World Bank Financed

Yugan Water Environment Management Project

Environmental Management Plan

CERI eco Technology Co., Ltd.

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1 Overview

1.1 Introduction

Based on “World Bank Financed Yugan 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

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

Yugan County, located in the northeast of Jiangxi Province, is at the southeast bank of the Poyang Lake and in the lower stream of the Xin River, with Wanian County to the east, Yujiang and Dongxiang County to the south, Jinxian, Xinjian, Nanchang to the west, and Boyang to the north. It borders on Poyang Lake, with Duchang County at the other side of the Lake. Pipa Lake, the only lake in the county, is connected with Huhui River, the tributary of Xin River, which flows into Poyang Lake. Therefore, the ecology of Yugan County has direct impacts on the Poyang Lake and the improvement of pollution control of Pipa Lake is also beneficial to the ecological safety of Poyang Lake Basin.

The aim of this project is to reduce pollutants entering into Poyang Lake basin from key water bodies, and improve water quality management of the County by taking the following measures: engineering measures, such as improving lake and river water environment, enhancing domestic sewage management system, building a garbage collection and treatment system, etc.; and non-engineering measures such as strengthening Poyang Lake Basin management, and project implementation facilitation to improve pollution control of Pipa Lake Basin and continuously reduce the total volume of pollutants.

2.2 Project Components

See Table 2-1.

Table 2-1 Project Components

project name	sub-project	content	nature	location
Sewage pipe project around Pipa Lake	Sewage pipeline network	A DN300-DN400 sewage pipeline of 5,562.8m is proposed to be built around Pipa Lake. And a new integrated prefabricated pumping station of 3,500m^3/d shall be built near the existing combined sewage pumping station.	new	around Pipa Lake
Pipa lake water diversion project	Water diversion and activation project	An integrated prefabricated pumping station of 300m^3/d shall be built in the mouth of the diversion channel. A sluice will be built in the outlet channel of Pipa Lake and 3 defective sluices will be replaced.	new	around Pipa Lake

project name	sub-project	content	nature	location
Pipa lake bottom silt dredging project	Dredging the bottom silt of channels	dredging silt of the 30,000m^3 in the outlet channel of Pipa Lake	new	in the outlet channel of Pipa Lake
Garbage collection and transfer project	Lakeside garbage treatment	Garbage transfer stations in front of the No.2 Middle School and in Huanhu Donglu in Pipa Lake Basin will be closed and the garbage transfer station of the Municipal Public Utility Administration Bureau shall be transformed into a garbage collection point and a new garbage collection point will be built.	Reconstruction	around Pipa Lake
Pipa lake water ecological restoration and water quality guarantee project	water ecological construction in Pipa lake	Landscape engineering of 40,000m^2, submerged plant of 3.6X10^9m^2, floating-leaved plant of 7.2X10^7m^2, emerging plant of 2,412m^2, and water area of strengthened purification of 3000m^3 will be built; 8 aerating apparatus, 8 immobilized microbiological incubators, and 2 aquatic plant cleaning docks will be set up; and 2 weed-cutting launches (with a load of 5t) will be purchased.	new	Around Pipa Lake
	ecological revetment construction	It is proposed to build plant eco-concrete slope protection of 2100m, ecological engineering material slope protection of 1816m, and natural plant gentle slope protection of 1297m, and improve existing slope of 2165m, wooden trestles of 1817m^2, trails of 18583m^2, fences of 4265m and grassed swales of 5231m.	new	around Pipa Lake
Water environment monitoring and control system	Water environment monitoring system premises	improve relevant equipment	use existing rooms	Yugan Bureau of Environmental Protection
	Automatic Water environment monitoring station	7 monitoring sites will be set up in Pipa Lake and Huhui River for the automatic water quality monitoring.	new	Pipa Lake
Cost	About RMB 232,50,600 in total, including USD 25 million (RMB165 million, 1 USD = 6.6 RMB) loan of World Bank and RMB 67,500,600 of counterpart funding.			

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	Distance from the project (m	Number of Household
pipeline network	construction period	dust and noise from construction machinery during the construction period	Pipazhou Community	in the northwest of the former garbage transfer station of the Municipal Public Utility Administration Bureau	100	100
			Guankou Village	pipeline network	20	250
sewage lifting pumping station	operation period	noise	Pipazhou Community	in the north of the pump station	100	100

Table 3-2 List of Water environment Protection Targets

No.	Protection target	Water quality target	Water body function	Involved project content
1	Huhui River	Category Ⅲ	water for scenic and recreational purposes	improve the water quality in Pipa Lake through measures such as controlling pollution source of Pipa Lake, water diversion project of Huhui River and ecological restoration.
2	Pipa Lake	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
		aquatic organisms	aquatic organisms in Pipa Lake

No.	Environment factor	Protection target	Overview of protection target
		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	pipe excavation	the impact of project construction on the travel and safety of residents, on schools and hospitals, on the business of shops along the existing roads, and on water and electricity supply and other public facilities
2	land occupancy	local economy and residents affected by the land occupancy
Applicable subproject		All subprojects

3.2 Environmental Protection Standards

International Finance Corporation's Environmental, Health, and Safety (EHS) Guidelines includes standards and requirements of atmospheric pollutants, noise and acoustic environment quality, wastewater, waste management, occupational health and safety, etc.

Assessment standards of this project are determined by comparing applicable standards in China and standards in the EHS Guidelines. See below for detailed results of comparison and selection.

3.2.1 Environmental Quality Standards

（1）Ambient air

The ambient air involved in the project is classified as Category II, therefore, shall meet the Category II standard in *Ambient Air Quality Standards* (GB3095-2012) while the allowed maximum concentration of atmospheric harmful substances in residential areas in *Hygienic Standards for the Design of Industrial Enterprises (*TJ36-79) is applied for ammonia gas and hydrogen sulfide of garbage collection sites. See Table 3-5 for details.

Table 3-5 Ambient Air Quality Standards

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	
NH_3	200 (one-time monitoring)	-	*Hygienic Standards for the Design of Industrial Enterprises (*TJ36-79)
H_2S	10 (one-time monitoring)		

（2）Water environment

Pipa Lake and Huhui River involved in this project are water for scenic and recreational purposes. They are subject to Category IIII standard in *Surface Water Environment Quality Standards (*GB3838-2002). See Table 3-6 for details.

