County, Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Baihe Town Government	The personnel of Baihe Town Government and the representatives of Baihedian Village, Xinlou Village and Jingtou Village, totally more than 30 persons.	The representatives attending the meeting expressed to support the project construction.	
			Shankeshan Village of Shifeng Subdistrict	The representatives of Shankeshan Village, more than 10 persons.		
	The second time: November 28-29, 2013	Project office of Tiantai County, Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Baihe Town Government	The personnel of Baihe Town Government and the representatives of Baihedian Village, Xinlou Village and Jingtou Village, totally more than 20 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
			Shankeshan Village of Shifeng Subdistrict	The representatives of Shankeshan Village, more than 10 persons.		
T4. Improvement project of water supply and discharge system for decentralized rural area of Tiantai County	The first time: August 28, 2013	Project office of Tiantai County, Zhejiang Huanke Environmental Consultancy Co., Ltd.	Jianshe Village and Langshuqian Village of Sanhe Town	The representatives of Jianshe Village and Langshuqian Village, totally more than 20 persons.	The representatives attending the meeting expressed to support the project construction.	
			Qianyang Village and Shantouzheng Village of Nanping Town	The representatives of Qianyang Village and Shantouzheng Village, totally more than 20 persons.		

			Xinzhong Village of Pingqiao Town and Xiaozhuang Village of Baihe Town	The representatives of Xinzhong Village and Xiazhuang Village, more than 20 persons.		
			Angu Village of Chicheng Subdistrict and Bixiazheng Village of Shifeng Subdistrict	The representatives of Angu Village and Bixiazheng Village, totally more than 20 persons.		
	The second time: November 28-29, 2013	Project office of Tiantai County, Zhejiang Huanke Environmental Consultancy Co., Ltd.	Meeting room of Sanhe Town Government	The personnel of Sanhe Town Government and representatives of Langshuqian Village and Jianshe Village, totally more than 20 persons.	The representatives attending the meeting expressed that the environmental impact of the project is relatively small and supported the project construction.	
			Bixiazheng Village of Shifeng Subdistrict	The representatives of Bixiazheng Village, totally more than 10 persons.		
			Meeting room of Dongqiao Town Government	The personnel of Pingqiao Town Government and the representatives of Xinzhong Village, more than 10 persons.		
			Xiazhuang Village of Baihe Town	The representatives of Xiazhuang Village, totally more than 10 persons.		
			Meeting room of Nanping Town Government	The personnel of Nanping Town Government and the representatives of Qianyang Village and Shantouzheng Village, totally more than 20 persons.		
			Angu Village of Chicheng Subdistrict	The representatives of Angu Village, totally more than 10 persons.		

Table 8.2-2 Public Information Disclosure of Each Subproject

Subproject Name	Time	Site	mediacy
A1 Perfection Project of Water Supply and Drainage Facilities of Tianzihu Area	September 9-20, 2013 September 26-October 12, 2013	Tianzihu Town Government, Xigang Village, Xiaoyun Village, Zhangzhi Village, Guyuan Village, Liangpeng Village, Gaoyu Village and Nanbeihu Village.	The announcement is posted on the column publicity of town government and village committee.
A2 Perfection Project of Water Supply and Drainage Facilities in Meixi Area	September 9-20, 2013 September 26-October 12, 2013	Meixi Town Government, Jiazi Village, Meixi Village, Longkou Village, Jingwan Village, Huaguang Village, Banqiao Village, Shilong Village, Xiaoshu Village, Dushantou and Luxi Village.	The announcement is posted on the column publicity of town government and village committee.

A3 Perfection Project of Water Supply and Drainage Facilities in Tianhuangping Area	September 9-20, 2013 September 26-October 12, 2013	Dipu Town Government, Lingfeng Resort, Tianhunagping Town Government, Bimen Village, Xiaquan Village, Lingfeng Village, Henglu Village, Shanhe Village, Yucun Village, Maji Village, Jingcun Village, Yinkeng Village, Baishuiwan Village and Gangkou Village.	The announcement is posted on the column publicity of town government and village committee.
A4 Perfection Project of Water Supply and Drainage Facilities in Banshan Area	September 9-20, 2013 September 26-October 12, 2013	Banshan Town Government, Dipu Town Government, Xiaoyuan Village, Kangshan Village, Shuanghe Village, Changle Community, Wushan Temple Village, Jiqingqiao Village, Hehuatang Village, Yinwan Village, Sanguan Village and Zhaojiashang Village.	The announcement is posted on the column publicity of town government and village committee.
A5 Perfection Project of Water Supply and Drainage Facilities in Xiaofeng Area	September 9-20, 2013 September 26-October 12, 2013	Xiaofeng Town, Banshan Town, Dipu Town, Lingfeng Resort, Shangshu Town, Xiaofeng Community, Chengbei Community, Dongshan Community, Shiguqiao Village, Zhukouxi Village, Chiwu Village, Fushi Village, Zhugenqian Village, Guanyinqiao Village, Luosifang Village, Banshanchang Village, Liuzhuang Village, Heluxi Village, Wanmu Village, Dazhuyaun Village, Jianshan Village, Hengshanwu Village, Luocun Village, Shangshu Village, Tiangai Village, Liujiatang Village.	The announcement is posted on the column publicity of town government and village committee.
A6 Expansion Project of AnJi Urban Sewage Disposal Plant	September 9-20, 2013 September 26-October 12, 2013	Dipu Town, Shuangyi Village, Shuangxikou Village, Nanbeizhuang Village, Yishita Village	The announcement is posted on the column publicity of town government and village committee.
A7. Sewage disposal system in decentralized rural area of AnJi	September 9-20, 2013 September 26-October 12, 2013	Baofu Town, Meixi Town, Shanchuan Town, Xilong Town, Banshan Town, Zhangcun Town, Zhangwu Town, Hanggai Town, Dipu Town, Shangshu Town, Xiaofeng Town, Jingxi Village, Changlingai Village, Hongmiao Village, Xiaoxikou Village, Gaojiatang Village, Dali Village, Majianong Village, Houhe Village, Xilong Village, Shangshugan Village, Zhangcun Village, Zhangwu Village, Yuhua Village, Jingwu Village, Hanggai Village, Tangshe Village, Panxi Village, Wucun Village, Majia Village, Xinshangtang Village, Huangdu Village, Changtan Village, Hegan Village, Gaoshan Village, Shiruan Village, Penghu Village, Baofu Village, Lujia Villagem Ancheng Village, Anshan Village, Shancun Village, Baiyang Village, Minle Village, Shangwu Village.	The announcement is posted on the column publicity of town government and village committee.
F1. Trial project of decentralized rural sewage disposal system of Fuyang City (the first batch)	July 9-23, 2013 August 9-23, 2013	Yinhu Subdistrict, Hongzhuang Village, Wanshi Town, Pengjia Village, Dayuan Town, Yankou Village	The announcement is posted on the column publicity of town government and village committee.
F2. Trial project of sewage interception piping for rural domestic waste in Fuyang City (the first batch)	July 9-23, 2013 August 9-23, 2013	Dongzhou Subdistrict, Huanggongwang Village, Jilongshan Village; Fuchun Subdistrict, Qiufeng Village, Sanqiao Village; Yinhu Subdistrict, Gaoqiao Village, Shouxiang Village, Xinchang Village; Dongqiao Town, Dongqiao Village	The announcement is posted on the column publicity of town government and village committee.
F3. Perfection Project of Joint Water Supply and Drainage Facilities for Rural Area of Changkou Town, Fuyang City	July 9-23, 2013 August 9-23, 2013	Changkou Town, Changkou Village, Yesheng Village	The announcement is posted on the column publicity of town government and village committee.
F4. Perfection Project of Joint Water Supply and Drainage Facilities for Rural Area of Xindeng Town, Fuyang City	July 9-23, 2013 August 9-23, 2013	Xindeng Town, Tashan Village, Gonghe Village, Bingxian Village, Shuangxi Village, NAnJin Village, Chengzhuang Village and Songxi Village	The announcement is posted on the column publicity of town government and village committee.

F5. Perfection Project of Joint Water Supply and Drainage Facilities for Rural Area of Dayuan Town, Fuyang City	July 9-23, 2013 August 9-23, 2013	Dayuan Town, Dayuan Village and Tingshan Village	The announcement is posted on the column publicity of town government and village committee.
F6. Fuyang Longyang Sewage Disposal Project	July 9-23, 2013 August 9-23, 2013	Wanshi Town and Dongqiao Town	The announcement is posted on the column publicity of town government.
F7. The phase IV project of Fuyang Sewage Disposal Plant	July 15-29, 2013 August 27-September 10, 2013	Dongzhou Subdistrict, Fuchun Subdistrict, Jilongshan (Minfeng) Village, Zhongda Western Suburbs Peninsula, Huanggongwang (Huashu) Village, Xinsha Village, East XInmin Village, Fuchunjiang (Xiaosha, Housahjiang, Jiangling) Village, the First Primary School of Dongzhou, School for the Blind of Fuyang	The announcement is posted on the column publicity of Subdistrict, Village Committee and Schools.
L1. Perfection Project of Water Supply and Drainage Facilities of Urban Area of Longquan City (including the modification project of lanes and alleys)	August 1-14, 2013 August 16-29, 2013	Jianchi Subdistrict, Nanqin Village and Chatan Village	The announcement is posted on the column publicity of Subdistrict and Village Committee.
L2. Water supply and drainage project of Xiaomei Town, Longquan City	September 2-16, 2013 September 23-October 11, 2013	Badu Town Government	The announcement is posted on the column publicity of town government.
L3. Water supply and drainage project of Chatian Town, Longquan City	September 2-16, 2013 September 23-October 11, 2013	Anren Town Government	The announcement is posted on the column publicity of town government.
L4. Water supply and drainage project of Lanju Town, Longquan City	September 2-16, 2013 September 23-October 11, 2013	Xiaomei Town Government	The announcement is posted on the column publicity of town government.
L5. Water supply and drainage project of Badu Town, Longquan City	September 2-16, 2013 September 23-October 11, 2013	Chatian Town Government	The announcement is posted on the column publicity of town government.
L6. Water supply and drainage project of Anren Town, Longquan City	September 2-16, 2013 September 23-October 11, 2013	Lanju Town Government	The announcement is posted on the column publicity of town government.
L7. Trial project of decentralized rural domestic sewage disposal system in Longquan City, Zhejiang Province	September 2-16, 2013 September 23-October 11, 2013	Shangwu Village of Tashi Subdistrict and He Village of Xijie Subdistrict.	The announcement is posted on the column publicity of Village Committee.
T1. Improvement project of water supply and drainage system for villages in eastern section of Tiantai Basin	August 28-September 11, 2013 November 18-December 2, 2013	Tantou Town, Sanhe Town, Hongchou Town, Hu'an Village, Wubai Village, Dongchen Village, Changcui Village, Yushan Village, Yanfan Village, Gangfeng Village, Xinan Village, Bayi Village, Paimenchen Village, Dongheng shangzhai Village, Dongheng Xiazhai Village, Yanxiaqiao Village, Tantou Village, Huangwuyang Village, Shishan Village, Dahuangxu Village, Dingli Village, Huangwu Village, Yangtou Village, Xiafang Vilage, Shantouyang Village, Tangxia Village, Xiajianxi Village, Daheng Village, Tangshang Village, Yandian Village, Xiangjia Village, Dayi Village, Da'er Village, Dasan Village, Shiji	The announcement is posted on the column publicity of town government and village committee.

		Village, Xiyang Village, Pingyuan Village and Xidong Village.	
T2. Improvement project of water supply and drainage system for villages in eastern section of Tiantai Basin	August 28-September 11, 2013 November 18-December 2, 2013	Pingqiao Town, Jietou Town, Bajiaoting Village, Pingzhenjie Village, Xiajie Village Machechen Village, Xiayangtian Village, Xiayangpan Village, Luxiaqiu Village, Shanzhai Village, Xiayuandian Village, Shizhu Village, Dongtangxia Village, Xindong Village, Changyangxu Village, Changyang Village, Shanqian Village, Lige Village, Shantoupang Village, Zhuangqian Villlage, Maiganshan Village, Xinwuxia Village, Zhuanghou Village, Hujing Village, Zhangsi Village, Xitouyang Village, Maoyang Village, Zhoukantou Village, Xiawang Village, Tunqiao Village, Shangpang Village, Hou Village, Dieshi Village, Shangbai Village, Jieyi Village, Jie'er Village, Jiesan Village, Jiesi Village, Yezhai Village, Butoujie Village, Butou Village, Chaoyang Village, Qinan Village and Daqishan Village.	The announcement is posted on the column publicity of town government and village committee.
T3. Improvement project of rural water supply and drainage system for the north central section of of Tiantai Basin	August 28-September 11, 2013 November 18-December 2,2013	Chicheng Subdistrict, Shifeng Subdistrict, Fuxi Subdistrict, Baihe Town, Jiufeng Village, Tianyangchen Village, Potang Village, Lukou Village, Qiaoxia Village, Kengbian Village, Badu Village, Xiabaoyuan Village, Wanshanzhang Village, Shangkeshan Village, Puqian Village, Wanshan Village, Guantangyu Village, Tangxiading Village, Guantang Village, Sanlisong Village, Dalucao Village, Xiayu Village, Xiayuanxu Village, Shangwang Village, Xiagangyao Village, Shibanlu Village, Yu Village, Jingtou Village, Dengtou Village, Cheng Village, Zhegufan Village, Xinlou Village, Daluxia Village, Shanmaoke Village, Xiaotianlou Village, Shangzhai Village, Xiazhai Village, Xijian Village, Hefangzhao Village, Baihedian Village, Wenxi Village, Hexixin Village, Zhongze Village	The announcement is posted on the column publicity of Subdistrict and Village Committee.
T4. Improvement project of water supply and discharge system for decentralized rural area of Tiantai County	August 28-September 11, 2013 November 18-December 2,, 2013	Chicheng Subdistrict, Shifeng Subdistrict, Fuxi Subdistrict, Jietou Town, Baihe Town, Sanhe Town, Hongchou Town, Pingqiao Town, Shiliang Town, Nanping Town, Yongxi Town, Leifeng Town, Sanzhou Town, Angu Village, East Hengshan Village, Dong'ao Village, Bixizheng Village, Shuanglian Village, Shangqiu Village, Shantouqiu Village, Bixiashi Village, Meng'ao Village, Yanxiayang Village, Houtian Village, Shitangxu Village, Aokou Village, Aoli Village, Louxia Village, Xiache Village, Xinzhong Village, Wudong Village, Fenglian Village, Xiacao Village, Xiazhuang Village, Xiaguoyang Village, Changtanglu Village, Toujiyan Village, Langshuqian Village, Jianshe Village, Xiajiao Village, Baoshan Village, Minggong Village, Zhangjiatong Village, Jiuzhe Village, Hou'an Village, Huqiu Village, Shantouxia Village, Jiyun Village, Shuagnxi Village, Jixi Village, Xiatang Village, Qianyang Village, Shantouzheng Village, Zhuangtang Village, Cuijia Village, Xiawu Village, Shuangfeng Village, Paimen Village, Yongxi Village, Daliuxi Village, Huangshui Village, Hanyan Village.	The announcement is posted on the column publicity of Subdistrict and Village Committee.

