The World Bank Financed

Jishui Water Environment Management Project
Environmental Management Plan

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1 Overview

1.1 Introduction

Based on “the World Bank Financed Jishui Water Environment Management Project－Environmental Assessment Report”, this environmental management plan (EMP) is an independent document that includes all environmental protection actions during the project design, construction and operation periods, and acts as an action principle and working framework for implementation of mitigation measures, environmental management and environmental monitoring. The main contents of the plan include:

*Project introduction
*Potential environmental impacts
*Agencies and responsibilities
*Environmental Management Plan
*Environmental monitoring plan
*Environmental supervision

1.2 EMP Objectives

The objectives of EMP preparation are to 1) improve project screening, site selection, planning, design, implementation and other activities through practicable and feasible prevention and mitigation measures or measures to offset adverse environmental impacts and enhance positive environmental impacts, i.e. to take measures during project implementation to mitigate and manage adverse environmental impacts; 2) assess the actual effectiveness of mitigation measures through implementing environmental monitoring plan, propose, based on monitoring results, recommendations for further improving mitigation measures and meet relevant environmental requirements of the state, Jiangxi Province and the World Bank.

2 Project Description

2.1 Project Background

To reduce pollutants flowing into Poyang Lake from Gan River and improve the water quality management of Jishui County,, the government of Jishui County plans to use the World Bank Financed Jishui Water Environment Management Project to build a relatively sound municipal drainage system, ensure the biological safety of the county's water environment, promote the rainwater-sewage diversion system, improve the wastewater collection and treatment rate, mitigate pollution to the Poyang Lake at the source, enhance the water environmental management level and achieve urbanization of sustainable development.

2.2 Project Components

As shown in Table 2-1, the project consists of reconstruction of urban drainage network and other non-engineering measures.

Table 2-1 Project Components

Project name	Sub-project	Content	Type	Location	Service coverage
Reconstruction of drainage network	Sewage pipeline network	A DN200-DN60 sewage pipeline of 27,400m shall be built along the road. Collected sewage will be treated in existing Jishui County sewage treatment plant. Collected amount of sewage will reach 13,000 m^3/d in the near term, 16,500 m^3/d in the middle term and 20,000 m^3/d in the long term.	new	south district and old urban district	south district and old urban district
	Rainwater pipeline network	A d600-d2000 rainwater pipeline (channel) of 15,200m shall be built along the road. Collected rainwater will drain off into Gan River and drainage ditches.	new	south district and old urban district	south district and old urban district
	Sewage pumping station	An integrated prefabricated pumping station of 1500m^3/d	new	Wenshan Avenue Sewage Pumping Station	south district
		An integrated prefabricated pumping station of 2500m^3/d	new	Enjiang Beilu Sewage Pumping Station	old urban district
		An integrated prefabricated pumping station of 5000m^3/d	new	Enjiang Bridge Sewage Pumping Station	south district
		A pumping station will be	Reconstructi	Xiaojiangk	south district and

		expanded from 10,000m^3/ to 15,000 m^3/d	on and expansion	ou Sewage lifting Pumping Station	old urban district
others	Water environment monitoring system premises	1 station	new	County EPB	mainly in charge of remote monitoring, data collection and transmission, data statistics and application of automatic Water environment monitoring station
	Automatic Water environment monitoring station for river cross sections	2 two-floor stations, on average each covering 153.5m^2	new	One station is located near the river water quality monitoring cross section of the Cuitou Group in Zhuanmen Village, Wenfeng Town, Jishui County; the other is near the river water quality monitoring cross section of the Dajiangling Group in Tangbian Village, Dingjiang Town, Jishui County.	One station is to monitor the water quality of the main stream of Gan River in the border among Qingyuan District, Jizhou District and Jishui County; the other to monitor water quality of Gan River in Dajialing, Wujiang Town, in the border between Yongfeng County and Jishui County.

	Automatic Water environment measurement sites	4 water environment measurement systems	new	Respectively located in Zhuqi Village of Badu Town, Yangjia Village of Jintan Town, water plant in south district and the estuary of Wujiang River	Respectively measure the water quality in Zhuqi Village of Badu Town, Yangjia Village of Jintan Town, water plant in south district and the estuary of Wujiang River
cost	About RMB 174,583,600 in total, including USD 17.5 million (RMB 115.50 million, 1 USD=6.6 RMB) loan of World Bank and RMB 59,372,300 of counterpart funding from the superior support and the local government's self-raised fund.				

3 Environmental Protection Targets and Standards

3.1 Environmental Protection Targets

The environmental protection targets of this project are shown as follows from Table 3-1 to 3-4.

Table 3-1 List of Acoustic and Ambient Air Environment Protection Targets

Project content	Impact period	Impact factor	Name of sensitive spot	Location	Number of Household /people	Distance from the project (m)
A)general environment protection targets						
Pipeline network	Construction period	dust and noise from construction machinery during the construction period	Shanshuihaocheng Community	Wanli Avenue, W	1000 household	18
			Yulongwan Communicty	Wanli Avenue, W	1800 household	155
			Xinchengyihao Community	Wanli Avenue, E	250 household	10
			Jiyang Community	Tongshi Road, S	550 household	20
			Hanwenyuan Community	Yongji Road, E	500 household	18
			Urban Garden Community	Huanyuan Road, W	420 household	13
			Shidaishangmao Community	Wenming Beilu, E	150 household	117
			Wenshui Community	Wenming Beilu, E	170 household	17
			Hanlinyuan Community	Longhua Zhongdadao, W	40 household	23
			Tianchengyipin Community	Longhua Zhongdadao, E	500 household	99
			Shiyang Community	Longhua Zhongdadao, W	85 household	13
			Qingzhang Garden	Longhua Zhongdadao, E	170 household	72
			Yangmingyuan Community	Wenhua Donglu, S	80 household	13
			Longfuyuan Community	Wenjiao Road, N	120 household	9
			Xinlongyuan Community	Wenfeng Dongdadao, S	70 household	58
			Binjiangguoji Community	Wenfeng Beidadao, E	800 household	17
			Boshiyuan Community	Shuinan Road, N	130 household	18
Pumping station	Operation period	Noise from instruments	Shuinanbei Village	Enjiang River Bride Sewage Pumping Station, W	20 household	30
			Wenshui Village	Xiaojiangkou Sewage lifting	30 household	20

Project content	Impact period	Impact factor	Name of sensitive spot	Location	Number of Household /people	Distance from the project (m)
				Pumping Station, N.E		
			Enjiang Beilu North Community	Enjiang Beilu Sewage Pumping Station, N	35 household	130
B)Key environment protection targets						
Pipeline network	Construction period	dust and noise from construction machinery during the construction period	Jishui Siyuan Experimental School	Wanli Avenue, E	4775 people	107
			Chengdong Elementary School	Wenhua Donglu, S	300 people	124
			Jishui No.2 Middle School	Wenhua Donglu, S	3300 people	99
			Jishui No.3 Middle School	Wenhua Donglu, S	3650 people	170
			Wenfeng Elementary School	Wenfeng Dongdadao, W	1500 people	10
			Jishui Experimental School	Wenjiao Road, S	3000 people	20
			Jishui No.4 Middle School	Shuinan Road, S.W.	1555 people	48
			Jishui Middle School	Wenshan Avenue, E	4300 people	32
			Jishui Chinese Medicine Hospital	Wenhua Donglu, S	300 people	29
			Jishui Aimin Hospital	Wenshui Avenue, N	200 people	14
			Jishui Central Kindergarten	Wenming Nanlu, E	200 people	17
			Jishui Maternity and Child Health Care Hospital	Renwen Road, S	400 people	17
			Jishui No.3 Middle School	Longhua Zhongdadao, W	3650 people	14
			Jishui People’s Hospital	Wanli Avenue, E	500 people	186
			Jishui Jinshi School	Tonshi Road, N	4157 people	10
			Jinggangshan Economic and Trade School	Longhua Zhongdadao, E	1700 people	12
			Wenfeng Health Center	Wenshan Avenue, W	20 people	10

Table 3-2 List of Water Environment Protection Targets

No.	Protection target	Water quality target	Water body function
1	Gan River (Jishui section)	Category Ⅲ	Water for scenic and recreational purposes

No.	Protection target	Water quality target	Water body function
3	Enjiang River	Category Ⅲ	Water for scenic and recreational purposes

Table 3-3 List of Ecological Environment Protection Targets

No.	Environment factor	Protection target	Overview of protection target
1	ecological environment	terrestrial plant	damaged plants due to permanent and temporary land occupation of the project
		wild animals	wild animals within the area affected by the project

Table 3-4 List of Social Environment Protection Targets

No.	impact factor	protection target
1	infrastructure	existing roads and buildings
2	Transport and safety.	the travel and safety of residents, schools and hospitals, and shops along the existing roads
3	public facilities	water and electricity supply and other public facilities

3.2 Environmental Protection Standards

3.2.1 Environmental Quality Standards

(1)Ambient air

In accordance with EHS, ambient air quality shall meet national standard stipulated by law. If there is no such standard, the latest WHO Air Quality Guideline or other globally recognized reference standard shall be applied. See Table 3-5. As China has issued the *Ambient Air Quality Standards* (GB3095-2012) and the ambient air involved in the project is classified as Category II, the Category II standard in *Ambient Air Quality Standards* (GB3095-2012) is applied. See Table 3-6.

Table 3-5 Ambient Air Quality Standards in EHS (μg/m^3)

item	Average cycle	guideline value	standard
SO_2	24h	125 (target value of the first phrase) 50 (target value of the second phrase)	WHO *Air Quality Guideline*
	10min	20 (guideline value) 500 (guideline value)	
NO_2	1a 1h	40 (guideline value) 200 (guideline value)	
PM_{10}	1a	70 (target value of the first phrase) 50 (target value of the second phrase) 30 (target value of the third phrase)	
	24h	20 (guideline value)	

		150 (target value of the first phrase) 100 (target value of the second phrase) 75 (target value of the third phrase) 50 (guideline value)	
$PM_{2.5}$	1a	35 (target value of the first phrase) 25 (target value of the second phrase) 15 (target value of the third phrase) 10 (guideline value)	
	24h	75 (target value of the first phrase) 50 (target value of the second phrase) 37.5 (target value of the third phrase) 25 (guideline value)	

Table 3-6 Ambient Air Quality Standard of This Project

Item	1-hour Average	24-hour Average	Standard
SO_2	500	150	Category II standard in *Ambient Air Quality Standards* (GB3095-2012)
NO_2	200	80	
TSP	-	300	
PM_{10}	-	150	

After comparison, it is found the 1-hour average value of NO_2 in China's national standard and its annual average value in EHS Guideline are the same; the 1-hour average value of PM_{102} in China's national standard and its target value in the first phrase in EHS Guideline are the same; the 24-hour average of $PM_{2.5}$ in China's national standard and its target value in the first phrase in EHS Guideline are the same; and the 24-hour average of SO_2 in China's national standard is lower than its target value in the first phrase in EHS Guideline.

Pursuant to EHS, ambient air quality shall meet national standard stipulated by law, therefore, relevant standard in Table 3-6 is applied.

(2)Water environment

The water bodies involved in this project are Gan River (Jishui section) and Enjiang River. Both are scenic water body and are subject to Category III standard in *Surface Water Environment Quality Standards (*GB3838-2002). See Table 3-7 for details.

Table 3-7 Surface Water Environment Quality Standards (mg/L, excluding pH)

Assessment factor	standard limit in *Surface Water Environment Quality Standards (*GB3838-2002)
	Category Ⅲstandard
pH	6-9
COD	≤20

Assessment factor	standard limit in *Surface Water Environment Quality Standards (*GB3838-2002)
BOD_5	≤4
TN	≤1.0
NH_3-N	≤1.0
TP	≤0.2 (for lakes and reservoirs, 0.05)
Petroleum	≤0.05
Involved water body	Enjiang River and Gan River (Jishui section)

(3)Acoustic environment

The acoustic environment quality related standards of China and noise standard in EHS are shown in Table 3-.8.

Table 3-8 Acoustic Environment Quality Standards (dB(A))

Acoustic Environment Quality Standard (GB3096-2008)				Noise guideline value in EHS		
Implemented area	Category of functional zone	Daytime 6:00~22:00	Nighttime 22:00~6:00	Receptor	Daytime 7:00~22:00	Nighttime 22:00~7:00
residential, commercial and industrial combined areas	Category 2	60	50	residential, office and cultural &educational area	55	45
areas along both sides of transport corridors	Category 4a	70	55	industrial and commercial facilities	70	70

Old urban district and south urban district involved in this project belong to residential, commercial and industrial combined areas, whereas Enjiang Bride Sewage Pumping Station, Wenshan Avenue Sewage Lifting Pumping Station and Enjiang Beilu Sewage Lifting Pumping Station are located along both sides of transport corridors. After comparison, *Acoustic Environment Quality Standard (GB3096-2008)* is applied in this project. See Table 3-9 for the acoustic environment quality standard of this project.