Table 3-6 Surface Water Environment Quality Standards (mg/L, excluding pH)

Assessment factor	Category III standard limits in *Surface Water Environment Quality Standards (*GB3838-2002)
pH	6~9
DO	≥5
permanganate index	≤6
COD	≤20
BOD_5	≤4
TN	≤1.0
NH_3-N	≤1.0
TP	≤0.2 (for lakes and reservoirs, 0.05)
petroleum	≤0.05
sulfide	≤0.2
fecal coliform	≤10000

（3）Acoustic environment

China's national acoustic environment standard limits and the acoustic guideline value in EHS are shown in Table 3-7.

Table 3-7 Acoustic Environment Quality Standards (dB (A))

Acoustic Environment Quality Standards (GB3096-2008)				Acoustic guideline value		
implementation area	type of function 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 II	60	50	residential areas, office areas and	55	45

				cultural and educational areas		

Areas involved in this project belong to residential, commercial and industrial combined areas. After comparison, Category II standard in *Acoustic Environment Quality Standards* (GB3096-2008), i.e. 60 dB(A) in daytime and 50 dB(A) in nighttime, is applied in this project.

（4）Soil

Bottom sludge in the outlet channels of Pipa Lake is involved in this project. At present, there is no existing standard for dredging bottom sludge. Common standards for sludge include the *Standards for Control of Pollutants in Agricultural Sludge* (GB4284-84), the *Standard of Soil Quality Assessment for Exhibition Sites* (HJ350-2007), the *Disposal of Sludge from Municipal Wastewater Treatment Plant - the Quality of Sludge Used in Forestland (*CJ/T362-2011), etc. The *Guidelines for the Utilization and Disposal of Wastewater Sludge* (40CFR Part 503) is applied in the USA while the *Sludge (Use in Agriculture) Regulations* (Directive 86/278/EEC) issued by European Committee for Standardization is used in the European Union. Here is a comparison of those standards.

Table3-8 A Comparison of Sludge Standards Home and Abroad （mg/kg）

Item / Standard	Category	pH	cadmium	copper	lead	chromium	zinc	nickel
Soil Environment Quality Standards (GB15618-1995)	Category I	Natural background	0.20	35（such as farmland）—（orchard）	35	90 (paddy land and dry land)	100	40
	Category II	<6.5	0.30	50（such as farmland） 150（orchard）	250	250 (paddy land) 150 (dry land)	200	40
		6.5~7.5	0.30	100（such as farmland） 200（orchard）	300	300 (paddy land) 200 (dry land)	250	50
		>7.5	0.60	100（such as farmland） 200（orchard）	350	350 (paddy land)250 (dry land)	300	60
	Category III	>6.5	1.0	400（such as farmland） 400（orchard）	500	400 (paddy land) 300 (dry land)	500	200
Standards for Control of Pollutants in Agricultural Sludge (GB4284-84)	—	＜6.5	5	250	300	600	500	
	—	≥6.5	20	500	1000	1000	1000	200
Standard of Soil	Category	—	1	63	140	190	200	50

Quality Assessment for Exhibition Sites (On trial) (HJ350-2007)	A							
	Category B	—	22	600	600	610	1500	2400
*Disposal of Sludge from Municipal Wastewater Treatment Plant - the Quality of Sludge Used in Forestland (*CJ/T362-2011)	—	5.5~8.5	20	1500	1000	1000	3000	200
Guidelines for the Utilization and Disposal of Wastewater Sludge (40CFR Part 503) (in the USA)	—	—	85	4300	840	—	7500	420
Sludge (Use in Agriculture) Regulations (Directive 86/278/EEC) (in EU)	—	—	20~40	1000~1750	50~1200	—	500~4000	300~400

Note: 1. Generally, the application of sludge that meets the requirements in *Standards for Control of Pollutants in Agricultural Sludge* (GB4284-84) shall not exceed 2000kg (for dry sludge) per acre per year.

2. The accumulated application of sludge used in forestland that meets the *Disposal of Sludge from Municipal Wastewater Treatment Plant - the Quality of Sludge Used in Forestland (*CJ/T362-2011) shall not exceed 30t/hm^2 per year.

As these standards all use heavy metal as the controlling indicator of main pollutants, this report will focus on comparing heavy metal. Take zinc as an example. After comparison, it is found that the maximum allowed concentration limit of zinc is the lowest in *Soil Environment Quality Standards* (GB15618-1995) in which the Category III standard is 500mg/kg (pH>6.5); next is *Standards for Control of Pollutants in Agricultural Sludge* (GB4284-84) in which the standard is 1000mg/kg; the third lowest is in *Standard of Soil Quality Assessment for Exhibition Sites* (HJ350-2007), in which the Category B standard is 1500mg/kg; the fourth lowest is in *Disposal of Sludge from Municipal Wastewater Treatment Plant - the Quality of Sludge Used in Forestland* (CJ/T362-2011), 3000mg/kg; The fifth is in the EU standard, 2500mg/kg~4000mg/kg; the highest one is in the American standard, 7500mg/kg.

Generally speaking, China's maximum allowed concentration limit in *Soil Environment Quality Standards* (GB15618-1995) is the lowest. The limits increase one after another, from the *Standards for Control of Pollutants in Agricultural Sludge* (GB4284-84), the *Standard of Soil Quality Assessment for Exhibition Sites* (HJ350-2007), the *Disposal of Sludge from Municipal Wastewater Treatment Plant - the Quality of Sludge Used in Forestland (*CJ/T362-2011), to the EU standard. The highest one is the American standard. Therefore, China's *Soil Environment Quality Standards* (GB15618-1995) and *Standards for Control of*

Pollutants in Agricultural Sludge (GB4284-84) are the most strict two standards. Reference can be made to other standards in China, the USA and the EU for the universality and risk evaluation of sludge.

When the heavy metal indicator does not meet the Category III standard of China's *Soil Environment Quality Standards* (GB15618-1995), but is up to the American standard or other sludge standards, it is believed that sludge does not belong to hazardous waste and can be treated as common sludge in this project.

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 3-9 for details.

Odor generated from the garbage collection stations during the operation period is subject to Category II Standard of fugitive emission in *Odorous Pollutant Emission Standards* (GB14554-93). See Table 3-10.