9 Environmental Impact Assessment Framework of Scattered Rural Sewage Treatment Project

The project covers AnJi country in Zhebei mountain area, Fuyan City in Hangzhou Jianxian County, Tiantai County in Taizhou City and Longquan City in Lishui City, and includes 30 subprojects, namely 28 constructive subprojects in four counties and cities and 2 organization-strengthen subprojects proposed by provincial project offices.

The Project is implemented in two stages: the first stage includes 16 subprojects in four counties (cities), namely the short list projects in the Report; the second stage is framework project.

At present, town sewage treatment project and the first-batch distributed rural in the four regional subprojects have finished environmental evaluation, and other distributed processing villages will be identified and selected in the following construction. The present environmental evaluation doesn't cover the villages to be identified in the future. In order to provide convenience for the following-identified villages to develop environment impact evaluation, environment evaluation framework is put forward as the basis thereof.

9.1 Overview

The general environmental impact assessment framework includes the project scope, composition, progress, etc.; environmental background of the project area and main environmental influence; evaluation basis, institution, evaluation arrangement, examination arrangement, management, progress, etc.

Project environment background is discussed in Chapter 2, and the main environmental impact can be referred the influence predicting outcomes of decentralized rural sewage disposal project. Assessment basis, organization and other contents are in Chapter 1. The project scope, composition, schedule, assessment arrangement, examination arrangement, the performed drainage water quality and other relevant contents will be stated here.

9.2 Project Scope, Composition and Progress

The scope of this subproject is the rural scattered domestic sewage treatment project outside of the first batch of four counties and city of AnJi County, Fuyang City, Tiantai County and Longquan City involved in Zhejiang rural sewage treatment project.

The subproject includes a few of public toilets, sewage collection pipes and sewage centralized disposal facilities.

The implementation period of the Project is six years.

9.3 Evaluation Arrangement and Examination Arrangement

This project is overall supervised by project office of Zhejiang Province, and the

subproject offices of AnJi County, Fuyang City, Tiantai County and Longquan City will organize to assess the environmental impact for domestic sewage disposal project of the rest villages of the decentralized rural sewage disposal subprojects in their respective county and city.

Select according to the security policy system (*Environmental Evaluation*) (OP, BP and GP4.01) of the World Bank, *Culture Heritage Protection* (OP4.11), *Natural Habitat* (OP/B 4.04), *Dam Security* (OP/BP 4.37), choose under the arrangement of various subproject offices and under the guidance of provincial project offices, and evaluate according to the security policy touched. In the process of project selection, areas with significant environmental impact and environmental sensitive areas (such as natural heritage area) shall be avoided to ensure that the environmental impact category can reach Class B.

Based on the security policy system of the World Bank, screening is done under the guidance of the provincial project office and the arrangement of various subproject offices, and evaluation is conducted based on the security policy touched.

Environment impact list is formulated for daily treatment below 50,000t in centralized processing of domestic sewage based on *List of Classification Management on Environmental Impact Assessment of Construction Project* (Order No. 2 of Ministry of Environmental Protection) issued by the Ministry of Environmental Protection in 2008.

The environmental impact report is reviewed and examined by the environmental expert of the World Bank. According to the limits for examining and approving authority of the national environmental impact assessment, the environmental impact report of this subproject shall be approved by the project subordinate county (city) environmental protection agency.

Based on the stipulation in *the Law of the People's Republic of China on Environmental Impact Assessment*, the EIA system must be executed for all newly-built, expanded and reconstruction projects; all construction projects with influence on the environment must be carried out according to law by performing the "Three Simultaneousness" system of simultaneous design, simultaneous construction and simultaneous operation of environmental protection facilities and main works.

9.4 Task Procedures for Environmental impact Assessment

(1) The environmental impact report is prepared and meets the requirement of environmental impact assessment framework.

(2) The environmental impact report is reviewed and examined by the environmental experts of the World Bank.

(3) The environmental impact report on AnJi County scattered rural sewage treatment project is approved by AnJi County Environmental Protection Agency; the environmental impact report on Fuyang City scattered rural sewage treatment project is approved by Fuyang Municipal Environmental Protection Bureau; the environmental impact report on Tiantai County scattered rural sewage treatment project is approved by Tiantai County Environmental Protection Agency; the environmental impact report on Longquan City scattered rural sewage treatment

project is approved by Longquan Municipal Environmental Protection Bureau.

(4) The environmental impact report is submitted to the World Bank.

(5) The environmental evaluation report is started to execute.

9.5 Water Quality Standard for the Performed Drainage

1. Rural sewage treatment system construction adopts the treatment process of simple process and convenient operation and maintenance.

2. For the villages out of the water source protection area, the rural domestic sewage shall be discharged through proper process treatment. The following limiting value requirements of pollutant shall be met: CODCr≤100mg/1, BOD5≤30mg/1, TN≤25mg/1 and SS≤30mg/1. When the villages are located near the functional areas of Class III surface water, the outlet water can't discharged directed to the nearby functional water body, but shall be discharged into the local rural ponds, channels and farmland system to form water cycle.

3. The domestic sewage in the water source protection area shall not be discharged after treatment, but shall be treated and diffused through land percolation treatment system.

① The water quality, before entering land percolation treatment system, shall be treated and meet the following pollutant index limit: CODCr ≤ 100mg/L, BOD5 ≤ 30mg/L, NH3-N ≤ 25mg/L, SS ≤ 30mg/L

② Land percolation treatment system shall be designed by selecting proper hydraulic loading and area loading according to the nature of soil. The distance between the border of percolation treatment system and the earth surface water shall be over 50m; the pipeline set of land percolation system shall exceed 1m over the ground water level. If the ground water depth is less than 1m, soil piling methods shall be adopted to make the pipeline set exceed 1m over ground water level.

③ Land percolation treatment system shall monitor the treatment effects. After the finishing of sewage treatment facilities in various water source protection areas, well shall be dug in the place of 10m on the upstream of land percolation treatment field and 50m on the downstream of the percolation treatment system border, in order to monitor the ground water quality. The ground water quality of monitoring well shall meet the Class III standard of *Quality Standard for Ground Water* (GB14848-93). If the background value of original ground water can't meet the Class III standard, the ground water quality at the downstream of the land percolation treatment field shall

not exceed the background value of ground water quality at the upstream of monitoring well.

4. Rural domestic sewage water used for farmland irrigation and fishery industry shall meet the regulations in *Standard for Irrigation Water Quality (*GB5084-2005*)* and Water Quality Standard for Fisheries (GB11607-89). The recycling water used for ornamental sight water (riverway) shall meet the requirement regulated in the current national standard: The *Reuse of Urban Recycling Water-Water Quality Standard for Scenic Environment Use* (GB/T18921-2002).

9.6 Framework of Environmental Protection Measures

9. 6.1 Environmental protection measures in the design stage

During the project design stage, the environment impact factors shall be fully considered, and the site selection of sewage treatment facilities shall avoid the sensitive areas of the project area, such as the natural conservation area, geological disaster area and the habitat with ecological sensitivity, good vegetation area, basic farmland preservation area, etc.; culture relic protection sites, etc. shall be avoided for the site selection of sewage treatment facilities and pipe network project; the flood basin shall be also avoided for the site selection of sewage treatment facilities.

9. 6.2 Environmental protection measures in the construction stage

See Table 9.6-1 for the detailed measures to reduce environmental impacts

9. 6.3 Environmental protection measures in the operation stage

Considering the small amount of sludge quantity generated by sewage disposal facilities in various villages, effective dehydration is hard to be performed. Therefore, dehydration will not be conducted. The sewage in the village is mainly domestic waste water, which will not cause the heavy metal exceed standard in the sludge. Therefore, the domestic sewage is recommended to be used in agriculture properly to meet the demand of rural organic fertilizer. Otherwise, fecal suction truck is applied at regular intervals to send it to the urban sewage disposal plant for treatment.

The rack dreg shall be timely cleared, done with sanitary landfill or burned together with household refuse.

The environmental protection/management framework is shown in Table 9.6-1 in details.

Table 9.6-1 Environmental Protection/Management Plan Framework of Decentralized Rural Domestic Sewage disposal Project

Subproject	Type of Impacts	Influence Mitigation Measures	Executor	Supervisor
Rural decentralized domestic sewage disposal subproject	Atmospheric Environment	Dust suppression measures such as watering or covering the storage yard are adopted for the temporary stacking place, and covering the compartment with canvas and watering on the transport route with soil road are adopted for automobiles transporting crushed aggregates (keeping the sealed transportation).	Contractor and Building Unit	Relevant County (City) Environmental Protection Bureau
	Water Environment	Domestic sewage of constructors must be used for farm irrigation or mountain forest greening without random discharging after reaching the standard; muddy water produced by the construction site shall be precipitated at the sedimentation basin to discharge the liquid supernatant, and piled sludge shall be transported outside for landfill after		

Subproject	Type of Impacts	Influence Mitigation Measures	Executor	Supervisor
		drying; or it may be used as the padding of the project combining the road greening.		
	Disposal of Solid Waste	Sanitary landfill shall be done for construction waste; household refuse shall be timely transported to the place assigned by the sanitation department for disposal; engineering spoil shall be intensively piled at the waste disposal area in each construction point, ecological afforestation and flood control ditch building shall be timely done to reduce water and soil loss upon the completion of construction.		
		It is suggested that the sludge shall be agriculturally utilized to solve the problem of rural organic fertilizer or sent to the urban sewage disposal plant for disposal by fecal suction truck.	Operation and Maintenance Unit	
	Acoustic Environment	The construction work time shall be rationally arranged, and strong-noise construction shall be prohibited during night; low-noise equipment and low-noise construction method shall be possibly used and advanced construction technology and low-noise equipment shall be adopted.	Contractor and Building Unit	
	Ecological Environment	The temporarily occupied land must be timely done with the original land utilization recovery or greening recovery.		
	Others	Discriminate whether it is in the scope of natural conservation area and preservation of cultural relics, which shall be avoided.	Construction Unit	

9.7 Acceptance arrangement of environmental protection

The facility of decentralized rural sewage disposal shall be conducted environmental protection acceptance by the Environmental Protection Bureau where the project is located.

9.8 Disposal process of rural decentralized sewage

9.8.1 Design of rural sewage collection system

1. Transformation of the current lavatory

♦ Give up the bottomless septic-tank indoor and outdoor, and connect the indoor lavatory drain pipe to outdoors; and continue to use the outdoor no-leaking septic-tank with bottom.

♦ The faeces sewage of outdoor public lavatory shall lead to the drain pipe network within the village.

2. Transformation of sewage discharge in current kitchen and yard

Arrange the drain pipe of washing tank and kitchen to the outside of yard and connect with the outdoor drain pipe, the connection methods can either adopt cleaning hole or inspection well.

3. Sewage pipe slope

Indoor pipe to the outdoors: if the pipe diameter is DN75, the slope shall be more than 0.02; if the pipe diameter is DN150, the slope shall be more than 0.01;

Outdoor pipe: if the pipe diameter is DN150, the slope shall be more than 0.005 - 0.01; if the pipe diameter is DN200, the slope shall be more than 0.005-0.007; if the pipe diameter is DN300, the slope shall be more than 0.004;

The maximum value and corresponding optimal design measures shall be adopted if the slope can't meet the requirements.

4. Inspection holes and cleaning holes

Plastic inspection well shall be adopted for areas with high underground water level and poor geological conditions; brick-laying inspection well and pressuring-bearing well cover shall be adopted for the inspection well set beside the highway. Inspection well space shall be set according to the site condition.

The method of cleanout shall be adopted for the connection between the water drainage of user's kitchen and kitchen sink and village to avoid too many inspection wells around the user's house, which is unhygienic and unbeautiful.

5. Road rehabilitation

While laying pipes, the pavement destroyed by construction shall be repaired. Village roads in the rural areas can be divided into two kinds generally: major traffic road and paths in the lanes of the village. The main road structures in the village are generally C25 plain concrete with thickness of 18-20cm; the secondary roads are generally C25 plain concrete with thickness of 8-10cm

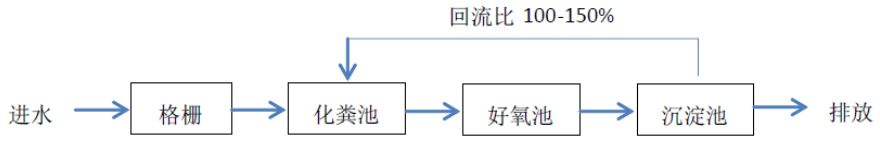
6. Pipe network layout

Pipe network layout inside village should combine the landform and the layout of the village to design.

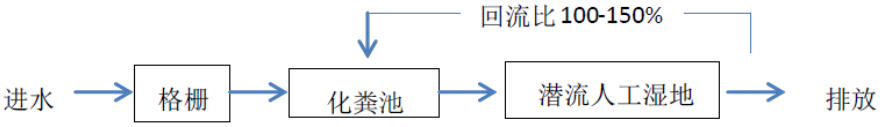
9.8.2 Rural sewage end disposal process

1. Comparison and selection of disposal process

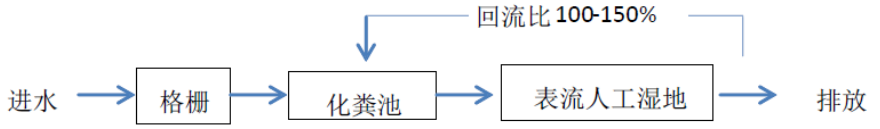
Zhejiang province has carried out a large number of rural sewage system constructions. When the black water discharging proportion is high, the sewage COD condensation is relatively high at end station, conversely the concentration is lower. The disposal process is related with the quality of water in and out of process; select the following four common technologies to carry out the cost analysis and comparison of the whole life cycle period.