Table 3-9 Acoustic Environment Quality Standard (dB(A))

Item	Category	Implementation area	*Acoustic Environment Quality Standards* (GB3096-2008)	
			daytime	nighttime
acoustic environment	Category II	Xiaojiangkou Sewage lifting Pumping Station and areas worse than Category-4a standard	60	50
	Category 4a	Enjiang Bridgehead Sewage Lifting Pumping Station, Wenshan Avenue Sewage Lifting Pumping Station and Enjiang Beilu Sewage Lifting Pumping	70	55

		Station		

3.2.2 Pollutants Discharge standards

(1)Atmospheric Pollutants

Monitored concentration limits for fugitive discharge in *Comprehensive Atmospheric Pollutant Emission Standards* (GB16297-1996) are applied for dust from construction. See Table 3-10 for details.

Table 3-10 Comprehensive Atmospheric Pollutant Emission Standards (excerpt) (unit: mg/m^3)

Pollutant	monitored concentration limits for fugitive discharge	
Particulate matter	Monitoring point	concentration
	maximum concentration outside the boundary	1.0

(2)Water Pollutants

The wastewater collected through pipeline network drains into Jishui wastewater treatment plant. Wastewater that flows into sewers is subject to Category B standard of *Water Quality Standard for Sewage Discharged to Urban Sewer* (GJ343-2010) as shown in Table 3-11. Treated and up-to-standard wastewater that meets the Category I B standard in *Pollutant Discharge Standards for Urban Wastewater Treatment Plants* (GB18918-2002) is discharged into Gan River. The treated water quality standards are shown in Table 3-12.

Table 3-11 Water Quality Standard for Sewage Discharged into Urban Sewers (mg/L，excluding pH)

No.	item	Category B	No.	item	Category B
1	COD	500	9	total lead	1
2	BOD_5	350	10	total chromium	1.5
3	SS	400	11	total nickel	1
4	NH_3-N	45	12	total zinc	5
5	pH	6.5~9.5	13	total copper	2
6	TN	70	14	total manganese	5
7	TP	8	15	total iron	10
8	total cadmium	0.1	16	total arsenic	0.5

Table 3-12 Wastewater Discharge Standards for Urban Wastewater Treatment Plants (unit: mg/L, excluding pH)

Source of standards / Pollutant	Category I B standard in *Pollutant Discharge Standards for Urban Wastewater Treatment Plants* (GB18918-2002)
pH	6~9
SS	20

Pollutant \ Source of standards	Category I B standard in *Pollutant Discharge Standards for Urban Wastewater Treatment Plants* (GB18918-2002)
BOD_5	20
COD	60
NH_3-N	8 (15)
petroleum	3
animal and plant oil	3

Note: the value outside brackets is the control indicator when water temperature is above 12℃, and the value in brackets is applied when water temperature is below or equal to 12℃.

(3)Noise

Standards for Ambient Noise Emission at Construction Site Boundary (GB12523-2011) is applied for all construction noises. See Table 3-13.

During operation period, noises produced by machinery in Enjiang Bridgehead Sewage Lifting Pumping Station and Wenshan Avenue Sewage Lifting Pumping Station are subject to Category IV standard, while Enjiang Beilu Sewage Lifting Pumping Station and Xiaojiangkou Sewage Lifting Pumping Station are subject to Category II standard in *Emission Standards for Industrial Enterprises Noise at Boundary* (GB12348-2008). See Table 3-11 for specific standard values.

Table 3-13 Standards for Ambient Noise Emission (unit: dB(A))

Item	*Emission Standards for Industrial Enterprises Noise at Boundary* (GB12348-2008)		*Standards for Ambient Noise Emission at Construction Site Boundary* (GB12523-2011)
	Category II	Category 4a	noise emission standards at construction sites
daytime	60	70	70
nighttime	50	55	55

4 Environmental Management Plan

4.1 Environmental Management Agencies and Responsibilities

Setup of the project's environmental management agencies is provided in Figure 4-1 and Table 4-1. Roles and responsibilities and staff establishment of agencies under the project are summarized in Table 4-2.

Table 4-1 Agencies under Environmental Management System

Nature	Name	Roles and Responsibilities
Management	PPMO	Designates an environmental manager to be exclusively responsible for environmental protection activities during planning, design and implementation, make sure work procedures meet domestic and World Bank requirements for environmental assessment and environmental management, incorporate EMP into bidding documents and contracts, and coordinate and supervise EMP implementation.
	County PMO	Designates staff to be exclusively responsible for routine environmental supervision and management during project implementation and operation, environmental acceptance and routine monitoring after project completion to reduce adverse environmental impacts of the project to the lowest possible or acceptable levels and maximize environmental benefits of the project; provide funding needed for carrying out environmental protection activities and take charge of sorting out and archiving relevant documentation.
	project Owner	Designates staff to be exclusively responsible for environmental management during project operation.
supervision	World Bank Supervision Mission	Sends an environmental specialist to supervise and review ECOP implementation.
	Various-level Environmental Protection Administrations	Supervise and inspect to ensure work procedures meet Government of China (GOC) requirements for environmental management and pollution control measures during project implementation meet GOC requirements for environmental protection.

Nature	Name	Roles and Responsibilities
implementation	Civil Works Contractor	Appoints a site environmental engineer to implement environmental protection and soil and water conservation measures specified in contract clauses and the bidding document, prepare and submit monthly environmental reports during construction, following requirements of the World Bank and local environmental protection administrations for environmental protection.
Consulting service	EIA Institute	Prepares project environmental report.
	Design Institute	Prepares feasibility study and construction design
	Environmental Supervision Agency	Supervises route construction activities of the contractor.
monitoring	Environmental Monitoring Agency	Qualified environmental monitoring agency takes charge of environmental monitoring during project construction and operation.

Figure 4-1 Organizational Framework of Environmental Management

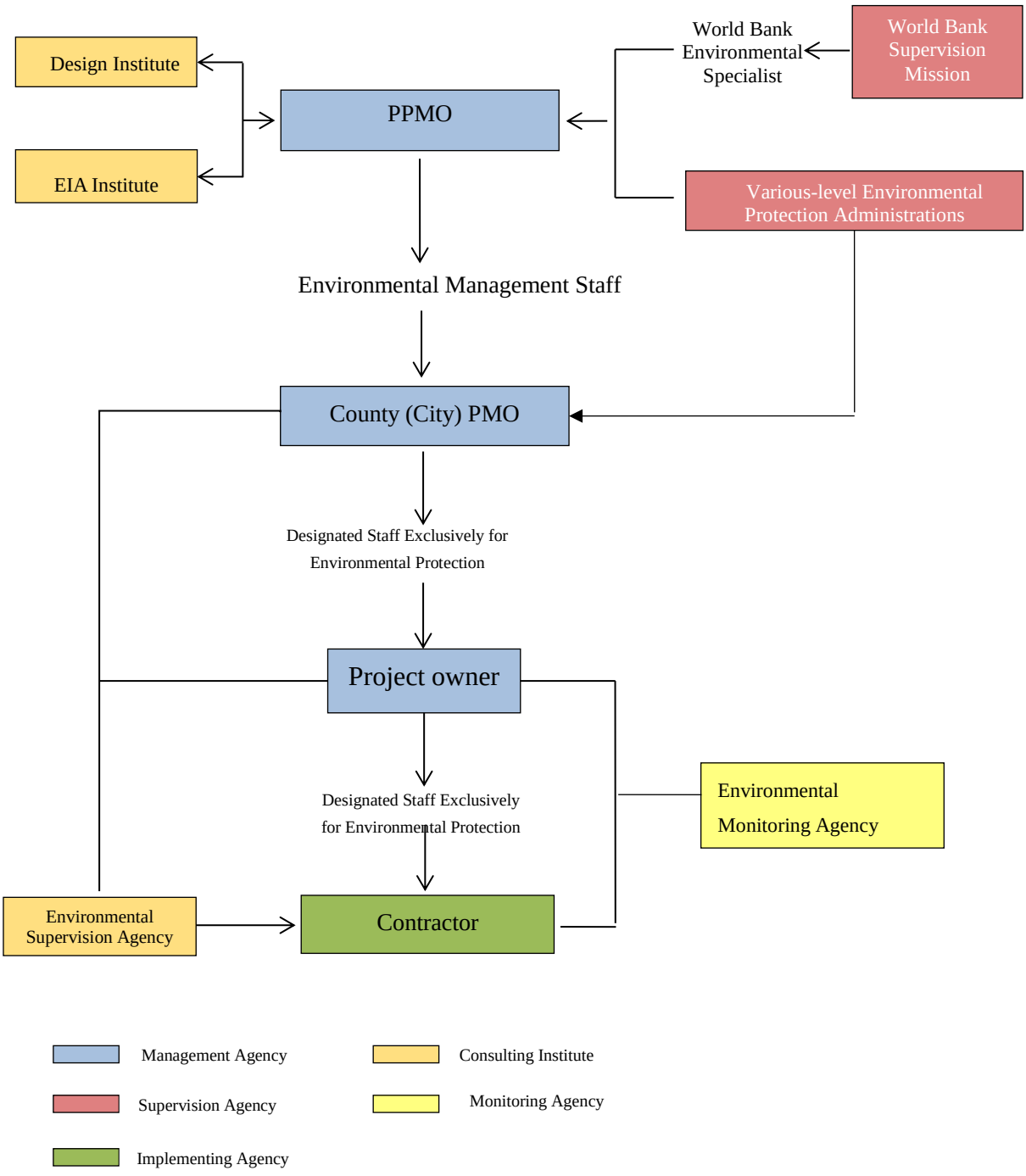


Table 4-2 Roles and Responsibilities and Staff Establishment of Agencies under Environmental Management System

Agency	Type	Staff Establishment (No. of People)	Roles and Responsibilities
Various-level Environmental Protection Administrations	Supervision	A few	1. Undertakes whole-process environmental monitoring and management in accordance with law, including approval of Project EIA (or sub-project EIAs), environmental monitoring and management during project implementation and operation.
World Bank	Supervision	1	1. Sends supervision missions every year to supervise project implementation; 2. Reviews implementation of the project's Loan Agreement and EMP.
PPMO	Management	1	1. Supervises EMP implementation; 2. Supervises and coordinates enforcement of domestic and World Bank requirements for environmental management; 3. Submits relevant reports to the World Bank every six months; 4. Inspects environmental protection activities of project counties (cities); 5. Coordinates with other relevant authorities to address significant environmental issues; 6. Engages panel of external environmental specialists to review environmental protection activities.
County PMO	Management	1	1. Supervises implementation of sub-project environmental management rules and institutions; 2. Incorporates environmental protection measures in the EMP into construction contracts; 3. Employs supervision engineer and supervises and coordinates its work (including qualification, responsibilities and management); 4. Organizes EMP implementation; 5. Organizes special-subject study or relevant investigations; 6. Properly documents and compiles complaints during construction and operation, clarifies to the public result of addressing complaints and addresses public complaints; 7. Reviews environmental supervision and environmental consulting reports; 8. Submits quarterly reports (statements) to PPMO;

Agency	Type	Staff Establishment (No. of People)	Roles and Responsibilities
			9. Signs off on site checklists submitted by the contractor and supervision engineer, verifies environmentally sensitive issues and archives the checklists; 10. Receives environmental supervision mission (including World Bank supervision mission).
Project Owner	Management	1	1. Supervises implementation of sub-project environmental management rules and institutions; 2. Supervises and coordinates work of supervision engineer (including qualification, responsibilities and management); 3. Organizes special-subject study or relevant investigations; 4. Properly documents and compiles complaints during construction and operation, clarifies to the public result of addressing complaints and addresses public complaints; 5. Reviews environmental supervision and environmental consulting reports; 6. Submits quarterly reports (statements) to PPMO and county PMO; 7. Signs off on site checklists submitted by the contractor and supervision engineer, verifies environmentally sensitive issues and archives the checklists; 8. Receives environmental supervision mission (including World Bank supervision mission).
EIA Institute	IEA	A few	1. Visits project sites and conducts EIA; 2. Prepares EMP.
Environment supervision agency	Consulting	1-2	1. Supervision engineer is employed separately by PPMO or county PMO; 2. Supervises and inspects domestic sewage treatment, production wastewater treatment, implementation of soil erosion, waste gas, dust and noise control measures, disposal of production and domestic garbage and epidemic control; 3. Fills out on a regular basis all checklists in the annexes of ECOP; 4. Proposes and follows up on solutions to rectify environmental issues/ problems encountered by the contractor during construction, including issuing rectification notices and checklists and archiving

Agency	Type	Staff Establishment (No. of People)	Roles and Responsibilities
			relevant documentation; 5. Submits to county PMO weekly implementation progress reports.
Contractor	Implementation	many	1. Develops environmental protection measures to be implemented during construction; 2. Accepts supervision and inspection of all aspects of environmental protection by supervision engineer, World Bank and various-level environmental protection administrations; 3. Sets up a feedback mechanism and completes rectification within 3 working days after receiving rectification notice (or within 10 working days when addressing of issues/problems needs coordination by management agencies); 4. Prepares, together with supervision engineer, prior to construction commencement and submits to county (city) PMO a construction site checklist; 5. Submits to county PMO weekly implementation progress reports.
Environmental Monitoring Agency	Monitoring	A few	1. Undertakes environmental monitoring during implementation and operation following environmental monitoring plan, archives and submits to county PMO monitoring reports.