Table 3-9 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 boundary	1.0

Table 3-10 Odor Discharge Standards (unit: mg/m^3)

Pollutant	Monitored concentration limits for fugitive discharge (new construction, reconstruction and expansion)
NH_3	1.5
H_2S	0.06

（2）Water pollutants

Collected garbage leachate is sent to be treated in the leachate treatment station of Yugan Garbage Landfill Plant; after collection and sediment treatment, flushing wastewater from garbage collection points and transfer vehicles drains into Yugan wastewater treatment plants through sewage pipeline network. If the treated wastewater meets the Category I B standard in *Pollutant Discharge Standards for Urban Wastewater Treatment Plants* (GB18918-2002), it will be discharged into Xin River. See Table 3-11.

Table 3-11 Wastewater Discharge Standards (unit: mg/L, excluding pH)

Source of standards / Pollutant	Category B standard in *Wastewater Quality Standards for Discharge to Municipal Sewers* (*GJ343-2010)*	Category I B standard in *Pollutant Discharge Standards for Urban Wastewater Treatment Plants* (GB18918-2002)
pH	6.5~9.5	6~9
SS	400	20
BOD_5	350	20
COD	500	60
NH_3-N	45	8（15）

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. And noise from pumping stations is subject to Category II standard in *Emission Standards for Industrial Enterprises Noise at Boundary* (GB12348-2008). See Table 3-12.

Table 3-12 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	noise emission standards at construction sites
daytime	60	70
nighttime	50	55

（4）Solid waste

Standard for Pollution Control on the Storage and Disposal Site for General Industrial Solid Wastes (GB18599-2001) is applied. Hazardous waste in the water environment monitoring lab is subject to *Standards for Pollution Control at Hazardous Waste Storage Site* (GB18597-2001) and relevant safety policy requirements of EHS and World Bank.

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

Type	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, and coordinate and supervise EMP implementation.
	County (City) 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.
Implementation	Project owner	River Head office	Designates staff to be exclusively responsible for the Basin management, the operation of monitoring system and the implementation of EMP during the project operation period.
		Municipal Public Utility Administration	Designates staff to be exclusively responsible for the EMP implementation of the garbage collection and transfer

Type	Name		Roles and Responsibilities
		Bureau of Yugan County	project during the project operation period.
		Pipa Lake Administrative Committee of Yugan County	Designates staff to be exclusively responsible for the EMP implementation of Pipa Lake water system restoration project during the project operation period.
	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		Takes charge of environmental monitoring during project construction and operation.

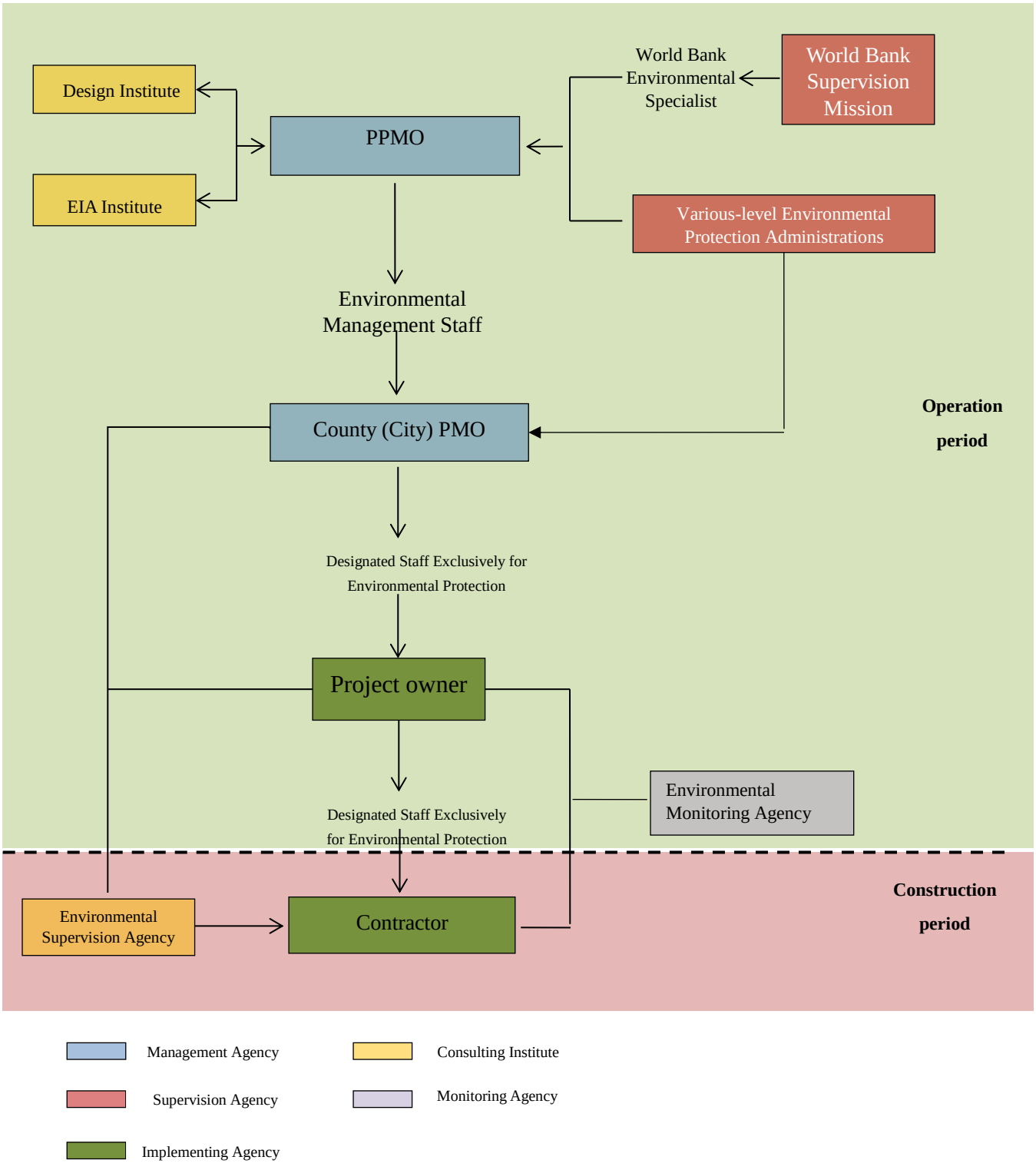

Design Institute
EIA Institute
PPMO
World Bank Environmental Specialist
World Bank Supervision Mission
Various-level Environmental Protection Administrations
Environmental Management Staff
County (City) PMO
Operation period
Designated Staff Exclusively for Environmental Protection
Project owner
Environmental Monitoring Agency
Designated Staff Exclusively for Environmental Protection
Environmental Supervision Agency
Contractor
Construction period
Management Agency
Consulting Institute
Supervision Agency
Monitoring Agency
Implementing Agency