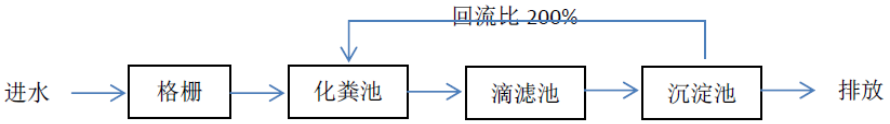
septic tank+ aeration biochemistry



septic tank+ subsurface flow constructed wetland



septic tank+ surface flow constructed wetland



septic tank+ filtering

The result of comparison shows that when water yield is relatively small, the cost for whole life cycle period of each scheme is not quite different. But as the water yield increases, the land use of surface flow wetland increases continuously, the cost of surface flow wetland is relatively high, while other technologies are basically similar with each other. Under surface flow wetland, surface flow wetland and filtering operation and maintenance costs are relatively low.

Based on above analysis, it is recommended to select undersurface flow wetland and filtering with low operation and maintenance cost as the preferentially selected scheme. Surface flow wetland is the simplest technology of operation and maintenance, and also taken as the priority scheme. As the cost and requirement of operation and maintenance of A/O technology are higher, it can be considered as the optional scheme only when water yield is relatively large and needs people specially to supervise.

2. If the rural dispersed dwellers or multi-dweller need the land disposal, it needs to design the sewage land processing system. Land hydraulic load is designed based on 0.2m³/m².d

3. For the villages at water conservation district, all the yielding water of terminal sewage disposal facility needs to go through land system percolation. The main design points:

♦ Site selection requirement of land percolation field

Land percolation is a dispersion process of tail water. Requiring the boundary of percolation field leaving more than 50m from the water area on ground surface. In order to make full use of the purification ability of soil aerated zone, the drainage pipeline is better to laid 0.6-0.8m below the ground surface. As the tail water contains certain concentration of pollutants, so the drainage pipe should laid more than 1m higher than the ground water level. When the ground water level is high, it can accumulate soil on ground, the pipeline is laid on the soil to ensure to keep the distance more than 1m higher than ground water level.

♦ Land disposal area

The land area required for processing is related with pollutant and the land permeability. The World Bank project suggests the COD concentration is less than 100m/l, SS less than 30mg/l before the land processing is began. The designed land hydraulic load is selected during 0.05-0.2m/m².d based on soil property.

4. LID System

According to the practical requirement and site conditions of the villages, some villages of AnJi, Tiantai, Longquan can construct part of LID facilities, such as open channel of rainwater around the house, build the concave-down greenbelt and grass ditch along village roads, construct the parking plot with permeable surface, clean and repair the damaged pond and channels, which can improve the drainage conditions of village, reduce the diffused pollution, and also beautify the village environment.

9.9 Operation and maintenance requirements

1. Organizations and systems

The operation and maintenance units of the rural sewage systems of AnJi County, Fuyang City, Tiantai County and Longquan City are respectively AnJi Guoyuan Water Company, Fuyang Water Group, Tiantai Running-water Company and Longquan Rural Water Supply Station. These organizations are actually professional companies with the core of technology and management, which build up the management system of Company- Towns- Villages. The operation and maintenance company will entrust the part-time staff of villages to carry out daily supervision for the village sewage system, the technicians of the company will go to the village to make a inspection tour once every tow weeks. For the village sewage system which has operation problem, the inspector and the part-time staff should timely notify the professional maintenance staff of the operation and Maintenance Company to maintain and solve in the limited time. For the dispute appeared during the process of operation and maintenance, the company can ask the town government to assign personnel to help resolving. Local environment monitoring department will carry out the water quality and quantity monitoring for the quality of water in and out of the village sewage station semiannually to take it as the main performance appraisal evidence of the annual operation and maintenance of rural sewage facility operation.

2. Sources of Operation and Maintenance Cost

The operation and maintenance cost is solved through the methods of governmental subsidies and the urban dweller water-rate incomes to finance rural area. The conditioned villages can consider charging appropriate sewage disposal fee from the villagers. These water rates should be used with a plan by the operation and Maintenance Company to ensure sustainable operation of rural sewage facilities.

10. Environmental management and monitoring plans

The project environmental protection and management means that the development unit, the design unit and the construction unit of the project must comply with the national and provincial environmental protection regulations, policies and standards implement the mitigation measures intending for adoption in environmental impact assessment report; and ensure the environmental protection facilities in the normal operation status. Work out the capacity building of organization, the responsibility of executing each control measures, the implementation progress, the monitoring content and report procedure, funding and its source, etc. During the construction and operation period of the project, accept the supervision and guidance of the competent department of local environmental protection, and coordinate the competent department of local environmental protection to complete the examination of the "Three in the Meantime" of the project construction.

10.1 Administrative Supervision Department

10.1.1 Environment protection supervisory organization

The environmental impact report of each subproject should be approved by Environmental Protection Bureau of Zhejiang Province, Environmental Protection Agency of AnJi County, Environmental Protection Agency of Longquan City, Environmental Protection Agency of Fuyang City, Environmental Protection Agency of Tiantai County; the competent department of environmental protection responsible for approving is the highest environment management and supervisory agency of each subproject, the responsibility of which is in charge of the inspection and acceptance of environmental protection facilities and the implementation of measures.

10.1.2 Implementation organization of environmental protection

The enforcement organization of each subproject is the implementation organization of environmental protection that are responsible to carry out the environmental protection measures.

10.2 Environmental Management Plan

10.2.1 The environmental management plan at the feasibility study stage of the project

The design unit should implement the environmental protection measures proposed in the environment impact report into the design of construction drawing; the environmental protection department of construction unit should be responsible for the examination of the engineering design scheme of environmental protection measures and accept the supervision of the local environmental protection department.

10.2.2 Environmental management plan during the primary designing stage of project

The development unit should set out the implementation action plan and management measures of environmental protection at construction period according to the environmental protection measures and suggestion proposed in the environment impact report, and incorporate them into the tender documents and the project contract agreement; the bidding document of the construction unit should include the content of environmental protection and civilized construction, the bid contract should also have the corresponding provisions of environmental protection measures

and suggestions proposed in the environment impact report.

10.2.3 Environmental management plan during the project construction period

The development unit carries out environmental protection advertisement, education and training, implements the environmental protection action plan and environment management plan, deals with the pollution accidents and pollution dispute timely, accepts the supervision and guidance of the environmental management department.

The development unit should also require the construction supervision agency to allocate a supervising engineer with certain environmental protection knowledge and skills who is responsible for environmental protection and supervision during the construction period, the important point is water and soil loss, basic farmland protection, water environment and land resource protection, construction noise and dust pollution.

The construction unit should accept the supervision and guidance of the constructor and the local environmental protection division, and implement the environmental protection and construction measures in accordance with the winning bid document and the construction contract, each construction unit should allocate a full-time environmental protection staff at least to specifically supervise and manage the implementation of environmental protection measures and the environmental management plan.

After the construction is finished, the development unit should organize to completely inspect the implementation of environmental protection measures and the environment restoration status, supervise and urge the construction unit to evacuate the temporarily occupied site timely, dismantle the temporary facility and recover the damaged land and vegetation.

10.2.4 Contractor's Obligations

At the construction stage of the project, the environmental protection is the responsibility of the contractor. The Article 19.1 of civil engineering evaluation contract issued by International Federation of Consulting Engineers (FIDIC) regulates: “in the whole process of project construction, completion, and mending other defects, the contractor shall adopt all reasonable procedures to protect the site and surrounding environment to prevent the harm and injury to personal and property of public due to the pollution, noise or other consequence caused by construction.” In the process of project construction, the contractor plays key role in environmental management, pollution control, controlling measure implementation and other aspects. Therefore, the contractor shall:

① Constructors selected shall be competent, with the view to ensure the effective implementation of the environmental management plans;

②Contractors and construction supervisors are requested to accept trainings about relevant environmental protection and management prior to construction;

③ Mitigation measures for environmental impacts during construction shall be included in bidding documents, as well as the manufacturing agreement at last, as contract requirements on constructors about the project;

④ Each constructor is required to monitor its environmental actions and provide logs about environmental performance once every week. Each project office, construction unit and supervision group shall supervise and inspect these records.

⑤ Each contractor shall prepare one full-time worker for environmental protection related with the project. These workers for environmental protection shall

have received professional trainings to be competent for their works.

⑥ During construction, the contractors shall communicate and coordinate with residents within the region of the project and establish bulletin boards at each construction section, to notify the public about specific construction activities and construction time. At the same time, it need to provide contract persons and phone numbers for the convenience of the public to make complaints and give advices about the construction.

10.2.5 Environmental management plan during project operation period

The subproject operation management organizations are responsible for organizing and implementing the environmental management and the monitoring as well as the complemented environmental protection engineering measures, etc. during project operation period.

10.2.6 Arrangement for implementation report of environmental management plan

The contractor, the supervising unit and the project office shall record the implementation situation of environmental management plan (EMP) during project implementation and timely report to the departments concerned. It mainly contains the following 3 parts of content:

1) The monitoring unit and contractors make a detailed record for the execution state of EMP and timely report it to the project office;

2) The project progress report (such as monthly report, quarterly report and annual report) prepared by the project office must include the contents of EMP progress, such as the execution progress and effect of EMP.

3) Submit executive report the World Bank about the Project semiannually.

EMP executive report mainly includes the following content:

① Implementation situation of environmental management plan;

② The status of project progress;

③ Whether there are public complaints, and if there is complaint, the relevant main content, solutions and public satisfaction shall be recorded;

④ EMP executive plan of the next year.

10.3 Environmental Monitoring Plan

The environmental management plan is under the supervision of the public and various competent administrative departments of environmental protection. The environmental impact report of each subproject should be approved by Environmental Protection Bureau of Zhejiang Province, Environmental Protection Agency of AnJi County, Environmental Protection Agency of Longquan City, Environmental Protection Agency of Fuyang City, Environmental Protection Agency of Tiantai County; the competent department of environmental protection responsible for approving is the highest environment management and supervisory agency of each subproject, the responsibility of which is in charge of the inspection and acceptance of environmental protection facilities and the implementation of measures.

10.4 Environmental Monitoring Plan

10. 4.1 Purpose

Environmental monitoring includes two phases, namely project construction period and operation period, aiming at comprehensively and timely mastering the pollution state of the planed project, knowing the environmental quality change of the project

site caused by project construction and the impact range as well as the environmental quality trends during project operation period, and timely sending the feedback information to the competent department so as to provide scientific basis for environmental management for the project.

10.4.2 Supervision unit

According to the specific circumstance in this project, the large wastewater disposal plant is always provided with some monitoring equipment and thus has certain monitoring ability. Moreover, the subprojects of the large wastewater disposal plant are completed by the monitoring analysis organization of the wastewater disposal plant or entrusted to the local environmental monitoring organization according to the monitoring project and the actual monitoring ability. The environmental monitoring of all other subprojects is entrusted to the professional environmental monitoring organizations.

10.4.3 Implementation

(1) Organization building

At the initial stage of each subproject, it is necessary to prepare relevant organizations of environmental management and after the commencement of the project, these organizations shall begin to work. In the construction period, relations with Zhejiang Environmental Protection Bureau and local environmental protection administrations shall be reinforced, to strengthen environmental management in the construction and operation period.

(2) funds Implementation

Organizations of environmental management require a large sum of funds to be used for the implementation of each environmental management and supervision plan; besides, huge investment shall be made each year to purchase necessary environmental facilities and function as running costs; in investment estimate, it needs to reserve sufficient funds as a fixed sum is for a fixed purpose.

(3) Personnel training

The staff of the environmental management organization shall undertake the technical training and the business personnel shall have the qualification certificates issued by environmental protection administration in order to ensure the reliability of the monitoring quality. The education and training pertaining to policy, laws and regulations and business for the management staff shall be strengthened in order to improve the management standard and the professional skill.

(4) Management reinforcement

Leaders of construction units for each subproject shall strengthen control on organizations of environmental management for each subproject. In addition, sufficient cares and supports shall be completely expressed in terms of policies, funds and talents; and upon the completion of this project, organizations of environmental management shall be entirely finished; besides, it needs to ensure the normal operation of environmental management and supervision works at the trial operation phase.

10.4.4 Monitoring Plan and Fund Demand

Monitoring plan and cost estimate of various subprojects are shown in Table 10.4-1.

10.4.5 Environmental monitoring report

(1) Environmental monitoring report during the construction period

During the period of construction, the building unit or contractor for subprojects of

relevant country (city) shall entrust the local monitoring station or qualified monitoring institution to monitor the environment of atmosphere, noise, nearby surface water body and underground water, and to report to the local environmental protection administration. Report content in this stage include the progress of works, main construction content and methods, environmental implication comment and the implementation of mitigation measures for environmental implication. During the period of project construction, monthly report shall be issued and reported to the provincial project office and Zhejiang Environmental Protection Bureau and relevant county (city) environmental protection bureaus. Each subproject office shall synthesize the monitoring report of various subprojects, summarize and compile the annual report of construction environment monitoring for regional subprojects, and send it to the provincial project office, who will report this report to the World Bank.

(2) Environmental monitoring report during the operation period

During project operation period, the relevant personnel shall carry out the environmental monitoring according to the environmental evaluation requirements, and timely submit the monitoring report to the local environmental protection administration.

Content of the monitoring report mainly contains:

① Monitoring time, frequency, point location, monitoring item and method;

② Monitoring data and statistical analysis.