4.2 Environmental Management Tasks at Different Project Stages

As shown in Figure 4-2, environmental management tasks differ in different stages of project implementation.

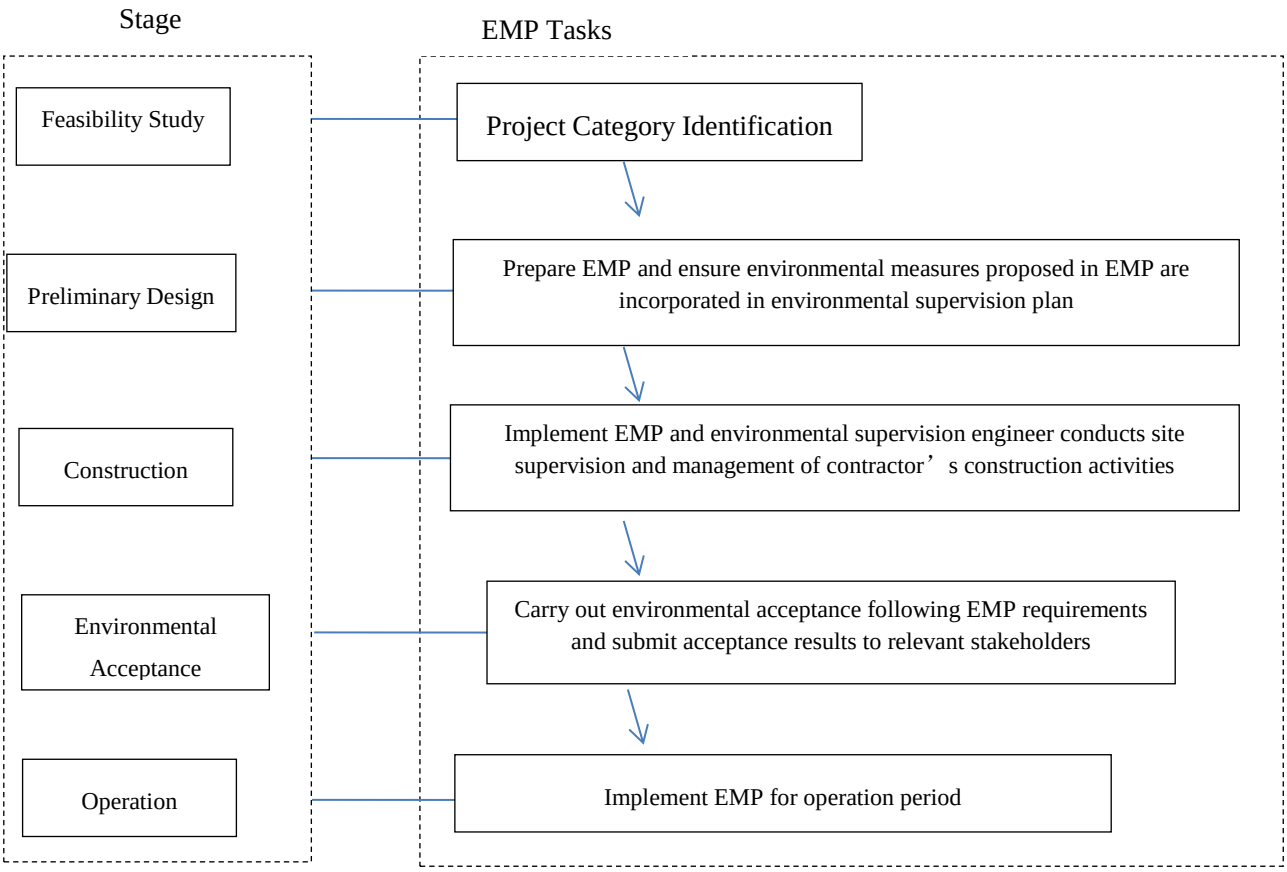


Figure 4-2 Tasks of Environmental Management at Different Project Stages

The most important task in the EMP is to ensure all environmental protection measures proposed are truly effectively implemented, including 1) incorporation of EMP environmental protection measures into design and construction contracts; 2) supervision through environmental engineer over implementation by the contractor of environmental protection measures during construction and review of effectiveness and implementation of environmental protection measures; 3) inspection, reporting and archiving mechanisms in the EMP. Inspection of routine activities is carried out to reflect the timeliness and effectiveness of these activities.

4.3 Environmental Supervision

4.3.1 Purpose of Supervision

During project implementation, environmental supervision engineer shall follow requirements in environmental protection design, conduct environmental supervision during construction, carry out all-round supervision and inspection of implementation of environmental protection measures by construction units and effectiveness of these measures, and address and resolve in a timely manner environmental pollution incidents.

4.3.2 Roles and Responsibilities of Environmental Supervision Engineer

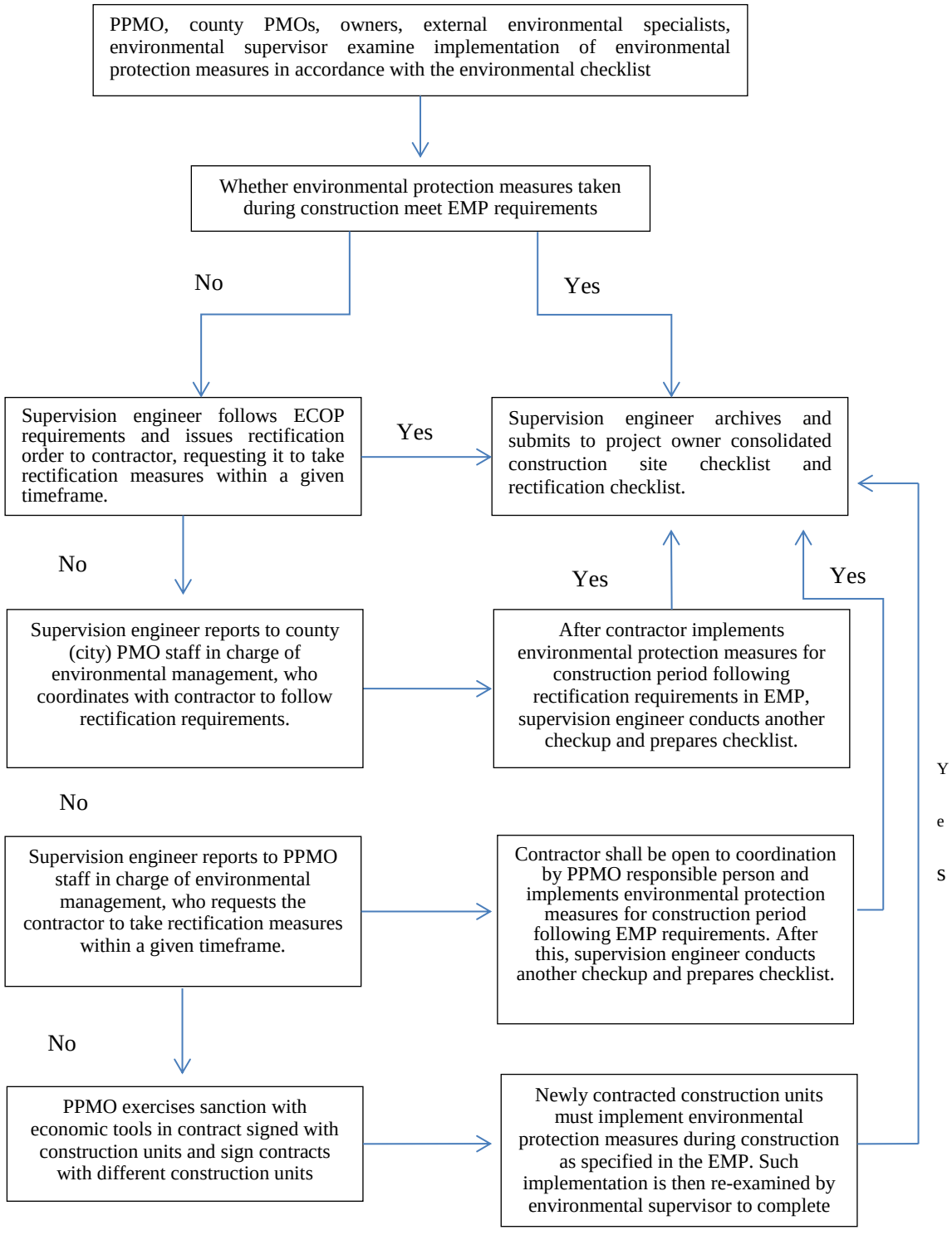
The environmental supervision engineer shall follow national and local governments' guidelines, policies, decrees, laws and regulations on environmental protection and supervise contractors to implement environmental protection-related articles in their contracts. Main roles and responsibilities are to:

(1) prepare environmental supervision plan and develop subjects and items of environmental supervision;
(2) take charge of reviewing environmental protection articles in tendering and bidding documents;
(3) conduct supervision over contractors to prevent and mitigate construction-induced environmental pollution and destructions to farmland and wild flora and fauna, as well as prevent fire;
(4) carry out all-round supervision and inspection of implementation of environmental protection measures by construction units and effectiveness of these measures, building on survey and monitoring data; and address and resolve in a timely manner environmental pollution incidents;
(5) conduct all-round inspection of cleaning and restoration of dump sites and construction "footprints" by construction units, including side slope stability, restoration of construction footprints, afforestation and afforestation rate;
(6) be responsible for implementing environmental supervision, reviewing relevant environmental reporting, and working out requirements for construction management corresponding to results of air quality, ambient air and noise monitoring to minimize adverse environmental impacts of construction; and
(7) maintain good supervision documentation during daily work, prepare supervision report and participate in completion acceptance.

4.3.3 Procedures for Implementing EMP during Construction by Environmental Supervision Engineer

Environmental supervision is an important component of environmental management and is relatively independent. Therefore, an independent and qualified environmental supervision agency shall be established. In compliance with contract articles and national environmental protection law, regulations and policies, the agency shall supervise, review and evaluate implementation of environmental protection measures by construction units, and timely identify and rectify construction activities in violation of contract articles and national environmental protection requirements. The environmental supervision engineer shall inspect construction site at least once a week, fill out and archive environmental protection checklist, propose plans for addressing relevant environmental issues/problems of construction units with their construction activities and monitor implementation of these plans, and report every six months to environmental chiefs of PMOs and environmental specialist of the World Bank. Procedures for environmental supervision during construction are provided in Figure 4-3.

Figure 4-3 Environmental Supervision during Construction



4.4 Environmental Management Plan and Environmental Impact Mitigation Measures

Details of EMP and mitigation measures are indicated in table 4-3. EMP of relevant engineering is indicated in table 4-4.

Table 4-3 Environmental Management Plan and Environmental Impact Mitigation Measures

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
preliminary preparation							
Tendering and bidding	——	1. Incorporate EMP into tendering and bidding documents; 2. Incorporate EMP into contracts with contractors, environmental supervision engineers and environmental protection contracts so as to ensure the effective implementation of all environmental protection measures.	——	——	——	PPMO, County PMO	——
Before Construction	Social environment	1. Timely inform the public of information about construction plan, environmental impacts, construction road, interim public traffic lines, etc. 2. If municipal services (including water, electric power, telephone line and bus line, etc.) need to be interrupted due to the construction, notice shall be posted at construction site, public traffic stops, as well as affected areas at least five days in advance. 3. Setting up specialized land acquisition office and formulating land resettlement plan. According to relevant land requisition and demolishing policies of	——	——	——	County Project Management Office, project owner, design institute, the working group of resettlement plan and social impacts	PPMO, County Bureau of Land and Resources, County Price Bureau

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		Chinese and local policies, the project should strictly implement compensation for land acquisition. 4. Design optimization: efforts will be made in reducing acquired land area involved in the project in designing stage. Advanced environmental protection measures should be taken to avoid the secondary pollution. 5. On the basis of consultation with the affected mass, migrants' living conditions will not decline due to the project construction as provided by relevant policies. 6. Preferential payment policies will be formulated and implemented for the poverty group. 7. Construction period of laying pipelines should be shortened as much as possible to minimize impacts on neighboring shops and households. Compensation may be made if possible. 8. Sewage of all the communities and households in the project area should be connected at the very source. 9. Taking the well-developed water system and abundant water volume in the project area into consideration, drainage project should				assessment team	

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		adapt to local conditions to ensure quality and service life of the project. 10. Participatory activities will be carried out. 11. Environmental knowledge and public health education training shall be conducted. 12. Institutional capacity building: it is proposed that we should enhance relevant social and security safeguard training of World Bank projects for project administrators and constructors. 13. A follow-up management mechanism will be set up for the project.					
Land Occupation	Land Acquisition and Resettlement	1.In the planning stage, when optimized selection for schemes was conducted, much consideration was put into the impact of project construction on the local socioeconomic, which was set as a key factor in the optimized selection for schemes; 2. Design was optimized. To reduce the demolition immigrants, existing national and local roads were used to connect planned construction area. 3. The design was optimized to occupy wasteland and state-owned land and reduce the occupancy of arable land.	——	——	Included in resettlement cost	Design institute and County Project Management Office	PPMO and County Bureau of Land and Resources
Design	Pipeline	1. In accordance with the	—	——	—	design	PP