Figure 4-1 Organizational Framework of Environmental Management during Construction Period

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 subproject EIAs), environmental monitoring and management during project implementation and operation.
World Bank	Supervision	1	2. Sends supervision missions every year to supervise project implementation; 3. 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 (City) 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

Agency	Type	Staff Establishment (No. of People)	Roles and Responsibilities
			addressing complaints and addresses public complaints; 7. Reviews environmental supervision and environmental consulting reports; 8. Submits quarterly reports (statements) to PPMO; 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	implementation	many	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 (city) 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.
Supervision Engineer (also undertakes environmental	Consulting	1-2	1. Supervision engineer is employed separately by PPMO or county (city) PMO; 2. Supervises and inspects domestic sewage treatment, production wastewater

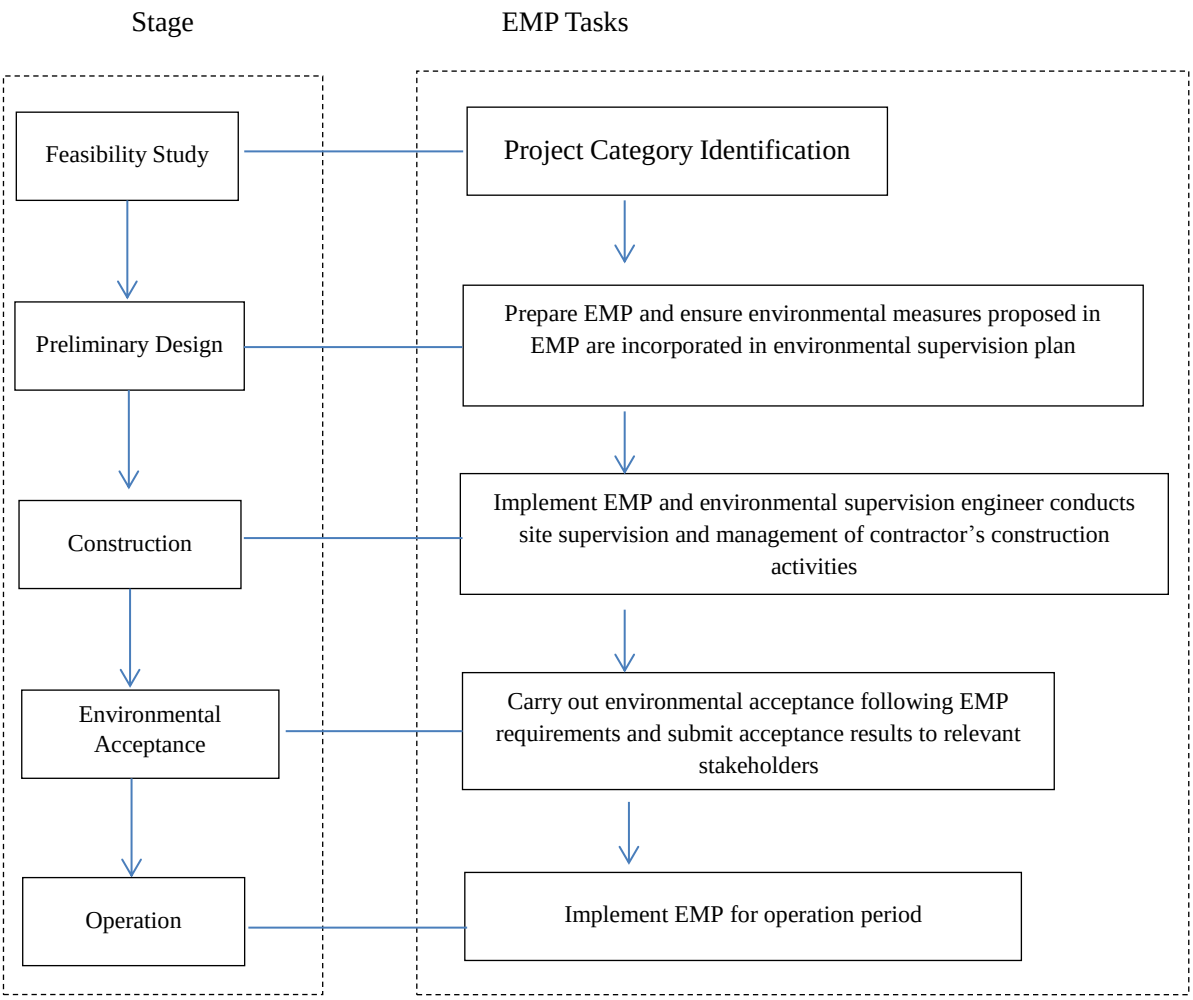
Agency	Type	Staff Establishment (No. of People)	Roles and Responsibilities
supervision)			treatment, implementation of soil erosion, waste gas, dust and noise control measures, disposal of production and domestic garbage and epidemic control; 3. Fills out on a regular basis all checklists in the annexes 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 relevant documentation; 5. Submits to county (city) 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 (city) PMO weekly implementation progress reports.
Environmental Monitoring Agency	Monitoring	a few	1. Undertakes environmental monitoring during implementation and operation following EMP requirements, archives and submits to county (city) 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.

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.

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



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 implantation 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.

4.4 Environmental Management Plan and Environmental Impact Mitigation Measures

Details of EMP and mitigation measures are indicated in table 4-3. Details of EMP for associate projects can be found 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;	——	——	—	PPMO, County PMO	— —

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		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.					
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. 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. 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 adapt to local conditions to ensure quality and service life of the project.	——	——	—	PPMO, County PMO County project owner, design institute, the working group of resettlement plan and social impacts assessment team	PPMO, County Bureau of Land and Resources and Price Bureau