Table 10.4-1 Environmental Monitoring Plan and Cost Estimate of Various Subprojects

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
Fuyang Area										
Trial Project of Scattered Rural Sewage Treatment System in Fuyang City (The First Batch)	Construction Period	Atmosphere	During the construction peak period, it shall be done with 1 time/year, and 3 days for each time.	Hongzhuang Village in Yinhu Subdistrict, Pengjia Village in Wanshi Town and Yankou Village in Dayuan Town	TSP	3285	25125	Environment Monitoring Institution	Fuyang Water Co., Ltd.	Fuyang City Environmental Protection Bureau
		Noise	During the construction peak period, it shall be done with 1 time/month, with frequency of 1 time/day; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Hongzhuang Village in Yinhu Subdistrict, Pengjia Village in Wanshi Town and Yankou Village in Dayuan Town	LAeq	6480				
		Water Body	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Baiyang Stream, Nanyang Stream and Dayuan Stream	CODcr, NH3-N, SS, pH, Petroleum	15360				
	Operating Period	Noise	1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of 3 sewage stations	LAeq	2160	19284		Fuyang Water Co., Ltd.	
		Atmosphere	1 time/year (summer), 2 days/time and 4 times for each day.	Field of 3 sewage stations	H2S and NH3	7200				
		Surface Water	1 time/year (dry season), 2 days/time, and 1 time separately in the morning and afternoon of each day.	Baiyang Stream, Nanyang Stream and Dayuan Stream	CODcr, BOD5, NH3-N, TP	4020				
		Ground Water	1 time/year, 2 days/time, and 1 time separately in the morning and afternoon of each day.	Monitoring wells near 3 sewage stations	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	5904				
Rural Joint Water Supply and Drainage Facilities Perfecting Project of Xindeng Town, Fuyang City	Construction Period	Atmosphere	One natural village can be selected for monitoring with 1 time/year and 3 days per time during the construction period.	Construction Point	TSP	1095	13495	Environment Monitoring Institution	Fuyang Water Co., Ltd.	Fuyang Municipal Environmental Protection Bureau
		Noise	One natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the	Nearby residential areas	LAeq	2160				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
			construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.							
		Water Body	Each section of Luzhu River and Songxi Stream may be selected for monitoring with 1 time/season, 2 days/time and 1 time separately in the morning and afternoon of each day.	Luzhu River and Songxi Stream	CODcr, NH3-N, SS, pH, Petroleum	10240				
Rural Joint Water Supply and Drainage Facilities Perfecting Project of Dayuan Town, Fuyang City	Construction Period	Atmosphere	During the construction period, one natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time and sampling time not less than 12h each day.	Construction Point	TSP	1095	8375	Environment Monitoring Institution	Fuyang Water Co., Ltd.	Fuyang Municipal Environmental Protection Bureau
		Noise	One natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	2160				
		Water Body	One section of Dayuan Stream may be selected for monitoring with 1 time/season, 2 days/time and 1 time separately in the morning and afternoon of each day during the period of construction.	Dayuan Stream	CODcr, NH3-N, SS, pH, Petroleum	5120				
Fuyang Longyang Sewage Treatment Project	Construction Period	Atmosphere	Monitoring is done with 1 time/year and 3 days per time during the period of construction.	Chenlin Village	TSP	21095	28375	Environment Monitoring Institution	Fuyang Water Co., Ltd.	Fuyang Municipal Environmental Protection Bureau
		Noise	During the construction period, it shall be done with 1 time/month, and the frequency of 1 time/day; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Chenlin Village	LAeq	2160				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
		Water Body	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Gexi River	CODcr, NH3-N, SS, pH, Petroleum	5120				
	Operating Period	Noise	1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of Longyang Sewage Disposal Plant	LAeq	720	7488		Fuyang Water Co., Ltd.	
		Atmosphere	1 time/year (summer), 2 days/time and 4 times for each day.	Chenlin Village	H2S and NH3	2400				
		Surface Water	1 time/year (dry season), 2 days/time, and 1 time separately in the morning and afternoon of each day. 2 sections are set at the upstream and downstream of the discharge outlet.	Gexi River	CODcr, BOD5, NH3-N, TP	2400				
		Ground Water	1 time/year, 2 days/time, and 1 time separately in the morning and afternoon of each day.	Monitoring wells near the sewage plant	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	1968				
The Fuyang Sewage Disposal Plant Project Phase IV	Construction Period	Atmosphere	During the construction peak period, it shall be done with 1 time/year, and 3 days for each time.	Construction Point	TSP	1095	8375	Environment Monitoring Institution	Fuyang Water Co., Ltd.	Zhejiang Provincial Environmental Protection Bureau Fuyang Municipal Environmental Protection Bureau
		Noise	During the construction peak period, it shall be done with 1 time/month, with frequency of 1 time/day; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Construction Field	LAeq	2160				
		Water Body	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Fuchun River	CODcr, NH3-N, SS, pH, Petroleum	5120				
	Operating Period	Noise	1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of Sewage Disposal Plant	LAeq	720	15888		Fuyang Water Co., Ltd.	
		Atmospher	1 time/year, 2 days/time, 4	Field of Sewage	H2S and NH3	9600				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
		e	times/day.	Disposal Plant						
		Surface Water	1 time/year (dry season), 2 days/time, and 1 time separately in the morning and afternoon of each day.	Fuchun River, section with 1km away from the upstream of discharge outlet, section of the discharge outlet and section with 1km away from the downstream of discharge outlet	CODMn, BOD5, ammonia nitrogen, total phosphorus and petroleum	3600				
		Ground Water	1 time/year, 2 days/time, and 1 time separately in the morning and afternoon of each day.	Monitoring wells near the sewage plant	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	1968				
Trial Project of Sewage Interception Piping for Rural Domestic Sewage in Fuyang City (The First Batch)	Construction Period	Atmosphere	During the construction period, 1 point is respectively arranged in 4 townships for monitoring with 1 time/year and 3 days/time.	Construction Point	TSP	4380	42140	Environment Monitoring Institution	Fuyang Water Co., Ltd.	Fuyang Municipal Environmental Protection Bureau
		Noise	During the construction period, 1 point is respectively arranged in 8 administrative villages for monitoring with 1 time/month and the frequency of 1 day/time; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	17280				
		Water Body	During the construction period, each section of Fuchun River (Fuyang section), Gexi Stream, Baiyang Stream and Shouxiang Stream may be selected for monitoring with 1 time/season, 2 days/time and 1 time separately in the morning and afternoon of each day.	Fuchun River (Fuyang section), Gexi Stream, Baiyang Stream and Shouxiang Stream	CODcr, NH3-N, SS, pH, Petroleum	20480				
Rural Joint Water Supply and Drainage Facilities Perfecting Project of	Construction Period	Atmosphere	During the construction period, Changkou Village is selected for monitoring with 1 time/year and 3 days/time.	Changkou Village	TSP	1095	8375	Environment Monitoring Institution	Fuyang Water Co., Ltd.	Fuyang Municipal Environmental Protection Bureau
		Noise	One natural village can be selected for monitoring with 1	Changkou Village	LAeq	2160				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
Xindeng Town, Fuyang City			time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.							
		Water Body	One section of Huyuan River may be selected for monitoring with 1 time/season, 2 days/time and 1 time separately in the morning and afternoon of each day during construction period.	Huyuan River	CODcr, NH3-N, SS, pH, Petroleum	5120				
AnJi Area										
Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring Site	Monitoring Item	Estimated Cost (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
The Perfection Project of Water Supply and Drainage Facilities in Tianzihu Area	Construction Period	Atmosphere	During the construction period, one natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time.	Construction Point	TSP	1095	8375	Environment Monitoring Institution	AnJi Guoyuan Water Group Co., Ltd.	AnJi County Environmental Protection Bureau
		Noise	One natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	2160				
		Surface Water	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Hunni Port	CODCr, NH3-N, pH, SS, Petroleum	5120				
Perfection Project of Water Supply and Drainage Facilities in Meixi Area	Construction Period	Atmosphere	During the construction period, two natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time.	Nearby residential areas	TSP	2190	11630	Environment Monitoring Institution	AnJi Guoyuan Water Group Co., Ltd.	AnJi County Environmental Protection Bureau

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
		Noise	Two natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	4320				
		Water Body	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Xiaoshu Port and Tianzigang Reservoir	CODcr, NH3-N, SS, pH, Petroleum	5120				
	Operating Period	Noise	1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of Gaoyu Water Plant, Meixi Sewage Plant, 1 water pumping station and 2 sewage lift pump stations	LAeq	3600	20368			
		Atmosphere	1 time/year (summer), 2 days/time and 4 times for each day.	Field of Meixi Sewage Plant and Shizijian Village	H2S and NH3	4800				
				Gaoyu Water Plant Field, Yangqiao Village, Gangxi Village	Cl2	3600				
		Surface Water	1 time/year (dry season), 2 days/time, and 1 time separately in the morning and afternoon of each day. 2 sections are set at the upstream and downstream of the discharge outlet.	Xitiao Stream	CODMn, BOD5, ammonia nitrogen, total phosphorus and petroleum	3600				
			Monitoring is done once in January and July of each year. Sampling is done once at the first ten days of a month in each phase.	Tianzigang Reservoir	Water temperature, pH, TP, DO, CODMn, ammonia nitrogen, petroleum, volatile phenol, fluoride and Fecal escherichia coli index.	2800				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
		Ground Water	1 time/year, 2 days/time, and 1 time separately in the morning and afternoon of each day.	Shizijian Village	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	1968				
The Perfection Project of Water Supply and Drainage Facilities in Tianhuangping Area	Construction Period	Atmosphere	During the construction period, one natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time.	Construction Point	TSP	1095	8375	Environment Monitoring Institution	AnJi Guoyuan Water Group Co., Ltd.	AnJi County Environmental Protection Bureau
		Noise	One natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	2160				
		Surface Water	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Huxi Stream	CODCr, NH3-N, pH, SS, Petroleum	5120				
	Operating Period	Noise	1 water pumping station and 1 sewage lift pump station: 1 time/year, 1 day/time, and 1 time separately at the day and night.	Field	LAeq	2880	2880			
Perfection Project of Water Supply and Drainage Facilities in Banshan Area	Construction Period	Atmosphere	During the construction period, one natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time.	Construction Point	TSP	1095	8375	Environment Monitoring Institution	AnJi Guoyuan Water Group Co., Ltd.	AnJi County Environmental Protection Bureau
		Noise	One natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	2160				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
		Surface Water	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Dipu Stream	CODCr, NH3-N, pH, SS, Petroleum	5120				
	Operating Period	Noise	Field of Banshan Water Plant: 1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of Banshan Water Plant	LAeq	720	7120			
		Atmosphere	1 time/year (summer), 2 days/time and 4 times for each day.	Field of Banshan Water Plant and Dahouwu Village	Cl2	3600				
		Surface Water	Monitoring is done once in January and July of each year. Sampling is done once at the first ten days of a month in each phase.	Fushi Reservoir	Water temperature, pH, TP, DO, CODMn, ammonia nitrogen, petroleum, volatile phenol, fluoride and Fecal escherichia coli index.	2800				
Expansion Project of AnJi Urban Sewage Disposal Plant	Construction Period	Atmosphere	During the construction period, one natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time.	Nearby residential areas	TSP	1095	8375	Environment Monitoring Institution	AnJi Guoyuan Water Group Co., Ltd.	AnJi County Environmental Protection Bureau
		Noise	During the construction peak period, it shall be done with 1 time/month, and frequency of 1 day/time; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residence	LAeq	2160				
		Water Body	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Huxi Stream	CODcr, NH3-N, SS, pH, Petroleum	5120				
	Operating Period	Noise	1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of AnJi Sewage Disposal Plant	LAeq	1440	13760			

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
		Atmosphere	1 time/year (summer), 2 days/time and 4 times for each day.	Yingjiatan Village, Hehuatang Village and Gaoqiao	H2S and NH3	7200				
		Surface Water	1 time/year (dry season), 2 days/time, and 1 time separately in the morning and afternoon of each day. 2 sections are set at the upstream and downstream of the discharge outlet.	Huxi Stream	CODMn, BOD5, ammonia nitrogen, total phosphorus and petroleum	5120				
Trial Project of Scattered Rural Domestic Sewage Treatment System of AnJi County	Construction Period	Atmosphere	During the construction period, one natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time.	Construction Point	TSP	1095	8375	Environment Monitoring Institution	AnJi Beautiful Rural Area Construction and Development Company	AnJi County Environmental Protection Bureau
		Noise	One natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	2160				
		Water Body	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Tiaoxi Stream	CODCr, NH3-N, pH, SS, Petroleum	5120				
	Operating Period	Noise	One natural village is selected in each township for monitoring with 1 time/year, 1 day/time and 1 time separately at the day and night.	Field	LAeq	3960	13448			
		Atmosphere	One natural village is selected in each township for monitoring with 1 time/year (summer) and 2 days/time; it shall be at 8:00, 11:00, 13:00 and 16:00 of each day.	Field	H2S and NH3	2400				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
		Surface Water	One natural village is selected in each township for monitoring with 1 time/year (dry season), 2 days/time and 1 time separately in the morning and afternoon of each day. Two sections of upstream and downstream are set.	Surface water body near sewage treatment facilities	CODMn, BOD5, ammonia nitrogen, total phosphorus and petroleum	5120				
		Ground Water	One natural village is selected in each county (city) for monitoring with 3 times/year (wet season, normal river flow season and dry season), 2 days/time and 1 time separately in the morning and afternoon of each day.	Monitoring well	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	1968				
Tiantai Area										
Improvement project of water supply and drainage system for cities and villages in the north central district of Tiantai Basin	Construction Period	Atmosphere	During the construction period, one natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time.	Construction Point	TSP	1095	8375	Environment Monitoring Institution	Tiantai New Rural Area Construction and Development Co., Ltd.	Tiantai County Environmental Protection Bureau
		Noise	One natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	2160				
		Surface Water	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Shifeng Stream	CODCr, NH3-N, pH, SS, Petroleum	5120				
Improvement project of water supply and drainage system for villages in eastern district of	Construction Period	Atmosphere	During the construction period, one natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time.	Construction Point	TSP	1095	8375	Environment Monitoring Institution	Tiantai New Rural Area Construction and Development Co., Ltd.	Tiantai County Environmental Protection Bureau