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
of pipeline sub-project	leakage	specific situation of the project county, select appropriate pipe, guarantee its quality and service life; 2. The ground foundation of drainage networks project shall meet the designed mechanical demands; otherwise, it shall be processed accordingly; 3. The foundation construction shall follow strictly the design drawing in terms of its width, thickness and strength, and guarantee the quality.	—		—	institutes	MO, County PMO, County EPB, County Water Bureau
Construction Period							
Pipeline sub-project	Common impacts caused by construction	Adopt measures in General Environmental Management Regulations on Construction Activities(see annex 1)	TSP, Noise	See details in monitoring plan	50	contractor	Environmental supervision agency, PPMO, County PMO, Project owner, County EPB

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
	Service interruption (including water, electricity, etc.)	1. Inform the public of service interruption (including of water, electricity, fuel gas, and public traffic lines) at least five days ahead by putting up a notification at project site, public traffic stops, as well as affected residents and enterprises. 2. On the basis of proper construction organization, ensure construction progress, shorten construction period as much as possible, guarantee safe construction and complete the construction as quickly as possible so as to restore municipal services.	——	——	1	contractor	Environmental supervision agency, PPMO, County PMO, Project owner, County EPB
	Impacts on business of stores along the road	Set up construction enclosure on the side facing business stores, and reserve pedestrian corridor.	——	——	1		
	Obstruction to traffic and traffic safety	1. Before construction, contractors shall communicate with traffic department and road administration department to make a traffic management plan, and provide the information on construction and engineering schedule, traffic detours and interim public traffic lines, and relocation, etc. on construction nameplate; 2. Warning board shall be placed at the entrance of each construction section, each crossroad, each road turn, each change of traffic lane, and each entrance of traffic aisle to inform people of entrance into construction area, and of	——	——	28	contractor	Environmental supervision agency, PPMO, County PM

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		traffic restrictions such as speed limit, height limit, etc.; 3. In principle, construction is banned between 22:00 and 06:00. When construction must be conducted during night, it shall be approved by local environmental protection authorities and the construction unit shall communicate with nearby residents in advance. Meanwhile, noise control measures such as setup of sound barrier shall be taken to minimize noise impacts on nearby residents; 4. In order to reduce traffic congestion, except in special circumstances, vehicles transporting earthwork shall avoid urban rush hour and run at night. Operation time of other construction vehicles shall be arranged properly in accordance with elements affecting traffic flow such as season, weather, holiday and emergency, etc; 5. For engineering with construction period of more than 30 days, the boundary of construction site shall be enclosed and have color plate enclosure, measures shall be adopted according to local conditions; the enclosure shall be at equal to or more than 2.5m/ 3m at construction site of common areas/ key areas respectively; 6. The enclosure shall be set up straight, orderly, clean, beautiful, and damage-free, with the appearance harmonious with surrounding environment; 7. The enclosure constructed on road shall be within 5m					O, Project owner, County EPB

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		range of visibility at crossroad; straight and rigid enclosure of metal mesh panel shall be set up without blocking the visual line of drivers and pedestrian, and in the precondition of guaranteeing traffic safety; no article shall be allowed to stack within 5m range of visibility; 8. In case the enclosure is equal to or less than 5m from residence, or the construction point is equal to or less than 15m from sensitive buildings like residence, hospital and school, etc., proper measures shall be taken to lower the noise, such as raising the enclosure, etc., the enclosure in sensitive areas shall be up to 3m high; and the scope of 5m outside the enclosure shall be kept clean; 9. It is forbidden to stack materials, tools, and earthwork, etc. within the scope of 1m inside the enclosure; 10. It is forbidden to use the enclosure as retaining wall or the support of other facilities and equipment; 11. When construction site is neighboring to access to residential areas, try to minimize impacts on travel of vehicles and nearby residents. One-way construction shall be adopted, and completed as quickly as possible, and the construction site shall be covered timely by earth. If the work cannot be completed on the very day, steel plates shall be used to cover ditches so as to guarantee the safe passing of pedestrian and vehicles; 12. Employ full-time “traffic					

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		director", and establish working team to ensure traffic safety and civilized construction, guarantee the implementation of traffic support measures, manage and maintain the measures during construction period, direct the traffic on the construction section, and assist in solving the traffic problems during construction period; 13. During construction period, vehicle and personnel in and out of the construction site shall observe traffic rules strictly and obey the directions of traffic administrations, accept inspection and examination of traffic administrations and construction bureau. Once problems affecting traffic are found, rectification shall be conducted immediately; 14. During construction period, safe and civilized construction shall be guaranteed, and measures to prevent disturbing residents, in particular, dust pollution control, noise pollution control, mud and earthwork management measures shall be implemented effectively. The construction unit shall communicate in advance with enterprises, institutions and residential areas along the construction site and try to win their understanding and support, so as to guarantee the smooth progress of construction; 15. Incorporate supporting traffic measures into construction organization design. Prior to construction, take the initiative to contact					

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		traffic administrations, introduce and report the project profiles, construction scheme, total plane layout and materials used, and earthwork transportation plan. Ask traffic administrations to give support and guidance to improve the transportation plan and formulate detailed rules for the implementation; 16. In case hidden well cover is opened or raised for construction on urban road maintained open to traffic, folding construction curb fender shall be adopted at the boundary of construction area; 17. It is forbidden to use red and white flag, safety isolation rope, or other materials to replace the construction curb fender; 18. The setting of construction curb fender surely makes the long-side section of channel steel on the foundation face towards construction area; in case construction passageway is set up between construction curb fender and construction area, the passageway shall be equal to or more than 0.6m wide; 19. In case the external surface of buildings (structures) is painted, refurbished, or cleaned, construction curb fender shall be used as fully-closed enclosure at the boundary of construction area, and various mechanical equipment, tools, and materials shall be placed within the scope of enclosure; 20. Never remove construction curb fender before the road construction takes interim passing measures or the					

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		engineering is completed; 21. In key areas, road pipeline shall be constructed by means of "excavating a section, paving a section, and renovating a section", and the whole pipeline shall never be excavated simultaneously; 22. For construction occupying urban road, the construction unit shall observe relevant regulations of public security, traffic department, and road administration department, handle relevant examination and approval formalities, and set up interim road according to specifications; 23. The construction unit shall observe the license regulations on construction period strictly, and never execute construction by occupying road or exceeding the licensed construction period; 24. Interim road shall be set up according to regulations for construction occupying urban road and impacting the travel of vehicles and pedestrian. In particular, interim road shall be set up near hospitals to facilitate the safe entry and exit of ambulance; if interim road is set up in the construction section neighboring kindergarten or school, the construction site shall be closed, and infants and children are forbidden to enter the construction area; 25. For construction occupying footway, the construction unit shall build up solid, flat and continuous pedestrian shortcut with safety edge enclosure at the access side neighboring to school,					

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		commerce, enterprises, office building or residence, etc., in order to guarantee the safe passing of the pedestrian; 26. The construction unit shall adopt sheet flattening method for construction in case the ditch or pipeline slot is excavated on urban road which is used as traffic road, and the work cannot be completed on the very day; 27. The supporting and consolidation scheme shall pass safety argumentation, and shall be reported to construction bureau for approval; the steel plate covering road shall be at least equal to or more than 0.03m thick; the edge of the steel plate and metal slope rack adopted shall be burnished to remove sharp edges and burrs, in order to ensure the safety of personnel and vehicles; 28. Metal shape shall be adopted for supporting and consolidating the lower end of covering steel plate in case the excavation width of ditch (pit) is equal to or more than 0.8m.					
Land Occupation of the Project	Land Acquisition and Resident Migration	1. Through basic data collection, in-depth analysis is carried out of current situation and future development of local society and economy so as to formulate a pragmatic and feasible migrant action plan in accordance with local conditions and to ensure no loss caused by the project construction for those affected by the project. 2. Public participation is encouraged. The project accepts public supervision. 3. Internal and external monitoring is strengthened by	/	/	/	County Project Management Office, project owner and construction institutes	PPMO and County Bureau of Land and Resources

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		establishing effective and open mechanism and channels of feedback to shorten information processing period and to ensure that various problems can be addressed in time during project construction. 4. The project site is arranged in a scientific way by occupying as less land as possible. When construction is completed, temporarily occupied area will be recovered as provided by its original land use type. 5. Temporary storage area of earthwork is properly arranged so that it is far from environmentally sensitive points such as residential quarters, schools and the like.					
Project Construction	Social Environment	1. The project provides job opportunities for migrants, urban and rural poverty households and women, which enables them to participate in the project construction. 2. Security and facility maintenance during construction: it is proposed that the project owner and construction institutes arrange the construction procedures after fully considering the objective demands and practices of local residents' life and work during construction.	/	/	/	County Project Management Office, project owner and construction institutes	PPMO and County Bureau of Land and Resources
Operation period							

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
pipeline networks	Pipeline leakage causes water pollution	1. Pipeline shall be dredged timely and damaged pipeline shall be replaced to prevent the running, spilling, leakage of wastewater from polluting nearby water body and underground water.	——	——	Listed in construction cost	Project owner	PPMO, county PMO, county water bureau, and EPB

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
	Industrial park wastewater accident release causes damages to the normal operation of wastewater treatment plants	1. The water quality in the drainage outlets of industrial parks shall be sampled and monitored at regular intervals; 2. In case of water quality abnormality, the causes shall be found from the main pollutants in the water catchment system. Relevant enterprises shall take emergency responses to control the release of microorganism and toxic matters.	pH, COD,BOD_5,NH_3-N, TN, TP, total cadmium, total lead, total chromium, total nickel, total zinc, total copper, total manganese, total	2 rounds/ year	Listed in monitoring fee	Project owner	PPMO, county PMO, county water bureau, and EPB

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
	Risks prevention	1. Before pulling out the inspection shaft, a warning sign shall be set up in advance, barriers shall be removed to guarantee smooth traffic; and non-operation personnel shall be evacuated before opening the cover; 2. The cover of the inspection shaft shall not be pried by steel chisel and anvil in order to avoid spark and cause burns and explosion; 3. Using electric machine to pump and drain sewerage, and check whether electric machine, power supply, line and knife switch have leakage or not to avoid electric shock; 4. Operating personnel should use natural ventilation to remove harmful gases such as carbon monoxide, carbon dioxide, hydrogen sulfide, methane before dredging, and use instrument to detect, and conduct pit operation after confirming harmless and safe. Operators under pit shall wear anti-static clothing, and shall not wear hard metal objects such as a key; 5. Operators above the pit shall hold seat belts in hands and contact with under-pit staff at any time. 6. After finishing clearing work, ditch cover shall be recovered and repaired in a timely manner; and warning signs or protection shall be set up in case of failing to finish the very day.	——	——	Listed in construction cost	Project owner	PPMO, county PMO, county water bureau, and EPB

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
	Maintenance and management	1. The inspection shaft shall be cleared and treated at regular intervals, checked frequently and repaired timely to ensure that wastewater interception pipe and inspection shaft are kept in good condition; 2. Garbage, sewage and sundries shall not be poured into inspection shaft, and debris shall not be piled on the inspection shaft, and blow-off line shall not be rebuilt without permission. 3. The cover plate of inspection shaft shall be closely covered to prevent the occurrence of stink and accident; 4. Fire use shall be prohibited nearby the inspection shaft; 5. Sludge taken out of the inspection shaft shall be transported to the professional treatment plant designated by municipal sanitation competent department, and documented properly to avoid cross contamination.	——	——	——		
Monitoring premises	Waste acid (HW34), waste alkali（HW35), and waste organic	1. Hazardous waste shall be stored separately in impermeable and leakage proof sealed containers with clear color signs; 2. Hazardous waste containers shall be stored in an impermeable and leakage proof temporary storage room;	——	——	9	County EPB	Municipal EPB

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
	solvent（HW42）	3. Hazardous waste shall be collected, transported and treated by organizations with permit for operation of hazardous wastes and the treatment fee shall be paid; 4. Permit for hazardous waste transfer and duplicate forms for transfer of hazardous waste shall be implemented; 5. Abandoning and littering hazardous waste shall be prohibited during transportation; Dumping and piling hazardous waste or mixing hazardous waste into domestic sewage or domestic garbage shall be prohibited; No one shall collect, store, transport or treat hazardous waste without an operation permit or in violation of the rules on permit for operation of hazardous wastes.					

The EMP of units to be expanded or to be environmentally checked and accepted in the associated projects is shown in the table below.

Table 4-4 EMP of Relevant Engineering

Project Name	Construction Situation	Construction Overview	EMP	Estimated Investment(10,000)	Implementation Agency	Supervision Agency
Jishui Sewage treatment plant	To be expanded	Phase I (Step I) (10,000m^3/d engineering) has been completed and brought into production, Phase I (Step II) (10,000m^3/d engineering) is under construction and planned to start production this year, and the treatment scale will reach 20,000m^3/d after being brought into operation.The total designed scale is 40,000m^3/d.	Investigate and report the construction progress every half year	——	County PMO, Project owner	PPMO

5 Environmental Monitoring Plan

5.1 Objectives of Monitoring

Environmental monitoring is conducted during the construction period and the operation period; the objectives are to 1) have an all-round and timely understanding of the pollution of the proposed project, 2) know the degree and scope of impacts of the project on local environment and the dynamic environmental quality, 3) report information timely to EPB and provide scientific basis for environment management of the project.