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		10. It is proposed that consultation should be conducted with residents occupying the wetland to help restoring farmland to lakes and improving ecological system in the wetland. 11. The Code of Economic Conduct in the Lake Area will be issued. 12. Scientific forces will be integrated to promote the parallel development of ecological protection and economic development in the Lake Area. 13. Participatory activities will be carried out. 14. Environmental knowledge and public health education training shall be conducted. 15. 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. 16. A follow-up management mechanism will be set up for the project. 17. It is proposed that residents' thought of "NIMBY" should be taken into consideration. The sites of waste collection, transfer, and treatment facilities shall not be either too near or too far from residential areas to avoid high cost of waste transportation. The core principle is to conduct more consultation and communication with residents to ensure their recognition of waste treatment project. 18. Due to adopted tax distribution system, financial budget of village and town (township) is very tight. Thus, the project funds should prefer the rural regions to support waste transfer system construction there. Meanwhile, the local government should not be responsible for too much project expenditure. 19. Technology plays a crucial role in improving the efficiency of waste treatment. Scientific treatment of waste should be conducted in terms of technology either in simple garbage landfill sites or in new garbage treatment plants, to prevent leakage and pollution.					
Land	Land Acquisition	In the planning stage, when optimized selection for schemes was conducted,	——	—	Included in	Design institute and	PPMO and County Bureau

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
Occupation	and Resettlement	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; Design was optimized. To reduce the demolition immigrants, existing national and local roads were used to connect planned construction area. The design was optimized to occupy wasteland and state-owned land and reduce the occupancy of arable land.			resettlement cost	County Project Management Office	of Land and Resources
Design of pipeline sub-project	Pipeline leakage	1. In accordance with the 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.	——	——	—	design institutes	PPMO, County PMO, County EPB, County Water Bureau
Waste collection and transportation design	Site Selection	1. Comply with urban and rural environmental sanitation planning; 2.Garbage collection stations shall get close to main roads for the purpose of easy entry and exit of waste transporters; 3. Garbage collection stations shall be set in places that have complete water and power facilities and sewage discharge pipe networks; 4. Garbage collection stations shall not be set in places that may pose a threat to traffic safety or easily cause traffic congestion.	— —	— —	—	design institute	PPMO, County PMO, County Sanitation authority, County EPB
	Structure	1. The site selection of garbage collection stations shall comply with the principles of high efficiency, energy conservation, environmental protection, safety and sanitation; 2. After entry into garbage collection stations, waste shall be directly dumped into waste containers lest waste should be dumped on the ground; 3. The appearance and color of Garbage Collection Stations shall be matched	——	——	—		

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		with their surroundings; 4. The architecture of garbage collection stations shall ensure the effective control of the waste collection operation over pollutants; 5. The wastewater collection system shall meet such requirements as corrosion resistance and leakage prevention.					
Pipa Lake water system restoration	Invasion of foreign species	In plants and animals design, local species shall be selected and introduction of foreign species is prohibited.	——	——	—	design institutes	PPMO, County PMO, County EPB, County Forestry 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, County EPB, Office of River head, Yugan County Municipal Public Utility Administration Bureau
	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.	——	——	2	contractor	Environmental supervision agency, PPMO, County PMO, County EPB, Office of River head, Yugan County Municipal Public Utility Administration Bureau
	Obstruction to traffic, traffic safety, and impacts on business of stores along the road	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	——	——	28	contractor	Environmental supervision agency, PPMO, County PMO, County EPB, Office of River head, Yugan County Municipal Public Utility Administration Bureau

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		people of entrance into construction area, and of 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 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					

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		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 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					

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		measures into construction organization design. Prior to construction, take the initiative to contact 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 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					

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		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, 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.					
Waste collection and	Common impacts	Adopt measures in *General Environmental Management Regulations on Construction*	TSP	See details in monitoring	30	contractor	Environmental supervision agency, PPMO,

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
transportation subproject	caused by construction	*Activities*(see annex 1)	noise	plan			County PMO, County EPB, Office of River head, Yugan County Municipal Public Utility Administration Bureau
Water system restoration	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	20	contractor	Environmental supervision agency, PPMO, County PMO, County EPB, County Water Bureau, County Forestry Bureau, project owner
	Impacts on water environment and ecology, and sludge	1. Environmental dredging shall be conducted, and construction time shall be shortened as much as possible to reduce disturbance to water bodies. Through flocculant agent-feeding treatment and after meeting relevant requirements, residue water from dehydrated silt shall be discharged into Pipa Lake. 2. After centrifugal dewatering treatment, dredged silt with moisture content of lower than 60% shall be transported to Changgangling and Xiaohegang Forestry Centers. Forestland covered by silt shall not be used to cultivate vegetables, grain and other crops. 3. Fences and warning signs should be set up on the construction forest land, in order to prevent the public from entering into the area. 4. The wasteland on the south side of the downstream outlet channel can be used to build a cofferdam of the sludge dumping area. The section form of the cofferdam is usually sloping and the inner side of the cofferdam shall be laid with impermeable materials..	—	—	20		

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		5. Far from the mud outlets, water outlets should be built in the cornet of the storage yard to make full use of the space to store mud with a comprehensive consideration of the mud-bearing capacity, area, geometric shape and drainage channels of the storage yard to meet the residual water monitoring requirements and requirements of emergency treatment for residual water that fails to meet the emission standards. 6. Emergency treatment facilities of residual water include accidental water storage pool, agent-feeding facilities for emergencies, etc. If it is possible, an emergent accidental water storage pool of different volumes should be built based on the specific conditions of the construction site to store residual of 2 to 4 hours. The pool should have some impermeable measures to store and treat accidental or emergent residual water that fails to meet the emission standards. 7. Cleared dredged silt should be moved in time. Tarpaulins should be added when dredged silt is temporarily piled up, so as to prevent water from washing and flowing back to Pipa Lake and resulting in water pollution. 8. Deodorant should be regularly sprinkled on the dumping area to reduce the influence on the ambient air. Cleared garbage and silt shall be removed in a timely manner so as to shorten temporary land occupation					

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		period as much as possible. 9. Pollutants from the sludge-dredged water body should be collected in waste collection boxes and cleared and transported by the environment and sanitation department to Yugan waste landfill for further treatment.					
	Invasion of foreign species	Following strictly the design, temporarily occupied land shall be reclaimed or vegetation restored. Local species shall be selected and introduction of foreign species is prohibited.	—	—	—		
Monitoring premises	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	15	contractor	Environmental supervision agency, PPMO, County PMO, County EPB, Office of River head
Land Occupation	Land Acquisition and Resettlement	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 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				County PMO, 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
		such as residential quarters, schools and the like.					
Project construction	Social Environment	1. The project will provide job opportunities for migrants, urban and rural poverty households and women, enabling 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 PMO, project owner and construction institutes	PPMO and County Bureau of Land and Resources
Operation period							
Pipeline sub-project	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	Yugan Municipal Public Utility Administration Bureau	PPMO, County PMO, County Water Bureau, County EPB
	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;	——	——	Listed in construction cost	Yugan Municipal Public Utility Administration Bureau	PPMO, County PMO, County Water Bureau, County EPB