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
Tiantai Basin		Noise	One natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	2160				
		Surface Water	During the construction period, it shall be done with 1 time/season and 2 days for each time separately in the morning and afternoon for once.	Shifeng Stream	CODCr, NH3-N, pH, SS, Petroleum	5120				
	Operating Period	Noise	1 sewage lift pump station: 1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of pump station	LAeq	720	720			
Improvement project of water supply and drainage system for villages in eastern district of Tiantai Basin	Construction Period	Atmosphere	During the construction period, one natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time.	Nearby residential areas	TSP	1095	8375	Environment Monitoring Institution	Tiantai New Rural Area Construction and Development Co., Ltd.	Tiantai County Environmental Protection Bureau
		Noise	One natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	2160				
		Water Body	During the construction period, it shall be done with 1 time/season and 2 days for each time, with separately monitoring in the morning and afternoon for once.	Cangshandao Stream	CODCr, NH3-N, pH, SS, Petroleum	5120				
	Operating Period	Noise	1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of Cangshan Sewage Disposal Plant	LAeq	1440	9920			
		Atmosphere	1 time/year (summer), 2 days/time and 4 times for each day.	Yushan Village, Shishan Village and Xiali Village	H2S and NH3	7200				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
		Surface Water	1 time/year (dry season), 2 days/time, and 1 time separately in the morning and afternoon of each day. 2 sections are set at the upstream and downstream of the discharge outlet.	Cangshandao Stream	CODcr, BOD5, NH3-N, TP	1280				
Improvement project of water supply and drainage system for decentralized villages in Tiantai Basin	Construction Period	Atmosphere	During the construction period, one natural village can be selected for monitoring with 1 time/year, or each natural village is randomly selected for monitoring with 3 days/time.	Nearby residential areas	TSP	1095	8375	Environment Monitoring Institution	Tiantai New Rural Area Construction and Development Co., Ltd.	Tiantai County Environmental Protection Bureau
		Noise	One natural village can be selected for monitoring with 1 time/month and the frequency of 1 day/time during the construction period; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Nearby residential areas	LAeq	2160				
		Water Body	During the construction period, it shall be done with 1 time/season and 2 days for each time, with separately monitoring in the morning and afternoon for once.	Cangshandao Stream	CODCr, NH3-N, pH, SS, Petroleum	5120				
	Operating Period	Noise	One natural village is selected in each township for monitoring with 1 time/year, 1 day/time and 1 time separately at the day and night.	Field of Sewage Disposal Station	LAeq	4680	92664			
		Atmosphere	One natural village is selected in each township for monitoring with 1 time/year (summer) and 2 days/time; it shall be at 8:00, 11:00, 13:00 and 16:00 of each day.	Field of Sewage Disposal Station	H2S and NH3	31200				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
		Surface Water	One natural village is selected in each township for monitoring with 1 time/year (dry season), 2 days/time and 1 time separately in the morning and afternoon of each day. Two sections of upstream and downstream are set.	Surface water body near sewage treatment facilities	CODcr, BOD5, NH3-N, TP	31200				
		Ground Water	One natural village is selected in each township for monitoring with 1 time/year (dry season), 2 days/time and 1 time separately in the morning and afternoon of each day.	Monitoring well	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	25584				
Longquan Area										
Perfection Project of Water Supply and Drainage Facilities for Urban Areas in Longquan	Construction Period	Atmosphere	At the construction point of Nandayang Water Plant, the municipal pipe network project is randomly selected for monitoring with 3 days/time and sampling time not less than 12h each day; the monitoring time is 1 time/year.	Construction Point	TSP	2190	18190	Environment Monitoring Institution	Longquan Water Supply and Discharge Co., Ltd.	Longquan Environmental Protection Bureau
		Noise	The field of Nandayang Water Plant and places along the municipal pipe network project shall be monitored with 1 time/month, with the frequency of 1 day/time, and 1 time separately at the day and night in case of any night construction.	Construction Area	LAeq	5760				
		Water Body	One point location is separately set at the upstream and downstream of Longquan Stream for monitoring with 1 time/season, 2 days/time and 1 time separately in the morning and afternoon of each day during the construction period.	Longquan Stream	CODcr, NH3-N, SS, pH, Petroleum	10240				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
	Operating Period	Surface Water	Longquan Stream is monitored with 1 time/season (dry season), 2 days/time and 1 time separately in the morning and afternoon of each day. 2 sections are set at the upstream and downstream of the discharge outlet.	Longquan Stream	CODcr, BOD5, NH3-N, TP	2400	4368		Longquan Township Water Supply Station	
		Ground Water	The nearby area of Nandayang Water Plant is monitored with 1 time/season, 2 days/time and 1 time separately in the morning and afternoon of each day.	Wells of natural villages	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	1968				
Water Supply and Drainage Project of Anren Town, Longquan City	Construction Period	Atmosphere	It is monitored with 1 time/year and the frequency of 3 days/time during the construction period.	Construction point in water supply plant and sewage plant	TSP	2190	13070	Environmental Monitoring Agency	Longquan Water Supply and Drainage Company	Longquan Environmental Protection Bureau
		Noise	During the construction period, it shall be done with 1 time/month, and frequency of 1 day/time; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Field of water supply plant, sewage plant, Huangshixuan Village and Xiangbian Village	LAeq	5760				
		Water Body	Monitoring is done at the frequency of 1 time/season, 2 days/time and once in each morning and afternoon during the construction period.	Anren Stream	CODCr, NH3-N, pH, SS, Petroleum	5120				
	Operating Period	Noise	Conducting at the frequency of 1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of Anren Sewage Plant and Anren Water Plant	LAeq	2880	16848		Longquan Township Water Supply Station	
		Atmosphere	It is done with 1 time/year (summer) with the frequency of 7 days/time; the concentration value at 4h of 02, 08, 14 and 20 in each day shall be gained.	Field of AnJi Sewage Disposal Plant	H2S and NH3	9600				
		Surface Water	It is done with 1 time/year (dry season), 2 days/time, and 1 time separately in the morning and afternoon of each day. Two sections of upstream and downstream are set.	Anren Stream	CODcr, BOD5, NH3-N, TP	2400				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
		Ground Water	It is done with 1 time/year (wet season, normal river flow season and dry season), 2 days/time and 1 time separately in the morning and afternoon of each day.	Monitoring well of Huangshixuan Village	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	1968				
Water Supply and Drainage Project of Badu Town, Longquan City	Construction Period	Atmosphere	It is monitored with 1 time/year and frequency of 3 days/time during the construction period.	Construction point in water supply plant and sewage plant	TSP	2190	13070	Environmental Monitoring Agency	Longquan Water Supply and Drainage Company	Longquan Environmental Protection Bureau
		Noise	During the construction period, it shall be done with 1 time/month, and frequency of 1 day/time; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Field of Jintian Village and Badu Sicun	LAeq	5760				
		Water Body	Monitoring is done at the frequency of 1 time/season, 2 days/time and once in each morning and afternoon during the construction period.	Badu Stream	CODCr, NH3-N, pH, SS, Petroleum	5120				
	Operating Period	Noise	Conducting at the frequency of 1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of Badu Sewage Plant	LAeq	1440	15408		Longquan Township Water Supply Station	
		Atmosphere	It is done with 1 time/year (summer) and frequency of 2 days/time; the concentration value at 4h of 02, 08, 14 and 20 in each day shall be gained.	Field of Badu Sewage Plant	H2S and NH3	9600				
		Surface Water	It is done with 1 time/year (dry season), 2 days/time, and 1 time separately in the morning and afternoon of each day. Two sections of upstream and downstream are set.	Badu Stream	CODcr, BOD5, NH3-N, TP	2400				
		Ground Water	It is done with 1 time/year (wet season, normal river flow season and dry season), 2 days/time and 1 time separately in the morning and afternoon of each day.	Monitoring well of Badu Sicun	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	1968				

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
The First Batch of Sewage Disposal Project in Decentralized Villages in Longquan	Construction Period	Atmosphere	It is monitored with 1 time/year and the frequency of 3 days/time during the construction period.	Construction points in Xiaomei Water Plant, Xiaomei Sewage Plant and scattered villages	TSP	3285	19205	Environmental Monitoring Agency	Longquan Water Supply and Drainage Company	Longquan Environmental Protection Bureau
		Noise	During the construction period, it shall be done with 1 time/month, and frequency of 1 day/time; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Field of 5 village construction points is selected.	LAeq	10800				
		Water Body	Monitoring is done at the frequency of 1 time/season, 2 days/time and once in each morning and afternoon during the construction period.	Xiaomei Stream	CODCr, NH3-N, pH, SS, Petroleum	5120				
	Operating Period	Noise	Conducting at the frequency of 1 time/year, 1 day/time, and 1 time separately at the day and night.	Field of Xiaomei Water Plant and Xiaomei Sewage Plant	LAeq	2880	16848		Longquan Township Water Supply Station	
		Atmosphere	It is done with 1 time/year (summer) and frequency of 2 days/time; the concentration value at 4h of 02, 08, 14 and 20 in each day shall be gained.	Field of Xiaomei Sewage Plant	H2S and NH3	9600				
		Surface Water	It is done with 1 time/year (dry season), 2 days/time, and 1 time separately in the morning and afternoon of each day.	As for Xiaomei Stream, select two sections of upstream and downstream of discharge outlet.	CODcr, BOD5, NH3-N, TP	2400				
		Ground Water	It is done with 1 time/year, 2 days/time, and 1 time separately in the morning and afternoon of each day.	Monitoring well of Meisi Village	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	1968				
The Second Batch of Sewage Disposal Project in Decentralized Villages in	Construction Period	Atmosphere	It is monitored with 1 time/year and frequency of 3 days/time during the construction period.	Construction points in Chatian Water Plant, Lanju Sewage Plant and 3 scattered villages	TSP	5475	37315	Environmental Monitoring Agency	Longquan Water Supply and Drainage Company	Longquan Environmental Protection Bureau

Subproject Name	Implementing Stage	Monitoring Content	Monitoring Time and Frequency	Monitoring location	Monitoring Item	Cost Estimate (Yuan)	Total Annual Expense (yuan)	Implementing Institution	Responsible Institution	Supervising Institution
Longquan		Noise	During the construction period, it shall be done with 1 time/month, and frequency of 1 day/time; it shall be monitored for 1 time separately at the day and night in case of any night construction.	Field of 15 village construction points is selected.	LAeq	21600				
		Water Body	Monitoring is done with 1 time/season, 2 days/time and 1 sampling in each day during the construction period.	Xiaomei Stream and Yuzhang Stream	CODCr, NH3-N, pH, SS, Petroleum	10240				
	Operating Period	Noise	Conducting at the frequency of 1 time/year, 1 day/time, and 1 time separately at the day and night.	Chatian Water Plant, Chatian Sewage Plant field, Xiaomei Water Plant and Xiaomei Sewage Plant	LAeq	5760	33696		Longquan Township Water Supply Station	
		Atmosphere	It is done with 1 time/year (summer) and frequency of 2 days/time; the concentration value at 4h of 02, 08, 14 and 20 in each day shall be gained.	Field of Lanju Sewage Plant and Chatian Sewage Plant	H2S and NH3	19200				
		Surface Water	It is done with 1 time/year (dry season), 2 days/time, and 1 time separately in the morning and afternoon of each day.	Xiaomei Stream, Yuzhang Stream and two sections of upstream and downstream of discharge outlet.	CODcr, BOD5, NH3-N, TP	4800				
		Ground Water	It is done with 1 time/year, 2 days/time, and 1 time separately in the morning and afternoon of each day.	Monitoring wells of Wumeiyang and Chasan Village	CODcr, BOD5, NH3-N, NO3-, NO2- and TP	3936				

10.4.6 Personnel training

10.4.6.1 Training for new environmental full-time and part-time personnel during construction period

The building unit entrusts the qualified unit to carry out the training for new environmental full-time and part-time personnel. The trainees are the technical leaders and the full-time management staff of the construction units. The training plan for environmental personnel is shown in Table 10.4- 2.

The content of training includes:

① Regulations, files and relevant requirements on environmental protection, conservation of water and soil and other aspects in construction project management by the state and Zhejiang Province;

② Requirements on project environmental management from the World Bank;

③ Environmental protection measures and environmental protection requirements during construction proposed in the design of this project;

④ Environmental protection guide during construction period of this project;

⑤ Environmental protection design director of environmental protection agency and design unit, relevant experts of environmental impact assessment unit and monitoring unit and environmental protection experts of the World Bank can be invited as the teachers of the training class.

If necessary, the new supervisor of the environmental supervising unit can also participate in the above training.

10.4.6.2 Training for new environmental full-time and part-time personnel during operation period

The building units are responsible for organizing and implementing the training for the new environmental full-time and part-time personnel during project operation period via employing relevant environmental experts from universities, scientific research institutions and operation management unit, or providing short-term training class to the new comers. The training plan for environmental personnel is shown in Table 10.4- 2.

Table 10.4-2 List of Training Plan for New Environmental Protection Personnel

Stage	Category	Number of Persons	Time	Cost (RMB Ten thousand Yuan)
Construction Period	Project Office Management Personnel	10 persons	Upon the determination of the Contractors, before construction	5.0
	The Building Unit of the Project	20 persons		10.0
	Contractors	40 persons		20.0
Operating Period	Management and Operation personnel	20 persons	Upon the completion of construction, before the project operation	10.0
Total		90 persons		45.0

Table 10.4-3 Regional Environment Management Costs List of Each Subproject

No.	Region	Monitoring Cost	Training Cost (yuan)	Total

		(yuan/year)		
1	Fuyang	134260	112500	246760
2	AnJi	53505	112500	166005
3	Tiantai	33500	112500	146000
4	Longquan	100850	112500	213350
				772115

10.4.7 Information exchange, summarizing and reporting

10.4.7.1 Information exchange

Necessary information exchange shall be conducted among different departments and posts in the organization regarding environmental management requirements, meanwhile, the organization shall report relevant information to the external (interested party, the public, etc.).

The internal information exchange can be conducted in the form of meeting, internal brief report and other ways, however, one formal meeting must be convened monthly, and all exchange information shall be recorded and filed.

The external information exchange shall be conducted once semiannually or yearly, and the information exchange with the coordinating unit shall be formed into summary and filed.

10.4.7.2 Recording

For effective operation of the environment management system, the organization must establish a perfect recording system, and keep records of the following aspects:

(1) Any legal and regulatory requirements;
(2) Permits;
(3) Environmental factor and relevant environmental implication;
(4) Training;
(5) Inspection, checking and maintenance activity;
(6) Monitoring data;
(7) Inconformity;
(8) Effectiveness of corrective and preventive measures;
(9) Information of related party;
(10) Examining and verifying;
(11) Review.

Additionally, necessary control on the above various records must be done, including the identification, collection, catalogue, filing, storage, management, maintenance, inquiring, storage life, disposal and other links of records.