5.2 Implementation of Monitoring

Based on the environmental impact evaluation results, sensitive spots with possible obvious pollution are chosen as monitoring spots. Considering the pollution in the construction and operation period, surface water environment, ambient air, acoustic environment which are heavily influenced by the environment are selected as medium for monitoring. Monitoring items are thus decided by pollution features in engineering analysis. Monitoring analysis methods in *Technical Specifications for Environmental Monitoring* of the Ministry of Environmental Protection are used and evaluation standards follow the relevant standards in EIA. Environmental monitoring agencies, county PMO and project owners respectively take charge of monitoring, construction, and operation. And various-level environmental protection administrations are the supervisors.

5.3 Environmental Monitoring Plan

The environmental monitoring plan of Jishui sub-project is shown in Table 5-1.

Monitoring Period	Medium	Location and Number of Monitoring Points	Item	Frequency	Unit Cost (10,000 yuan / round)	Annual Cost (10,000 yuan/ year)	Stage Cost (10, 000 yuan/ year)	Monitoring Agency	Responsible Agency	Supervision Agency
Construction period (5 years)	Ambient air	2 monitoring points: Jishui County People's Hospital, Jishui Experimental Elementary School	TSP	2 rounds/year, 1 day/round, once/day	0.25	1	5	Qualified agency	Owner	Jishui County EPB
	noise	2 monitoring points: Jishui County People's Hospital, Jishui Experimental	LeqdB（A）	6 rounds/year, 1 day/round,	0.04	0.48	2.4			

			Elementary School		twice/day (once at daytime and nighttime, respectively)					
	Subtotal (10,000 yuan)							7.4		
Operation period (3 years)	Water quality	Online monitoring	2 automatic monitoring cross sections in this project: one at the south reach of the Beiliao River at the border between Jishui County and Fengxin County, one at the north reach of the Beiliao River at the border between Jishui County and Anyi County,	Water temperature, pH, DO, COD, BOD, permanganate index, NH_3-N, total phosphorus, total nitrogen, chlorophyll a	Online monitoring	——	——	——	Owner	Jishui County EPB
		Pipeline network	1monitoring point at the drainage outlet of industrial park	pH, COD, BOD_5, NH_3-N, TN, TP, total cadmium, total lead, total chromium, total nickel, total zinc, total copper, total manganese, total iron, total arsenic	2 rounds/year, 1 day/round, once/day	1	2	6		
	Subtotal (10,000 yuan)							6		
Total (10,000 yuan)								13.6		

Table 5-1 Environmental Monitoring Plan of Jishui Sub-project

The environmental monitoring plan of associated project is shown in Table 5-2.

Table 5-2 Environmental Monitoring Plan of Associated Project

Name of associated project	medium	Location and Number of Monitorin	Item	frequency	Unit Cost (10,000 /roun	Annual Cost (10,000 yuan/ year)	3-year Cost (10,000 yuan/ year)	Monitoring Agency	Responsible Agency	Supervision Agency

		g Points			d)					
Jishui Town Wastewater Treatment Plant	Water quality	2 monitoring points: 1 at the inlet, 1 at the outlet	pH, suspended matter, COD, BOD_5, NH_3-N, petroleum, total nitrogen, total phosphorus, permanganate index	1round/ year, 1 day/round, once/day	____	____	____	Qualified agency	Associated project Owner	Jishui County EPB
	sludge	Transported sludge	Moisture content and heavy metals	1round/ year, 1 day/round, once/day	____	____	____			

Note: The monitoring cost of associated project is covered by associated project owners, therefore, is not included in the monitoring cost of this project.

6 Personnel Training

6.1 Objectives of Training

Objectives of environmental management training are to ensure smooth and effective implementation of environmental management activities, enable relevant staff to familiarize themselves with contents and procedures of environmental management, enhance capacity of environmental management staff, and ensure effective implementation of environmental protection measures. Environmental capacity building is mainly targeted at environmental managers and environmental supervision engineers and training for them is part of the project's technical support. During project implementation, training is also provided to contractors and construction workers. Before construction is initiated, all construction units, operation units and construction supervision engineers are required to participate in compulsory training on environment, health and safety.

6.2 Training and Training Participants

The training is organized by PPMO for PMO environmental managers, project environmental management coordinators and supervision engineers before and during the construction of the project. Environmental technical experts shall take charge of the training. They can invite environmental protection specialists from universities and scientific research institutes, environmental protection designer of design institute and experts from EIA institute and supervision agencies to lecture.

The participants are all staff from PPMO and county PMOs, all environmental supervision staff, representatives from environmental monitoring agencies, and representatives from key contractors, etc.

6.3 Training Contents

1) World Bank environmental safeguard policy, domestic environmental protection laws and regulations, and knowledge about and application of environmental

standards;

2) Environmental management models and environmental articles in the Loan Agreement of the project;
3) EA and EMP of the project;
4) Environmental management regulations of the project, especially those for the construction period;
5) Roles and responsibilities of and relationships among environmental management staff, environmental supervision staff, environmental monitoring staff, and contractors;
6) Preparation of environmental management report, environmental supervision report, environmental monitoring report and contractor's monthly report.

6.4 Training Program

Funding for training during JPESTP implementation would be incorporated into the project budget and funding for training during operation would be included in the O&M cost. Capacity building and training program is summarized in Table 6-1.

Table 6-1 Capacity Building and Training Program

Subject	Participant	Contents	Times	Day/ Time	No. of Participants/Times	Budget (10,000 yuan)
Construction Period						
Environmental protection laws, regulations and policies	County PMOs, project owners, construction units	Ⅰ Environmental protection laws and regulations	1	1	3	2
		Ⅱ Environmental policies and plans	1	1	3	
		Ⅲ Environmental management at the World Bank	1	1	3	
EMP implementation	Construction units, project owner	Ⅰ Roles and responsibilities for environmental protection during construction	1	0.5	4	2
		Ⅱ Main tasks of environmental protection during construction	1	0.5	4	
		Ⅲ Main contents of environmental protection during construction	3	0.5	4	
		Ⅳ EMP (including ECOP)	2	0.5	4	
		Ⅴ Improvement or amendment of EMP	1	0.5	4	

Subject	Participant	Contents	Times	Day/ Time	No. of Participants/Times	Budget (10,000 yuan)
		Ⅵ Internal monitoring methods, data collection and processing , etc.	1	0.5	4	
Subtotal during construction						**4**
Operation Period						
Environmental monitoring, inspection and reporting	Project owner	Inspection of environmental protection facilities, ecological restoration and environmental quality monitoring and report preparation	2	1	2	2
Environmental protection facilities and measures	Project owner	I. Rules and specifications for ensuring environmental safety	2	1	2	2
		Ⅱ Emergency preparedness plan	2	1	2	
Subtotal during construction						**4**
Grand Total						**8**

7 Environmental Management Plan Cost Estimation

It is estimated that the total cost of the EMP of this project is about 1.104 million yuan.

Table 7-1 List of the Cost of Project EMP (unit: 10,000 yuan)

Cost of Environmental Management	Cost of Environmental Monitoring		Training fee	Total cost of EMP implementation
	Construction period	Operation period		
89	7.4	6	8	110.4

8 Information

For the purpose of carrying out environmental management, necessary information sharing is needed among PMOs, owners, contractors and operators and all staff within these entities, which also need to disclose relevant information to external parties (stakeholders and the general public). Internal information sharing can be carried out through meetings and internal bulletins, but a formal meeting needs to be held every month and all information sharing activities shall be recorded and archived. External information sharing is carried out biannually or annually.

Information sharing activities with partners shall be recorded and archived.

9 Documentation

To ensure effective operation of environmental management system, the project owner must organize to establish a sound documentation system and maintain records on the following:

(1) Requirements of laws and regulations;
(2) Relevant review and approval documents for the project;
(3) Environmental media and relevant environmental impacts;
(4) Training;
(5) Supervision, verification and maintenance activities;
(6) Monitoring data;
(7) Effectiveness of corrective and precautionary measures;
(8) Information of relevant entities;
(9) Examination and verification
(10) Review and evaluation

In addition, necessary control is needed for the above records, including identification, collection, categorization, archiving, storage, management, maintenance, storage period, and disposal of these records.

10 Reporting

During project implementation, the contractors, operators, monitoring agencies, environmental supervision engineers and PMOs s shall record and report in a timely manner to pertinent departments project progress, EMP implementation and environment quality monitoring results. Specific tasks include:

(1) Environmental Supervision Engineer of the project documents in detail EMP implementation by month and submit in a timely manner weekly and monthly reports to the project owner and respective county PMO, which shall cover implementation of environmental protection measures, status of environmental monitoring and monitoring data;

(2) The project owner or operator documents in detail project progress and EMP implementation by quarter, submits in a timely manner quarterly report to PPMO and provides a copy to the provincial environmental protection bureau (EPB);

(3) After completing monitoring activities, the monitoring agency submits in a timely manner monitoring report to the project owner (operator) and environmental supervision engineer;

(4) County PMO submits in a timely manner project progress report to PPMO and provides a copy to the provincial EPB. Such report (e.g. monthly report, quarterly report or annual report) must cover EMP progress, such as EMP implementation progress and effectiveness and especially environmental monitoring results;

(5) In the event of incidents in serious violation of environmental protection regulations, the environmental supervision engineer and county PMO shall report such incidents to the local environmental protection administration and to higher level environmental protection administrations when necessary;

(6) The project's EMP implementation report for each year must be prepared and submitted to the World Bank by March 31 of the next year. The report mainly includes

the following:

a) Implementation of training program;

b) Project progress, for instance, the construction progress and the length of pipeline laid

c) Implementation of environmental protection measures, status of environmental monitoring and key monitoring results;

d) Whether there are public grievances; if incurred, such grievances, their solutions and degree of public satisfaction shall be recorded;

e) EMP implementation plan for the next year.

11 Public Grievance Redress and Project Change Mechanisms

1. Public Grievance

In the EIA process of the proposed project, views and comments of the public shall be collected through convening discussion meetings and distributing questionnaires. The public could offer their views and comments or lodge their complaints through attending discussion meetings, filling out questionnaires, sending letters, faxes or emails to or phoning the project owner or EIA institute, or through local EBPs and petition offices.

During the construction and operation periods, the public could offer their views and comments or lodge their complaints through sending letters, faxes or emails to or phoning the project owner or EIA institute, or through local EBPs and petition offices.

Immediately after receiving complaints about environment related issues/problems or rectification notices issued by government administrations, the EIA institute, contractor or project owner shall work together with the design institute and other relevant agencies to organize site visits and investigations, disclose rectification plans and implement appropriate rectification measures to address environment related issues/problems.

2. Environmental Requirements in Case of Project Changes

Based on environmental monitoring reports and inspections by supervision agencies, mitigation measures in the EMP would be adjusted and environmental management activities would be further improved.

During inspection, if significant deviations from EMP contents are identified, or project changes result in significant adverse environmental impacts or significantly increase the number of people affected by these adverse impacts, PPMO shall immediately consult environmental authorities and the World Bank and set up an environmental assessment team to carry out additional environmental assessment or additional public consultation, if necessary. If the EMP is revised, the implementing agency and contractor also need to be informed of the revisions to ensure that they follow the revised version.

Annex I General Environmental Management Regulations on Construction Activities

1. Overview

First, the construction unit and construction personnel shall implement mitigation measures proposed in this specification to prevent inconvenience to or influence on the lives of local residents, and to reduce the project impacts on the environment during construction and operation periods;

Second, remedial measures which cannot be effectively carried out during the construction shall be implemented when the project is completed:

1) Vegetation landscape of all affected areas shall be timely rehabilitated via grass planting and afforestation, etc;

2) Rubble and silt left by waterway construction shall be cleaned up to ensure smooth water flow in drains and culverts;

3) Waste gravels shall be cleared and remaining construction materials shall be properly disposed in all construction sites;

4) The borrow area shall be restored.

2. Construction personnel's Code of Conduct and Environmental Standards

This section shall be combined with national and local laws and regulations, being a guideline for construction personnel's behavior. Before breaking ground, the construction unit shall develop project construction plans, in which detailed rules for the implementation based on the specification shall be clarified. Only after engineer-in-charge's approval of the plan shall the construction begin.

2.1 Prohibited acts

The following acts are prohibited at the construction site or in surrounding areas:

1) Logging outside the construction site;

2) Hunting, fishing, capturing wild animals, and picking plants;

3) Using unapproved toxic materials, including lead-based paint and asbestos, etc;

4) Influencing other art buildings and architectures of historical value;

5) Triggering house fires;

6) Drunk constructing.

2.2 Traffic

Selection of routes to the construction site shall be approved by the engineer-in-charge. Appropriate vehicles shall be chosen according to local road level and load capacity shall be limited to avoid damage to local roads and bridges. For damage to local roads and bridges caused by overload, the construction unit shall be

responsible for the repair under the consent of the engineer-in-charge.

Vehicles with heavy emissions or strong noises should not be used. At completed areas, noise reduction devices shall be installed under normal operation.