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		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.					
	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.	——	——	—		
Waste collection and transportation sub-project	Associated project	Yugan County domestic waste landfill shall supply environmental acceptance reply and monitoring report.	——	——	—	Owner of Yugan County waste landfill	PPMO, County PMO, County EPB
	Leachate, flushing wastewater, domestic sewage	1. Garbage trucks shall all be enclosed; 2. Compressed garbage truck shall be equipped with leachate collecting container. Leachate generated during compression shall be collected and transported to leachate treatment station of Yugan County domestic garbage landfill for treatment; 3. Drain flushing wastewater into municipal wastewater treatment plant of Yugan County through municipal sewage networks.	pH, COD, BOD_5, NH_3-N, SS	2 rounds /year	30	Yugan Municipal Public Utility Administration Bureau	
	Odor	1.Regularly clean garbage trucks to reduce odor; 2.Vehicles and containers capable of minimizing air emission during the process of waste reception, unloading, treatment and storage shall be selected; 3. Garbage collection stations and nearby roads shall be frequently	NH_3, H_2S	2 rounds /year	50		

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		cleaned, and sprinkled with water to control dust when necessary; 4. All of biological waste shall be rapidly cleaned and disposed on a daily basis; 5. Garbage truck shall be sealed to prevent garbage from leaking or spilling; 6. Make and improve the transporting route of garbage truck so as to prevent vehicle exhaust from affecting sensitive sites on both sides of the road, such as residential area, school, and hospital.					
	Acoustic environment	1. Enhance the management and maintenance of garbage trucks so as to lessen vehicle accident rate; 2. Workers who are responsible for waste transportation should receive occupational training and hold related certificates; 3. Make and improve the transporting route of garbage truck so as to prevent traffic noise from affecting sensitive sites on both sides of the road, such as residential area, school, and hospital.	Leq dB（A）	2 rounds /year	2		
	Social environment	1. Garbage collection stations shall make safe operation procedures for operation and maintenance, and operate according to the operation procedures; 2. Garbage collection stations shall keep a clean look, regularly clean collection containers; adopt biological methods, such as spraying biological bacteria, and light and liquid disinfection system to eliminate bacteria and mosquitoes in a systematic way; Sweep and wash equipment and station floor regularly for disinfection and sterilization, ensure that the surface is clean, without dirt and leachate. Waste transfer stations shall spray insecticide in and out to kill mosquitoes; 3. Administrative staff and operators of garbage collection stations shall receive the pre-job training to grasp technical process and technical requirements of Garbage Collection Stations as well as major technical indicators and operation and management requirements of relevant facilities and equipment;	——	——	3		

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		4. Garbage Collection Stations shall be opened in strict accordance with the schedule time; 5. Operators shall randomly inspect waste content, and any hazardous waste and forbidden object are prohibited from entering the stations; 6. Collected materials and organic waste are classified for the purpose of easy collection and compost; 7. Messes are strictly prohibited from being piled up in Garbage collection stations.					
	Impacts on occupational health	1. Garbage collection stations shall formulate codes concerning running, maintenance, and safe operation, and follow these codes; meanwhile, a sound emergency rescue plan shall be established; 2. Administrative staff and operators of garbage collection stations shall receive the pre-job training to grasp technical process and technical requirements of Garbage Collection Stations as well as major technical indicators and operation and management requirements of relevant facilities and equipment; 3. Conduct pre-service and regular occupational health knowledge training, especially emergency rescue related knowledge training; 4. In accordance with the relevant provisions of the state, conduct pre-, during and after service occupational physical examination for workers engaged in the occupational-disease-inductive operations, and faithfully inform them of the exam results. Workers who have not gone through occupational physical examination shall not be arranged to conduct occupational-disease-inductive operations. Workers who have occupation disease contraindications shall not be arranged to conduct taboo operations; 5. Garbage collection stations shall keep a clean look, regularly clean collection containers; adopt biological methods, such as spraying biological bacteria, and light and liquid disinfection system to eliminate bacteria and mosquitoes in a systematic	——	——	3		

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		way; Sweep and wash equipment and station floor regularly for disinfection and sterilization, ensure that the surface is clean, without dirt and leachate. Waste transfer stations shall spray insecticide in and out to kill mosquitoes; 3. Administrative staff and operators of garbage collection stations shall receive the pre-job training to grasp technical process and technical requirements of Garbage Collection Stations as well as major technical indicators and operation and management requirements of relevant facilities and equipment; 6. Operators shall randomly inspect waste content, and any hazardous waste and forbidden object are prohibited from entering the stations.					
Monitoring premises	Waste acid (HW34), waste alkali（HW35), and waste organic solvent（HW42）	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; 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.	——	——	9	Yugan County EPB	PPMO, County PMO, County EPB, Office of River Head
	Domestic waste	Collected domestic waste shall be sent directly into compression room and then transported to waste treatment plant.	——	——	1		
Other non-engineering measures	Positive impacts	1. River and lake water environment patrol monitoring; 2. Strengthen water environment policy	——	——	in construction cost	Office of River Head	PPMO, County PMO

Sub-project/ activities	Potential impact	Mitigation Measures	Monitoring Item	Monitoring Frequency	Cost (10,000 yuan)	Implementing Agency	Supervision Agency
		and planning research; 3. Improve water environment system; 4. Strengthen the maintenance management and regular refits of facilities, ensure the normal operation of the system; 5. Encourage public to participate in the supervision of environment protection; 6. Publicize water environment information through internet and outdoor LED display.					

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 Associated Projects.

Name of Sub-project	**Construction situation**	**Construction overview**	**EMP**	**Estimated Investment（10,000 yuan）**	**Implementation agency**	**Supervision agency**
Yugan County domestic waste landfill	To be checked and accepted	At present the total built storage capacity is 950,000m^3，the project is proposed to apply for environmental acceptance in the second half of 2016.	After the acceptance, Yugan County domestic waste landfill shall supply acceptance reply and monitoring report.	——	Yugan 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 Yugan sub-project is shown in Table 5-1.