10.4.7.3 Reporting

Contractors, monitoring unit and building unit and project office shall record the project progress condition, the execution state of environmental management plan (EMP), environmental quality monitoring result, and timely report it to relevant department. It mainly contains the following 3 parts of content:

① The monitoring unit and Contractors make a detailed record for the execution state of EMP, and timely report it to the project office;

② The project progress report (such as monthly report, quarterly report and annual report) prepared by the project office must include the content of EMP progress, such as the execution progress and effect of EMP.

③ The yearly EMP executive report of the project must be completed before

March 31 of the next year and submitted to the World Bank.

EMP executive report mainly includes the following content:

① The implementation conditions of the training plan;

② The status of project progress;

③ Whether there are public complaints, and if there is complaint, the relevant main content, solutions and public satisfaction shall be recorded;

④ EMP executive plan of the next year.

10.4.8 Channel for public continuous participation and dispute complaint

10.4.8.1 Continuous public participation plan

During the construction period and 3 years after operation, 1 time of random return visit and survey is conducted for environmentally sensitive target of each subproject semiannually; one public participation field survey is convened at the concentration area of environmentally sensitive target yearly.

The survey result is based to evaluate the satisfaction degree of the public, analyze the relevant advice, and improve the environmental mitigation measures when necessary.

10.4.8.2 Channel for dispute complaint

(1) Establishment and composition of complaint reception organization

To better guarantee the legal right of affected people, a sort of complaining scheme will be set up to provide a convenient, transparent, fair and effective complaining way for affected people; therefore, subproject offices of four counties and cities shall establish a complaint reception leading group on environmental impacts, whose group leader can be held concurrently by related personnel of the subproject director, and its group members are from the subproject office, building unit, relevant county and municipal environmental protection agencies, environmental impact assessment unit, etc. A complaint acceptance office is set subordinate to the complaint acceptance leading group of environmental influence and set at the subproject offices of four counties and cities. It will collect, clear up and summarize the daily complaints. After negotiation, the complaint reception office and the relevant responsible unit shall present the handling suggestion.

(2) Complaining procedures

The complaint reception leading group and office will start the complaint reception within 1 week after the commencement of works, open the complaining hot line and complaining mailbox, and publicize relevant complaint and appealing method at the construction site. The complaint procedures are shown below in details:

When the affected people consider that his right is infringed concerning any aspects of environmental protection, he may complain to the complaint reception office or directly to the contractor in written form or oral form; the oral complaint will be recorded in detail and cleared up by the member of the complaint reception office or the contractor, and the treatment suggestion will submitted within two weeks.

If the complainant dissatisfies the suggestion of the complaining contractor or the reception office, he can complain to the environmental protection agency of relevant county and city in written form within one month after receiving the treatment suggestion, and the environmental protection agency of relevant county and city will give the treatment suggestion within the legal specified time.

If the complainant still dissatisfies the suggestion of the environmental protection agency of relevant county and city, he can complain to its superior competent department of environmental protection or Zhejiang Environmental Protection Bureau, or directly prosecute to the local people's court for trial and adjudication based on *The*

Civil Procedure Law of the People's Republic of China after receiving the treatment suggestion.

10.5 EMP (Environmental Management Plan) Summary

Please refer to Table 10.5-1 and Table 10.5-2 for the details of the environmental management plan summary.

Table 10.5-1 EMP Summary

Stage	Subproject	Environmental factors	Mitigation measure	Execution unit	Supervision unit
Construction Period	All Subprojects	Noise	① Try best to use construction machinery and technologies with low noise, install vibration stands for fixed machinery and equipment yielding relatively massive vibration and strengthen the maintenance and repair to various facilities. Intensify management to sources of noise pollution on the construction site and gently lift and put down mental materials at the time of their loading and unloading. ② Reasonably arrange the construction schedule, forbidden field operation with strong noise at night, suitably lay out and set up blanket materials around equipment yielding strong noise. Operation at night shall be approved by the environmental protection agency in advance and follow regulations. ③ Strengthen construction supervision and strictly abide by the regulations of Environmental Noise Limits for Construction Site Field. ④ The transport vehicles shall slowly pass through residential areas. ⑤ During construction, according to specific conditions, reasonably arrange construction time, improve operation skill and well communicate with the residents nearby in order to prevent the noise from disturbing the residents.	Construction Unit, Construction Unit	Zhejiang Provincial Environmental Protection Bureau and local environmental protection administrations, Provincial project office and subproject offices of the four counties
		Atmosphere	① During construction, fence and barrier shall be used in the construction site to reduce dust diffusion. ② Dust suppression measures such as watering or covering shall be taken for temporary sand and stone storage, encapsulating measures shall be taken for the transportation of the powdery materials, and the height of the loaded spoil shall be lower than that of the compartment baffle and meanwhile tarpaulin shall be covered on the spoil. ③ Try best to avoid construction on windy weathers and try best either to shorten the construction duration, improve the project efficiency and lower the duration when the surface is exposed. ④ On the construction site shall have specially assigned persons to regularly water the ground, so as to reduce the amount of raise dust, with the number for watering decided based on practical weather conditions, but generally 1-2 timers per day. Should it is windy or arid, it is allowed to suitably add the times of watering. ⑤ The special persons shall be arranged on the construction site, to dispose, clean and stack the discard soil, building garbage and building material, and the canvas is covered on the stacking site, or the water is sprayed, so as to avoid the secondary lifting dust.		
		Surface Water	① Domestic sewage produced by construction staff shall be used for farmland irrigation or mountain forest greening when such materials satisfy certain standards upon processing, rather than randomly discharging. It is suggested to borrow existing living facilities from local villagers. Construction sites with mature conditions shall install sewage interruption pipelines. ② Muddy water from the site shall firstly be collected into settling ponds for sedimentation, to discharge the supernatant liquor, while mud left may be delivered externally for landfilling upon desiccation; or may be used as filler of the project in association with practical road greening. ③ Storm sewage and muddy water shall be collected for sedimentation before their discharging satisfying specified standards. Reinforce maintenance and repair of construction machinery, which shall be inspected prior to construction, to avoid accidents occurrence as oil leakage in the process of operation.		

Stage	Subproject	Environmental factors	Mitigation measure	Execution unit	Supervision unit
			④ If construction sites of the project involve in protection zones of drinking water source, it is strictly forbidden to discharge construction sewage into such areas, rather, they shall be collected, processed and cleared. ⑤ Waste water due to pigging and pressure testing shall be sedimented and filtered before discharging into nearby ditches. ⑥ Should pipelines be necessary to cross rivers, it is required to try best to perform in non-flood season. Approval shall be obtained from departments concerned, and local watercourse management rules shall be seriously complied with.		
		Solid Waste	① Building rubbish shall be recycled or disposed of through sanitary landfills. ② Domestic garbage shall be timely transported to designated locations as required by the sanitation department for treatment, to avoid polluting ambient environment. ③ Since the construction sites are disperse and engineering spoils are to be collectively packed into the waste disposal areas on each site, which, however, shall be processed with ecological afforestation to lower water and soil loss.		
		Ecological Impact	① Additionally install necessary temporary rainwater heads based on requirements, compact exposed grounds and try best to mitigate the flushing of rainwater to soils and lower water and soil loss. ② Timely cleaning or back-filling of spoil and construction waste. ③ Upon construction completion, roads shall be hardened and open spaces greened in time, to recover and rehabilitate the vegetation. ④ In order to reduce the impact on the ecological environment of the temporarily occupied site due to construction, the temporarily occupied land must be timely greened. ⑤ Reasonably plan the temporary pipeline construction site and strictly control the construction width. ⑥ With respect to pipeline ditches, they shall be excavated and preserved hierarchically, the same as their backfilling. At the time of earthwork excavation and backfilling, surrounding areas for temporary piling of such earthworks shall be retained by straw bags or rails. Plots where excavation and construction have finished, it is necessary to timely plant vegetation for greening. Earth excavation and backfilling shall be at non-flood seasons as far as possible, with protections to working surfaces in advance.		
		Social Impact	① Compensation for land acquisition shall be executed according to relevant policies made by governments of each level. ② It is required that, in line with national land management law, ordinances about compensation and resettlement, as well as other laws, regulations and policies, suitable implementation plans about land requisition and demolishing and compensation and resettlement shall be formulated for comprehensive arrangement, complete coordination, sufficient compensation, appropriate layout without any future troubles and various compensations shall be fully allocated to relocation households or units, instead of being withheld or embezzled by units concerned, so as to ensure the affected people to live and work in peace and contentment and the influenced enterprises having a stable production and to retain the living standards of immigrants. ③ During construction, the construction of existing roads would be occupied, and the traffic of existing		

Stage	Subproject	Environmental factors	Mitigation measure	Execution unit	Supervision unit
			roads is blocked, so the traffic management shall be enhanced, the vehicle transportation in the traffic peak period is stopped or reduced, so as to reduce the crowding degree of vehicles. ④ If the interruption of electricity, communications, running water, etc. may occur during construction, the coordination with relevant departments shall be made, and the affected people are informed to make preparations in advance.		
		Water and Soil Loss	① The excavation and engineering shall avoid the rainy season. ② Upon construction completion, temporary lands acquired shall be cleaned off and renovated, to dismantle all temporary buildings, sweep the ground, re-loosen the close-grained soils that are compacted, earth up and level up the depressions, perform greening works and lower water and soil loss to the minimum. ③ Earthworks on the construction site shall be reasonably piled, to keep a certain distance from rivers, avoid their flowing into rivers and decreases the effects of water and soil loss on nearby rivers; Around the filed for sand and stone materials shall yard straw bags to ward off sands and simple ditches shall be excavated around to lead off ponding on the site.		
Operating Period	Sewage Disposal Plant	Noise	① Low-noise equipment shall be selected, and the equipment foundation shall be set with vibration pad to reduce the noise caused by equipment vibration. ② The air compressor shall be set with silencer, silencer and pedestal shock pad, and set with specialized plant adopting double glazing; The air blower shall be installed with silencer. ③ Regular checking, maintenance and management shall be enhanced for various mechanical equipment and its noise reduction devices, and it shall be timely replaced in case of any fault in equipment, so as to reduce the mechanical noise caused the abnormal running of machinery. ④ Pumps in the sewage pumping station shall be set with anti-vibration pad, and the pump house is set with sound insulation doors and windows.	Building Unit, Operation and Maintenance Unit	Zhejiang Environmental Protection Bureau and local environmental protection administrations
		Atmosphere	① Tiantai Cangshan Sewage Disposal Plant carry out capping for the primary settling tank, anaerobic tank and secondary sedimentation tank, requires to seal the sludge-tank, dehydration machine room, sludge shed and other stench source points, and sets up flue gas gathering fan; The collected flue gas is sent to the deodorization reactor for treatment and then discharged into the upper air; biological deodorization method is the first choice, and the deodorization efficiency can be stabilized at about 80%. 100m of width of sanitary protection zone needs to be set and no housing estate shall be allowed within the width of sanitary protection zone. ② Meixi Sewage Disposal Plant requires to cap the aerobiotic biochemical pool, fine rack grit basin, dehydration machine room and other structures for sealing collection (the gas collection rate is not lower than 95%), and adopts the plant extract atomization and oxidation system to treat stench; The removal efficiency of H2S, NH3 and other odor pollutants is not lower than 95%. The sanitary protection distance of 200m is set. ③ AnJi Urban Sewage Disposal Plant carries out capping for the coarse screen and influent pump station, fine rack and rotational flow grit basin, biochemical pool, secondary sedimentation tank, mud storage pool, thickener room, dehydration machine room, etc. for sealing collection (the gas collection rate is not lower than 80%), and adopts the biological deodorization tower to treat stench (the removal efficiency is not lower than 80%). The sanitary protection distance of 150m is set.		

Stage	Subproject	Environmental factors	Mitigation measure	Execution unit	Supervision unit
			④ Air draft is adopted in the Fuyang City Sewage Treatment Phase-IV Project to keep the collecting zone in micro-negative pressure status, thus preventing the overflow of odor pollutants internally created from influencing the environment; The collected odor pollutants are treated with bacteria bed for deodorization, and the off-gas up to the standard after treatment is discharged to the external environment via the exhaust funnel with release height of not lower than 15m. Meanwhile, capping reform is implemented for the first, second and third-phase project of Fuyang Sewage Disposal Plant to collect and treat the stench generated. Displacement and resettlement for Minfeng Village at the southeast side of the plant boundary shall be finished before the operation period of the fourth-phase project. ⑤ Xiaomei Town Sewage Plant, Lanju Village Sewage Treatment Plant, Badu Town Sewage Treatment Plant, Anren Town Sewage Treatment Plant and Chatian Town Sewage Treatment Plant of Longquan City shall all be set with a sanitary protection distance of 100m. ⑥ Straightening the greening of plant area, and adopting the multi-layer protective green belt of tree, shrub and vegetation combination.		
		Sludge and solid waste	① Sludge yard within AnJi Meixi Sewage Disposal Plant shall be set with rainshed, and collecting basin at its surrounding; sludge after dehydration may be send to the incineration plant for incineration treatment. ② Sludge produced in the Fuyang City Sewage Treatment Phase-IV Project shall be sent to Zhejiang Qingyuan Ecological Thermoelectricity Co., Ltd. for concentrated disposal with incineration disposal facilities after thickening and dehydration in the plant, and sludge produced shall be monitored and kept with the original monitoring record. ③ The sanitation department may be entrusted to regularly clear and uniformly dispose the waste sundry and household refuse produced by sewage treatment in Anren Town Sewage Plant, Badu Town Sewage Disposal Plant, Chatian Town Sewage Disposal Plant, Lanju Township Sewage Disposal Plant, Xiaomei Town Sewage Disposal Plant, etc. of Longquan City. Sludge after filter pressing and dehydration is done with composting process, and the compost is used for the farmland or mountain land near the project. ④ Sludge produced by Longyang Sewage Disposal Plant of Fuyang City is regularly sucked out by fecal suction truck, and transported to Qingquan Environmental Thermal Power Plant for incineration disposal. ⑤ Sludge produced by Cangshan Sewage Disposal Plant is recently sent to Tiantai County refuse landfill for landfilling. ⑥ The living garbage generated by sewage treatment plant is periodically removed by local environmental sanitation department. ⑦ The solidified sludge shall be equipped with special purpose vehicle for outward transport during transporting, and the sludge transport vehicle shall be sealed, waterproof and free from leakage, and ledges around the vehicle shall be firm, reliable, unbroken and tight in baffle; Before driven out of the loading site, the vehicle ledges and wheels shall be washed clear without carrying mud during traveling and leaking on the way; in case of leakage found during transporting, it shall be timely cleaned up. Sludge transporting shall be kept away from the resident gathering points, water conservation districts, and places of interest, resort districts and other environmental sensitive areas as possible.		
		control of source	① The municipal department shall actively do well in the sewage cleaning and diversion work of sewage pipe network to avoid a large number of rainwater entering the sewage disposal plant. Relevant department		