During the implementation of the contract, the construction unit, under engineer-in-charge's consent, may take necessary traffic control measures.

2.3 Construction Personnel and Construction Camp

Whenever possible, the construction unit shall recruit local workers and offer them appropriate training.

The construction camp shall be set at the place easy to rent local houses. Domestic sewage cannot be discharged arbitrarily but disposed via surrounding existing sewage treatment system to avoid affecting nearby rivers.

The construction unit shall establish a set of system and methods for on-site construction materials storage and generation and disposal of solid waste.

The construction unit shall provide substitute fuel while prohibit the use of wood in the camp for cooking or heating.

The on-site layout scheme shall be approved by the engineer-in-charge.

The construction unit should ensure that the construction site, warehouses, storage yards, and manufacturing equipment are not set within 500m to the river. Pollutants running into the river, especially the leakage via land or surface water during the rainy season, shall be avoided; lubricant should be recycled; in surrounding areas channels shall be dug out, at the exit of which settling pond or oil collecting pond shall be set up.

When preparing molding construction materials, construction personnel are prohibited to use wood to heat up.

Production and living areas shall be set independently in accordance with the unit's bidding section. Living areas, based on actual construction conditions, shall be set at a high location among the bidding section. The construction camp consists of living and office welfare facilities, constructing and processing plants, construction warehouses, simple repair stations and other ancillary facilities.

2.4 Waste Management and Water and Soil Erosion

Solid waste, sanitation and hazardous waste can be effectively controlled by implementing the following measures:

2.4.1 Waste management

1) Reduce the generation of wastes which require treatment and disposal;

2) Identify and classify the generated wastes. Were there hazardous wastes, then storage, collection, transportation and disposal must be conducted in accordance with

appropriate procedures.

3) Identify and arrange treatment zones and clearly label them with what materials and substances are allowed for storage.

4) The construction unit must not dispose any waste in any environmentally sensitive area.

5) Construction wastes (including excavated soil) shall be transported to the designated disposal sites (shall be 300m away from the rivers, creeks, lakes or wetlands). Solid waste recycle-and-classify system shall be set up at designated disposal sites to dispose wastes, scrap metal, waste engine oil and the rest construction materials generated during the construction.

6) Comprehensive classification and recycling of recyclable wastes (scrap iron, scrap steel and materials packing bags sold to scrap yards; waste bricks used as materials for road base) shall be conducted. Wastes that cannot be recycled shall be timely transported to the designated construction waste dump site. During the process, sealed transportation shall be ensured and scattering be avoided. When temporary stacking is needed, waterproof, windproof and other measures shall be conducted.

7) For recyclable wastes, the recycling shall be conducted only after on-site identification and assessment and approval of the engineer-in-charge.

During the construction, any residue or sludge stacking on the ground near the construction site should be removed immediately. The stacking area should then be restored to the level approved by the engineer-in-charge.

Throughout the construction period (including preparation, maintenance, demolition and residue clean-up periods) and under the guidance of engineer-in-charge, there shall be a schedule for transportation, and measures to emergencies should be considered.

Inside the construction area, garbage bins for domestic wastes which have daily clearing, collection and classification shall be set, and the transportation of wastes commissioned to the Sanitation Department.

2.4.2 Water and soil erosion control:

Rationally choose the construction period and try to avoid rainy season or construction in raining days. Set up construction enclosure surrounding the work site to prevent construction materials and wastes from leaking into the surface water.

Set up earthen drainage ditch around the construction site on the basis of its terrain conditions. And set up an earthen grit chamber at the outlet of the ditch, slowing down the water and settling sand.

Combine key control with surface protection, and engineering measures with phtyto measures. Emphasize in engineering measures to realize its quick effect and guarantee function. Phtyto measures are auxiliary ones for soil and water conservation,

conserving soil and water in a long term and stable manner, meanwhile afforesting and beatifying ambient environment.

Protect leaf layer and organic matters of the land surface and backfill them to the damaged areas to promote the growth of native plants.

Cover the eroded barren areas with native grasses and trees, or harden the soil surface of such areas.

Proper erosion control measures shall be conducted before the rainy season, in order to better carry out the next works. Corresponding erosion measures shall be prepared at each construction point upon the completion of their sub-projects.

In all construction sites, there shall be sedimentation control facilities to slow down the water, change the flow direction and settle silts before the vegetation is restored. Such facilities include material piles, stone pathways, settling pits, straw bales, hedgerows and sludge piles, etc.

Use ditches, berms, grass fences and stone piles and other measures to prevent the water from rushing into the construction site or affect on-site work.

Maintain and continue to adopt erosion control measures till the vegetation is fully restored.

Spray water on earthen roads, excavation areas, filling areas and earthwork areas if necessary to reduce wind erosion.

2.4.3 Protection area:

Identify and designate the equipment protection area (at least 15m away from rivers, streams, lakes and wetlands); fuel shall be stored in an appropriate location, which shall be admitted by the engineer-in-charge.

Make sure all equipment is used only within the designated protected area; never dump the used oil on the ground, or into the water, sewer or drainage system.

All spilled wastes and collected oil shall be disposed in accordance with standard environment procedures or guidance. Fuel storage and backfilling areas shall be set 300m away from the intersection of drainage buildings and important water bodies, or be set under the guidance of the engineer-in-charge.

2.5 Earthworks and Side Slope Excavation and Filling

Reasonably arrange the earthworks, especially the work during the rainy season. During the construction, the side slope shall be kept solid and firm so as not to interfere other areas outside the construction area. In particular, continuous construction shall be conducted during the rainy season to complete as soon as possible the excavation and filling of the same section. Try to avoid slope erosion caused by interruption of construction due to rainy days and other reasons.

Build intercepting ditch and drainage ditch at the top and the bottom of the slope

and plant grass or other plants according to the drawings to protect the slope from erosion. The Intercepting ditch shall be located higher than the slope being excavated to reduce the runoff so as not to erode the slope.

Excavated soils and stones and other materials that cannot be utilized shall be transported to the designated location after obtaining the consent of the engineer-in-charge.

The disposal site cannot be set at the place which may cause landslides, nor should it affect other agricultural plants or private lands. In addition, prevent piling materials from rushing into the surface water through rainfalls or other media. Drainage ditch shall be set up around the stacking area under the guidance of the engineer-in-charge.

2.6 Borrow and Storage Areas

Consent of the engineer-in-charge shall be obtained when opening new borrow areas at the land surface, river or utilized lands. The borrow area shall not be located in places which may damage natural or artificial drainage facilities. River borrow areas shall not be located in places which may erode or destroy the riverbed, or tend to bring a lot of sand to the downstream.

The construction unit shall ensure that all used borrow areas have a firm and solid side slope and bear a neat and level ground. No stagnant water shall be left in the drainage ditch so as not to attract mosquitoes.

Sand and gravels excavated from the river should be transported far enough for stacking. The depth of excavation of each borrow area shall not be greater than one-tenth of the width of the river, to avoid drying up rivers or eroding or damaging the riverbed. It needs the engineer-in-charge’s consent to borrow soil from which the vegetation will be destroyed. When doing this, use effective dust treatment equipment and try to avoid environmentally sensitive spots or residential spots.

Each Borrow area and spoil area shall meet the following requirements:

1) Identify and classify borrow and spoil areas, and ensure that the distance between them and sensitive areas (e.g. high and steep slopes, easy-to-erosion land, areas where waste water directly goes into the sensitive water) is larger than 15m.

2) Make sure that the soils are all excavated in admitted and designated borrow areas.

3) The topsoil of newly excavated borrow areas shall be retained and be backfilled into the hole after excavating usable soils and restore the areas into flat lands or slopes; build terraces on some steep slopes to prevent soil erosion.

4) The excess topsoil shall be compacted on which vegetation shall be planted. Topsoil or residues containing organic matters are allowable for covering the surface in suitable areas to facilitate the restoration of vegetation. Native plants are easier to grow.

5) Prevent soils from rushing into the drainage ditch if there had already been one in this construction area.

6) Once the work is completed, all the waste residues generated during the construction should be cleaned from the site.

2.7 Wastewater Control

1. Construction Wastewater

Construction wastewater disposed by settling pond can be used for mixing concrete and watering to reduce dust, and cannot be discharged into nearby water bodies; slurry generated during the construction should be disposed in the settling pond via mud pump and to be solidified through drainage and evaporation, and the slurry cannot be discharged into nearby water bodies; wastewater generated from washing machinery and equipment, after disposed by oil-separating sedimentation tank, can be used for watering the construction site to reduce dust, and cannot be discharged into nearby water bodies.

Drainage should be taken into full account in terms of the layout of the construction site, which should also be away as far as possible from the river. Ensure that the construction site, warehouses, storage areas of diesel oil and bitumen, and facilities for manufacturing bitumen are more than 500m away from the river. Prevent pollutants from entering the river when operating the facilities, especially avoid leakage via land or surface water during the rainy season.

During construction, the on-site ground should be kept clean. Prevent wastewater or pollutants from entering the ditches which leads to infiltration of wastewater.

If on-site oil storage is needed, then anti-seepage treatment must be conducted in the warehouse. Measures should be carried out for storage and use in order to avoid phenomena of evaporating, emitting, dripping leaking, or polluting water bodies.

Try to construct the infrastructure in the non-flood season to reduce influence of shallow groundwater level on the construction.

2. Domestic Sewage

Domestic sewage from construction personnel should be disposed via surrounding existing residential sewage treatment system, and cannot be discharged arbitrarily. Anti-seepage and anti-loss measures should be conducted in accordance with relevant requirements for temporary garbage storage room.

2.8 Noise and Dust Control

To control noise and dust, the construction unit should meet the following requirements:

1) Adopt advanced construction techniques; use wet process for crushing gravels and concrete; be equipped with dust collection device; control vehicle speed and exhaust emission from cars and coals; spray water at the construction area when needed (4 to 5 times a day is available); construction teams should use liquefied petroleum gas, electricity and other clean energy; enhance afforestation of the construction site and strengthen labor protection for construction personnel. All these will reduce the negative impacts on ambient air.

2) At the inner side of entrance and exit for vehicles transporting materials and spoil, a car washing platform should be established, surrounded by barriers to prevent the leakage of wastewater from washing cars. Before leaving the site, the tires and body of vehicles must be washed in the washing platform. Any sludge is not allowed to be attached to vehicles' surface. Materials and spoil should not exceed the upper edge of the vehicle ledge during transportation, and the vehicle hopper should be covered with a tarpaulin or be sealed.

3) Concrete mixing station and asphalt mixing station cannot be set inside the construction site; use commodity concrete and asphalt.

4) Transporting vehicles, bulldozers, excavators and other vehicles should slow down the speed when passing by villages or entering the construction site. Furthermore, regular repair and maintenance should be conducted to ensure vehicles' normal function and to reduce exhaust emissions.

5) Set up dust-proof barriers around the work area, especially at places close to residential areas, hospitals and schools.

6) Try to minimize the generation of dust and particulate matter in order to avoid the impact on the surrounding residential and business practices; focus on protecting vulnerable populations (such as children, the elderly, etc.).

7) Set up warning signs and use low-noise equipment at acoustic environment sensitive sections; control noise source, media of noise transmission, and traffic noise; offer construction personnel anti-noise earplugs; reasonably arrange construction time and other measures.

8) Reasonably arrange construction time according to *Standards for Ambient Noise Emission at Construction Site Boundary* (GB12523-2011). Simultaneous operation of a large number of high-noise equipment and construction at sensitive time should be avoided whenever possible. Try to arrange daytime operation of high-noise equipment and reduce nighttime transportation. Construction at night (22:00 - 6:00) is prohibited. Construction activities that must be carried out at night should be approved by relevant local department of environmental protection and negotiation in advance with local residents should be conducted. In addition, noise reduction measures should be implemented (such as installing sound barriers) to minimize the impact of construction noise on local residents.

9) The speed of all construction vehicles outside the work site must not exceed 25km/h.

10) The speed of vehicles inside the construction site must not exceed 15km/h.

11) Try to keep the noise lower than 90 decibels of the machinery and equipment.

12) More stringent measures should be carried out in sensitive areas (including residential areas, hospitals, nursing homes, etc.) to prevent harsh noises.

13) Appropriate measures should be adopted to reduce the influences of construction noise and vibration on ambient environment.

2.9 Social Impact

Scientifically arrange the construction site and minimize land occupation.

Temporarily occupied area will be restored according to its original land use type after construction is completed.

Reasonably arrange temporary stacking areas of earthworks and stones which should be away from environment sensitive spots like residential spots and schools, etc.

Timely inform the public of the construction plans, environmental impact statement, construction access roads, temporary bus route, demolition announcement and other information.

Limit nighttime construction. When construction at night is necessary, ensure the schedule is clear and reasonable and inform affected residents in advance to let them take necessary precautions.

When public facilities (such as water pipes, electricity system, telephones, bus routes, etc) cannot work properly due to the construction, affected residents should be informed at least five days in advance through the form of notice posting at the construction site, bus stops and the affected areas.