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

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	Two monitoring points: Pipazhou Community, Guankou Village	TSP	2 rounds/ year, 1 day/round, once/day	0.25	1	5	qualified agency	Project owner	PMO, Yugan County EPB
		Two odor monitoring points: Bajiazui Village and Siguayan Village	NH3、H2S	2 rounds/year, 1 day/round, once/day	0.25	1	0.5 (1 year)			
	noise	Two monitoring points: Pipazhou Community, Guankou Village	LeqdB（A）	2 rounds/ year, 1 day/round, once/day, during daytime	0.02	0.04	0.2			

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
	Surfaces water	One monitoring point: Pipa Lake	Water temperature, pH, DO, COD, BOD, permanganate index, NH_3-N, total phosphorus, total nitrogen	2 rounds/ year, 1 day/round, once/day	0.25	0.5	0.5 (1 year)			
		One residual water outlet	Water volume, suspended matter, turbidity, permanganate index , total phosphorus, total nitrogen, heavy metal, etc.	2 rounds/year, 1 day/round, once/day	0.25	0.5	0.5 (1 year)			
	Bottom sludge	Two sites	Water content, organic matter, heavy metal, etc.	1 round/year, 1 day/round, once/day	0.5	1	1 (1 year)			
	Subtotal (10,000 yuan)						9.7			
Operation period (3 years)	Water quality	Seven monitoring points: seven automatic monitoring stations of this sub-project along Huhui River and Pipa Lake	Water temperature, pH, DO, COD, BOD, permanganate index, NH_3-N, total phosphorus, total nitrogen, chlorophyll a	——	——	——	——			PMO, Yugan County EPB
	noise	Two monitoring points: sewage pumping station,	LeqdB（A）	1round/year, 1 day/round, twice/day	0.04	0.08	0.24		Project owner	

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
		diversion pumping station		(once at daytime and nighttime, respectively)						
	Subtotal (10,000 yuan)						0.24			
Grand Total (10,000 yuan)							9.64			

The environmental monitoring plan of associated project is shown in Table 5-2. The monitoring cost of associated project is covered by associated project owners, therefore, is not included in the monitoring cost of this project.

Name of associated project	Medium	Location and Number of Monitoring Points	Item	Frequency	Monitoring Agency	Responsible Agency	Supervision Agency
Yugan Town Wastewater Treatment Plant	water quality	2 monitoring points: 1 at the inlet, 1 at the outlet	pH, suspended solids, COD, BOD_5, NH_3-N, petroleum, TN, TP, permanganate index	2 rounds/year, 1 day/round, once/day	qualified agency	owner of associated project	EPB of Yugan County
	odor	Five monitoring points: four boundaries of the plant and the nearest residential area	NH_3, H_2S	2 rounds/year, 1 day/round, once/day			
	sludge	Transported sludge	Heavy metals（As, Hg, Pb, Cr, Cu） and water content	2 rounds/year, 1 day/round, once/day			
Yugan County garbage landfill	odor	Five monitoring points: four boundaries of the plant and the nearest residential area	NH_3、H_2S	2 rounds/year, 1 day/round, once/day			
	ground water quality	2 monitoring points at upstream and	pH, suspended solids, COD, BOD_5, NH_3-N,	2 rounds/year, 1 day/round,			

		downstream of the plant	petroleum, TN, TP, permanganate index	once/day			
	water quality	2 monitoring points at inlet and outlet of leachate wastewater treatment station	pH, suspended solids, COD, BOD_5, NH_3-N, petroleum, TN, TP, permanganate index	2 rounds/year, 1 day/round, once/day			

Table 5-2 Environmental Monitoring Plan of Associated 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	
		ⅢEnvironmental management at the World Bank	1	1	3	
EMP implementation	Construction units, project owner	ⅠRoles and responsibilities for environmental protection during construction	1	0.5	4	2
		Ⅱ Main tasks of environmental protection	1	0.5	4	

Subject	Participant	Contents	Times	Day/ Time	No. of Participants/Times	Budget (10,000 yuan)
		during construction				
		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	
		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 2.8094 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		
263	7	0..24	8	280.94

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 of s waste transfer station and lengths of pipelines already paved;

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.

Annex1 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 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.

5) 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.

6) 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 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 subprojects.

In all construction sites, there shall be sedimentations 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 are 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) Ensure 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: the 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 shall 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 shall be taken into full account in terms of the layout of the construction site, which shall 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 the leakage via land or surface water during the rainy season.

During the construction, the on-site ground shall be kept clean. Prevent wastewater or pollutants from entering the ditches, thus leading to the penetration 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 the 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 the construction personnel shall be disposed via surrounding existing residential sewage treatment system, and cannot be discharged arbitrarily. Anti-seepage and anti-loss measures shall 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 shall 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 shall 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 shall 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 shall not exceed the upper edge of the vehicle ledge during transportation, and the vehicle hopper shall 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 shall slow down 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 shall 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 shall be approved by relevant local environmental protection department and negotiation in advance with local residents should be achieved. In addition, noise reduction measures shall 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 25 km/h.

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

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

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

13) Appropriate measures shall 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 the occupation of land. Temporary occupied area will be restored according to its original land using type after construction is completed.

Reasonably arrange temporary stacking areas of earthworks and stones which shall 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 shall 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 safety and property 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 shall be equipped with a safety information bulletin; warning signs shall 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 shall be suspended when encountering heavy rains or other emergencies;

10) The electrical equipment and machinery shall 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 shall 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 shall 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 shall, 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 shall 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 shall 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 shall 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 shall provide workers with basic first aid services and emergency facilities, including medical devices and mode of operation for personal use. Injured workers shall be treatable 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 shall add health plan outline into its construction plan, offering workers advice to keep healthy during the construction. The outline shall be approved by engineer-in-charge before the construction is initiated.

3 Environmental Supervision Measures

The engineer-in-charge/construction supervisor shall ensure the implementation of above requirements. 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 shall 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 □	
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 rainy season will be affected by flood	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 Yugan 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		
1. General Requirements	1.1 Whether effective measures for preventing and controlling atmospheric pollution, water and soil pollution and noise pollution 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					

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	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.)					

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	2.5 Whether the existing building and infrastructure are utilized as 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					

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	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					
	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					

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	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 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				

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	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					

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	6.5 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					
	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					

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	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 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					
	8.9 whether the dredging was conducted during the dry season.					
	8.10 whether the dredged silt is processed through dewater treatment, and whether impermeable materials has been applied around the cofferdam in the dumping area.					