Stage	Subproject	Environmental factors	Mitigation measure	Execution unit	Supervision unit
			shall complete the management work of pipe entry enterprises, water quality entering the pipe must reach the inlet standard, high concentrated organic wastewater and harmful and toxic substances concentration shall be strictly controlled according to the inlet standard. ② The running condition of sewage treatment facilities shall be timely understood so as to ensure the normal running. The inflow and effluent quality shall be regularly monitored, and the running status of the processing unit shall be timely adjusted based on different water volume and water quality, so as to ensure the optimal treatment efficiency. ③ Relevant department shall enhance the treatment for industrial pollution sources, especially for the first-class pollutant, and require various pollutant-holding enterprises to conduct pretreatment in the plant, strictly control the discharge of poisonous and harmful substances and ensure the normal running of sewage treatment facilities. ④ Meixi Sewage Disposal Plant shall accelerate its pace in perfecting its advanced treatment system and reuse system of reclaimed water, and putting it into operation, thus ensuring the water quality of sewage treatment plant reaches the standard and reducing the environmental emission of sewage. ⑤ Monitoring for water pollution shall be enhanced, including the monitoring on inflow and effluent quality and quantity.		
		Others	① Establish sewage treatment plant running management and operational responsibility system; do well in staff training, establish technical examination files, and forbid the unqualified people from working. ② It is suggested that in the future planning of relevant departments, new residence zone, hospital, school and other sensitive buildings are prohibited to build within the width of sanitary protection zone set in the sewage treatment plant.		
	water plant	Noise	① Select the low-noise equipment as possible, and adopt shock absorption, sound insulation and other measures for main noise production equipment (such as electromotor). ② Adopt overall sound insulation measures for pump house. ③ Civilize the normalized operation and ensure the good running state of equipment. ④ Pumps in the sewage pumping station shall be set with anti-vibration pad, and the pump house is set with sound insulation doors and windows.	Building Unit, Operation and Maintenance Unit	Zhejiang Environmental Protection Bureau and local environmental protection administrations
		Atmosphere	① Auto and sealed chlorine dioxide generator is used in the water plant, and workers operate in the control room far away from the production equipment, and ventilation and detoxification are enhanced. Individual protection must be done well. ② Straightening the greening of plant area, and adopting the multi-layer protective green belt of tree, shrub and vegetation combination.		
		Surface Water	① Domestic sewage of Gaoyu Water Plant and Banshan Water Plant in AnJi County is discharged into the municipal sewage pipe network after treatment in the digestion tank. The water plant is set with recycling pool to discharge into the backwash wastewater of filter chamber, and the wastewater is sent to the steady-pressure distributing well by lift pump after adjustment, and enters water purification process for retreatment and utilization without discharging outside. Sludge water of plate flocculation tank and horizontal sedimentation tank is discharged into the sludge discharge tank, mud and water are separated after		

Stage	Subproject	Environmental factors	Mitigation measure	Execution unit	Supervision unit
			sedimentation and percolation, the liquid supernatant is discharged into the nearby river, and the intercepted sludge is cleared by manual work after drying. ② The sewage of water plants is discharged into the municipal sewage pipe network after preliminary treatment at the septic-tank.		
		Solid waste	① Mud cake produced by Gaoyu Water Plant and Banshan Water Plant in AnJi County shall be sent to the incineration plant for incineration treatment. ② Temporary storage site is set within the plant for sludge produced by Nandayang Water Plant of Longquan City, the ground is hardened with cement setting up cofferdam around it and covering the ceiling, and then the sanitation department may be entrusted to send it to the refuse landfill for sanitary landfill after temporary storage. ③ Household refuse of staff in various water plants shall be regularly cleared and disposed by the local sanitation department.		
		Others	① Establish a reliable operation monitoring and controlling system; ② Enhance the maintenance and management of facilities, and improve the serviceability rate of equipment; ③ Establish perfect water quality file system; ④ Strengthen the protection for water source quality of various water plants, divide drinking water conservation district, conduct management in strict accordance with the protection and management regulations on drinking water source, and ensure the safety of water source. ⑤ Formulate the emergency plan for accidents of water source pollution.		

Table 10.5-2 Summary Table for Environmental Management of Rural Decentralized Sewage Treatment Project

epoch	Environmental factors	Mitigation measure	Execution unit	Supervision unit
Design period	Atmospheric Environment	Site selection of cement mixing shall be far away the residential buildings as possible.	Design and construction unit	The local environmental protection administration Provincial project office and subproject offices of the four counties
	Ecological Environment	Occupy less cultivated land as possible, scientifically select the site and design the control measures.		
Construction Period	Atmospheric Environment	Dust suppression measures such as watering or covering the storage yard are adopted for the temporary stacking place, and covering the compartment with canvas and watering on the transport route with soil road are adopted for automobiles transporting crushed aggregates (keeping the sealed transportation).	Construction Unit, Building Unit	
	Water Environment	Domestic sewage of constructors must be used for farm irrigation or mountain forest greening without random discharging after reaching the standard. 2. Muddy water from the site shall firstly be collected into settling ponds for sedimentation, to discharge the supernatant liquor, while mud left may be delivered externally for landfill upon desiccation; or may be used as filler of the project in association with practical road greening.	Construction Unit, Building Unit	
	Disposal of Solid Waste	Sanitary landfill shall be done for construction waste; household refuse shall be timely transported to the place assigned by the sanitation department for disposal; engineering spoil shall be intensively piled at the waste disposal area in each construction point, ecological afforestation and flood control ditch building shall be timely done to reduce water and soil loss upon the completion of construction.	Construction Unit, Building Unit	
	Acoustic Environment	The construction work time shall be rationally arranged, and strong-noise construction shall be prohibited during the night; low-noise equipment and low-noise construction method shall be possibly used and advanced construction technology and low-noise equipment shall be adopted.	Construction Unit, Building Unit	
	Ecological Environment	Timely restoration must be done for the temporarily occupied land.	Construction Unit, Building Unit	
Operating Period	Disposal of Solid Waste	It is suggested that the sludge shall be agriculturally utilized to solve the problem of rural organic fertilizer or sent to the urban sewage disposal plant for disposal by fecal suction truck.	Operation and Maintenance Unit	all counties (cities) Environmental Protection Bureau

11 Overall Conclusions

11.1 Project Overview and Capital Source

Taking use of the World Bank loan, the rural domestic sewage treatment system and drinking water project in Zhejiang Province covers four counties and cities, i.e. Longquan City, Tiantai County, Fuyang City and AnJi County, including the perfection project of water supply and drainage in market towns, the treatment of decentralized sewage and the improvement project of the sewage collection network.

Totally eight subprojects will be performed in AnJi County, including the perfection of joint water supply and drainage facilities in rural areas in six regions, including Tianzihu Town (9 villages), Meixi Town (19 villages), Tianhuangping Town (11 villages), Banshan Town (10 villages), Xiaofeng Town (18 villages and 3 communities) and the expansion of urban sewage plants (4 villages, 13 communities and rural areas in Xiaofeng Town and Tianhuangping Town). The first package batch of rural sewage treatment project covering 19 decentralized villages and the second package radiating 15 villages. In total, 105 villages are considered. Owner of the project is AnJi Guoyuan Water Co., Ltd and operations taken in the later period is also performed by the same company.

The total number of subprojects to be performed in Fuyang Area is 9, consisting of the Fuyang sewage treatment project Phase IV, the construction project of joint water supply and drainage facilities in four rural market towns, i.e. Xindeng Town, Dayuang Town, Changkou Town and Longyang Town, two packaged sewage treatment projects in 19 decentralized villages and two packaged sewage interruption pipeline construction projects in 41 villages. Totally 84 villages are covered by the project: 19 decentralized villages, 41 ones in the sewage interruption pipeline construction project and 24 ones in joint rural market towns. The Owner of the project is Fuyang Water Group Company and operations and maintenances to be taken in the later period are also performed by the same company.

The Tiantai County has four subprojects totally, including perfection projects of water supply and drainage system for villages respectively in the north central section, the eastern section and the western section of Tiantai Basin, as well as the packaged sewage treatment project in 49 decentralized villages. Owner of the project is Tiantai Water Supply Company and operations to be taken in the later period are also performed by the same company. See Table 1.2-3 for details.

Nine subprojects in total are to be executed in Longquan, including the perfection project of water supply and drainage infrastructure of urban areas, the improvement project of lanes and alleys of urban areas, the perfection project of connection water supply and drainage infrastructure in An’ren, Badu, Xiaomei, Lanju and Zhatian villages, and two rural sewage treatment projects constructed in two phases. Totally 100 villages are considered. Owner of the project is Longquan Township Water-supply Station and Longquan Water-supply and Drainage Co., Ltd and operations and maintenances to be taken in the later period is also performed by these two same units.

Gross investment of this investment is about RMB 2.46324 billion, including a loan worth USD 200 million from the World Bank and other supporting funds of each county (city). The Project is implemented in two stages: the first stage includes 16 subprojects in four counties (cities), the gross investment is RMB 1,162.13 million, including a loan of USD 95.39 million from the World Bank. The second stage is

framework project; the gross investment is RMB 1,267.11 million, including a loan of USD 99.61 million from the World Bank.

11.2 Classification of Environmental Impacts

According to the division principle for environmental evaluation in *Operation Policy for Environmental Assessment (OP4.01)* of World Bank and the confirmation of the headquarters of World Bank, the environmental impact of this project is evaluated as Class B.

11.3 Present Conditions of Regional Environmental Quality

11.3.1 Environmental quality of surface water

1. AnJi area

AnJi region locates in the Tiaoxi River basin and it is known from the conventional water quality monitoring materials from 2012 to 2013 about the cross section of Tiaoxi River Chaitanbu, the monitoring section of Dipu and Zhili of West Tiaoxi River, the cross section of Jingwan, the cross section of Baishuiwan, the cross section of Liangpeng, the cross section of Wufengshan Mountain, the cross section of Banshanchang and the cross section of Liujiaqiao, all months are able to satisfy the required standards except for the Dipu cross section, with the ammonia nitrogen and the total phosphorus indexes exceeding the Class III standards in Environmental Quality Standard for Surface Water (GB3838-2002); water qualities of other cross section can meet the Class III standards.

All monitoring indexes of Fushi Reservoir satisfy the Class II water quality standard, including dissolved oxygen, permanganate index, BOD5, ammonia nitrogen, total phosphorus, total nitrogen, copper, zinc, fluoride, selenium, arsenic, mercury, cadmium, hexavalent chromium, lead, cyanide, volatile phenol, petroleum, anionic surfactant, sulfate, chloride, nitrate nitrogen, iron and manganese, and it is satisfactory for the project limit value requirements to be regarded as domestic drinking water.

All monitoring indexes of Tianzigang Reservoir satisfy the Class II and III water quality standards, including total hardness (calculated by CaCO3), chloride, sulfate, total dissolved solids, nitrate, nitrite, ammonia nitrogen, total phosphorus, total nitrogen, volatile phenol, anionic surfactant, chemical oxygen demand (cod), fluoride, arsenic, iron, manganese, copper, zinc, cadmium, lead, chrome, mercury, total number of bacteria and total coliform group, and it is satisfactory for the project limit value requirements to be regarded as domestic drinking water.

2. Fuyang area

The Fuyang subproject is adjacent to rivers including the Fuchun River, the Gexi River, the Songxi River, the Luzhu River, the Dayuan River and the Nanxinxi River and according to monitoring results, the COD and ammonia nitrogen in the Gexi River nearby the project have exceeded standards, which means that it can not satisfy the functional requirements for the present Class II water body; while, TN, NH3-N, BOD_5 and COD_{Mn} in Songxi River and Luzhu River are out of limits, primarily resulting from direct emission of domestic sewage into surface waters; current water quality of cross sections from Fuyang Bridge to Ling Bridge along the Fuchun River can no longer satisfy target requirements for the Class III water quality, with major factors out of gauge including fecal coliform, permanganate index, total phosphorus and petroleum pollutants, which are mainly affected from the pollutants discharged

along the rivers. COD, DO, TN, NH_3-N, T and petroleum in Dayuanxi River cause relatively serious pollution of current water quality of surface waters in the region.
Generally speaking, rivers where the project locates are affected from the pollutants discharged along the rivers, water quality exceeds the standards at different levels, which can no longer satisfy the requirements on water functional areas, and the water quality is poor.

3. Tiantai area

According to analysis of surface water monitoring in Tiantai County in 2012, it is obvious that overall water quality of Tiantai County expresses certain decreasing trends and partial sections are seriously polluted, especially quality of the lower reaches of the Shifeng River, which is out of limits. Pollution characteristic of the water body is organic and major pollution factors include TP, ammonia nitrogen, permanganate index and BOD, etc. There are 9 monitoring sections totally in Tiantai County, seven of which satisfying the Class II water quality standards, accounting for 77.8%, the other two that meeting the Class III standards, occupying 22.2%. Average rate of reaching the standards is 100% according to data from conventional monitoring stations for surface waters in Tiantai County in 2012

4. Longquan area

The Longquan subproject locates at a region flowing by the Longquan River, the Anren River, the Badu River, the Yanzhang River, the Zhulong River and the Xiaomei River. Its all monitoring indexes can reach the Class III and II water quality standards in Environmental *Quality Standard for Surface Water* (GB3838-2002); therefore its water environment quality is better.

11.3.2 Current conditions of atmospheric environment quality

Daily average concentration of SO2, NO2 and PM10 are all lower than the Class II *standard limit value in Ambient Air Quality Standards* (GB3095-2012) and ambient air quality in the project site is better.
As for the place where Fuyang subproject locates, concentration of both ammonia and hydrogen sulfide can reach the maximum acceptable concentration of hazardous substance in the air in the settlements according to the Hygienic Standards for the Design of Industrial Enterprises (TJ36-79), while that for PM10, SO2 and NO2 can meet the Class II *standards in Ambient Air Quality Standard* (GB3095-2012), so ambient air quality in the region is better.
As for the Tiantai region, concentration of SO2, NO2 and PM10 can all satisfy the Class II *standard limit value in Ambient Air Quality Standard* (GB3095-2012) and the regional ambient air quality is good.
Daily average concentration of SO2, NO2 and PM10 are all lower than the Class II *standard limit value in Ambient Air Quality Standard* (GB3095-1996) and the atmospheric environment quality in the project site is better.