2.10 Construction Safety

Responsibilities of the construction unit include protecting every individual surrounding the site, namely to avoid impacts on individual's personal and property safety caused by the construction. The construction unit has the responsibility to comply with national and local safety regulations and take all necessary measures to avoid accidents. Measures may include:

1) Set up noticeable safety signs at construction access roads and the entrance and exit of the construction site;

2) Dispatch personnel to guide the traffic near schools in the students' rush hour;

3) Set up sufficient traffic warning signs (including painting, frames and markers, etc.), road signs and guardrails to ensure the safety of pedestrians during the construction period;

4) Provide safety training to all construction workers before the construction is initiated;

5) Provide construction workers with and force them to use personal protective equipment and clothes (such as goggles, gloves, masks, dust cover, and helmet, etc.);

6) Each site should be equipped with a safety information bulletin; warning signs should be set up in the chemicals storage warehouse;

7) Require all workers to know the safety information about various materials and clarify to the construction personnel the possible risks for them and their families (especially for pregnant women or families planning a pregnancy) when using these materials, and encourage workers to share relevant information;

8) Make sure the waste oil or other toxic materials are disposed by specially trained workers;

9) The construction should be suspended when encountering heavy rains or other emergencies;

10) The electrical equipment and machinery should be able to withstand a certain level of earthquake.

2.11 Disposal of Cultural Relics and Heritage Sites during Construction Period

During excavation and construction, if heritage sites, historic sites, human remains, grave yard or individual graves were found, disposal should be conducted according to the following procedure:

1) Stop construction activities at the discovery site;

2) Draw and mark the discovery location and area;

3) Protect the site to prevent any possible damage to cultural relics. When movable cultural relics or sensitive fossil remains were found, personnel should be set to ensure their safety until the local relevant government departments or national cultural relics management department take over the charge;

4) After cultural relics were found, the finder should, within 24 hours, inform the patrolling supervision engineer who will be in charge of contacting local relevant government departments or national cultural relics management department;

5) Before deciding follow-up works, the local relevant government departments or national cultural relics management department will charge for the protection and conservation of the discovery site and cultural relics. Experts from the national cultural relics management department will prepare preliminary assessment on the cultural relics based on related cultural relics assessment criteria, namely from aspects of aesthetic, historical, scientific, social and economic value, to analyze the value and significance of the discovery;

6) Local relevant government departments and national cultural relics management department will decide how to handle the discovery, which includes how to modify construction plan (for example, when immovable cultural relics with cultural or archaeological sense were found), and how to save, repair and utilize the heritage sites, etc.;

7) Local relevant government departments should deliver written materials to the project manager and inform treatment decisions on the cultural relics;

8) In order to protect the safety of cultural relics and heritage sites, the construction should be resumed only after obtaining permission of local government or the national cultural relics management department.

2.12 Hazardous Waste

If hazardous waste or suspected hazardous waste (asbestos-containing substances generated from disposal of construction waste) might be generated in the construction site, the construction unit needs to develop a hazardous waste management plan, which, after engineer-in-charge's approval, applies to all personnel involved in disposal and transportation work. Works to clear and dispose hazardous construction waste should be conducted by specially trained personnel in accordance with national and provincial regulations or universally accepted procedures.

2.13 Health Service and HIV/AIDS Education

The construction unit should provide workers with basic first aid services and emergency facilities, including medical devices and mode of operation for personal use. Injured workers should be treated before being sent to the hospital.

The construction unit has the responsibility to develop a plan to prevent the spread of sexual diseases (especially HIV/AIDS) among workers.

The construction unit should add health plan outline into its construction plan, offering workers advice to keep healthy during the construction. The outline should be approved by engineer-in-charge before the construction is initiated.

3 Environmental Supervision Measures

The engineer-in-charge/construction supervisor should ensure that said requirements are implemented. Non-compliance of the contract will lead to suspension of the construction or other sanctions until the issue has been resolved under the engineer-in-charge's satisfied manner. The construction unit should also follow relevant national and local regulations related to environment, public health and safety.

Annex 2 Checklist of Construction Site before Commencement of Work

Serial No.	Environmental Problem	Check Result (Marked with "√)	Remark
1	Whether the project involves natural habitat, material culture resources, involuntary resettlement and other World Bank safeguard policies	Yes □ No □ Not Involve □	
2	Whether there are important vegetation and trees within the scope of project land occupation	Yes □ No □ Not Involve □	

Serial No.	Environmental Problem	Check Result (Marked with "√)	Remark
3	Whether project construction road will cause significant impacts on going out of surrounding residents	Yes □ No □ Not Involve □	
4	Whether there are the public (residential community, school, hospital, office area, etc.) vulnerable to the impacts of work construction nearby the project	Yes □ No □ Not Involve □	
5	May cause the deterioration in the quality of life of nearby town	Yes □ No □ Not Involve □	
6	Whether project construction needs to interrupt municipal services (including water, electric power, telephone, bus line, etc.)	Yes □ No □ Not Involve □	
7	Whether project construction needs demolition	Yes □ No □ Not Involve □	
8	Whether the project will be affected by flood during rainy season	Yes □ No □ Not Involve □	
9	Whether land outside project areas is temporarily occupied	Yes □ No □ Not Involve □	
10	Whether electric power, telecommunications and other municipal service lines are involved within and nearby the scope of project construction	Yes □ No □ Not Involve □	
11	Whether there is surface water body within and nearby the scope of project construction	Yes □ No □ Not Involve □	
Others		Yes □ No □ Not Involve □	

Annex 3 Checklist of Construction Site Environment

Checklist of Construction Site Environment for World Bank-financed Jishui County Water Environment Management Project						
Name of project		Name of Work Site				
Contract Number and Name		Check Result (Marked with "√")				Remark
Inspect Item		Yes	No	Not Involve		
General Require	1.1 Whether effective measures for preventing and controlling atmospheric pollution, water and soil pollution and noise pollution					

Checklist of Construction Site Environment for World Bank-financed Jishui County Water Environment Management Project						
Name of project			Name of Work Site			
Contract Number and Name			Check Result (Marked with "√")			Remark
	Inspect Item		Yes	No	Not Involve	
	as well as for improving environmental health are in place in construction organization design of the project					
	1.2 Whether environmental protection, environmental health management and inspection system for construction site are established					
	1.3 Whether environmental protection, environmental health management and inspection for construction is recorded					
	1.4 Whether operating personnel are provided with necessary protective equipment and effective occupational-disease-prevention measures are taken					
	1.5 Whether the personnel engaged in occupational-disease-inductive operation are provided with regular physical exam and training (with relevant physical exam certificate and training record)					
	1.6 Whether diet health, sunstroke prevention, cooling, cold protection, warmth keeping, gas poisoning prevention and epidemic prevention for operating personnel are in place in combination with seasonal characteristics					
	1.7 Whether education training and assessment for operating personnel at construction site contain laws and regulations relating to environmental protection and environmental health (with related records and documents)					
	Others (shall specify)					
2. Site Layout and Temporary Facilities Construction	2.1 Whether the construction area at the construction site is clearly separated from office area and living area and whether relevant isolation measures are taken					
	2.2 Whether the construction area is neat and orderly					
	2.3 Whether the access of the construction site is marked with enterprise name or enterprise logo, whether the visible place of main access is set with project profile plate meeting the requirements					
	2.4 Whether the public is informed in advance when the construction needs to interrupt municipal services (including water, electric power, telephone, bus line, etc.)					
	2.5 Whether the existing building and infrastructure are utilized as					

Checklist of Construction Site Environment for World Bank-financed Jishui County Water Environment Management Project						
Name of project			Name of Work Site			
Contract Number and Name			Check Result (Marked with "√")			Remark
	Inspect Item		Yes	No	Not Involve	
	temporary facilities of the construction site					
	2.6 Whether newly built temporary house is reasonable in land occupation and meets safety and fire control requirements (with related certificates)					
	2.7 Whether the construction of temporary facilities uses clay bricks					
	2.8 Whether oil, chemical solvent and other items stored at the construction site set special warehouse and warning signs					
	2.9 Whether anti-seepage treatment is made for the ground of oil and chemical warehouse, and whether such emergency treatment materials as absorption bag/sands/bits of wood are in place in the warehouse					
	2.10 Whether collective staff dormitory is set in unfinished building					
	2.11 Whether temporary facilities are demolished within one month upon completion of the construction work					
	Others (shall specify)					
3. Operating Conditions and Environmental Safety	3.1 Whether enclosed color steel fence with the height of no less than 2.5m is set at the construction site, and whether the height of sensitive section is no less than 3.m					
	3.2 Whether the construction site sets qualified bulletin board, indicating environmental protection and civilized construction system, and disposal process for emergencies, etc.					
	3.3 Whether the construction unit takes protective measures to ensure the safety of buildings, structures and underground pipelines adjacent to construction work					
	3.4 Whether tall scaffolding, tower crane and other large machinery and equipment at construction site keep a safe distance from overhead transmission conductor, and whether high voltage line adopts insulating material for safety protection					
	3.5 Whether mandatory safety protection measures are taken for sidewalks and vehicle access surrounding construction work, and whether lighting indicating device is set in the nighttime					
	3.6 Whether visible safety warning sign meeting national standard is set at dangerous section of the construction site					

Checklist of Construction Site Environment for World Bank-financed Jishui County Water Environment Management Project						
Name of project			Name of Work Site			
Contract Number and Name			Check Result (Marked with "√")			Remark
	Inspect Item		Yes	No	Not Involve	
	3.7 Whether the construction site adopts corresponding safety technology measures based on season change to achieve civilized and safe construction conditions					
	3.8 Whether fire extinguishing equipment is kept in good condition, and whether escape way is without obstruction					
	Others (shall specify)					
4. Dust Pollution Control	4.1 Whether construction site road reasonably utilizes the existing or proposed road in and surrounding the site					
	4.2 Whether hardening treatment is made based on its usage when constructing new road, and whether the road section producing dust controls dust by sprinkling					
	4.3 Whether materials are piled up together at construction site					
	4.4 Whether the second location selected to pile up materials is reasonable					
	4.5 Whether site material storage area, processing area and large mold storage area are flat and solid					
	4.6 Whether fine particle granular materials and the materials easy to float in the air at construction site adopt sealed storage, and whether shielding measures are taken for their handing and transportation					
	4.7 Whether covering, solidifying or greening measures are taken for earthwork piled up together					
	4.8 Whether spoil is utilized or transported to designated disposal sites					
	4.9 Whether bare ground at office area and living area of the construction site controls dust by sprinkling and is greened and beautified based on the actual situation					
	4.10 Whether earth, waste and construction garbage are transported using closed vehicles					
	4.11 Whether the facilities washing vehicles are set at the access of the construction site, and whether the road between vehicle washing facilities and the exit of the site is paved with concrete, asphalt, straw mattress or broken brick hardcore to avoid bringing silt out of the site					
	4.12 Whether the construction site uses ready-mixed concrete and					

Checklist of Construction Site Environment for World Bank-financed Jishui County Water Environment Management Project						
Name of project			Name of Work Site			
Contract Number and Name			Check Result (Marked with "√")			Remark
	Inspect Item		Yes	No	Not Involve	
	ready-mixed mortar					
	4.13 Whether dust prevention and dust removal measures are taken when conducting concrete and mortar mixing operation					
	4.14 Whether earth backfill, transportation and other construction that may produce dust pollution are prohibited in the weather with force four wind					
	Others (shall specify)					
5. Harmful Gas Emission Control	5.1 Whether all kinds of wastes are burned at construction site					
	5.2 Whether construction vehicles and mechanical equipment are kept in good condition, and whether the exhaust gas emitted meets the emission standard provided by the state					
	5.3 Whether decoration materials adopt building materials qualified through the verification of legal detection unit (with certificate of conformance)					
	5.4 Whether wood board and other wood materials used for interior decoration are prohibited from using asphalt, coal tar class anti-corrosive and moisture-proof finishing agent.					
	5.5 Whether the kitchen in living area is installed with lampblack treatment facilities as required					
	Others (shall specify)					
6. Water Pollution Control	6.1 Whether sedimentation tank is set at the place washing mixer foreground and transport vehicles at construction site					
	6.2 Whether wastewater is directly drained into municipal sewage pipe network or river					
	6.3 Whether wastewater is recycled or used for dust suppression through sprinkling after secondary precipitation					
	6.4 Whether sediment disposal is conducted when sediment in sedimentation tank reaching 1/4 depth of the tank, whether sediment in sedimentation tank is cleared and transported to designated place					
	6.5 Whether the canteen sets separation tank, and whether qualified cleaning unit is entrusted to timely clear it away					
	6.6 Whether closed waste food bin is set outside the canteen and is cleared away in a timely manner					