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	8.11 whether Water outlets, residual water treatment and emergency pools are built in the dumping area, whether permeable measures have been take.				
	8.12 whether flocculation treatment is conducted for residue water before it is discharged				
	8.13 whether solidified silt is recycled and used in forest land, and after silt is mixed with soil, whether the land is afforested.				
	8.14 After the project completion, whether the solid wastes generated during construction are completely removed.				
	8.15 Dosage consumption during the construction should meet the water quality requirements for discharging residual water. Keep the residual water quality under strict surveillance, and decide dosage parameter and whether adopt emergency dosage measures basing on the on-site test and monitoring results.				
	8.16 Dredging project doesn't allow under-excavation; Dredging area should reach the designed depth, meanwhile, strictly control the project volume of ultra-depth. When the construction units conduct the measurements after the dredging, supervising engineer should inspect the measuring equipment and supervise the measurements beside the construction units.				
	8.17 Ten-day reports on dredging project, monthly progress reports, and summary of the project should be submitted to supervising engineer by construction units.				
	8.18 Whether cofferdam of stocking places and residual pond adopt measures to prevent permeation.				
	8.19 Whether dumping area adopts water conservation measures like enclosure and the like as well as measures to prevent water and				

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	soil erosion.					
	8.20 After the dewater treatment, whether the silt is transported to dumping area by sealed vehicles.					
	8.21 Whether residual water emergency response facility is set up, including measures like setting up accident reservoir and emergency chemical addition equipment.					
	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)					

Checklist of Construction Site Environment for World Bank-financed Yugan 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. 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.)					
	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					

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	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					
	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					

Checklist of Construction Site Environment for World Bank-financed Yugan 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	
	14.6 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 Yugan 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.

③As 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:

_____

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: _____

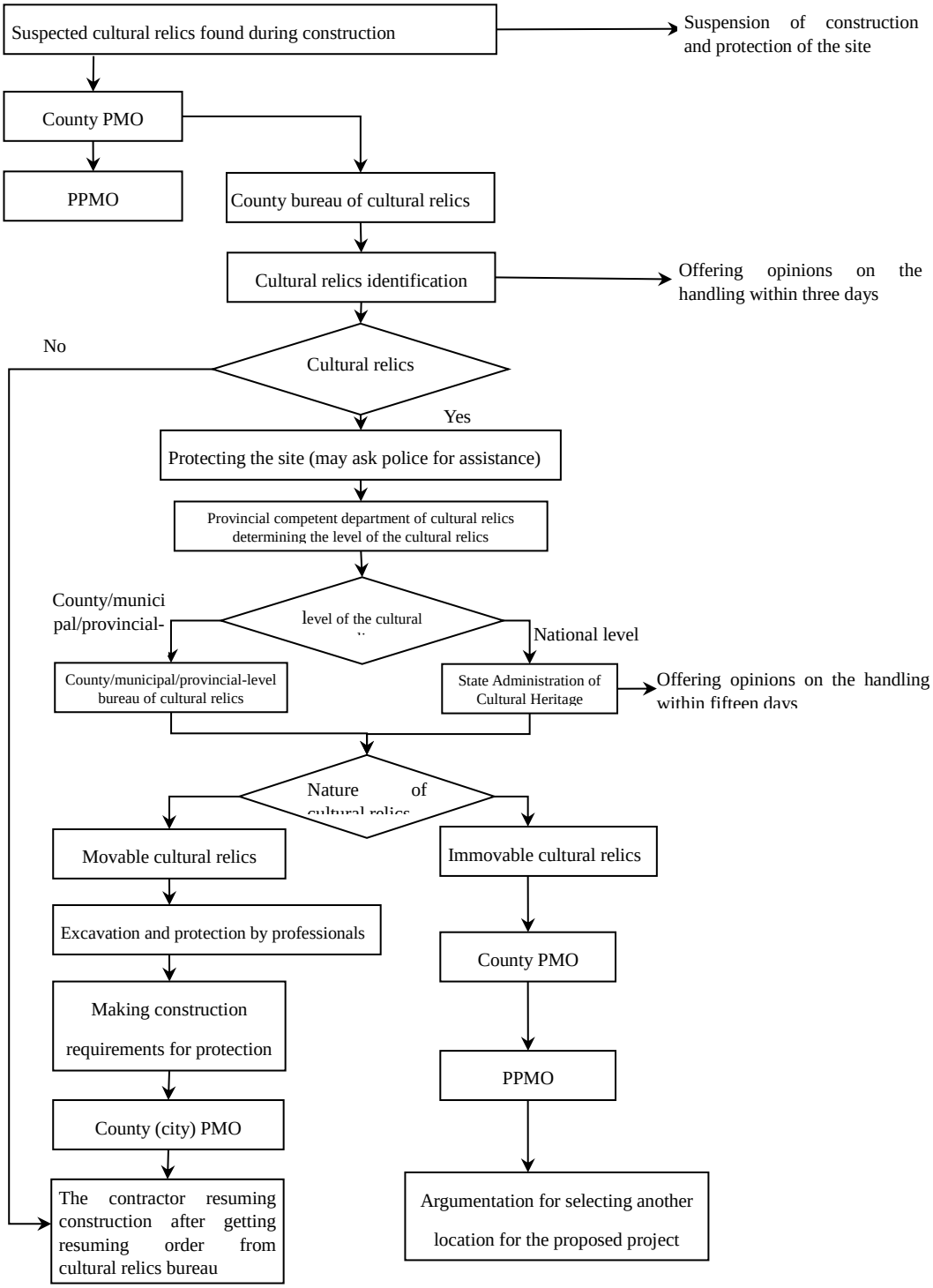
Opinion of environmental supervisor:

Responsible person on environmental supervisor side: _____Date:_____

Opinion of competent department of environmental protection (when necessary):

Environmental Rectification Notice
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 Relics


Suspected cultural relics found during construction
Suspension of construction and protection of the site
County PMO
PPMO
County bureau of cultural relics
Cultural relics identification
Offering opinions on the handling within three days
No
Cultural relics
Yes
Protecting the site (may ask police for assistance)
Provincial competent department of cultural relics determining the level of the cultural relics
County/municipal/provincial-
level of the cultural
National level
County/municipal/provincial-level bureau of cultural relics
State Administration of Cultural Heritage
Offering opinions on the handling within fifteen days
Nature of
Movable cultural relics
Immovable cultural relics
Excavation and protection by professionals
County PMO
Making construction requirements for protection
PPMO
County (city) PMO
The contractor resuming construction after getting resuming order from cultural relics bureau
Argumentation for selecting another location for the proposed project