11.3.3 Current conditions of noise environment quality

Quality of acoustic environment of the place where the AnJi subproject locates is relatively perfect and can reaches relevant standard limit value requirements of *Environmental Quality Standard for Noise* (GB3096-2008).
As for the proposed places for the Fuyang subproject, expect that the east and the west boundaries of the Longyang Sewage Disposal Plant can not satisfy the Class 1 standard as required in *Environmental Quality Standard for Noise* (GB3096-2008) at daytime and that the south, the west and the north boundaries can not meet the Class 1 standards at night, noise level round the clock of other proposed sites for the subproject can all satisfy the Class 2 and 4a standards in *Environmental Quality*

Standard for Noise (GB3096-2008), so the quality of acoustic environment in this region is better.

Quality of acoustic environment of the place where the AnJi subproject locates is relatively perfect and can reaches relevant standard limit value requirements of *Environmental Quality Standard for Noise* (GB3096-2008).

Day and night Noise level of all proposed places for the subproject in Longquan region can satisfy the Class 2, 1 and 4a standards in *Environmental Quality Standard for Noise* (GB3096-2008) and the region has a relatively good quality of acoustic environment.

11.3.4 Current conditions of water environment quality

In the region for the Fuyang subproject, except that fecal coliform in underground water nearby the Xindeng Sewage Disposal Plant exceeds the Class III *standards in Quality Standard for Ground Water* (GB/T 14848-93), other indexes reach standards; each and every monitoring index at the gauging point for underground water of other regions is able to meet the Class III *standards in Quality Standard for Ground Water* (GB/T 14848-93). As a whole, the quality of the regional groundwater environment is relatively good.

In the Tiantai subproject region, fecal coliform in underground water exceeds the Class III *standards in Quality Standard for Ground Water* (GB/T 14848-93), while other indexes reach standards, which is mainly resulting from the penetration of domestic sewage into underground waters.

All indexes about underground water in the region where Lonquan Nandayang Water Plant locates can accord with the Class III *standards in Quality Standard for Ground Water* (GB/T 14848-1993), and the groundwater environment quality is relatively good.

11.4 Main Environmental Impacts

11.4.1 Brief summary of ambient air impact

NH3 and H2S are the key pollutants discharged by Meixi Sewage Disposal Plant, AnJi Urban Sewage Disposal Plant, the Fuyang Sewage Disposal Plant phase-IV Project, Fuyang Longyang Sewage Disposal Plant, the sewage disposal plant in Anren Township in Longquan, the sewage disposal plant in Badu Township in Longquan, the sewage disposal plant in Chatian Township in Longquan, the sewage disposal plant in Lanju Village in Longquan, the sewage disposal plant in Xiaomei Township in Longquan and Cangshan Sewage Disposal Plant of Tiantai County and upon calculation and prediction, the maximum ground level concentration of NH_3 and H_2S upon superposition with the background value conforms to the maximum allowable concentration of hazardous substances in ambient air of the residential areas as required in Hygienic Standards for the Design of Industrial Enterprises (TJ36-79). Momentary maximum allowable concentration of NH_3 and H_2S of sensitive spots nearby plant site can also reach standards and the ambient environment is influenced on a relatively low level.

Decentralized sewage disposal stations in rural areas has lower sewage disposal capacity and hardly discharge H2S, NH3 and other odor pollutants, having small impact on the atmospheric environment.

11.4.2 Summary for environment impact of surface water

1. The Fuyang Sewage Disposal Plant Phase-IV Project

① At the time of normal discharging, the envelop area is 0.053km² if the maximum incremental value of COD_{Mn} during neap tide is larger than 2mg/L and its

contribution value to boundaries of the functional district of the downstream Class II surface water is 0.24mg/L; when the discharge is abnormal, the envelop area is 0.082km² if the maximum incremental value of COD_{Mn} during neap tide is larger than 2mg/L and its contribution value to boundaries of the functional district of the downstream Class II surface water is 0.29mg/L; during accident discharge, the envelop area is 0.167km² if the maximum incremental value of COD_{Mn} during neap tide is larger than 10mg/L and its contribution value to boundaries of the functional district of the downstream Class II surface water is 1.84mg/L. while individual discharge, certain influence will produce to the water environment of the involved waters; normal discharge impacts the water environment at slightest, and abnormal discharge greater, accident discharge greatest. NH3-N and TP have similar disciplines.

② It is indicated by overlaying with numerical procedures of other pollution sources, other sources of pollution have little influences on the water environment of waters nearby the discharge outlets for the fourth phase of Fuyang project, whose sewages will not overlaid with other polluters and whose contribution value to boundaries of the Class II surface water at the upper reaches takes little proportion.

③ Upon the execution of the fourth phase of Fuyang project, emission loads of COD_{Mn} and NH3-N respectively increased by 46% and 9%, which is with a trend consistent with the predictive results about the water quality affected in the water body and the COD_{Mn} index and the NH_3-N expressed certain variation in the receiving waters.

④ What are connected with the discharge outlets of Fuyang sewage disposal plant is completely drinking water source protection areas. Several water intakes have been set at the upper and the lower reaches. At the time of normal discharging, since the sail upstream river function of this river section is weak, water quality is barely influenced at intakes from Fuyang Jiangbei and Jiangnan water plants at the upper reaches of sewage discharging of the fourth phase of Fuyang project. At the lower reaches, Zhoupu Water Plant is the nearest water plant away from the discharge outlet, and the plant, during spring tide, will have the maximum incremental value about COD_{Mn}, NH3-N and TP respectively being 0.15mg/L, 0.04mg/L and 0.004mg/L, while that in the neap tide period is separately 0.12mg/L, 0.03mg/L and 0.003mg/L. Water intake from the Juxi Water Plant is the largest water intake for domestic water in Hangzhou, which, during the spring tide, has the maximum incremental value about COD_{Mn}, NH3-N and TP respectively being 0.04mg/L, 0.01mg/L and 0.001mg/L, while that in the neap tide period is separately 0.03mg/L, 0.01mg/L and0.001mg/L; therefore, the impact is relatively small.

2. Other sewage disposal plants

Other sewage disposal plants do not have water intakes or other protected object nearby the discharge outlets. Based on predicted results, when each sewage disposal plant conducting up-to-standard discharge, some may exceed the standards nearby the discharge outlets; but after mixing and attenuation along certain distances, it is able to satisfy the functional requirements of water body absorbing pollutants, making relatively small impact on water quality in the lower reaches. Since sewage inside the service scope of the project are collected and processed, replacing the former direct discharge situations, pollutants discharged into the river are reduced and water quality will be improved.

3. Water plant

Water quality of water sources of AnJi Gaoyu Water Plant, Banshan Water Plant and

Nandayang Water Plant involve in the project are stable and up to standards, which can meet water in-taking of all water plants. Therefore, the project water in-taking impact on water usage of lower reaches of the river is relatively small.

4. Decentralized rural disposal system

Decentralized sewage treatment stations in rural areas has lower sewage treatment capacity and the emission points are scattered in these four counties; besides, certain sewage will be filtered by the soil infiltration system and therefore, the general effects of tail water discharged on the surface water body is extremely not obvious.

11.4.3 Summary for environmental impacts of noise

1. Sewage disposal plant

Noise coming from sewage disposal plants are mainly mechanical noises produced by air blowers in the blower room, various pumps in the sewage pump house, dehydrators, solids and liquid separators, grit-water splitters, air compressors and other equipment, whose noise intensity are about 75 - 95dB.

Based on prediction and analysis, except for the east and north boundaries of Meixi Sewage Disposal Plant which exceed standards at night, noise level of each boundary could all live up to the Class 2 standard value (60dB) as required in *Emission Standard for Industrial Enterprise Noise at Boundary* (GB12348-2008); while noise level of each boundary of the AnJi Urban Sewage Disposal Plant can reach the Class 2 standards.

As for the forth phase of Fuyang Sewage Disposal Plant, its south boundary will reach the Class 4 standards day and night; while its east, west and north boundaries are able to reach the standards in the daytime; but the east and the north boundaries at night are respectively 1.1 and 0.1 higher than the standard value. The west boundary does not exceed standards at night.

Noise levels at each boundary of the Sewage Disposal Plant of Anren County, the Sewage Disposal Plant of Badu County, the Sewage Disposal Plant of Chatian County, the Sewage Disposal Plant of Lanju Village and the Sewage Disposal Plant of Xiaomei County in Longquan City are all up to standards.

As for Longyang Sewage Disposal Plant, except for the south boundary with a noise level exceeding 7.4dB at night and the north boundary, with a noise level exceeding 0.4dB at night, noise levels of other boundaries can all reach the Class1 standards.

Noise levels of each boundary Tiantai Cangshan Sewage Disposal Plant can satisfy the Class 1 standard requirements at day and night

All sensitive spots nearby the sewage disposal plants could reach the standards and little impacted by noise.

2. Water plant

Noises generated during the production of tap water are mainly divided into pneumatic noise and mechanical noise coming from air blowers and water pumps used by water plants. Upon prediction, noise values at the boundaries of each water plant can conform to the Class 2 standard values in *Emission Standard for Industrial Enterprise Noise at Boundary* (GB12348-2008).

11.4.4 Summary for environmental impacts of solid waste

Solid wastes produced by the project mainly consist of sludge from sewage disposal plants and water plants and living garbage from the staves.

Domestic garbage will be collected and cleaned by local environmental sanitation department.

The sludge produced in Fuyang Sewage Disposal Plant Phase IV Project and Longyang Sewage Disposal Plant shall be transported to Zhejiang Qingyuan

Ecological Thermoelectricity Co., Ltd. for incineration treatment; the sludge produced in AnJi County Meixi Sewage Disposal Plant and AnJi Urban Sewage Disposal Plant shall be transported to the incinerator in AnJi Wangneng Renewable Resource Utilization Co., Ltd. for incineration treatment; The sludge produced in Tiantai Cangshan Sewage Disposal Plant shall be transported to Tiantai County Waste Landfill for backfilling; sludge produced from Longquan Nandayang Water Plant will transport to Gaotang Rufuse Landfill for sanitary landfill, and sludge produced by the sewage treatment subprojects shall undergo composing process; the compost being used in the farmland or mountain land near the project. In general, the sludge generated by the project will have no influence on the surrounding environment through effective treatment.

11.5 Public Participation and Information Disclosure

According to the requirements of *Temporary Methods of Public Participation in Environmental Impact Assessment* (HF 2006[No.28]) and *Operation Policy for Environmental Evaluation of World Bank* (OP4.01), take the subprojects in various counties and cities as the unit for public participation, post up notices to present the relevant environmental impact assessment information to the public and place the reports at public library, reading room, etc. in order to facilitate the public to further obtain the information pertaining to the environmental impact assessment of this project. Additionally, carry out public consultation via questionnaires for social organizations and the public, or via interviewing or via holding small conversazione, etc.

Two times of public consultation and information disclosure are carried out for all the subprojects, thus making the public of the project site effectively and fully know the project information and the environmental impact, and meanwhile the opinions of the public is also timely fed back to and accepted by the building unit. The results of the investigation show that, people of each subproject area fully understand the construction meaning, and are actively in favor of the project construction.

11.6 Alternative Solution Comparison and Selection

Since 2003, Zhejiang Province has been continuously promoting the ecological province construction, having successively carried out three times of “811” ecological environmental protection action, which fully strengthens water pollution control and water environment protection, with water quality in the whole province being generally stable and good. Meanwhile, part of river sections of the main river systems remain serious water pollution problems, with river networks in plane areas and offshore areas being seriously polluted, and the dirty, disorderly and bad situation in some river channels in rural and urban areas directly impacts people’s production and living.

Through World Bank loan, Zhejiang Province selects to carry out rural sewage treatment and drinking water engineering construction in AnJi County of Taihu Basin of northern Zhejiang Province, in Fuyang City of Hangzhou suburb of the Qiantang River basin, in Tiantai County of middle Zhejiang mountainous area of Jiaojiang basin and in Longquan City of southern Zhejiang mountainous area of Ou River basin, totally including 28 subprojects, serving for 1,500,000 people and thus benefiting for a lot of people. Moreover, after construction, till 2020, the sewage treatment capacity of will add to 54,050,000 t/a, COD discharge amount can be reduced by 12,987t/a while BOD discharge amount can be reduced by 5,934t/a, thus effectively improving

the water quality of the rivers.

If the project is not implemented due to insufficient capital, the problems existing in water supply and sewage treatment system in the four counties can not be solved in a short term, and water supply safety for village residents will not gain guarantee. The domestic sewage in villages being directly discharged without any treatment will impact water environment, and the village environment sanitation can not be improved.

Therefore, it is much necessary and urgent to implement the project, the demonstration function of the four counties and cities can provide technology, running and sewage discharge standards and technical supports and demonstration for future rural sewage treatment in Zhejiang province and advance the sustainable development of Zhejiang Province.

11.7 Environmental Management Plan

Please refer to Table 10.5-1 and Table 10.5-2 for EMP of this project.

11.8 Conclusion

Through World Bank loan, Zhejiang Province selects to carry out rural sewage treatment and drinking water engineering construction in AnJi County of Taihu Basin of northern Zhejiang Province, in Fuyang City of Hangzhou suburb of the Qiantang River basin, in Tiantai County of middle Zhejiang mountainous area of Jiaojiang basin and in Longquan City of southern Zhejiang mountainous area of Ou River basin, totally including 28 subprojects, serving for 1,500,000 people. The project construction is in accordance with both the environmental functional district planning requirement and the national industrial policy. After the completion of this project, the environmental benefit and the social benefit are predicted to be better, thus largely cutting down pollutants, greatly contributing to improving the water quality of the project construction site and the rural environment as well as the rural water supply safety, and effectively promoting sustainable development and new rural construction in Zhejiang Province. By the measures for slowing down the environmental impact, the discharged pollutants are controlled in the permissible discharge range and the environmental impact is also controlled in the acceptable range. Accordingly, the implementation of the project is feasible from the view of environmental protection.