Checklist of Construction Site Environment for World Bank-financed Jishui County Water Environment Management Project						
Name of project			Name of Work Site			
Contract Number and Name			Check Result (Marked with "√")			Remark
Inspect Item			Yes	No	Not Involve	
	6.7 Whether septic tank of temporary toilet set at construction site conducts anti-seepage treatment					
	6.8 The construction site shall set drainage ditch. Whether waste water is drained into municipal sewage pipe network or river after precipitation, and whether drainage ditch is smooth					
	Others (shall specify)					
7. Noise Pollution Control	7.1 Whether the requirements of construction time is strictly followed					
	7.2 Whether surrounding residents are informed of nighttime continuous construction, and whether related formalities for nighttime continuous construction are handled					
	7.3 Whether shielding, closing and greening measures for noise absorption and noise insulation purposes are taken for the construction site					
	7.4 Whether low noise equipment are adopted and maintenance for the equipment is well conducted					
	7.5 Whether the equipment producing noise are set at the side far away from residential community					
	7.6 Whether noise reduction measures such as enclosing are taken to the equipment producing noise					
	7.7 Whether such measures as speed limit and no honking are taken for construction vehicles					
	7.8 Whether the equipment (air compressor, electric generator, etc.) producing noise are placed in enclosed equipment room					
8. Waste Control	8.1 Whether the construction site sets enclosed refuse storage area, and whether construction waste and domestic garbage are stored separately and cleared away and disposed according to the provisions					
	8.2 Whether corresponding container or pipe transportation are adopted for the removal of construction waste in buildings					
	8.3 Whether wastes produced from construction, demolition and site cleaning are disposed separately, recovered and recycled					
	8.4 Whether construction waste cleaning unit holds waste disposal qualification and business license approved by relevant authority					
	8.5 Whether abandoned oil and chemical solvent are stored in a					

Checklist of Construction Site Environment for World Bank-financed Jishui County Water Environment Management Project						
Name of project			Name of Work Site			
Contract Number and Name			Check Result (Marked with "√")			Remark
Inspect Item			Yes	No	Not Involve	
	centralized way, and entrusted to qualified unit for disposal					
	8.6 Whether construction equipment has obvious oil spatter					
	8.7 Whether the construction camp has set enclosed refuse storage area to collect the workers' domestic garbage, which shall be timely cleared away as required.					
	8.8 Whether septic tank is timely cleared and buried with land upon completion of the construction					
	Others (shall specify)					
9. Soil Erosion and Control	9.1 Whether utilize the existing legal borrow area and the waste abandoning place determined by local sanitation department					
	9.2 Whether newly built borrow area obtains approval from relevant authority, and whether protective measures are taken to the side slope of borrow area					
	9.3 Whether surface soil is cleaned and stored to ensure that it is used for vegetation restoration upon completion of the construction					
	9.4 Whether intercepting ditch and headrace are built to lead water flow formed in rainy season away to avoid the washout of surface runoff to work					
	Others (shall specify)					
10. Preservation of Cultural Relics	10.1 In case cultural relics or suspected cultural relics is found during construction period, the construction shall be immediately stopped and the site shall be well protected, while at the same time reporting to local administrative department of cultural relics for disposal, the construction can be resumed only after disposal of relevant department					
	Others (shall specify)					
11. Vegetation Protection	11.1 Whether such behavior as cutting down trees outside construction site exists					
	11.2 Whether the layout of construction site is reasonable (judging from the point of the damage caused by work implementation to vegetation)					
	11.3 Whether effective measures are taken for the vegetation damaged and bare soil caused due to the construction to avoid soil erosion and loss (adopting such measures as covering with gravels, planting fast-growing grass, etc.)					

Checklist of Construction Site Environment for World Bank-financed Jishui County Water Environment Management Project						
Name of project			Name of Work Site			
Contract Number and Name			Check Result (Marked with "√")			Remark
Inspect Item			Yes	No	Not Involve	
	11.4 Whether original vegetation area destroyed is restored or reasonably greened upon completion of the construction					
	11.5 Whether alien species are introduced when conducting ecological restoration and greening for vegetation					
	Others (shall specify)					
12. Risk Prevention	12.1 Whether accident prevention plan is formulated					
	Others (shall specify)					
13. Occupational Health	13.1 Whether warning signs or warning instructions are set at operating post, equipment and place vulnerable to occupational hazards					
	13.2 Whether operating personnel wear ear plugs for hearing protection when conducting high noise construction work					
	13.3 Whether anti-corrosive and waterproof operation in basement where good natural ventilation cannot be guaranteed are equipped with mandatory ventilation facilities. Whether the operating personnel wear respirator or protective mask in the workplace with toxic or harmful gases					
	13.4 Whether the operating personnel wear dust mask in the workplace with dust					
	13.5 Whether the operating personnel wear protective mask, goggles, gloves and other personal protective equipment when conducting welding operation					
	13.6 Whether the construction site is equipped with sunstroke prevention and cooling supplies when conducting high temperature operation, and the work-and-rest timetable shall be reasonably arranged					
	Others (shall specify)					
14. Hygiene and Disease Control	14.1 Whether staff meals, drinking water and rest area at construction site are in compliance with health standards (with health certificate)					
	14.2 Whether dormitory, canteen, bathroom and toilet are equipped with ventilation and lighting facilities, and maintained by special personnel					

Checklist of Construction Site Environment for World Bank-financed Jishui County Water Environment Management Project						
Name of project			Name of Work Site			
Contract Number and Name			Check Result (Marked with "√")			Remark
	Inspect Item		Yes	No	Not Involve	
	14.3 Whether construction site dormitory meets the requirement of setting open type window; the beds in the dormitory shall not exceed two layers, a wide bed for a number of people is strictly prohibited					
	14.4 Whether the canteen obtains effective sanitary license issued by relevant authority, whether canteen workers hold effective health certificate					
	14.5 Whether the canteen is located far away from toilet, refuse storage area, toxic and harmful pollution sources					
	14.6 Whether the canteen sets independent food preparation room and storage room, whether the lower part of door leaf sets rat guard no less than 0.2m					
	14.7 Whether toilet, sanitation facilities, drainage ditch and damp area are regularly disinfected (with related records)					
	14.8 Whether the living area sets closed container with regular fly killing and timely clearing					
	14.9 Whether the construction site sets health center, equipped with health kit, commonly used drugs and bandage, tourniquet, neck collar, stretcher and other emergency equipment					
	14.10 When construction personnel develop infectious diseases, food poisoning and acute occupational poisoning, whether it is timely reported to the epidemic prevention department and competent department in charge of construction of the locality, and disposed according to relevant regulations stipulated by the epidemic prevention department					
	Others (shall specify)					
15. Traffic Safety	15.1 Whether safe driving is emphasized on drivers and safety education & training is carried out regularly					
	15.2 Whether driving time is limited, and drivers take turns in driving; whether driving on dangerous road and in dangerous time is avoided					
	15.3 Whether the parts used for vehicle maintenance are approved by the manufacturer, and whether vehicle parts are purchased timely for maintenance purpose					
	15.4 Whether separation of people and vehicles are achieved					

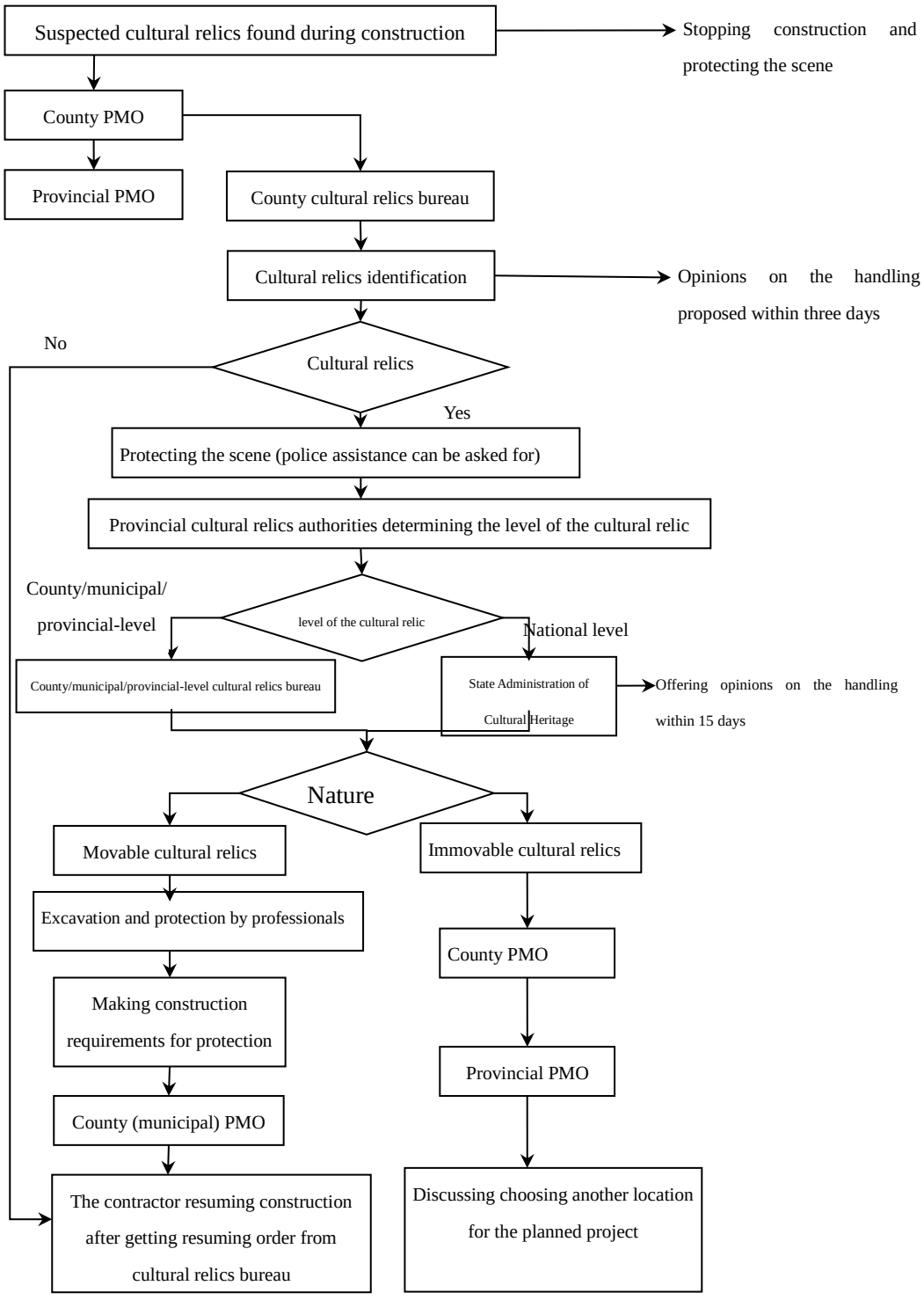
Checklist of Construction Site Environment for World Bank-financed Jishui County Water Environment Management Project						
Name of project			Name of Work Site			
Contract Number and Name			Check Result (Marked with "√")			Remark
Inspect Item			Yes	No	Not Involve	
	15.5 Whether cooperate with local community and competent authority to improve road signs and strengthen the visibility of road signs					
	15.6 Whether traffic safety and pedestrian safety education are carried out in the communities surrounding project construction and the communities nearby school					
	15.7 Whether materials are purchased locally as far as possible					
	15.8 Whether drivers operating the vehicles hold driving license					
	Others (shall specify)					
Others (shall specify)						
The construction stage when inspecting:_____Date of inspection: _____ Time of inspection: _____ Weather record: _____ Signed by on-site inspector: _____ Signed by environmental supervisor: _____ Description: ① The problem observed, unqualified situation described, corrective and preventive actions and suggestions put forward can be filled in remark. ②If it is found through on-site inspection that measures are unqualified and need to be improved, environmental supervisor shall immediately issue "Environmental Rectification Notice" to the contractor and record the serial number of "Environmental Rectification Notice" in Remark. The detailed corrective actions carried out by the contractor shall be recorded separately. ③ As for the specific subproject and environmental problems, local environmental situation and construction content can be combined to make appropriate adjustment to this form and to adopt appropriate environmental protection measures.						

Annex 4 Environmental Rectification Notice

Environmental Rectification Notice
No.: _____ Contract No. and name:

Environmental Rectification Notice
_____ Name of subproject: _____ Name of Work Site: _____ Current construction stage: _____
The problems existing in on-site inspection: Checked by: _____ Date: _____
The contractor analyzes the reasons and formulates rectification plan: Contractor in charge: _____ Date: _____
Opinion of environmental supervisor: Responsible person on environmental supervisor side: _____Date:_____
Opinion of competent department of environmental protection (when necessary): Contact person: _____ Date: _____
Modification deadline: Completed as of _____ Contractor in charge: _____ Date: _____ Responsible person on environmental supervisor side: _____Date:_____
Conclusion after review: Rechecked by: _____ Date: _____

Map 1 Emergency Handling Flow Chart in case of Discovering Cultural Relic


Suspected cultural relics found during construction
Stopping construction and protecting the scene
County PMO
Provincial PMO
County cultural relics bureau
Cultural relics identification
Opinions on the handling proposed within three days
No
Cultural relics
Yes
Protecting the scene (police assistance can be asked for)
Provincial cultural relics authorities determining the level of the cultural relic
County/municipal/ provincial-level
level of the cultural relic
National level
County/municipal/provincial-level cultural relics bureau
State Administration of Cultural Heritage
Offering opinions on the handling within 15 days
Nature
Movable cultural relics
Immovable cultural relics
Excavation and protection by professionals
County PMO
Making construction requirements for protection
Provincial PMO
County (municipal) PMO
The contractor resuming construction after getting resuming order from cultural relics bureau
Discussing choosing another location for the planned project